Arab Republic of Egypt
Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency
Coastal and Marine Zones Division

Country Report on Egyptian ICZM Experiences with Special Reference to Sharm El- Sheikh – Southern Sinai

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1 INTRODUCTION

Most of the Egyptian coast is characterized by its beautiful appearance, owing to a diversity of natural coastal subsystems and habitats. Examples are: the coastal lakes, salt marshes, mud flats, beaches and dune complexes along the Mediterranean coast; the mangroves and coral reefs in the Red Sea area; and the related coastal and marine bio-diversity (populations of coastal migratory birds, turtles and a great variety of fish species).

The Egyptian Red Sea and its two gulfs (Aqaba and Suez) warrants special attention because it contains a wide range of environmental conditions, and is not buffered by large oceans of deeper waters. The most conspicuous shallow water marine habitats in the Red Sea are formed by the extensive coral reefs which fringe much of the coastline and often extend offshore for many kilometers. Coral cover is usually less than 50% but in sheltered areas one or two species cover 80% of the substrate. The complexity of the ecosystem is illustrated by its high diversity - approximately 180 species of soft corals and even higher diversity of fishes (more than 1000 species) may be found in Red Sea coral reefs.

The coastal and marine environments of the Red Sea are becoming subjected to increasing pressures, most of which resulting in harmful environmental effects. More acute ecological problems have arisen from loss and degradation of coastal habitats. Pollution can be listed under three major sources : urbanization associated with tourism, oil extraction and transport, and other types of industries. Sewage and industrial waters are increasing and usually discharge below the intertidal zone with considerable inputs around the cities. Considerable amount of garbage, especially plastics, enter the sea from urban areas and ship traffic.

Environmental impacts resulting from stresses include extremes in temperature, bioregion, episodic rainfall and massive discharge of flood waters, wave turbulence, turbidity and sedimentation. Environmental impacts resulting from human activities include loss of coral areas and mangroves because of coastal construction, decline in fish and invertebrate abundance because of tourist activities, coral degradation and alteration of coastal communities, changes in water quality, habitat reduction for breeding turtles, and local eutrophication.

The Government of Egypt (GOE) has made major progress in the enactment of environmental laws and in adopting regulations for administering these laws. Under the Environmental Law No. 4/1994, the Egyptian Environmental Affairs Authority (EEAA) has issued guidelines for environmental impact assessment, has established the national steering committee for coastal zone management which in turn has issued environmental guideline for development in coastal areas and is currently developing an environmentally sustainable tourism strategy for the Red Sea Coast. Under the Egyptian Conservation Law No.102/1983, the Government has established a number of protected areas, and has provided staff and regulatory oversight of Ras Mohammed National Park.

1.1 Country profile

Egypt, officially the Arab Republic of Egypt, is located in northeastern Africa and includes the Sinai Peninsula, which is often considered part of Asia, and forms the only land bridge between the two continents. Most of Egypt’s terrain is desert, divided into two unequal parts by the Nile River. The valley and delta of the Nile are the main centers of habitation. The capital and largest city is Cairo.

Egypt is part of the Mediterranean Basin (995km of coastline), and it embraces two biogeography corridors, the Red Sea (1,941km) linking the tropical seas of the Indian Ocean with the temperate Mediterranean, the Nile River linking equatorial Africa with the Mediterranean Basin. It is also part of the Sahara of North Africa.

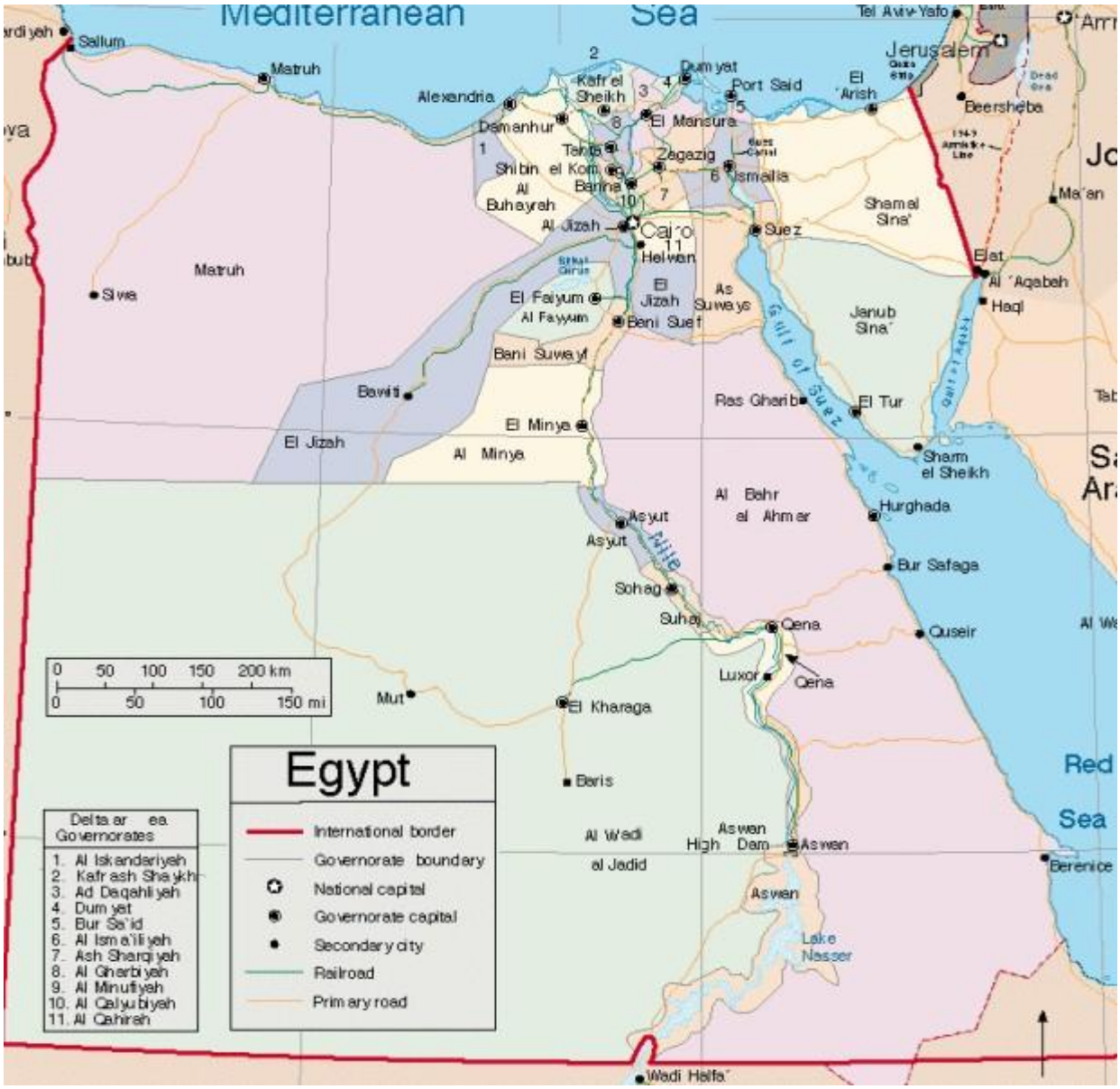
Egypt is divided into twenty-six governorates, which include four city governorates : Alexandria, Cairo, Port Said and Suez; the nine governorates of Lower Egypt in the Nile Delta region; the eight governorates of Upper Egypt along the Nile River south from Cairo to Aswan; and the five frontier governorates covering Sinai and the deserts that lie west and east of the Nile. All governorates, except for the frontier ones, are in the Nile Delta or along the Nile Valley and the Suez Canal (see Fig 1. Map of Egypt).

The population of Egypt is 74,718,797 (2003 estimate). The people live almost exclusively in the Nile Valley, the Nile Delta, the Suez Canal region, and the northern coastal region of the Sinai Peninsula. Egypt's overall population density is 75 persons per sq km (194 per sq mi), but the population density in the inhabited portions of the country, which make up less than 5% of its land area, is 1,900 persons per sq km (4,900 per sq mi).

The Gulf of Aqaba is one of the two northern extensions of the Red Sea separating the Sinai Peninsula from Arabia. It is approximately 260km long, 14-26km wide, has an average depth of 800m and joins the main body of the Red Sea via the narrow (6km) Titan straight. This enclosed marine environment is surrounded by desert characterized by extreme temperatures and low rainfall. Since there are no permanent rivers flowing into the Gulf of Aqaba, the waters tend to be hypersaline, but mid-oceanic water quality and biota prevail. Water temperature remains in the range of 20-26^{o}C.

The Sharm El Sheikh Area is located at the entrance of the Gulf of Aqaba. The Municipality of Sharm El Sheikh stretches for 20km along the coast from Ras Mohammed National Park in the south to the airport in the north. Bounded by mountains to the west, the town can be split into six development areas:

- the original souk and harbor area to the south of the city
- El Hadaba above the souk with municipal and commercial buildings
- El Amair with the medical center, government and private housing
- Ras Urn Sadd on the promontory with large tourist developments
- Naama Bay with the main row of big hotels
- north of Naama Bay which is undergoing tourist related development



Map of Egypt

1.2 The Egyptian Coastal Zone

1.2.1 Definition

The coastal zone may be defined according to ecological, socio-economic, political or legal criteria or any combination of these. The same factors can also be used to determine the extent and boundaries of a region, sector, or other geographical unit. The following definition for the coastal zone has been adopted by the National Committee for ICZM:

The coastal zone is a domain of land-sea interface. It encompasses the territorial water and extends landwards to areas of active interaction with the marine environment for at least 30km in the desert areas, unless major topographical features interrupt this stretch, while in the lower Nile Delta region the terrestrial part would extend up to the 3.0m contour above sea level.

1.2.2 Some important characteristics of the Red Sea coastal zone

The Red Sea and Gulf of Aqaba areas of Egypt are estimated to comprise about 1500km of reef including the coastal and island margins, while the Red Sea shore area alone (from Sinai down to Sudan) includes nearly 800km of fringing reef, extensive wadis, mangroves and seagrasses.

Most of the Red Sea coast is bordered by more or less flat lands, 3 - 20km wide, some of which look like depressions. Behind these lands is a chain of mountains. The scrapes reach the coast in some areas and can have some extension along the coast, or produce islands, such as Shedwan

In general the Red Sea coast can be divided into five morphological zones:

The islands: The islands of the Red Sea can be divided into two classes: one is the oceanic islands, having the characteristics of islands formed at great depths. Examples of such islands are Ikhwan and Zabargad (St. John's) islands; the latter has an area of 12km^2; the second type is off-shore islands, located close to the shoreline and arranged in three rows. Each island has an igneous core with a fringe of coral reefs formed at a time when the core was covered with sea water. Coral development continued until that core appeared above sea level.

The Coral Reef zone: The rocks of the sea bottom close to the coast consist of coral reefs and sand upon which some seaweeds grow. This zone also includes the lagoon separating the coral reefs from the coastal dunes.

The coastal dunes: These are found along the Red Sea coast mainly where the coastal plain is wide. The direction of the dunes parallels the direction of the northwesterly winds. Plants have stabilized these dunes.

The coastal plain: Lies between the Red Sea mountains and the coast. The coastal plain of the Red Sea is composed of several kinds of sedimentary rocks, exemplified by the Miocene limestones. These formations differ in thickness, and this is attributed to different conditions at the time of deposition.

The Wadis: The wadis flowing from the Red Sea mountains to the Red Sea are short, steep and numerous. The number of wadis going east from the Red Sea mountains towards the Red Sea is forty-seven, each with their own individual course leading directly to the Red Sea. Wadi Al-Hawdayn is the most important of the wadis going to the Red Sea. It has an important tributary known as Wadi Al-Naam entering from the northwest.

The Red Sea is known as a "Coral Sea", since it contains a rich diversity of corals and a particularly wide range of reef types, where 170 species of the reef building corals exist.

1.3 Sharm El Sheikh – a case study

1.3.1 General

Sharm El Sheikh is located on the eastern shore at the southern tip of the Sinai Peninsula, and consisting of a series of bays. It is basically divided into three main regions: Sharm el Maya, where the airport is based as well as many private yachts and pleasure boats that take divers to the best diving spots in areas such as Ras Mohammed. Ras Om El Seed,

famous for its coral reefs, has a very high cliff where many hotels are situated. However, the biggest tourist attraction in the city is Naama Bay. This long bay is where most of the hotels, shopping malls, and nightlife can be found.

The municipality of Sharm El Sheikh stretches 20km along the coast from Ras Mohammed National Park in the south to the airport in the north and is bounded by mountains to the west.

In 1986, the town comprised only the fishing port and commercial area and had an estimated population of 1,000. Since then rapid tourist development has occurred with over 65 hotels constructed with a bed capacity of around 33,000. This development has led to an influx of tourists, hotel employees and urban population necessary to service the hotels, tourists and their employees.

1.3.2 Roads

The main trunk road runs from the port to the airport over a distance of 20km and is maintained by the Roads and Bridges Department. The Sinai Reconstruction Authority (SRA) maintains the access roads to many of the tourist areas. The municipality also maintains some roads but many, particularly in the souk area, are in poor condition. A new road has been constructed about three kilometers inland at the back of the town to serve as a by-pass road to Naama Bay from the south of the town. SRA proposed to construct about 40km of access roads to open up land for development. Much private road development is also taking place.

1.3.3 Water resources and supply

Water is supplied by a complex combination of private and government agencies and by desalination plants, pipelines and tankers. The original desalination plant was built after 1967. It lies adjacent to the harbor and uses a vacuum vapor process (VVC). The original capacity was 1,750 m^3/day (two x 200 m^3/day units plus two x 400 m^3/day and one x 550 m^3/day unit), but is presently producing 400 m^3/day. A Finnish grant was used to construct a 500 m^3/day VVC plant near the airport. It is currently under repair and will supply 350 m^3/day. South Sinai Governorate (SSG) contract Care Services to carry out operation and maintenance of both these desalination plants and the distribution networks.

A pipeline from wells near El Tur was constructed in 1967 and this supplies 1,000 m^3/day. The military is responsible for its maintenance. There is a 5,000m^3 reservoir tank which receives water from the desalination plant and the pipeline which serves a network of about 8km of pipes, also built after 1967. Care Services estimates that about 50,000 people, including tourists, are served in Sharm El Sheikh by water of which 8,000 is by the municipal services. The municipal water is supplied flee of charge.

The South Sinai Water Company (SSWC) operates a reverse osmosis desalination plant at Naama Bay producing 7,000 m^3/day. The plant serves around 35 hotels in Naama Bay and new resorts around the golf course through 20km of pipeline. Some hotels have their own backup or supplementary desalination plants. The Hilton has a 100 m^3/day plant, Novotel 200 m^3/day, Sunafir 400 m^3/day and the Movenpick, 300 m^3/day. It is estimated by SSWC that the hotels can generate about 10,000 m^3/day at present. The SSWC plant is one kilometer from the sea and operates with 6 staff. Some 18,000 m^3/day of saline ground water (about 60,000 parts per million total dissolved solids (TDS)) is extracted from 80m depth. Effluent brine is piped out to sea over the reef. The power needs of 1.5

MW are met from the town's power supply, while SSWC use their own generators for pumping to the supply system. Operation and maintenance is carried out by a German company who also operate some hotel desalination plants. They are responsible for the upkeep of the private networks. Treatment is based on achieving standards which are tested twice per month. The SSWC retail their water at 11 Egypt Pounds per m^3.

Approximately another 6,000 m^3/day is tankered from the wells at El Tur and used mainly for construction work and laborers. Tankers also serve the new developments which are currently unreticulated.

1.3.4 Sanitation and Wastewater Management

The original sewerage system was built during Israeli occupation and has been extended to the present day system of l7km which covers the city center, the port, El Amair and Naama Bay. The trunk sewer is under renovation by SRA. Six pump stations and pressure mains pump an estimated flow of 25,000 m^3/day to oxidation ponds in the middle of Sharm El Sheikh. The treatment capacity is only 1,200 m^3/day as the bund walls of two ponds have been destroyed by floods and only four ponds are working. Inspection showed the influent to be weak as would be expected from a high water usage tourist area. Effluent goes to a nearby orchard. The unserviced areas use septic tanks which are emptied by tankers which take the sewage directly to the ponds. In all, about 20 hotels have there own wastewater treatment systems while about 50 hotels use the municipal system. The Governate contract Care Services to maintain the system. They estimate around 30,000 people, including tourists, are served. The service is free of charge to consumers. SRA have built oxidation ponds costing 60 million Egypt Pounds, initial capacity is 15,000 m^3/day with a 2020 design capacity of 30.000 m^3/day. The SSWC are building a 3,000 m^3/day (6,000 & 9,000 phased capacity) activated sludge plant adjacent to the new municipal plant using primary, secondary and tertiary treatment. Effluent will irrigate the golf course under construction 5km distant.

1.3.5 Solid Waste Management

Care Services collects waste from 40 hotels and about 400 private villas and apartments. Other hotels contract local Bedouins to remove solid waste. Care Services has 120 staff working in their solid waste division recruited from all over Egypt who are provided with accommodation. It has eight trucks which make a total of 60 trips per day to the dumpsite, 5km from town and hidden by low hills. The 4ha site belongs to the municipality and has a supervisor from Care Services. Open tipping and burning is carried out and scavenging and separation are done by local Bedouin.

1.3.6 Power supply

Sharm El Sheikh is presently served by its own gas turbine generator, while many of the hotels have their own generators either as the main supply or as standby. With the connection to the national grid, all the generators will be used for standby only.

Sharm El Sheikh is being used as a case study and will be referred to frequently in this report.

1.4 Identification of Egyptian coastal problems

1.4.1 The main problems

Egypt has substantial coastal resources with over half of its boundaries along the Mediterranean and Red Seas. There are a number of urban centers situated along the coasts. The country's top international revenue earners are coastal or marine based, including: tourism, transportation through the Suez Canal and oil production. As the coastal zone encompasses more than 4000 of Egypt's industry, this region is extremely important economically, containing substantial capital investment. It qualifies as a sector within the Environmental Strategy. Even though there are overlaps with other sectors and many programs elsewhere, the Strategy will contribute beneficially to coastal zone management.

The Egyptian Environmental Affairs Agency (EEAA) was given the responsibility of initiating and coordinating national ICZM activities .A National Committee for Integrated Coastal Zone Management (NCICZM) was established and the Secretariat of this Committee was set up under the Environment Management Sector of the EEAA.

One of the major events supervised by this committee was the Technical Workshop which was held at Hurghada during the period from 3 to 7 May 1995. During this workshop international and national experiences were provided and recommendations and preliminary outlines of the "Framework ICZM Programme" were developed.

Detailed working papers covering more than 1000 pages were submitted, addressing a large variety of Egyptian coastal issues and coastal areas and reflecting both the natural coastal dynamic processes and socio-economic developments. Also, a great many coastal problems have been identified within the following main ICZM issues:

Irrational land use: This result of unplanned growth of existing urban areas and from a dramatic expansion over the last five years of coastal tourism. Developments are occurring in unsuitable or unsafe areas, and lack of strategic or physical planning is resulting in deterioration of land and marine habitats as well as conflicts between those involved in agriculture, human settlements and tourism and nature conservation.

Water pollution: Coastal waters serve as a sink for land-related pollution, for example from diffuse, large-scale agricultural sources such as drainage water rich with fertilizer and pesticide residues and specific waste flows from point sources such as industrial plants, sewage outflows, offshore petroleum facilities and shipping accidents. It has been estimated that nearly 4000 tonnes of oil are discharged into the Mediterranean from refineries in Alexandria alone, every year.

Shoreline erosion and flooding: Coastlines are naturally subject to erosion and accretion; however, existing human presence in certain areas may make protection from erosion or flooding essential. In currently undeveloped areas, better planning is required to ensure that human activity is integrated with natural processes rather than acting against them.

Deterioration of natural resources and habitats in coastal areas: Certain activities pose a direct threat to natural resources if not adequately managed. Theses include fishing, hunting of coastal and marine animals such as turtles and seabirds, uncontrolled diving and boating activity, mining, extraction, refining, land reclamation and mangrove cutting.

1.4.2 Nature of threats to Gulf of Aqaba/Sharm El Sheikh

The marine natural resources of South Sinai have come under unprecedented pressures in the past 20 years due to the exponential increase in tourism and other development activities in the region. This pressure has lead to deterioration in some marine resources, namely the coral reef ecosystem and its living components.

Generally this deterioration is manifested in many problems such as physical damage to coral reefs, reduced diversity of coral communities, reduced fish stocks in some areas subjected to over fishing, pollution (both solid and liquid wastes), damage to reefs from maritime accidents and collisions, infringement on coastal perimeter and land filling (irrational land use and practice) with consequential sedimentation on corals and the loss of income to traditional local communities from their natural resources. Natural processes also have their damaging effects such as population explosions of crown of thorns starfish and sedimentation resulting from flash floods (the impact of which is exaggerated due to extensive soil disturbance upstream in the desert wadis. Although many of these threats have been controlled by the existing management structure during the past decade, they continue to pose a risk to the natural environment and need constant and growing input. The direct causes of those threats can be attributed to overexploitation, mismanagement of tourist activities and tourism facilities projects and poor waste management schemes.

Sharm El Sheikh, for example, is one of the best and most famous diving destinations in the world today characterized by its diverse and unique coral reef systems. This has led to a rapid increase in the tourism volume and development in the region, including hotels, diving centers and diving and recreation boats. There are about 300 diving boats active in the Sharm El Sheikh area at the moment. One marina and a few jetties service these. The jetties are used only for loading and unloading divers and diving gear; whereas the marina is used as a docking port for overnight stays and refueling and maintenance.

The marina is located within the boundaries of a protected area, yet it has not the environmental standards established by the law. This has lead to negative impacts on the marine habitats in the area surrounding the marina from different sources of pollution, such as solid waste, sewage leaks, petroleum products, etc. Recently the marina administration has established sewage holding receiving facilities and dive boats have installed holding tanks. Yet these measures still require reinforcement to prevent chronic pollution sources and reduce risks from accidents.

1.5 Existing policy and mechanism before ICZM

Since exploitation of new resources and activities such as oil, ports and tourism began in the early 1960s, many settlements appeared along the Red Sea coastal zone. This lead to a Policy that divided the Red Sea into three regions according to the existing activities which govern and control development from the economic point of view :

- Gulf of Suez, where shipping and the oil industry (exploration, pipelines, terminals, etc) are the main source beside some tourism activities at Ain El-Sukhna and Ras Sudre. Agricultural activities are restricted to the Suez Canal region.
- The Gulf of Aqaba, which is mainly oriented to tourism and recreation activities (Sharm El Sheikh, Dahab, Nuweibaa, etc) and to some extent exploitation of fisheries resources.
- The Red Sea proper where tourism and recreation remain the main development goal with few mining and ore exporting activities in Safaga and El Hamrawan. Fisheries and

aquaculture are popular in Hurghada and Shalateen.

Tourism development in the Egyptian part of the Gulf of Aqaba has been a recent and rapid phenomenon. During the last decade, the coastline in and around Sharm El Sheikh, Dahab, Nuweiba, and Taba has been transformed from its natural state by tourism developments. These developments consist mainly of large hotels and associated services and infrastructure (*e.g.* roads, power and telecommunication, desalination plants, sewage treatment plants). In addition, there has been a substantial increase in use of the coastline and reef areas by a growing number of local and international tourists. Economic development has also resulted in an estimated eightfold increase in the resident population of the city of Sharm El Sheik during this period.

These developments have already had an impact on the environment of the Gulf of Aqaba and the integrity of the coastline, coral reef and adjacent desert ecosystems that constitute a resource on which the tourism industry is based.

The establishment of curative and preventive measures to protect and conserve the Gulf's natural resources, as well as to provide clean bathing and drinking water, is an issue of critical importance for Egypt and to all of the riparian states. Without the establishment of a preventive framework, the environment of the Gulf of Aqaba is exposed to the threat of irreversible damage, which is likely to he exacerbated as borders in the region open up.

The Governorate of South Sinai was established to carry out general administration and ensure coordination and integration of developments taking place in the South Sinai region. It has overall responsibility for all activities within the Gulf of Aqaba. Land use on the Egyptian coast of the South Sinai Governorate can be categorized by jurisdictional boundaries of the three government agencies involved in the area :

(a) The Local Government with authority over urbanized areas,
(b) The Department of Nature Protection of the Egyptian Environmental Affairs Agency (EEAA) which supervises protected areas, and
(c) The Tourism Development Authority (TDA) which has jurisdiction in four tourist development sectors: Taba, Dahab, Nuweiba, and Sharm El Sheikh.

Therefore, out of the 260km of Gulf coastline, a total of 98km has been declared and is managed as protected areas of international importance; another 108km has been allocated to tourism development; and the remaining 54km encompasses the municipalities of Dahab, Nuweiba, and Sharm El Sheikh and Taba village.

Of particular note and importance, is the success of the government of Egypt in protecting 38% of the Gulf of Aqaba coast through the establishment and management of three core protected areas (Ras Mohammed National Park / Sharm El Sheikh, and Abu Galum and Nabq Managed Resource Protected Areas) and 260km of coral reefs of global importance.

1.6 Overview of EIA system in Egypt

The increase of awareness for the sustainability of economic development in Egypt had led to issuing the law for the environment, known by Law 4 /1994 concerning protection of the environment. Executive regulations were issued by the Prime Ministerial decree No.338 of 1995. The objective of the law was not only to address pollution measures and control, but also involved new developments and projects including expansions of the existing ones. So the law states that new establishments or projects, expansions or

renovations of existing establishments must be subjected to an Environmental Impact Assessment before a permit is issued

EIA is one of the important policy interventions that aim to ensure that projects are environmentally sound and sustainable and that any environmental impacts are recognized and taken into consideration early in the project cycle. So Law No. 4 of 1994 states that new establishments or projects as well as expansions of existing establishments must be subject to an EIA before a permit is issued. The EIA report should be submitted via the Competent Administrative Authority (CAA) to the EEAA and the EEAA will review it and prepare an opinion indicating if the project can be approved.

Coastal developments or coastal projects are no different from any other development - an EIA must be submitted to the EEAA through the CAA. When a project is planned within the 200m set-back, the approval of the Shore Protection Authority (SPA) in coordination with the EEAA is mandated according to articles 59 and 60 of the executive regulations of Law 4/94. Proponents are encouraged to contact the SPA to obtain a copy of their guidelines and procedures before proceeding with the EIA.

For tourist developments, the TDA and the EEAA encourage the creation of Integrated Development Centers IDC to produce integrated plans for larger areas serving many individual resorts. Such centers offer an attractive alternative to linear development along the coastline. Several IDC were formed along the Red Sea and South Sinai. These companies were mainly developed to construct infrastructure services for the tourism centers.

1.7 Legal Aspects

The coastal and marine environments in Egypt, including coastal zone management, are regulated by a number of different laws and regulations, examples of which are given below :

1.7.1 International and Regional Environmental Conventions

Egypt is party to about 30 global and regional treaties, conventions and other agreements related to the marine and other aspects if the environment.. These agreements can be divided into the following categories : marine global environment (6 conventions); marine regional environment (4 conventions) and the Strategic Action Plan (SAP) for the Red Sea and Gulf of Aden; nature conservation (7 conventions); atmosphere (6 conventions); hazardous substances (3 conventions); nuclear safety (3 conventions).

Upholding these is particularly important in the Red Sea, where trans-boundary resources constitute a ‘regional commons’ shared by nine countries and utilized by many others. Hence, Egypt is very much part of the ‘global alliance’ striving to balance the needs of conservation with the needs of development, but which also recognizes that the two are interconnected.

1.7.2 National Legislative setting

Approximately 200 national laws and decrees exist in Egypt that directly or indirectly regulate coastal development or aim to protect the marine and coastal environment. Of

these, two are of particular significance. The first is the 'Law for the Environment' (Law No. 4, 1994), which led to the founding of the EEAA. The second is the Law No. 102 (1983) governing Protected Areas. The main provisions of Law No. 4/94 empower the EEAA by :

- Establishing and co-coordinating environmental information and monitoring networks to guarantee an effective implementation of the Agency's mandate
- Providing EEAA with powers to co-ordinate pollution control and management
- Setting up an Environmental Protection Fund with sufficient resources
- Ensuring that all development is subject to an appropriate level of EIA
- Establishing an Environmental Affairs Department in each Governorate to help co-ordinate and implement EEAA's mandate at the local level.

Articles 59 and 60 of law No 4/94 have far-reaching implications for the design of new coastal resorts. Article 59 prohibits the construction of any establishment within 200m of the shorelines of Egypt except with the approval of the Egyptian General Authority for Shore Protection in co-ordination with EEAA. This can only take place after approval of a satisfactory EIA. Art 60 prohibits all activities that cause alteration of the natural shoreline.

The Egyptian Conservation Law No.102 (1983) established the framework for the creation of protected areas. Implementation of some of the provisions of this law is provided by prime ministerial decree (1983). Protected areas so far established include Ras Mohamed Marine National Park and, in the south, the Gebel Elba conservation Area. Law 102, which is administered by the Natural Conservation Section of EEAA, provides the extra level of protection above law No. 4/94 by: (i) prohibiting exploitation and disturbance of both living and non-living natural resources, (ii) requiring that all development undergo increased scrutiny, (iii) placing restrictions on the level and scale of activities that can occur within protected areas and (iv) special revenue raising powers.

2 EGYPTIAN INTEGRATED COASTAL ZONE MANAGEMENT PROCESS

2.1 ICZM policy

In recent years, there has been a growing awareness of existing and potential coastal problems in Egypt. This awareness has become manifest in a number of legislative and institutional developments.

According to the Law for the Environment (Law No 4 for the year 1994), the Egyptian Environmental Affairs Agency (EEAA) was established within the Prime Minister's Cabinet. The EEAA has a public juridical personality and is affiliated with the competent Minister for Environmental Affairs. In this respect, the EEAA formulates the general policy and prepares the necessary plans for the protection and promotion of the environment. In addition, it follows up the implementation of such plans in coordination with competent administrative authorities.

ICZM, protection of water environment, environmental impact assessment (EIA), environmental monitoring networks, management and supervision of natural protectorates, etc., are amongst the areas regulated and addressed in the Law for the Environment. In view of the above, it was imperative to consider introducing the ICZM within the national activities under the umbrella of EEAA.

It must be assumed that the nature of environmental problems will differ considerably between different governorates since each have problems which could be selected as top priority for certain area or areas by the Governing Council. At the same time, some of these problems are regional and considered common problems that they wish to resolve through a cooperative program. Two approaches would be followed in solving these problems: a top down approach, where issues of national importance would be addressed, and a bottom up approach where case studies and pilot projects focusing on specific problems in specific coastal areas would be undertaken. These problems usually relate to local hot spots in which case the bottom-up approach takes priority over the top-down approach.

2.2 Objectives and development of the Egyptian ICZM strategy

There are two groups of priority actions needed for the protection of the coastal areas of the Egyptian Red Sea:

- The first group includes regional problems which need short term actions at the local and regional level and could be implemented on the regional level with the supervision of the national level
- The second group includes problems of a national nature which will need long term action in all the available levels with national implementation assisted by international expertise.

The long term objective is to have in place a functioning national coastal zone management strategy (or plan), that provides clear guidance for actions and activities in the coastal zones of Egypt. This plan should be a binding document, ensuring the sustainable use of coastal resources based on integrated decision-making involving the various line ministries, agencies and the various other stakeholders. Within the long term objective, medium and short term objectives should be developed.

The Hurghada workshop suggested the following main issues to be considered as the cornerstones of the Contemplated national Egyptian ICZM strategy:

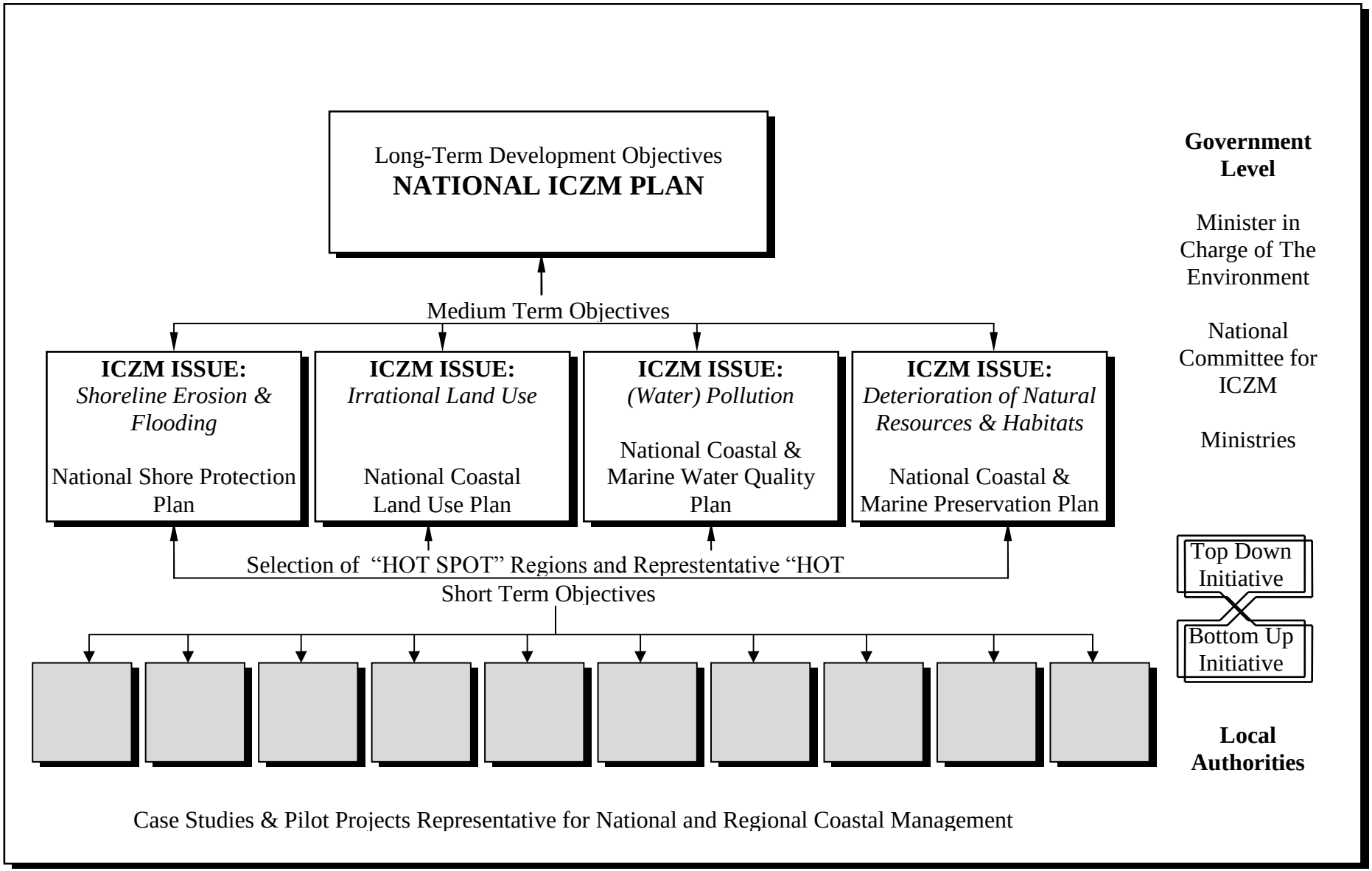
- Irrational land use.
- Shoreline erosion and flooding
- Water pollution
- Deterioration of natural resources and habitats.

The medium term objective is to develop national strategies or plans, focusing on the above key issues. Thus the following plans should be developed :

- National Shore Protection Plan
- National Coastal Land Use Plan
- National Coastal and Marine Water Quality Plan
- National Coastal and Marine Resources Preservation Plan

The short term objectives, in general, would be to identify the most vulnerable coastal areas and quickly develop a set of urgent measures that could be taken in order to bring to a halt irreversible environmental degradation. An overview of the objectives and approach for the development of a national ICZM plan for Egypt is provided in Figure 1.

ICZM may be considered from the perspective of different geographical and administrative levels, which determine the relevant actors, tasks and responsibilities involved with ICZM. For the sake of the inventory of ICZM tasks, a distinction is made in three levels, i.e. the national, regional and local level.



From an administrative perspective, these levels can be interpreted as follows. **The national level** coincides with the various ministries involved with ICZM, coordinated by the National Committee for ICZM. The most relevant other administrative level is the governorate. In this respect, **the regional level** of ICZM tasks coincides with a geographical scale which is typically above the governorate level (*i.e.* including more than a single governorate). **The local level** of ICZM tasks coincides with a geographical scale which is clearly within the governorate level. In view of the nature of ICZM, the national authorities (ministries) and institutes will play a major role in the execution of ICZM tasks at all geographical levels. However, with respect to the coordination and execution of ICZM at the regional and local level, the governorate should play an important role among those concerned with diverse sectors and interests, including coastal settlements, industrialization, agriculture, fisheries, human health, transportation, science, and indeed the full range of human activities in the region.

2.3 Data Gathering

2.3.1 Methodology

Assessment (Data Collection and Compilation)
This entails collection of data on aspects of the environment and also human, legal, socio-political and related issues and can be acquired using available information, and/or data from field surveys, interviews and other sources. Data collected for this action plan should be compiled onto databases, maps and a Geographical Information System (GIS), to allow periodic updating of information.

Issues and Options (Data Analysis)
This concerns data analysis, to define and quantify actual or potential problems, opportunities and other issues. Important coastal issues include shoreline erosion and flooding, irrational land use, water pollution, and deterioration of natural resources and habitats. Issues, problems and opportunities can be identified in different ways such as :
i) map analysis, including use of GIS, for instance, to identify areas of resource-use conflict and compatibility;
ii) statistics, modeling and other numerical analyses, for example fishery stock assessment, or determination of the effects of sewage on coral reefs and reef fisheries;
iii) issue analysis, to help understand problems such as common resource property rights, or assessment of institutional capabilities;
iv) Integrated analysis (i - iii), for example to determine expected costs, impacts, benefits and options concerning a proposed tourism resort.

Formulation (Data Synthesis)
This involves data, synthesis, using the results of the preceding two phases, to formulate an action plan, strategy or any other decision. These usually comprise a series of operational tasks. Tasks may be divided into those relating to the entire coast, country or region (*i.e.* broad-scale) and those targeted at particular coastal areas (*e.g.* protected areas, habitat restoration).

An illustration of ICZM as a generalized process is shown in Figure 2. This figure depicts the discrete tasks or sets of actions, familiar in management across diverse fields, that constitute the management process. It is important to recognize that it is a continuous, iterative process with intrinsic feedback routes that allow for the numerous uncertainties in which ICZM programmes to operate.

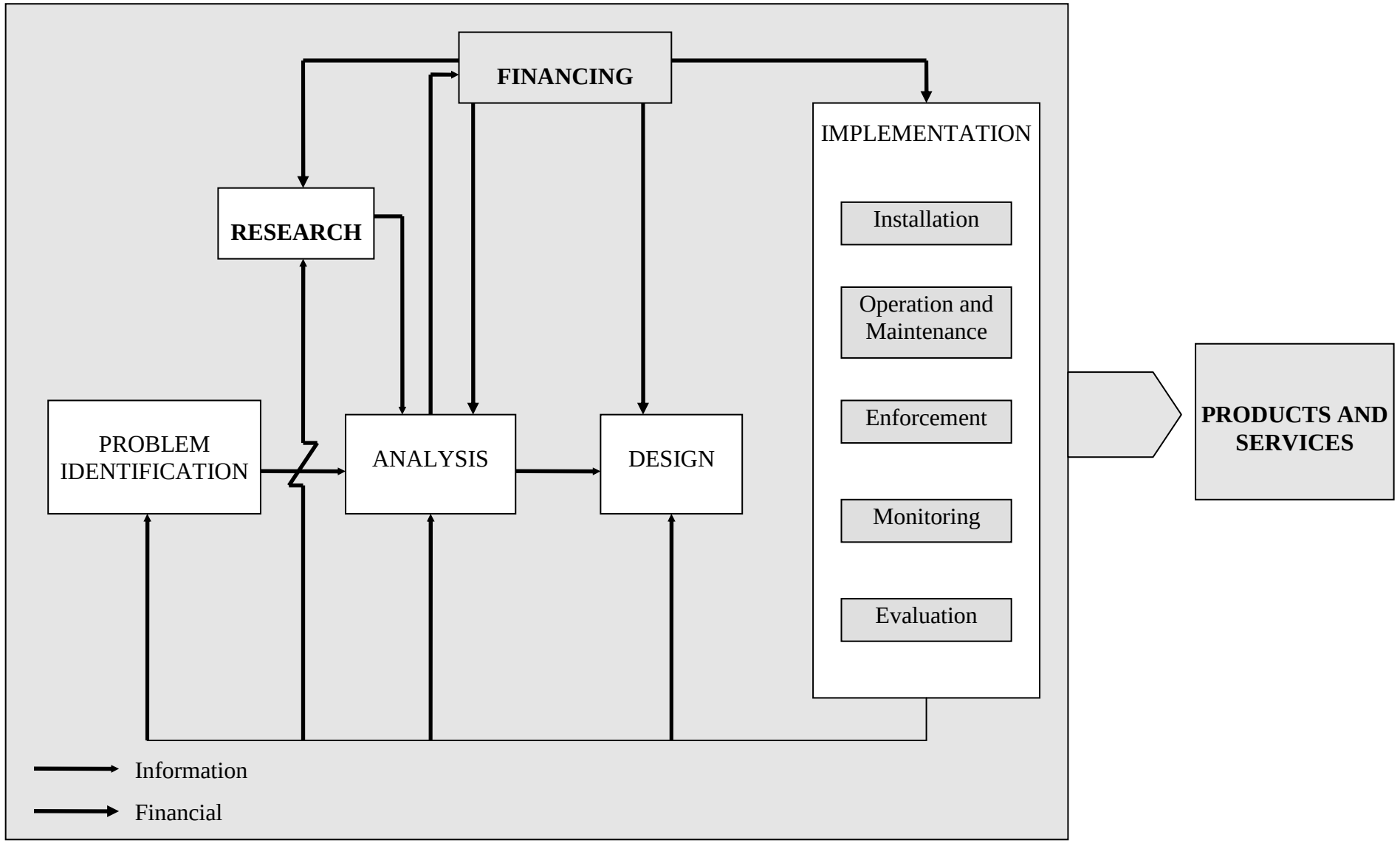


Figure 2 **: Illustration of ICZM as a generalized process (Source : NOAA/CZM Centre, 1995)**

From Figure 2 it can be observed that the ICZM process includes both analysis and implementation:

- The analysis phase includes a number of key activities such as: research and data collection; problem identification; analysis of impacts on natural and socio-economic systems; and plan/project formulation (including design).
- The implementation phase is involved with plan/project execution (construction or installation), operation and maintenance, enforcement, monitoring and evaluation of the effectiveness of project execution.

2.3.2 Indicators of ICZM effectiveness

Though it is quite important and vital to judge the effectiveness of an Integrated Coastal Zone Management Plan, this is a very difficult task. It requires long series of data and clear national criteria. This is the reason why Egypt is still in the process of developing a series of indicators that will permit monitoring of the effectiveness of its ICZM plan. In developing the criteria, the three major aspects, namely, policy relevance, analytical soundness and measurability, will need to be taken into consideration.

To evaluate CZM program effectiveness, the following "indicators of effectiveness" are being considered, but have not yet been adopted :

Regulatory Program Outcomes:

- No further or reduced rate of encroachment into coastal resource areas
- No further or reduced rate of hardening of undeveloped beachfronts through shoreline stabilizations
- Controlled shoreline access ways
- Healthy and intact natural habitat areas along the coast

Adopted Plan Outcomes:

- Achievement of Plan Objectives through implementation and monitoring

The Coastal Land Management and Acquisition Outcomes:

- Extent of land holdings in parks/preserves containing beach, dune, bluff or rocky shores
- Active public natural resources stewardship of coastal land holdings
- Coastal lands acquired

2.4 ICZM plan formation

2.4.1 Purpose of the ICZM Plan

This ICZM Action Plan provides a detailed process to allow tourism and other human uses of the Egyptian Red Sea coast to be managed on a more sustainable basis. In this way the Red Sea's valuable goods and services can continue to sustain Egyptian society and overseas visitors long into the future. The action plan provides a programme of action for the Red Sea within the national context (Mediterranean and Red Sea) regarding the following four major environmental concerns:

- environmental damage resulting from land use along the coastal margin;
- pollution of the marine environment from land based activities;
- deterioration of natural coastal-marine resources and habitats; and
- Shoreline erosion and flooding.

2.4.2 Threats to the coastal zone in Egypt in general

These threats and problems could be grouped under four major issues:

2.4.2.1 Shoreline erosion and flooding

This issue deals with all problems related to coastal protection by natural and man-made protection systems. Natural, sandy coasts may be subject to erosion, leading to land losses and deterioration of the natural protection system. Erosion may also threaten the stability of man-made protection systems. Safety from flooding of flood-prone areas depends on the condition of both the natural and man-made protection systems. Both erosion and safety from flooding may be aggravated by human activities inducing *e.g.* subsidence, climate change (changes in water levels and storm frequency), and changes to sediment budgets.

In the Red Sea area, the increase in flood frequencies may threaten and deteriorate marine habitats, especially the coral reef, due to the resulting high sedimentation. It may also affect human activities and utilities, particularly in flood-prone areas. The estimated flooding rate in one of the Red Sea valleys (Wadi El-Gemal) ranges between 29 and 45 million m^3/year.

2.4.2.2 Irrational land use

In view of the scarcity of suitable land resources and high development pressures related to rapid population growth, there is a high risk of uncontrolled and undesired land development. Problems arising from this are *e.g.* development in unsuitable areas (saline, polluted) or unsafe areas (land losses, flood risk); deterioration and over-exploitation of water and land resources and natural habitats; land use conflicts between uses/users (agriculture, human settlement, tourism, nature preservation); unbalanced and non-optimal development of scarce land resources.

In view of their multiple use options, coastal areas are specifically vulnerable to these developments. Many coastal areas in Egypt are exposed to great damage due to irrational use. A prime example is the coastal area of Hurghada (Red Sea).

During the last decade and due to the lack of an ICZM plan, 12,000,000m^3 of dust were used in land filling of the shallow areas of the Hurghada coast (40km) to construct resorts and hotels mainly on coral reef as well as on sea grass beds and mangrove forests. Another example is the Nile Delta lakes connected to the Mediterranean Sea. According to the data from the General Authority for Fisheries Research Development, the estimated area of these lakes was 960,000 acres in 1889, reduced to 259,000 acres by the year 1992. Most of this land is used for agriculture.

2.4.2.3 Water pollution

The incidence of water pollution is a common threat to aquatic systems and especially to coastal water systems which often serve as a sink to land based sources of pollution. The Egyptian coast is exposed to different types of pollution. Large scale sources of pollution related to *e.g.* agriculture (fertilizer, pesticides) and specific wastewater flows from point sources. In addition, the coastal water problems are aggravated by coastal and marine related pollution sources such as wastewater flows from domestic sources, industry and tourism, and spills from off-shore activities and marine transport. Wastewater flow from domestic, industrial and agricultural sources is causing a serious problem along the

Egyptian Mediterranean coast where the discharge then leads directly to the sea or via the northern lakes with an average rate of 16 billion m^3/year (Anonymous, 1997).

The Egyptian Red Sea is exposed mainly to oil pollution. Oil production of the Gulf of Suez is 30 million tonnes / year (about 80% of the Egyptian total production). The oil discharge from different sources into the Egyptian Red Sea averages 3,918 tonnes / year, from a total of 6,851 tonnes/year in the whole Red Sea. In other words, 14kg of oil discharge yearly per km^2 in the Red Sea compared with an international average of 9kg/km^2, *i .e.* one and half times the international average.

2.4.2.4 Deterioration of natural resources and habitats

In addition to the above types of issues and problems, a number of other activities pose a direct threat to natural resources, such as fish stocks, wildlife (turtles, birds), coral reefs, mangroves, etc. Examples of such threats are over-fishing, diving, anchoring boats, mining/excavation, land reclamation and cutting of mangroves. The impacts on the Egyptian Red Sea and the Mediterranean coast are clear examples of this issue.

2.4.3 Existing and potential Environmental Threats in Gulf of Aqaba / Sharm El Sheikh

Aqaba's environmental problems are primarily induced by tourism and associated activities as well as maritime traffic which result in the pollution of coastal waters, groundwater and soil, noise pollution, and the destruction of coral reef and desert ecosystems. In addition, environmental issues which are related to the management of wastewater and solid waste are exacerbated by the increasing population of the coastal cities and the number of tourists visiting the area.

2.4.3.1 Tourist activities

An estimated 500,000 tourists visited the Gulf of Aqaba coastal zone in 1996 and more than 3 million are expected in 2017. The relatively rapid growth of tourist visitations since the late 1980s has spurred interest in further development of tourism as an additional source of foreign income. The Aqaba coast currently offers a total of 14,000 hotel beds. The Ministry of Tourism intends to encourage an increase in the number of hotel beds on the coast to 60,000 by the beginning of the next decade. Tourism Development Authority (TDA) plans for further development of tourism in Aqaba indicates the intention to have in place more than 90,000 hotel beds by 2017. Environmental concerns relate to the impact that these developments, and the increase in numbers of tourists, will have on the resources that tourists visit the Aqaba coast to enjoy. Of particular concern are their effects on the fragile coral reef and the adjacent desert ecosystem. The need for additional desalination plants and wastewater treatment which will be necessitated by the anticipated increase in tourism developments in the area, is also of concern.

2.4.3.2 Marine Pollution from maritime activities

Between 1985 and 1991, an annual average of 1,600 vessels handling 13 to 20 million tonnes of cargo each year, including oil, minerals and chemicals, entered the Gulf of Aqaba through the Strait of Tiran. The level of shipping activity is likely to increase steadily over the next few years. The lack of local capacity to contain and control any significant

accidental spills of oil is a major concern. Other environmental issues relate to marine pollution resulting from frequent small spills of oil and other contaminants. In addition, waters are polluted by garbage and animal carcasses thrown over board by ferries and ships. Furthermore, reefs are destroyed by ships that accidentally miss the navigational waterway through the strait of Tiran.

2.4.3.3 Land base pollution

Tourism resorts generate pollution from inefficient utility services leading to the release of untreated wastewater, accumulation of garbage on the land and coral reef, and indiscriminate solid waste disposal in the desert area. In addition, construction activities generate dust and waste affecting the marine and terrestrial ecosystem.

2.5 Stakeholder Participation in coastal Management

In a region whose development is traditionally based around centralized planning, the concept of stakeholder participation and ownership of regional development is relatively new. However, past experience has show that stakeholder consultation is essential in order to ensure acceptance and sustainability (METAP 1997).

There is no regular forum for stakeholder participation in coastal development, although some groups are well represented on the coast and actively shaping the planning direction of coastal development.

The objective of stakeholder consultations is to gain a greater understanding of the coastal stakeholder expectations for the coastal management process, together with their own perspectives on conflicts and issues with other resource users. This process was used to balance grass roots views with the 'top down' approach that this Action Plan has, by necessity, adopted. The findings do not pretend to provide a comprehensive analysis of stakeholder issues, but they describe the development of a framework for future consultation to be gradually embedded into the institutional process of participatory coastal management.

In addition to the EEAA, a number of Coastal Governorates and government agencies are responsible for the protection of the marine environment. The following are identified in the new Environmental Law as being involved in the management of the Red Sea and Egypt's coast line: Port and Light House Authority, Suez Canal Authority, Suez Port Authority, and the General Organization for Coastal Protection.

Other agencies may be identified by Ministerial decree as having powers and responsibilities for marine environmental matters. Concerned agencies are responsible for carrying out enforcement under their own jurisdictions. These include the General Organization for Physical Planning, the Ministry of Petroleum, the General Authority for Development of Fish Resources, the Port and Lighthouse Authority, the Egyptian General Authority for Shore Protection, the Institute for Coastal Research of the National Water Research Center and the military.

A number of Universities also have established research centers with teaching facilities and research laboratories for marine and coastal environment. The private sector, investors, developers, industry as well as non-governmental organizations, all need to be included in the consultative process and partnership.

2.6 Plan adoption

According to the Law No 4 for the year 1994, the EEAA was given specifically the authority to participate with the concerned agencies and ministries in the preparation of a National Integrated Coastal Zone Management Plan for the Mediterranean Sea and the Red Sea coasts.

The national framework toward integrated coastal zone management planning was first drafted by EEAA in collaboration with DANIDA and adopted by the steering National Coastal Zone Management Committee in 1996 and provides a strategy for developing overall short, medium and long-term planning requirement.

As outlined in the Framework Programme for the Development of a National ICZM Plan for Egypt (1996), the Decision Making involves a number of steps, namely:

- identifying the problems and setting the objectives;
- defining priorities and opportunities;
- collecting, synthesizing and analyzing relevant data and information;
- deciding on the outcomes that can be translated into sets of actions.

The effectiveness of any action needs to be carefully assessed through monitoring, which completes the (cyclical) planning process.

Taking into consideration the big differences in the problems facing each sea bordering Egypt, four common issues were identified during the process of formulating the National ICZM Plan, - shore erosion, land use planning, preservation of water quality and conservation of resources.

It has to be noted that delays in plan adoption and inability to reach objectives, are due to lack of political commitment and financial resources. Several meetings have been held by the committee trying to minimize the interest of individual stakeholders and trying to put a mechanism for developing the national integrated coastal zone management.

3 THE EGYPTIAN ICZM INSTITUTIONAL SETTING

3.1 National Committee for ICZM administration

According to the Law for the Environment (Law No 4 of the year 1994), the Egyptian Environmental Affairs Agency (EEAA) has initiated the coordination of ICZM planning and the first step was to establish the National Committee for ICZM. Based on the Law of the Environment No 4 of the year 1994 and its executive regulations, the Ministerial Decree constituting the establishment of the National Committee for ICZM was issued in 1994 and amended in 1996. The Secretariat of this Committee was also established in 1995 under the Environment Management Sector of the EEAA including the department of Coastal and Marine Zones Management and the divisions of the Mediterranean and the Red Sea Coasts were established (Figures 3 and 4). The function of the Committee is not only to draw-up a consistent policy and strategy for future development, but also to resolve conflicts between users.

Figure 3

Cabinet Presidency
EEAA
Organization Sub-Structure
Environmental Management Sector
July 1995
Approved by CAOA

رئاسه مجلس الوزراء
جهاز شئون البيئه
الهيكل التنظيمى التفصيلى
الأداره البيئيه - يوليو 1995
وفق المعتمد من الجهاز المركزى للتنظيم و اللأداره

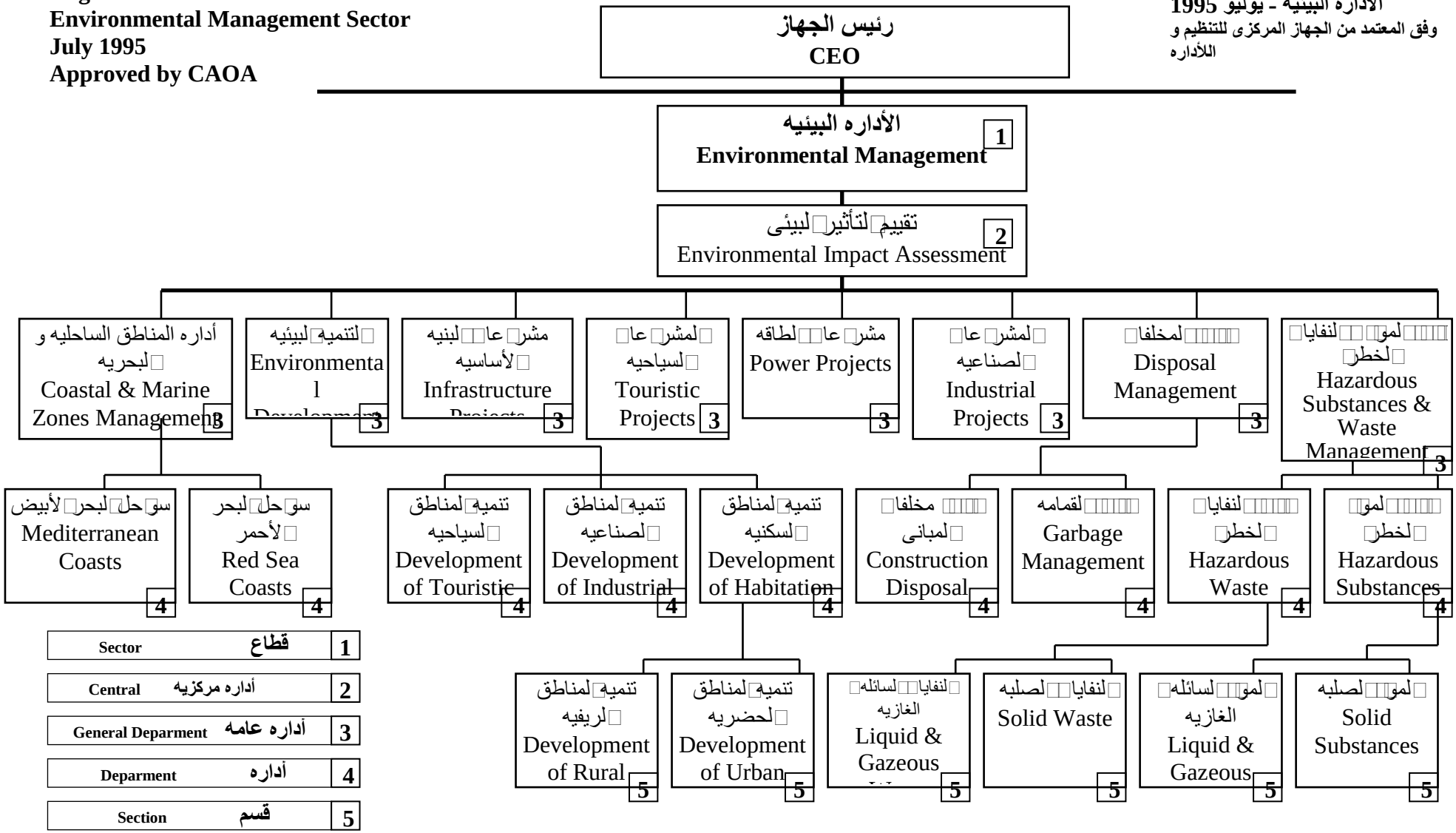


Figure 4 : Environmental Management Sector, EEAA.

Coastal and Marine Zones General Department includes Red Sea and Mediterranean Departments

In 1994, Ministerial decree number 173/1994 was issued to form the first NICZM-Committee. The committee consisted of 14 members from different authorities and Ministerial decree number 200/1996 was issued to add a representative from Ministry of Planning and change some names. Finally, in 1998, Ministerial decree number 59/1998 was issued to form The National Committee for ICZM with representatives from the Non-Governmental Organizations (NGOs), the private sector, the public enterprise sector and all the concerned authorities.

Clearly, institutional arrangements are required at different administrative levels (national, regional, local) for taking responsibility for ICZM. In Egypt until now, the national level and regional levels have been established (Figure 5).

3.2 The mandate of the National Committee for ICZM

- To coordinate all coastal activities between the competent authorities towards Integrated Coastal Zone Management through the drafting, setting and approval of general guidelines for all activities, including Environmental Impact Assessment studies.
- To make sure that all land use plans and development activities in the coastal areas take into account contingency arrangements.
- To harmonize between the proposed development activity and the carrying capacity of the ecosystem towards a sustainable use of available resources.
- To ensure wide participation in drafting and preparing the ICZM Plan. To ensure efficient implementation of the commitments of the Egyptian Government to Regional and International conventions concerning the protection of the marine environment and coastal areas.
- To approve programmes and plans aiming at restoring and rehabilitating coastal ecosystems which suffer from environmental stresses, damage and deterioration.
- To coordinate and specify mandates for different authorities in the coastal area.
- To approve national arrangements related to the protection of the environment in the coastal area and contingency plans.
- To study and evaluate all major projects to be executed in the coastal zone, especially projects which may lead to conflict of interest between ministries or other governmental bodies while reaching a final decision.
- To look at any activities or projects relevant to ICZM.

ICZM INSTITUTIONAL ARRANGEMENT

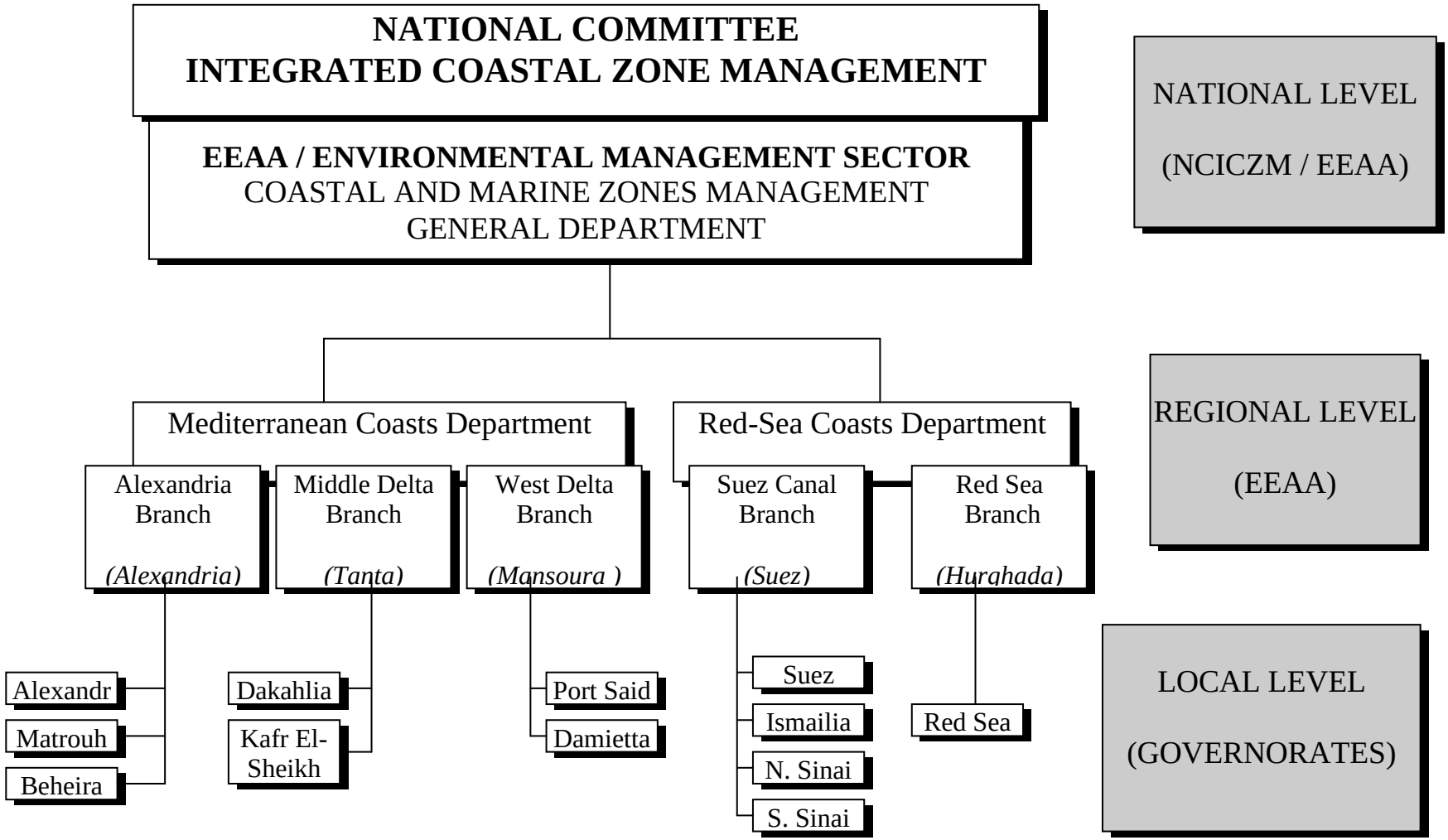


Figure 5 : Organizational Structure of CZM Institutional Arrangements (Levels Interrelation)

3.3 Implementation requirements

The development and enforcement of an ICZM plan requires an adequate implementation structure, covering the national, regional and local levels. The implementation structure needs to be defined in terms of the following aspects:

- Institutional
- Legislative
- Financial
- Human resources

Each of these aspects is discussed briefly below.

3.3.1 Institutional implementation

Institutional arrangements are required at the different administrative levels for taking responsibility for coastal arrangements.

The national level administration should be concerned with the development and implementation of broad coastal management policy. The overall coordination and leading agency is the EEAA. At this level not only act and strategy are considered, but environmental and conservation standards also need to be laid down for coastal areas. A degree of indicative national planning is needed to inform regional and local authorities of the intentions of national development policies.

At the regional level, the EEAA/Environmental Management Sector through the Mediterranean and Red Sea divisions in coordination with the Branch offices, should provide more detailed but integrated planning and management within the responsibility of regional authorities

Detailed planning, development and implementation take place at the local level. In this respect, the local level is interpreted as the geographical/administrative level where a single governorate can effectively manage the coastal zone, while the regional level would require governorates to cooperate closely to implement policy.

In Egypt, ICZM activities and coordination efforts are initiated by central government (EEAA), and are therefore primarily to be regarded as a top-down approach to ICZM. EEAA has initiated the coordination of the ICZM planning through the establishment of the National Committee for ICZM and its Secretariat. The function of the Committee is not only to draw up a consistent policy and strategy for future development, but also to resolve conflicts between users interests. It is strongly recommended that the Committee is given the explicit task of screening all coastal projects proposed by other parties or individual ministries. Projects which are not found acceptable by the Committee should not be eligible for donor funding.

A tentative organizational structure for the institutional implementation at national, regional and local levels is provided in Figure (5) .

3.3.2 Legal implementation

The Egyptian Environment Law (No 4/1994) provides an overall umbrella for ICZM. At the same time many other acts and regulations are in force in coastal areas dealing with a variety of activities: shipping, fisheries, general environmental, conservation, transport and

local government laws, etc. Some of these laws are often dated and they can be contradictory, particularly in their interpretation.

For coastal managers one of the main tasks is to ensure an interpretation of the various laws and regulations on coastal areas and activities that will facilitate the use of coastal resources without infringing environmental and conservation legislation.

3.3.3 Financial implementation

Different types of financing requirements are generally essential for effective ICZM: financing of the administrative structure (including the planning and information system and project review mechanisms); financing the infrastructure and pollution control expenditures; and financing of conservation measures.

Clearly, many of the funds needed should be provided by the Egyptian Government, which requires the availability of explicit budgets and the establishment of a financial implementation system (institutions and procedures for budget assessment, allocation and control). To the extent possible, the development of the financial implementation system will have to be based on existing institutions and procedures.

3.3.4 Human resources

Available human resources relate to both the capacity and capability dimension. In view of the efforts required for the proper execution of nation-wide ICZM tasks, human resource requirements may be quite substantial. In part, this capacity will be present in existing institutes and agencies, which is especially true in instances where the ICZM tasks build on already existing activities. If new activities are involved, and especially in the case of non-existing institutions, additional capacity will be required.

In addition to the National Committee for ICZM, technical committees (advisory groups) to perform specific assignments may be formed by the National ICZM Committee, as stated in the Decree No. 200/1996, fourth article.

3.4 Integration

The national ICZM plan should be based on the integration of a number of other national plans, coinciding with the main ICZM issues, *i.e*:

- Shoreline and flood protection plan
- Coastal area land use plan
- Water quality plan
- Resources preservation plan

The enhancement and integration of these plans within the ICZM process is seen as the medium term objective of the ICZM Framework Programme. Within each of the above plans, there is a hierarchical setting in which the national plan basically provides the guidelines and priorities for a set of regional plans. Within the regional plans, more specific local plans, measures and projects are formulated.

3.5 Potential funding mechanisms

3.5.1 Costs in Coastal Zone Management

In the marine areas of specific concern to ICZM, there are many obvious costs of management, covering for instance operation of marine parks, buoyage, equipment, enforcement and related activities. These costs have two components:

- initial set-up costs
- annual operating costs, including provision for renewal of the original investment (depreciation)

On the land side, it is evident that tourism — the main user of the coastal zone — requires a huge range of infrastructural support ranging from airports and roads to waste disposal sites and medical support services if it is to be successful.. These all have capital and operating cost components. Furthermore there are additional costs associated with the management of the environment covering monitoring and enforcement of the performance of ports, of vessels, of tourism sector treatment plants. Which are highly significant.

The costs of coastal management are justified by the benefits it brings to the local community in ensuring that coastal resources are sustained, along with the activities that depend on them, so the benefits can continue to flow into the local and wider national economy in terms of income and jobs.

3.5.2 Present Financing of Coastal Zone Management

Currently, many national and international organizations are involved in coastal zone management activities in Egypt. Most of the activities are undertaken on a project basis but also some programmes are being implemented. Most activities are currently funded by external donor funds from both bilateral and multilateral sources.

Clearly many of the funds for future activities will have to he either partly or fully provided by the Egyptian Government, especially when it comes to implementation of necessary infrastructure developments (sewage treatment, sanitation, etc.) to secure sustainable development of the coastal zones. The financing of such investments may come directly from the government b udget or through environment charges or through other economic instruments.

Different types of financing needs are generally required for implementation of ICZM programmes. The basic need would be for institutional support to establish programmes, implement these programmes and monitor the activities. Such activities do not normally require large investments. It is clear that implementation of efficient ICZM measures will require enormous funds in a country like Egypt, where the future urbanization of the coastal zones will increase dramatically.

Obviously, large amounts can be saved by careful planning in due time and by developing the coastal zones with a preservation approach rather than developments based on command and control systems and end of pipe solutions.

3.5.3 Environmental Fund

According to article (14) of the Environmental law no. 4 /1994, a special fund shall be established in the EEAA under the name "the Environment Protection Fund" to which shall devolve:

- Amounts allocated in the state budget to subsidize the fund
- Grants and donations presented by national and foreign organizations and accepted by the Board of Directors of the Agency for the purpose of protecting and promoting the environment
- Fines levied and damages awarded or agreed upon for any harm caused to the environment
- The financial resources of the protectorates fund provided for in Law 102 of 1983

This fund receives the entrance fees of protectorates, fines for violations and accidents, as well as donations. This fund is available to support and develop the management of the protected areas network in Egypt, in addition to the support of other environmental programs. The income generated by fees of the Gulf of Aqaba Protectorates exceeds the operation and recurrent costs, making them the first fully self-financing protectorates in Egypt.

The resources of the Fund shall be allocated to the fulfillment of its objectives, in particular for :

a) Experimental and pioneering projects in the field of protecting natural wealth and the environment from pollution.

b) Financing the manufacture of model equipment, machinery and plants for the treatment of environmental pollutants.

c) Establishing and administering Nature Reserves in order to preserve natural wealth and resources.

d) Financing the studies required to prepare environmental programmes, assessing environmental impact and determining the standards and criteria that must be observed in order to protect the environment.

e) Participating in financing environmental protection projects undertaken by local administrative agencies and grass-roots organizations which are partly financed through popular participation.

3.6 Effectiveness

3.6.1 Through monitoring

The Gulf of Aqaba Protectorates have established resource baselines for all major coastal and marine features focusing on coral reefs, associated ecosystems, reef fish communities, mangroves and adjacent coastal ecosystems.

Since 1995, a monitoring program has been going with support from international scientists. The initial outcome of this program has been the collection of data on ship groundings to determine reef recovery rates from 25 permanent and 12 further stations. The program will now concentrate on mapping all reef resources on the Gulf of Aqaba and will gradually expand to include 80 stations between Taba and Ras Mohamed.

In addition to coral monitoring, species associated with coral reefs are also monitored. The long-term monitoring includes fixed transects, permanent photo-monitoring stations, physical parameters, dynamics and interactions of coral reefs, and mangrove and seagrass systems. The short-term monitoring deals with the study and control of abnormal phenomena (crown-of-thorns starfish, diseases, etc.), beach dynamics, flash floods, assessment of artisanal fisheries and their effect on reef areas.

A regular survey process is being carried out for all development projects on the coastline. All information is mapped using GIS by experts from the south Sinai Protectorates Sector. GIS is considered an efficient tool to assess land-use plans and the environmental status of the Gulf of Aqaba. In addition, GIS is used to map habitats and physiographic information collected during monitoring and surveys. More data are now collected from partner institutions such as the Geological Survey, Remote Sensing, the Biodiversity Unit and literature. A lot of work is promising in that regard.

The South Sinai Protectorates Sector is making use of the data collected through the National Monitoring Network of the Environment which is now being developed in Egypt.

3.6.2 Review (Performance Evaluation)

3.6.2.1 Verification of Achievements

This originates from the expansion of protected areas and declaration of new ones on the Gulf of Aqaba and in the south Sinai Governorate. The Government of Egypt declared these protectorates as a result of the successful return of resource conservation on tourism activities, employment and the economy of the area.

This can also be evaluated by the tourism development expansion from 1030 beds in 1989 up to 16,000 beds in 1998, which has increased the value of assets. The number of visitors to Sharm El Sheikh increased from a few thousand in 1989 to half a million in 1998. The number of visitors to Ras Mohamed grew from hundreds in 1989 to 150 000 in 1998. As the Government of Egypt recognised the close link between sustainable development and the environment, it gave directives in 1997 that existing and future protectorates should be plotted on the National Investment Map in order to be considered by all development projects.

The management system of the Gulf of Aqaba is considered suitable for integrated coastal management on the Red Sea. The Egyptian Environmental Affairs Agency, the Tourism Development Authority, the Red Sea Governorate and investors have requested the declaration of the Red Sea Marine Park.

3.6.2.2 Enforcement of Legislation

Developers on the Gulf of Aqaba now recognize the existence of the protectorates and guarantee not to alter or damage coastlines or to discharge any effluent. Owners, managers and dive centres make their guests respect conservation regulations enforced by EEAA rangers. The number of violations of hotels are now very limited due to awareness of the community and effective patrolling.

All developments are now subject to an Environmental Impact Assessment (EIA) by law, which after agreement is considered as a commitment by developers from which they should not deviate.

The number of acceptable EIAs received is increasing as a result of the understanding by investors that conservation programs are the best guarantee for continued sustainable returns on their investment.

Enforcement is essential to the success of natural resources protection. All ship and boat accidents are prosecuted, and fines are evaluated by the Protectorates' staff based on the economic value of the damaged resources. Those accidents are decreasing due to the declaration of the boundaries on maritime maps, facilities for navigation in the Straits of Tiran and applying environmental laws on pollution or any damage to coral reefs. Any other incidents such as the collection of marine resources, fishing in marine reserves, or infringement to regulations are also prosecuted. The number of such cases is decreasing.

4 PARTICIPATION IN DEVELOPING EGYPTIAN ICZM

4.1 Different Stakeholders in Costal Zone Management in Egypt

Directly after the issuing of Law number 4 of 1994, the Egyptian Environmental Affair Agency (EEAA) initiated the action for the establishment of a National Committee for Integrated Coastal Zone Management (NCICZM). The ministerial decree establishing the Committee was issued in 1998. It listed 17 members representing different stakeholders by title and position rather than by individual names:

- EEAA Executive Director (Chairman of the Committee)
- Head of the Planning Sector and Supervisor of the Affairs Sector of the Office of the Minister of Public Works and Water Resources, member
- Sector Head of the Office of the Deputy Prime Minister and the Minister of Agriculture and Land Reclamation, member
- Head of SPA, member
- Head of the General Organization for the Development of Fish Wealth, member
- Undersecretary of the Ministry of Naval Transportation, member
- Head of the Authority of Harbors and Lighthouses, member
- Head of the National Institute of Oceanography and Fisheries, Ministry of State for Scientific Research, member
- Head of the Urban Planning Authority, Ministry of Housing, Utilities and New Urban Communities, member
- Head of the Executive Agency of TDA, member
- Chief of Naval Staff, Ministry of Defense, member
- Head of the Health, Social and Presidential Service Sector, Ministry of Planning, member
- Vice-Chairman of the Egyptian General Petroleum Corporation EGPC, Ministry of Petroleum, member
- Representative of the private sector to be selected by the EEAA Executive Director, member
- Representative of the public enterprise sector to be selected by the EEAA Executive Director, member
- Representative of the Non-Governmental Organizations (NGOs) to be selected by the EEAA Executive Director, member
- An expert to be selected by the EEAA Executive Director, member
- Head of the Environmental Management Sector, the EEAA, reporter

4.2 Role and Mandates of the Main Government Stakeholders and their contribution to the ICZM Committee

4.2.1 Egyptian Environmental Affairs Agency

According to the Law for the Environment (Law No 4 for the year 1994), the Egyptian Environmental Affairs Agency (EEAA) was given specifically the authority to "participate with the concerned agencies and ministries in the preparation of a National Integrated Coastal Zone Management Plan for the Mediterranean Sea and the Red Sea coasts " and the responsibility of initiating and co-coordinating national ICZM activities.

A National Committee for Integrated Coastal Zone Management (NCICZM) was set up, and the Secretariat of this Committee was established under the Environment Management Sector of the EEAA. One of the major tasks of the National Committee for ICZM is to develop a programme for the development of a national ICZM Plan.

The current role of EEAA in the Committee is as follow :

- Review the Environmental Impact Assessment reports and provide the environmental license for all projects located within the coastal zone area
- Develop costal zone management guidelines
- Participate in and chair the National Integrated Coastal Zone Management Committee (NICZMC).

4.2.2 The Ministry of Public Works and Water Resources (Shore Protection Authority (SPA))

The Shore Protection Authority (SPA) was established in 1981 by presidential degree 261/1981 under the Ministry of Public Works and Water Resources. The main responsibility of SPA is to manage the shoreline in those coastal areas, which have socio-economic value or natural resource value that are threatened by erosion.

The mandates of SPA on CZM until 1994 was on a quasi-exclusive basis and was ruled by law 12/1984 concerning irrigation and drainage as well as CZM (articles 86, 87, 88, 97 and 99). Law 4/1994 has amended law 12/ 984 to include environmental concerns in shoreline management and introduced the new authority (EEAA) into CZM as well as introduced ICZM planning as a strategic concept towards sustainable development of Egypt.

The current role of SPA in CZM is as follows :

- Develop coastal zone management plans
- Participate in the National Integrated Coastal Zone Management Committee (NICZMC)
- Design projects for shore protection and all studies for shore protection
- Issue license for projects located in the coastal zone areas

4.2.3 Ministry of Tourism

The main department within the Ministry of Tourism dealing with coastal zone management is the Tourist Development Authority (TDA) which protects coastal zone areas from tourist activities. TDA is the competent administrative authority for all tourist activities in coastal zone areas. In practice, the TDA developed guidelines for Red Sea

development activities and provided assistance for Environmental Impact Assessment studies (check list and guidelines). The main activity of TDA is to protect the coastal zone area in the Red Sea coast only.

4.2.4 Ministry of Planning

The Ministry is responsible for developing master plans for the country and it does not have any department for the coastal zone. Its involvement in the Committee is very important since it plans for development activities without affecting coastal zone areas.

4.2.5 Ministry of Housing

The main department in the Ministry dealing with planning is the Urban Planning Authority. It is responsible for developing guidelines for urban planning in the costal zone area as well as outside coastal zone areas. It is also responsible for any modification or extension or new project in the country. In addition, the Ministry provides assistance to any developer to prepare the Environmental Impact Assessment within and outside coastal zone areas.

4.2.6 Ministry of Scientific Research and Technology

The National Institute for Oceanography and Fisheries is the responsible institute within the Ministry of Scientific Research and Technology for the coastal zone area. The Institute undertakes research and develops databases for marine ecosystems which is necessary for coastal zone development and management. It provides the government, investors, and other research institutes with data on the coastal zone.

4.2.7 Ministry of Transportation

The Marine Transportation Department, Ministry of Transportation, is located in Alexandria and is responsible not only for marine transportation projects but also for providing assistance to developers and the Government in all aspects of marine transportation. It works closely with the Marine and Harbor Authority in the area of environmental protection and environmental impact assessment.

4.2.8 Ministry of Agriculture

The main Authority/Department dealing with the coastal zone in the Ministry is the Fish Authority. It provides licenses for fish farms and fishing activities. It works closely with the Coastal Guard Department of the Ministry of Defense. It does not have any specific mandate for costal zone management or shore protection.

4.2.9 Marine and Harbor Authority

The Marine and Harbor Authority is responsible for establishing marinas and harbors in the country. It does not have any specific mandates for coastal zone management but it issues licenses for projects (marinas and harbors) in the coastal zone.

4.2.10 Ministry of Petroleum

Health, Safety and Environmental (HSE) Department, Ministry of Petroleum is responsible for all environmental studies and environmental license to on-shore and offshore activities. They provide guidelines and assistants to all Egyptian and non-Egyptian developer. They check the Environmental Impact Assessment studies before sending it to EEAA. They are working closely with EEAA for all on-shore and off-shore projects.

4.2.11 Ministry of Defense

The Coastal Guard Department is the only department responsible for all coastal activities with the Ministry of Defense. Department of Coastal Guard is a very important department for coastal zone protection for checking licenses in coastal areas before any project can start. It is also working closely with the Fish Authority of the Ministry of Agriculture to check fishing licenses. It does not have specific mandates for coastal zone management.

4.2.12 Suez Canal Authority

The Research Center located in the Suez Canal Authority is the only department dealing with shore protection. It has substantial facilities for shore protection work and it works independently for the Suez Canal in three different governorates - Suez, Ismailia and Port Said.

4.2.13 Arab Academy for Maritime Transport

The Arab Academy for Maritime Transport does a lot of teaching and research in the area of Maritime Transport. It has facilities for work on shore protection and waves. It does not have any requirement to cooperate with any other organization.

4.3 Community and Private Sector participation

Community based organizations and other exponents of the non-government sector have been very active in the coastal planning process, especially in trying to protect certain areas for natural and cultural purposes, thereby improving the quality of life in low-income communities. It is also acknowledged that private sector participation in the development process can improve productivity and entrench sustainable economic growth.

In recognition of the above, the decree establishing the National Committee for Integrated Coastal Zone Management, included membership by a representative of the private sector and a representative of the NGO sector. These two members are expected to attend committee meetings and participate by contributing their opinions on the development and implementation of the ICZM Plan. Those two representatives are to be selected by the EEAA Executive Director.

5 MEASURES OF EFFECTIVENESS AND INDICATORS

The effectiveness of the action plans, and components of it are monitored regularly and a comparison is made between expected and actual results. Adjustments to the plans can then be made as necessary.

5.1 Coastal water Quality

One of the components of the Environmental Information and Monitoring Program (EIMP) is the Coastal Water Monitoring component. This component has developed EEAA capacity to obtain and manage information about the pollution of the coastal waters of Egypt, the coast of the Mediterranean Sea and the Red Sea Region (the Gulf of Suez, the Red Sea and the Gulf of Aqaba). This component required the development of a database at EEAA on the pollution of coastal waters.

The proposed water sampling program focuses on measurements of marine water samples in the vicinity of :

- Identified major industrial pollution sources along Egyptian coastal waters
- Pollution from sewage discharges from major coastal cities
- Pollution from sewage discharges at major tourist resort areas
- Outlets from the River Nile and the major lakes

The monitoring is carried out six times a year on a bimonthly basis. Details of the Program for the Red Sea and the Mediterranean Sea are as follows :

Area	No. of Stations	Basic parameters	Bacteriological parameters	Eutrophication parameters
Red Sea	39	39	32	39
Mediterranean Sea	45	42	35	42

The following parameters are measured :

- visual observations (weather condition, oil pollution, sewage impact, etc)
- hydrographical conditions (water temperature, dissolved oxygen, salinity and pH)
- Bacteriological parameters (total coliform, E. coli and faecal streptococci bacteria)
- Eutrophication parameters (chlorophyll-a, total suspended matter, transparency, total nitrogen, nitrate, nitrite, ammonium, reactive and total phosphate and reactive silicate)

All phases and analysis are carried out according to international standards.

According to EIMP annual reports, visual observations in the coastal Waters of the Gulf of Suez, Gulf of Aqaba and the Red Sea proper in 1999/2000, reveal that lumps of old tar are found in moderate quantities at Ras-Gharib City and Ras-Sudr. Small quantities are found at the beach of Ras-Gharib Harbor in the Gulf of Suez. Various quantities of thin oil films, faeces, sewage, and general litter were found in Suez and Ras-Gharib. The coastal waters of the Red Sea proper and the Gulf of Aqaba region were found to be clean except in a few locations such as Safaga in the Red Sea and Sharm El Sheikh Harbor and Sharm El-Sheikh Naama Bay at the Gulf of Aqaba.

Data demonstrate that wastewater discharges strongly influence the hydrographical and eutrophication conditions at the northern part of the Gulf of Suez. On the other hand, the Red Sea region has low levels of the measured physical, chemical and bacteriological parameters. Levels of nutrients like nitrate, nitrite, and ammonia, at the northern part of

the Gulf of Suez, are much higher in comparison to the rest of the Gulf of Suez including the Red Sea proper and the Gulf of Aqaba. The biological response to these high levels of nutrients is found in the relative higher levels of phytoplankton biomass in the area measured as chlorophyll. The high levels of Total Suspended Matter (TSM) and low levels of clarity near the city of Suez support these findings. This is a result of discharging untreated, or partly treated wastewater from Suez and the heavy maritime transportation in the area.

With regard to the level of reactive phosphate in the investigated regions, it appeared to be very low throughout the year. Few exceptions of higher levels were found in Suez in February, in Ras-Suheir in November, and in Ain-Sukhna and Abu-Zenima in April. In the Red Sea proper a relative increase in phosphorus was observed.

The Gulf of Aqaba region was in general clean except in a few locations with slight contamination of oil such as Sharm El-Sheikh Harbour and Sharm El-Sheikh Naama Bay. These may be due to human activities and the increasing number of ships. Faeces were found on the beach in Dahab and Mersa Muqibila. General litter was found in large quantities at the beach of Ras Mamlah and Hibeiq-Ras Naber. These may be due to the effect of waves and current action on these locations.

5.2 Coral reefs health, biological diversity and associated ecosystems

Selecting indicators which can be easily measured without costing too much in staff time and resources, is the key to making this approach work. A system has been designed to measure the number of visitors in different zones of the site and a simple visual impact score for the coral and reef fish community structure in each zone has been experimented with.

An example of the types of indicator that could be measured at modest cost could be :

- State of the environment indicators include amount of influenced species or habitats, amount of litter, species composition of a particular habitat/ area and water quality
- Pressure on the environmental indicators include number of visitors in different zones at set times and total number of visitors to the sites and carrying out a particular activity
- Response indicators include satiation levels of the visiting public number of complaints and the number of prosecutions
- Economic indicators include income generated, number of staff recruited and number of jobs supported

5.3 Waste management

Solid waste is possibly the most visible and widespread environmental problem on the Red Sea coast. It is randomly disposed along roadways and on vacant lands within the vicinity of all construction sites and operating tourism centers. Solid waste and litter threaten the very foundation of the Red Sea economy. If solid waste management is not improved, the conditions witnessed in northern (more developed) parts of the Red Sea coast will become the reality in the south as development progresses.

Hotels contract either Care Services or local Bedouins to collect and dispose of solid waste which is generally left at a dumpsite in the desert and burnt which produces noxious

fumes. The Multinational Force and Observers (MFO) in Sharm El-Sheikh dump its waste in a site which is ringed by a fence to prevent scattering of waste by the wind. Most municipalities have trucks for collection which are supplied to the waste collection contractors, but not enough to meet requirements. With little industry in the area, hazardous or toxic wastes are not a problem. Clinical waste from the towns' health centers is supposed to be buried in pits or incinerated.

The National Programme for Solid Waste Management that EEAA issued and approved by the Governors' Council, is the framework to regulate the collection and disposal processes. It addresses issues, such as the shortage of landfill sites for final disposal of waste financing of waste management as between the public budget, which is the main source of finance for waste management, and user-fee complements. There is a shortage of financial and human resources to deal with the volumes of waste that are generated on a daily basis as well as the need to remove the accumulated wastes from the streets.

The Red Sea tourism industry trying to overcome this problem by implementing good solid waste management systems.

5.4 Human health and well-being

Ensuring good water quality of the Red Sea is essential for human health and ecosystem health, tourism and recreation, the fisheries and for other reasons. Seawater, through desalination, is also used increasingly as a source of freshwater along the Egyptian Red Sea coast. Hence the links between an uncontaminated coastal environment and sustainable development can be very striking and real.

6 ICZM ACTION PLAN BENEFITS

As described throughout the ICZM Action Plan, information was collected from a diverse constituency of agencies, universities and institutes in order to prepare a Plan that provides an objective synthesis of the many views and information resources from these stakeholders.

The ICZM Plan outputs are designed to provide each agency with planning tools, information resources, data management systems and an improved institutional capacity to manage the coastal resources of the Egyptian Red Sea. Such implementation will therefore impact a much broader group of 'downstream beneficiaries' who, in essence, are the stakeholders themselves and beneficiaries of improved coastal management.

Taking an even broader view of benefits to society, the following points summarise what may appear to be less immediately tangible outcomes. These are the more profound and sustainable benefits which can have a positive impact on all Egyptians of the Red Sea coast should the principles and primary recommendations in this Plan be carried out:

- *Equitable* access *to limited or scarce resources*
- *Improved resource management capacity through better control over access from institutional co-ordination and sharing of information management systems*
- *Long-term, enhanced tourist income through maintenance of a high value and unspoilt destination*
- *Stable and rewarding employment opportunities for residents*
- *Physical, ecological and cultural heritage preserved through improved planning*
- *Quality of life through an improved environment*

7 LESSONS LEARNED

7.1 Hurghada

Hurghada provides a very clear example of the conflict between rapid and uncontrolled tourism development and the environment in Egypt. In the last ten years, the population of Hurghada has increased more than ten times, the number of Hotels reached 127 hotels and resorts with about 40,000 beds, and this is expected to be doubled within a few years. Many developments have taken place in the littoral zone and even on parts of the reef flat, which has been land filled or dredged. Land filling the sea, dredging the beaches, and building within the 200 meters set-back zone, are the challenging conditions facing the EEAA in enforcing the new environmental law in Hurghada. Recent statistics show that more than 60% of the tourist development projects in Hurghada were built on land filling over a total area of 1.7 million hectares.

Several steps have been taken or are required to learn from past mistakes and overcome this situation -

1. A large number of cases have been referred to the State Attorney for the violation of the new law number 4/1994 and its Executive Regulation ER 338/95, either by land filling works or changing the coastline
2. In order to enforce the law and resolve the problem without compromising its efficient implementation, several meetings were convened headed by the Minister-in-Charge of the Environment and the Governor of the Red Sea and attended by the investors
3. Guidelines and measures for present or future development activities in the coastal zone have been formulated and certain principles/policies have been established such as: future land filling or dredging activities will not be allowed; measures must be taken to stop erosion/leaching of existing reclaimed land areas causing turbidity of coastal waters; shifting of the plans to landward direction to allow for a two hundred meters distance between buildings and the coastline, especially in virgin land zones; establish pass ways/passages between neighbouring sites with a minimum width of 10m for emergency access.
4. An EIA report should be submitted with the request/application for all new projects or extensions of existing projects covered by Law number 4/1994 and its executive regulations. Proponents of individual hotel/resort projects within a tourism center may be able to use the Environmental Screening Form 'B' for individual tourism projects located within TDA tourism centers without having to complete a full-fledged EIA study, provided that a full EIA has been undertaken by the Master Developer for the tourism center as a whole and that an Integrated Environmental Impact Assessment Report (IEAR) for the center has been submitted and approved by EEAA.

5. Establishment of Coastal Building Front Line (CBFL) and Reef Protection Line (RPL). The CBFL represents the front limit of any future construction along the coast, and the RPL is not to be exceeded by any future shoreline training operations. Both lines have been drawn up on a 1:15,000 map.
6. Mooring and anchoring of boats and ships along the coastline must be controlled and restricted to certain areas.
7. Establishment of new private marinas in connection with individual hotels or tourist villages will not be allowed. Two or three centralized integrated marinas should be constructed along the Hurghada coastline to serve existing and foreseen needs. A system for controlling all sources of pollution from boats/ships at existing marinas, embankments and jetties must be established.
8. Beaches for public use must be designated in order to secure the future development of Hurghada.

7.2 The North western Mediterranean coast

The rapid and unplanned development on the north coast which began in the second half of the 1980s has alienated the public from the sea and prevents public access to the beach. In addition, the suitability of particular stretches of coast for recreational activities was not fully considered, so many resorts had to build wave barriers (breakwaters) in order to make beaches suitable for swimmers and this has resulted in erosion problems along the coast.
1. EEAA tackled these problems and responded quickly after the coming into force of the law No.4 concerning the environment. The agency prepared and accredited guidelines for development in coastal areas and sent these to concerned administrative authorities. These guidelines establish the need for buffer areas between resorts to allow for public access to the beach and encourage public beaches and to discourage breakwaters.
2. All local development projects should include economic feasibility and social and environmental impact studies.
3. The Land Use Plan should be supported by proper infrastructure and promotional plans to avoid the pressures arising from individual hotels and resort infrastructures.

7.3 Generally

A few lessons have come up which apply to Integrated Coastal Zone Management Planning in general -
1. It should be understood among all stakeholders that ICZM is a Process rather than a Plan.
2. Addressing the difference between resource management plans, land-use plans, economic development plans, urban and rural plans, and coastal zone management plans will help to solve many conflict of interest in the future.
3. Setting up a set of definitions accepted by all stakeholders will ensure a common language between them.
4. Who is responsible for what? A difficult question that needs to be answered through a legal group from all stakeholders.
5. Assigning borders of responsibilities and zonation (horizontal or vertical) accepted by all stakeholders should be seriously explored.
6. The existence of a strong database is a very valuable facility of the coordinating authority which will earn it the respect of other authorities.
7. The country strategy towards critical issues need to be clearly addressed, adopted and issued as a clear policy as early as possible during the process.

7.4 Gulf of Aqaba / Sharm El-Sheikh

The intensive development of tourism in the Gulf of Aqaba generally and particularly in Sharm El-Sheikh, provides a challenge to plan and prepare for this rapid economic development within a sound environmental framework , learning from previous experience and applying best practices. The most important key issues in this regards were :

1. Well defined institutional responsibilities regards land use (who is responsible for what …? and who is doing what ….?). Land use can be categorized by jurisdictional boundaries of the three key government agencies : (a) Local government with authority over urban areas; (b) Egyptian Environmental Affairs Agency (EEAA) Department of Nature Protection which supervise the core protected areas; and, (c) The Tourism Development Authority which has jurisdiction over currently undeveloped parts of the Gulf coast outside of the municipalities and core Protected areas.
2. Construct a walkway (Corniche) along the coast on the setback line. This will help provide beach access for the public and ensure that development is only behind the setback line .
3. Establishment of several public beaches between private resorts.
4. An EIA report should be submitted with the request/application for all new projects or extensions of existing projects to the EEAA for review and approval through the Competent Administrative Authorities (according to land allocation as mentioned in step 1).
5. In general, prohibit all land-based discharges of wastewater or dumping of wastes whether commercial, public services, tourism, etc, anywhere along the coast.
6. In cooperation between the three responsible authorities, suitable locations should be selected for jetties to be used for loading and unloading .
7. Marker buoys on permanent moorings for anchoring boats should be established in order to protect the reefs.
8. A field research is currently conducting a study on the carrying capacity for each diving site.
9. Establish environmental awareness programs for tourism operators and diving center managers and issue guidelines for them .
10. Encourage Hotels to apply the concept of ecotourism

REFERENCES

Arab Republic of Egypt, Cabinet of Ministers, Egyptian Environmental Affairs Agency, Environmental Management Sector, (1996) , "Guidelines for Egyptian Environmental Impact Assessment".

Arab Republic of Egypt, Cabinet of Ministers, Egyptian Environmental Affairs Agency, Environmental Management Sector,(1996), "Framework programme for the development of a national ICZM Plan for Egypt".

Arab Republic of Egypt, Egyptian Environmental Affairs Agency (EEAA). (1996a). Environmental guidelines for development in the coastal areas.

Arab Republic of Egypt, Cabinet of Ministers, Egyptian Environmental Affairs Agency, Environmental Management Sector, (2002) , "The national Environmental Action Plan 2002/2017".

Pearson M, Shehata A (1998) Protected Areas on the Gulf of Aqaba, Egypt: A Mechanism of Integrated Coastal Management. Nature Conservation Sector, Egyptian Environmental Affairs Agency

Red Sea Coastal and Marine Resources Management Project (1998) Integrated Coastal Zone Management Action Plan for the Egyptian Red Sea (Report 6), Egypt.

Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) (2001), Strategic Action Programme for the Red Sea and Gulf of Aden, Egypt Country Report.

United Nations Environmental Program (UNEP). (1995). Guidelines for integrated management of coastal and marine areas. UNEP Regional Seas Reports.

World Bank (1998), the Environmental Action Plan for the Egyptian Coast of the Gulf of Aqaba (GAEAP).

Wilson,M (1998) The GEF Egyptian Red Sea Coastal and Marine Resource Management Project — A Decade Of Effort, Experience and Trade-Offs Required to Achieve Marine Tourism and Conservation, First International Tropical Marine Ecosystems Management Symposium (ITMEMS)

World Coastal Conference (WCC, 1994) , Preparing to meet the coastal challenges of the 21st Century. Ministry of Public Works , Transport and Water Management , Coastal Zone Management Centre, The Hague, The Netherlands.

World Resources 1992-1993 (WR 1992/1993), Towards Sustainable Development – a guide to the global environment, report by the World Resources Institute, UNDP and UNEP, New York, 1992.