

3 Seas and Coastal Zones

3-a Introduction

The Egyptian coastline extends 3000 kilometers (World Resources 2004) along the Mediterranean Sea and Red Sea beaches in addition to the Suez and Aqaba gulfs. Natural conditions on Egyptian Mediterranean coasts differ significantly from those on the Red Sea coasts in terms of salinity, sea currents and temperature. Such difference has led to different biodiversity and ecosystems in each.

By definition, a Coastal Zone is “The scope of marine environment which covers territorial water, and the scope of land extending inwards that can affect or be affected by the marine environment. It extends for not less than 30 Km in desert areas, unless this length is not blocked by any topographic phenomenon. In the Delta depression, this scope extends to contour line +3m”.

Half of Egypt’s population lives in Egypt coastal zones (World Resources 2004), where sources of food, jobs and income are available. They depend mainly on traditional fishing and to a lesser degree on automation. The Red Sea is characterized by the great diversity in fish production due to biodiversity (coral reefs, sea weeds ...etc). The total fish catch of sea fishes (according to 1999 estimations) 172, 400 tons, of which 90,000 is produced from the Mediterranean Sea, and 82,400 tons from the Red Sea. Such industry creates job opportunities for more than 100,000 persons; most of them use traditional fishing techniques.

Nearly 40% of industrial development activities are practiced in Egyptian coastal zones, in addition to a number of urban and tourism development activities. Furthermore, coastal zones monopolize the sea-ports infrastructure, in addition to agricul-

tural and land reclamation sectors, as well as a developed road network capable of accommodating all development aspects. The coastal zones attract increasing numbers of migrating workers from other areas and Governorates.

Egyptian coastal zones production is estimated at 85% of Egypt's production of oil and natural gas; The Gulf of Suez production alone is estimated to be 36 million tons. In addition, the crude oil and natural gas production in the Mediterranean coastal zones is increasing every year. The following table presents the number of oil wells dug and amounts of crude oil and natural gas consumed and produced.

Number of Verified Oil Wells					
Year	Number of Verified Wells	Consumption*		Production*	
		Petroleum Products	Natural Gas	Crude Oil	Natural Gas
91 – 92	14	19.8	7.1	43.8	8.8
93 – 94	15	17.5	9.1	45.2	11.3
96 – 97	33	20.6	10.3	41.8	12.9
97 – 98	32	23	10.5	40.3	13.3
98 – 99	31	23.9	11.5	39.5	14.5
99 - 2000	31	23.5	14.3	37	18

* Figures are in million tons.

A number of specialized ports are located in coastal zones, e.g. crude oil, most important of which is Somid Company that transports 117 million tons of crude oil per year from Al Ain Sokhna terminal on the Red Sea to Sidi Krir terminal on the Mediterranean coasts. In addition, there are also ports for shipping some important metals such as Phosphate.

The Red Sea Coastal zone possesses a huge reserve of metals, including phosphate,

zinc, iron, tin and precious and semi-precious stones.

Tourism development represents one of the main activities in Egypt's coastal zones, particularly in terms of beach development regarded as the basis of international tourist attraction. Hurghada and Sharm El-Sheikh are two tourist attractions with significant impact on national economy. Further, there is a diverse group of land uses for the purpose of tourism, urban and industrial development implemented in coastal zones.

In coastal zones, enrolment rates in primary and secondary education are higher compared to the national figures. These rates are mainly among women; as rates notably exceed the national average, whereas literacy and unemployment rates are generally low.

3-b Pressures and Hazards on Coastal Environment

Impacts of human activities due to unsustainable fishing practices, abusive use of natural habitats and development pressures resulted in jeopardizing coastal ecosystems. Fresh water resources in coastal zones are expected to constitute critical constraints to development by 2005. Fresh water percentages have increased via desalination in coastal zones, especially in tourism projects.

The quality of marine and coastal environments and their environmental resources in Egypt are threatened by a number of hazards related to the following activities:

- Internal development inside the country whose impacts are carried to coastal zones via the river Nile, agricultural drainage system and air (land sources).
- Coastal development activities leading

to changes in coastal dynamics and consequently, to environmental resources and coastal water quality.

- Activities related to sea transport and seabed resource utilization (marine sources).

a. Land Sources

Large and diverse problems arise from land sources (e.g. sanitation water, organic pollutants, radioactive material, heavy metals, oils, carbohydrates, nutrients, and sediments accumulation and waste). Agricultural and industrial wastewater constitutes major problems.

According to available statistics, Egypt's quota of the High Dam water amounts to 55.5 billion m³ each year covering Egypt's needs of water for agricultural, urban and industrial purposes. The bulk of water is used in the various activities, while approximately 3 billion m³ of water are discharged directly through industrial and agricultural drains into the sea through both branches of the Nile and agricultural drains, or indirectly, through the northern lakes.

Monumental amounts of fertilizers and pesticides used in agriculture reaches the sea, via the agricultural drainage network.

Pollution resulting from industrial activities primarily takes place in specific areas, including but not restricted to Alexandria Governorate, especially in Abu Qir and El Amireya. The direct impact of this industrial activity is manifest in Mariout Lake, Malahat, in front of Max pumping station and parts of Abu Qir bay (annexes 1 and 2). In addition, El Zeiteya area in Suez is also an industrial area where petroleum industries are predominant and their impact is obvious and direct on the Suez Gouna.

Pollution from sewage drainage appears in specific areas that suffer from sanitation network problems, as in some areas in the cities of Alexandria, Suez and El Arish. Most sanitation pollution is characterized by being seasonal, related to surges in population, during summer vacations for example, or resulting from northwest winds that drive pollutants to Egyptian borders, as in Rafah and El Arish.

b. Coastal or Internal Resources

Unplanned intensive tourism development resulted in the deterioration in the quality of marine environment in many areas, such as Hurghada, Suez, and the North Coast... etc. The key indicator of such type of hazards is the slow intangible changes, though insignificant on the short-term, yet destructive on the long term.

Perhaps, the most significant and obvious example is the effect of the High Dam on erosion and sedimentation processes in the Mediterranean basin coast, as well as the backfilling of coasts, road building, blocking and changing coastal flood streams. Establishing anchorages and harbors is one of the activities that have significant impact on the deterioration of the quality of coasts and the scarcity of their environmental resources.

c. Marine Sources

Shipping lines crossing the Egyptian coastal zones carry huge amounts of oil, representing one quarter of globally transported oil amounts. 117 million tons of crude oil is transported through Somid pipeline (El Ain El Sokhna) in Suez Gulf to countries on the north and west of the Mediterranean via the shipping port in Sidi Krir. A further amount of about 36 million tons of oil and oil products are annually

transported through the Suez Canal (10 million tons of which are transported to the South).

Statistics indicate that 8940 vessels enter the Egyptian ports every year. These largely contribute to the oil pollution problems. International studies proved that marine environment pollution by oil resulting from freight constitutes more than one third the quantity of marine pollution by oil recorded globally, although the amount of leakage in one incident resulting from the majority of freight does not exceed 7 tons, mainly related to fuel and oil supply.

Maritime shipping constitutes another source of pressure on the coastal environment. Due to the presence of the Suez Canal and Soudan Company, approximately 20,000 vessels and oil tankers use the Suez Gulf annually, in addition to the 8,940 ships entering the Egyptian ports every year.

With the increase in recreational activities, the need arose for building new harbors. A port construction plan was therefore developed on three phases until 2017 to serve 50,000 yachts and ships.

Accidents of mine production leakage cause grave seabed harms, as in the case of raw phosphate mines loading ports in the Red Sea (Hughada, El Hamrawein and El Qoseir), raw iron (Abu Ghassn) and the water used in washing raw tin resulting from the experimental factory in Marsa Alam.

3-c Challenges

Tourism development constitutes one of the challenges facing the coastal zones in the Arab Republic of Egypt. This is particularly true for coast development and

habitats destruction - the basis for many sensitive ecosystems that represent a major tourist attraction. Furthermore, there are set of diverse land uses for the purpose of internal and recreational tourism development, and urban and industrial development practiced in coastal zones.

Waste management from all sources is one the pollution sources in the coastal environment in general. Areas surrounding human settlements are characterized by the existence of a variety of metal, wood, plastic, wastes and the different building material. Although these wastes are not extremely hazardous to environmental components, they hinder successful tourism development of coastal zones. Currently, necessary measures are being taken to improve municipal waste collection and disposal in many coastal Governorates.

The disappearance of natural habitats is one of the main hazards caused by development and pollution. This problem is widely associated with the construction of harbors and tourism facilities, land reclamation, housing, tourism and industrial development. The primary impacts include total loss of habitats, such as the destruction of mangrove forests or coral reefs. On the other hand, secondary impacts include sedimentation that may harm ecosystems, such as coral reefs and seabed plants. Precipitation may also lead to the grave deterioration of habitats, impacting their quality and productivity, thus their capacity to play a role in the ecosystems they serve, e.g. fisheries, tourist attraction and other development activities. Studies have pointed out that unplanned sports and recreational activities negatively impact on many ecosystems. For instance, coral reefs environment in the Red Sea undergoes great harm due to ship anchorage in coral reefs areas. Fur-

thermore, coral reefs in shallow waters are harmed when divers walk on them to reach greater depths.

Curio collection and trading is widespread in many areas, particularly in Hurghada and Safaga. Most important of these products are rare fishes, invertebrates and coral reefs. Although the types and quantities traded seem very little, the methods used in obtaining these products adversely harm the ecosystem to which they usually belong.

3-d State Efforts in Facing Coastal Zones Problems

General Principles

After surveying the problems facing coastal and marine environment, a number of general principles were set and monitored, which have become widely accepted. These principles are:

- Marine pollution threatens all state sectors; Marine pollution prevention is a collective responsibility, not restricted to one entity.
- Each sector is required to prevent the sources of marine pollution resulting from its activity, in accordance with local laws and according to and in compliance with international and regional conventions.
- Each sector is responsible for protecting its investments from marine pollution hazards and is required to raise its preparedness to address marine pollution to the level corresponding to the hazards such sector causes or is exposed to.
- Encouraging private sector participation in marine pollution prevention, and establishing specialized companies for that purpose.

Measures Implemented

“Prevention is better than treatment” is the principle adopted by the Arab Republic of Egypt. Accordingly, a number of principles were agreed upon to prevent and abate coastal and marine environment hazards.

- a. Adopting a group of sustainable continuous activities that allow the detection and monitoring of any changes taking place in the quality of coastal environment (Coastal and Marine Environment Quality Monitoring Program) and other programs that allow continuous follow up of consistent pollution sources. Sound pollution prevention systems should also be established to combat pollution and coastal and marine environment deterioration resulting from accidents, illegal fishing or climatic changes such as emergencies, crises and environmental disasters.
- b. Enforcing a special protection system for coastal hot spots that need special protection. This is included within central management responsibilities (For the Protection of Nature and Biodiversity).

1- Implementing Coastal and Marine Zones Integrated Management System

“Integrated Coastal Zones Management” (ICZM) is defined as a continuous dynamic process, designed and implemented by the government with the purpose of solving the problems that may arise between entities that utilize and manage coastal zone resources. It promotes sustainable development and the renewable use of coastal zone resources.

For this purpose, a high-level representation “ICZM Steering Committee” was es-

established, mandated with the following tasks:

- Coordinating coastal activities among all entities such as land use master plans and coastal resources utilization activities in order to achieve sustainable development.
- Coordinating and defining the responsibilities of the various administrative organizations in coastal zones.
- Matching the proposed development activities to the ecosystem capacity with the objective of achieving sustainable development.
- Developing the Integrated Coastal Management National Plan and adopting deteriorated coastal ecosystems improvement and rehabilitation programs.
- Revising the different environmental emergency plans for coastal environment protection.

Assessing national development projects planned to be implemented in coastal areas, particularly those in conflict with the renewable use of sources.

Through the different studies, reports and observations, it was also possible to identify the environmental problems hindering the use of coastal zones resources, including:

- Coastal erosion and change in marine sedimentation movement pattern.
- Lack and pollution of water resources, and air pollution.
- Growth in population, tourism resorts, mining and illegal fishing.
- Urban Expansion and traffic bottlenecks (land or sea).

Threatened species, migrating living things and the loss of habitats.

The most harmed or adversely impacting economic sectors were identified, which must integrate their plans under the um-

brella of the ICZM integrated plan. These include:

- Fisheries, fish farms, agriculture, food products and forests.
- Mining; processing; use of oil resources and refineries; energy production; ports; marine warehouses; yacht marinas; maritime navigation and airports.
- Tourism and tourism development. Governmental activities, urban development, military usage and defense purposes, etc.

It was agreed that an ICZM integrated plan scope would include:

- Information and data collection.
- Developing a general guiding policy when planning land use and coastal environment resource management.
- Improving the decision-making process. Administering and Monitoring the ICZM plan implementation.

2- Environmental Inspection Program (EIP) Implementation

The program was established in 1998, with the purpose of verifying the extent of compliance of all fixed sources with discharge limits to the environment in general according to EEAA approved standards pursuant to Law 4/1994 and its executive regulation. A whole chapter is dedicated to this issue.

3- Implementing the Program for Identifying and Controlling Marine Environment Pollutants from Land-based Sources

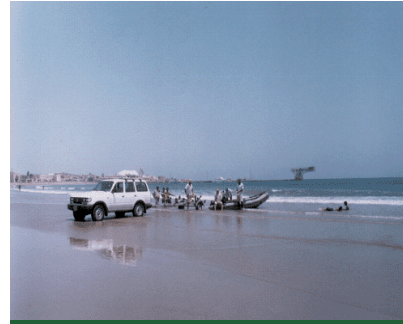
Through many joint efforts on the regional and international levels under the Global Program of Action for the Prevention of Marine Pollution From Land-based Activities (GPA/LBA & MEDPOL), it was possi-

ble to identify many polluted areas in need of urgent action. Most of the adverse impacts were identified and their volume estimated in order to enable their elimination. Data pointed out to the existence of hot spots that need special attention where pollution has exceeded permissible limits, such as Abu Qir and El Max (Annexes 1 and 2).

Environmental inspection program results indicated an increase in the number of land-based sources that have adjusted their status and complied with Egyptian Laws and regulations, or that have active environmental compliance programs in place. Moreover, evidence provided by applied marine environment quality monitoring programs showed a noticeable improvement in the quality of marine environment since the launching of these programs in 1998, particularly in the Mediterranean Sea at the Hot Spots.

4- Implementation of the Environmental Monitoring Program

The integrated coastal water quality monitoring program comprises a network of water quality monitoring stations, as reference stations, and other areas for water quality monitoring in polluted areas. Indicators showed a partial improvement in treated sanitation water quality and that most of it was disposed of following different treatment methods. Similar results were provided by marine and coastal environment water quality monitoring programs launched by EEAA - in cooperation with research institutes in Egypt and the Danish International Development Agency (Danida) – and also by pollutants monitoring programs implemented by the Mediterranean Action Plan (MAP) Programs.

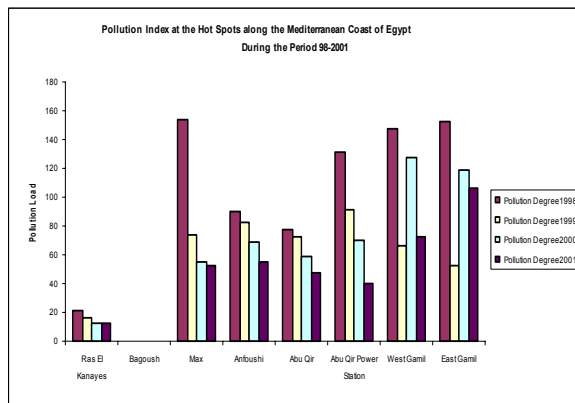


Preparation for launching The Axoriac into coastal waters to begin sampling operations and hydrographic measurements

The program included continual sample analysis for four years, from about 48 stations on the Mediterranean Sea and 41 on the Red Sea. Monitoring is undertaken once every two months along the Egyptian coast on the Mediterranean Sea from El Saloum to Rafah and from Suez to Shalatin on the Red Sea. A high-quality database was set up for this program based on international standards.



The different monitoring sites on the Mediterranean and Red Sea Coasts



Pollution Index at the Hot Spots along the Mediterranean Coast of Egypt During the Period 98-2003

In the Mediterranean Sea, the environment quality monitoring program signaled natural levels of fluctuation in all main nutritive mineral components. However, given the presence of a number of hazardous sources, the focus was on the bacteria causing Faecal Streptococci, where mutations appeared in some samples exceeding internationally approved rates. Total count of Colon bacteria nearly followed the same pattern indicating the presence of sources against which no action has been taken.

3-e Marine Environment Pollution Prevention

1- Cooperation with Regional and International Organizations:

As pollution and its spreading do not acknowledge political borders, it was inevitable to cooperate with international and regional organizations in order to identify the marine environment status and determine the major reasons that may lead to the degeneration of its components. This has been implemented through:

a. Mediterranean Action Plan (MAP) (Barcelona Convention)

This is a regional action plan including 21

Mediterranean states as well as European Common Market. It aims at protecting the Mediterranean environment, pollution prevention from its different sources and cooperating in combating pollution caused by accidents the Mediterranean Environment is exposed to. A number of serious studies were conducted resulting in the Arab Republic of Egypt taking the following actions:

- Defining the most polluted areas in the Mediterranean Sea.
- Defining the most hazardous pollution sources at the national and regional levels.
- Initiating strategies to limit marine environment land-based pollution as well as abating and controlling marine pollution resulting from increased marine transport.
- Developing and implementing national programs for monitoring Mediterranean environment quality and inspecting and observing the extent of land-based sources compliance with laws and regulations.
- Initiating the development of a national ICZM strategy.
- Disseminating Cleaner Production technology and the best practice environmental solutions for addressing land-based pollution sources.

b. Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah Convention)

This is a regional action plan comprising 7 Red Sea states. It aims at protecting the Red Sea environment, pollution prevention from its different sources and cooperating in combating pollution caused by accidents the Red Sea Environment is exposed to. As the activities of this plan are starting

soon, the Arab Republic of Egypt has cooperated with the Red Sea and the Gulf of Eden Action in implementing the Strategic Action Plan (SAP), successfully cooperating with the other member states signatories to the convention. In the framework of this action plan, Egypt has developed an ICZM plan for coastal zones in Sharm EL Sheikh.

Egypt has also donated the site for establishing the Mutual Assistance Center for the member states within the Red Sea and Gulf of Aden work plan to address and combat sea accidents that cause pollution hazards threatening the Red Sea and Gulf of Aden environment.

2- Combating Marine Pollution

To protect sensitive environmental resources and major tourism investments at the Gulf of Aqaba entrance, EEAA has established a Marine Pollution Prevention Center in Sharm El Sheikh, with a direct cost of L.E. 21 million for construction, in addition to L.E. 10 million for studies and land allocation.

The center is equipped with state-of-the-art marine pollution control technologies, ranging from rubber breakers, oil scrapers, and control ships and oil separation equipment, in addition to all required shore cleaning equipment.

The Center can address hazards which the area between the borders of Ras Mohamed and Nabq protectorates might be exposed to. The center can be self-sufficient in responding to accidents caused by oil pollution within 300 tons limit.

The center administration has assigned a specialized company the responsibility of ensuring the center's effective operation

and raising staff efficiency as well as the efficiency of technicians working at South Sinai protectorates to seek their assistance during major pollution accidents. This arrangement has proved effective, as the center was able to efficiently handle the Flash Air accident as well as the coinciding oil pollution accident in January 2004.

3-f Future Vision

Evidently, much essential efforts are needed to address all previously identified challenges, of which some were presented in this brief description. These efforts include but are not limited to:

- Directing research and studies to complement the data and information needed by various entities to set forth development plans for all sectors based on sound environmental principles.
- Organizing an environmental databank, and a database for collecting available information and data, including advisory studies and scientific papers.
- Setting priorities for all state economic sectors based on clear economic assessment of these components.
- The necessity of developing a general guiding strategy when developing land use plans and managing coastal environment resources and sustainable development bases.
- Exerting relentless efforts to improve decision-making and taking at the national level for addressing problems.
- Overlaps that may arise among all entities during the development of the various economic sectors.

Laying down clear bases and specific responsibilities for administering and controlling ICZM plan implementation.

3-g References

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