Table of Contents

Acknowledgments

This document was prepared in the framework of the MAP Coastal Area Management Programme "Fuka-Matrouh" Project by the Priority Actions Programme Regional Activity Centre. In its work on the CAMP, MAP and PAP/RAC enjoyed great support by the Egyptian Ministry of State for the Environment and the Egyptian Environmental Affairs Agency. Special thanks go to H.E. Ms. Nadia M. Ebeid, Minister of State for the Environment, Mr. Ibrahim Abdel Gelil, Chief Executive Officer of EEAA, Mr. Mohamed A. Fawzi and Mr. Ahmed Aboul-Azm, former and present National Focal Points for PAP, and the members of the core national team from the University of Alexandria, led by Mr. Mohamed El-Raey, Dean of the Institute for Graduate Studies and Research. MAP and PAP/RAC are grateful to Mr. Kamal A. Amer, Matrouh Governor, and the local core team in Matrouh for the hospitality and support during field trips and joint work in Marsa Matrouh. Special mention has to be made of the MAP's Regional Activity Centres which participated in the preparation and implementation of the CAMP "Fuka-Matrouh".

Executive Summary

CAMP is the MAP programme with the objective to develop planning and management strategies for a sustainable development of Mediterranean coastal and marine resources. As such, the Programme promotes and supports national coastal management initiatives building relevant institutional and human capacities.

The Programme provides, and it was doing so in Egypt, to all MAP RACs and MEDPOL the opportunity of a harmonized joint practical work with the host country national and local authorities, institutions and scientific community, demonstrating the capacity for integration and application of best methodologies and tools in real conditions.

According to the Agreement between Egyptian Government and MAP, signed in 1992, MAP agreed to implement the Project, in order to tackle major problems and issues in the Fuka-Matrouh area. It was important that proposed study area with its problems and concerns appeared to be enough representative of the wider Mediterranean coastal region of Egypt. The main issues include:

- Uncontrolled development of tourism (intended for domestic market as summer houses) which mostly excludes local population as beneficiares while producing negative impacts on natural environment and infrastructure.
- Complex natural conditions that require sensible agricultural policies, whose main beneficiaries should be native population, Beduins.
- Ecologically and environmentally sensitive areas, as well as valuable cultural heritage.
- Absence of an effective land-use planning and development control system, as well as of a participatory approach in overall development planning.

Accordingly, the long-term objective of the Project was setting up of the system of integrated planning and management of resources in the area, as well as to support efforts towards the development of a national coastal management programme. The immediate objective of the Project was to provide solutions to development and environment problems of the most urgent nature which could be implemented in short run.

As a matter of fact, during the Project implementation the Framework ICZM Programme for Egypt, in year 1996 was prepared. It defined the basic institutional and legal arrangements, and the Fuka-Matrouh Project and the ICAM Planning Study fit into that framework. The communication between the Fuka-Matrouh Project and the on-going national ICZM Programme were made easy by the fact that EEAA was in charge of co-ordinating both the overall national ICZM activities and the activities of the national team working on the Fuka-Matrouh Project.

The Project was composed of two groups of activities: those primarily sectoral, focused on individual topics or issues which mostly make the analytical part of the planning process, and the activities which integrate the information and knowledge gained in the analytical phase in outputs, such as CCA, ICAM Planning Study and SEA.

The first group produced as comprehensive, precise and value-free information as possible to support decision and policy making in the second stage of the planning process. The second

phase of the planning process synthesised the collected information and produced an integrated physical development strategy at a regional level (ICAM Planning Study), and formulated a management strategy including legal and institutional aspects, as well as action plans.

With regard to the individual activities, some of them brought in innovative methodologies and tools that proved to be useful and applicable, such as:

- assessment of land resources - characterized by holistic approach and methodology that combined high-tech remote sensing technologies with field surveys and laboratory work to produce valuable and cost-effective information,
- strategic environmental assessment (SEA) - an important issue in case of the coastal development of the Fuka-Matrouh area was a need to ensure tools to assess not only the individual project impacts within the usually very limited geographic area, but also whole development programmes or plans covering wider coastal segments (i.e. additive impacts of tourist villages in the whole Fuka-Matrouh coastal strip).

Integrated Coastal Area Management (ICAM) Planning Study is the main ouput that synthesized all the knowledge and recommendations gained by individual activities and sectoral studies. The development concept proposed in this Study and shown only within the study area boundaries is the result of the considerations of the wider regional and national context. This concept envisages the creation of an important development pole in the western coastal region. Instead of individual tourist resort projects sneaking into the coast and silently using it up, mostly excluding the local population as beneficiaries, the proposed concept aims at a comprehensive development of the western coastal region. This regional development concept has the following main objectives:

- to support the national policies such as population decentralization from overpopulated Nila valley and equitable distribution of international tourist development benefits nation-wide,
- to introduce measures and technologies to develop most of the land suitable for agriculture (including the restoration of rangeland) to revitalize rural, mostly Bedouin communities, and take advantage of their intimate knowledge of this environment,
- to ensure diversification of the tourist product and activities (larger share of commercial and international tourism) providing for more jobs in tourism as well as in other tourism related sectors,
- to ensure protection of the area's natural and cultural heritage.

The Fuka-Matrouh area is a good example of the area where an integrated coastal management plan is needed because of negative development trends, conflicting issues and complex management problems. One of the project key words is integration. It is equally needed during the planning process – horizontal integration – when relevant authorities and disciplines have to cooperate as well as at implementation stage – so called vertical integration – when different levels of government should pull together.

To this end, an important project recommendation is that the power of the existing line agencies should be balanced with the **real operational powers of co-ordinating bodies** such as the National Committee for ICZM.

While the Fuka-Matrouh project has provided a comprehensive scientific and technical analysis, and proposed an ambitious, intensive and knowledge based regional development concept, there are, as just mentioned, numerous administrative and socio-political issues that should be resolved if the coastal management goals are to be achieved.

1. GENERAL INFORMATION ON MAP COASTAL AREAS MANAGEMENT PROGRAMME (MAP CAMP)

Context

CAMP is the MAP programme for sustainable coastal management, integrating environmental concerns into development planning and practice, oriented at understanding and resolving practical environmental, development and management problems at local and national levels in Mediterranean coastal areas.

The geographic context of the Programme is defined by the Barcelona Convention, and encompasses the Mediterranean marine environment and its coastal and watershed areas.

Programme Objectives

The objectives of the Programme are:

a) to develop strategies and procedures at local and national levels for a sustainable development, environment protection and rational utilization of coastal and marine resources, to be also used as inputs for Mediterranean strategies for sustainable development,

b) to identify, adapt, and test, in a realistic operational context, methodologies, tools and practices for sustainable coastal management in the region,

c) to contribute to the upgrading of relevant national/local institutional and human capacities, and

d) to secure a wider use, at national and regional levels, of experience and results achieved by the Programme and its individual projects, and create conditions for follow up.

The Programme provides to all MAP RACs and MEDPOL the opportunity of a harmonized joint practical work with the host country national and local authorities and institutions, demonstrating the capacity for integration and application of best methodologies, procedures and tools in real conditions, dealing with complex environment/development problems in coastal and marine areas and watersheds.

2. CAMP FUKA-MATROUH BACKGROUND INFORMATION

Initiation of the Programme

This programme was developed at the request of the Egyptian Government which expressed its commitment to the philosophy of the integrated planning and management of the coastal area of Fuka-Matrouh and invited the Co-ordinating Unit of the Mediterranean Action Plan to initiate the Programme. The Programme was implemented within the Mediterranean Action Plan - UNEP, in accordance with the conclusions of the Sixth and Seventh Ordinary Meetings of the Contracting Parties to the Barcelona Convention, and in close co-operation with the authorities of Egypt.

Preliminary activities relevant to the coastal area of Fuka-Matrouh started in the end of 1988. Three MAP/PAP missions visited Egypt in the period 1988-1992. Together with the Egyptian authorities and the Regional Activity Centres (RACs), they prepared the Coastal Area Management Programme (CAMP) for the Coastal Area of Fuka-Matrouh. In October 1992, the Egyptian Government and the Mediterranean Action Plan signed the "Agreement Relative to the Coastal Area Management Programme for the Coastal Area of Fuka-Matrouh (Egypt)". According to that Agreement MAP agreed to implement a number of activites, in cooperation with national and local authorities as well as expert teams from universities and other organizations, with the main goal to ensure sustainable development of the Fuka-Matrouh area.

Programme Study Area

One of the objectives of the Fuka-Matrouh Project was to support initiatives towards a national integrated coastal management policy. The proposed study area with its problems and concerns appeared to be enough representative of the wider Mediterranean coastal region of Egypt. The urgency of the problems related to tourism development trends in the time of the Project inception was another reason for the definition of the study area in its present boundaries.

The Fuka-Matrouh area is a semi-desert, sparsely populated area which is a part of the North-Western Mediterranean coast of Egypt, located approximately 210 km to the West of Alexandria. It is bounded on the North by the Mediterranean Sea, on the West by the escarpment of the plateau and on the South by an arbitrary line at approximateiy 100 m altitude.

The region encompasses almost 500 km of coastline and is characterized by arid Mediterranean climate, with an average rainfall along the coast of 100-180 mm per year. The region currently supports about 300,000 people whose primary source of income is derived from cattle production and fruit tree planting. The coastal zone had undergone degradation since the 11^{th} century resulting from neglect and wars, nomadic life, cutting of trees and overgrazing. However, the zone was once highly productive, especially during Roman times who used dry land farming practices based on the development of water resources and storage of rain water in underground reservoirs.

Figure 1: The Study Area

Another rather recent phenomenon is the business of building tourist villages along the coast. Majority of these villages are planned and designed as summer houses (secondary homes), intended chiefly to be sold on the domestic market. As such they are not used more than few weeks a year, and do not provide any significant number of new jobs for the local population or increase in tax base.

Taking into consideration its special characteristics, including the vicinity of the capital of Governorate, it was agreed that the area to be covered by the Project is approximately 100 km of coastal belt covering the area which starts from the City of Matrouh to the Fuka area in the East. As regards the depth of the area, it was agreed that it will cover an area ranging from 10 to 20 km from the coast.

Institutional Arrangement

The following main actors were participating in the development and implementation of the CAMP Fuka-Matrouh:

- Mediterranean Action Plan of UNEP,
- local authorities and institutions,
- national authorities and institutions,
- other international institutions and organizations.

MAP participated through:

- Co-ordinating Unit for MAP (Athens),
- Pollution Monitoring and Research Programme (MED POL),
- Priority Actions Programme Regional Activity Centre (PAP/RAC),
- Blue Plan Regional Activity Centre (BP/RAC),
- Environment Remote Sensing Regional Activity Centre (CTM ERS/RAC),
- Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC),
- Specially Protected Areas Regional Activity Centre (SPA/RAC),
- Centre for 100 Historic Sites.

National co-ordinating authority was established at the Egyptian Environmental Affairs Agency with the objective to co-ordinate all relevant national institutions and authorities (financial, economic, planning, development, industry, energy, tourism, sanitation, transportation, water resources, etc.), receiving for this necessary scientific, technical, logistical and financial support as envisaged by the agreement and its budget and workplan.

Other international institutions and organisations participated in their respective fields of competence in accordance with the agreement between the national co-ordinating authority and the MAP Co-ordinating Unit.

National Coastal Management Programme

With the passing of the Law for the Environment (No 4/I994), and in recognition of the active development of the coastal zone and the increasing pressure and impacts on this zone from various sources, the Egyptian Envirorirnental Affairs Agency (EEAA) was given the responsibility to initiate and coordinate national ICZM activities. A National Committee for Integrated Coastal Zone Management was initiated, 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 develnpment of a national ICZM Plan.

One of the key documents adopted by the National Committee is Framework ICZM Programme. This document analysed important characteristics and issues of the Egyptian coast and recognized the need for changing the existing trends of growth and development in coastal areas. In addition, it formulated objectives of the management strategy including institutional setting, and considered international, bilateral and national funding options. Finally, it elaborated candidate short term actions and projects.

Main coastal issues identified in the Framework ICZM Programme include:

- shoreline erosion and flooding,
- irrational land use and inappropriate land use planning system,
- water pollution from coastal and marine sources,
- deterioration of natural resources and habitats.

While the long-term objective of the Egyptian ICZM strategy is to develop and adopt national CZM Plan that provides a clear guidance for actions and activities in the coastal zone, the short-term objective is to identify the most vulnerable coastal areas and quickly develop a set of urgent measures that could be taken in order to bring irreversible environmental degradation to a halt. One of the pilot projects intended to improve coastal land use planning practice and to prevent adverse effects was suggested for coastal area east and west of the Matrouh city.

3. STUDY AREA PROFILE

The Fuka-Matrouh area is located in the central coastal part of the Matrouh Governorate which occupies the northwestern portion of Egypt. The Governorate is one of the largest in Egypt, with an area of 212,000 km^2, representing 22% of the area of the country. However, the population density in the Governorate is very low. According to the preliminary results of the 1996 census, the population of the Governorate amounts to 212,000 which gives a population density of around one person per km^2 (for comparison, population density in the Nile Valley and the Delta is about 1,500 inhabitants per km^2). Population density of the study area is around 10 inh/km^2. Population growth rate is around 3% while the national growth rate is 2.8%.

Marsa Matrouh city and its hinterland has the biggest concentration of population, around 90,000 inhabitants, representing about 40% of the total Governorate population, while the urban population of the Governorate amounts to 76%. There are two different social groups, the Bedouins as native population, and immigrants who have migrated from the Nile Valley. The Bedouins used to live nomadic life, but are now mostly settled in rural areas and in the desert, while the immigrants live in urban centres employed in Goverment services and construction.

As for the educational status of the population, the 1996 Census preliminary results show that about 2.3% of the population had a university degree, while those who received high school certificates accounted for 18%. Illiteracy rate was found to be around 33%, whereas the remaining 46.7% were classified in the "can read and write" category. It is worth noting that as education has received recently considerable attention from the government, the number of students attending schools has increased.

In general, pasturing was for a long time the main source of income in the Governorate, but with time, agriculture has become the principal source. Since the rain plays an important role in agriculture and pasturing and determines the yield, the level of income in both is characterized by uncertainty. This particularly affects the native population, the Bedouins, around 80% of whom are engaged in sheep and goat herding and cultivation of barley, vegetables and fruit trees. This fact justifies the trend to diversity the economic activities and, accordingly, the sources of income.

Concerning the Government policies in the study area, one of the main themes is to continue the development of the north coast of Egypt. This is to be carried out parallel to the development of other axes, such as the Red Sea, Sinai, and Southern parts of Egypt. The ultimate target is to increase the inhabited areas to 7-8% of the total area of Egypt. Accordingly, Five Years Economic and Social Plan, enviseges construction of the important water supply system components, including water pipelines and water stations.

Major problems and issues in the Fuka-Matrouh area can be summarised as follows:

- Uncontrolled development of tourism which mostly excludes local population as beneficiares while producing negative impacts on natural environment and infrastructure.
- Complex natural conditions that require sensible agricultural policies.

- Ecologically and environmentally sensitive areas, as well as valuable cultural heritage.
- Absence of an effective land-use planning and development control system, as well as of a participatory approach in overall development planning.
- Insufficient integration of policies (horizontal and vertical) among various bodies in charge of different sectors or geographic segments of the coastal area.

4. PROJECT OBJECTIVES AND CONTENTS

Objectives of the Project

The overall direction and goal of the Project is the future development of the area based on the principle of sustainability, achieved through integrated planning and management of coastal resources. Accordingly, the final project output, which is the integrated management plan, should incorporate all the knowledge gained by individual activities, and propose a concept of sustainable development of the Fuka-Matrouh area.

An important long-term objective of the Project was to create conditions for the establishment of the system of integrated planning and management of resources in the area, as well as to support efforts towards the development of a national coastal management programme. Following this objective the project team members were trying to move from strictly reactive actions as a response to emergency situations to comprehensive understanding of the coastal environment and social processes taking place there. This understanding is the prerequisite for the move from reactive, *ad hoc* measures to preventive actions which are always cheaper and safer than rectifying environmental harms later.

The immediate objective of the Project was to provide, within the individual actions, solutions to development and environmental problems of the most urgent nature which could be implemented in short run.

In addition to these objectives, each of the four Project components and 9 implemented activities had their own specific objectives harmonised with the Project needs and objectives.

Project Contents

During its life span, the Fuka-Matrouh Project ensured implementation of a number of activities belonging to the four main Project components, as follows:

l. Prospective analysis

- systemic and prospective analysis, development/environment scenarios,
- implications of climatic changes in the coastal area of Fuka-Matrouh.

2. Integrated planning and management programme

- on-the-job training on the methodology of integrated planning and management in coastal areas,
- integrated coastal management Planning Study for the coastal area of Fuka-Matrouh,
- application of tools and techniques for coastal management:
  - Geographical Information System (GIS), application and training,
  - Carrying Capacity Assessment (CCA) for Tourism Activities.
  - Strategic Environmental Assessment (SEA),

3. Legal instruments and institutional structures
    - status and development of environmental legislation and institutional framework,
    - specially protected areas and implementation of the Specially Protected Areas (SPA) Protocol.
4. Sectoral planning (operational activities)
    - soil erosion, desertification, and water resources,
    - assessment of natural resources and soil conservation issues supported by remote sensing.

Detailed description of each activity, including the activity objectives, expected benefits, and institutional framework, were defined in the relevant Agreement.

5. PROJECT METHODOLOGIES, TOOLS AND PROCEDURES

Planning Process Methodology

The Fuka-Matrouh Project planning process followed a general methodology delineated in the beginning of the Project, which was adapted to the local conditions and developed during the project implementation. Apart from that, individual activities used specific methods of work, procedures and techniques that were suitable for the topics of those activities.

Generally speaking, the project was composed of two groups of activities: those primarily sectoral, focused on individual topics or issues which mostly make the analytical part of the planning process, and the activities which integrate the information and knowledge gained in the analytical phase in the form of outputs, such as ICAM Study, as the most important one, CCA and SEA.

The first phase of the planning process is characterised by scientific approach and relevant methods of analysis in depicting natural, physical and socio-economic conditions and processes. The second phase is characterised by public policy making approach which considers societal needs and goals, and relies on participatory process and administrative arrangements for policy adoption and implementation.

The first group produced as comprehensive, precise and value-free information as possible to support decision and policy making in the second stage of the planning process. The second phase of the planning process synthesised the collected information and produced an integrated physical development strategy at a regional level (ICAM Planning Study), and formulated a management strategy including legal and institutional aspects, as well as action plans and implementation guidelines. Theoretical basis of the first stage of the planning process was a rational planning model (problem identification, definition of opportunities and constraints, alternative strategies formulation), while the second stage was designed to rely mostly on the consensual (participatory) planning approach.

Although the project, by its physical scope, has a local character, when considering and evaluating development options of the study area significant inputs were required from the national and wider, regional levels. This regards especially the national policy of population decentralisation from the Nile Valley, which designated the Mediterranean coastal zone as one of immigration areas to which that population is directed. There is also a policy, less formal, of allocating tourist capacities for domestic population at the Mediterranean coast. The former is reasonable and can not be reproached, while the latter can not be easily avoided in the market economy conditions, so it has to be directed and managed appropriately.

Another aspect which required a wider consideration than defined by the borders of the study area regards administrative solutions and techniques related to the implementation of the ICAM Planning Study. The solution to this problem was facilitated by the preparation of the Framework ICZM Programme for Egypt (1996). It defined the basic institutional and legal arrangements, and the Fuka-Matrouh Project and the ICAM Planning Study fit into that

framework. The communication and co-ordination of activities between the Fuka-Matrouh project and the on-going national ICZM Programme were made easy by the fact that EEAA and its Environment Management Sector were in charge of co-ordinating both the overall national ICZM activities and the activities of the national team working on the Fuka-Matrouh Project.

Innovative Tools

With regard to the individual activities, some of them brought in innovative methodologies and tools that proved to be useful and applicable in the typical conditions of the Mediterranean coast of Egypt. Some of them are briefly presented in the following paragraphs.

In the activity "Assessment of Natural Resources and Soil Conservation Issues Supported by Remote Sensing" an integrated survey of land resources was carried out. The applied methodology combined high-tech remote sensing technologies with field survey and laboratory analysis which together enabled a cost effective way to provide comprehensive information on soil capabilities in a relatively large area. This information, in turn, proved to be a significant contribution to the land use planning process.

"Carrying Capacity Assessment (CCA) for Tourism Development" was an activity that applied the carrying capacity concept. While the concept is not new, its application in the Fuka-Matrouh Project was specific, trying to avoid mechanical calculations that pretend to deliver its outputs (usually a quota system to limit volume of visitors) with cold objectivity. Instead, in addition to physical factors, CCA in the Fuka-Matrouh Project tried to introduce socio-economic and cultural parameters to the analysis. Although these parameters are less prone to quantification, it turned out that they were crucial for the definition of the carrying capacity of tourism development in the study area.

Strategic Environmental Assessment (SEA) is another innovative tool applied in the Project. It enables environmental assessment for programmes, policies and plans. The need for this tool emerged after analysing the tourism development trends along the study area coastline. Although the present EIA provisions may be judged as rather comprehensive and capable to control future coastal projects (if effectively implemented and enforced), the need still exists for a tool that allows consideration of environmental impacts over larger geographic area and development time frame. This is exactly what SEA (i.e. of a regional land use plan) enables - assessment of cumulative, secondary, long-term or delayed impacts.

Although neither new nor original, mapping is an important part of the Fuka-Matrouh Project methodology. Geographic information and positional exactness is often important in depicting coastal phenomena. Accordingly, a significant aspect of the coastal profiling phase was the use of geographic information systems (GIS) as a principal tool of environmental information management. Traditionally, majority of disciplines communicate much easier in textual form, so the requirement to have "problems" drawn or marked down on the maps was a good exercise for all the team members. As a matter of fact, the national team from the University of Alexandria has undertaken important steps in establishing a strong environmental information department, and selected GIS and remote sensing as the principal technology for environmental information management. Building upon this, the Project ensured GIS support for most of the activities, and carried out GIS training and education programme for the national team members in Marsa Matrouh and Alexandria.

6. RESULTS OF INDIVIDUAL PROJECT ACTIVITIES

Systemic and Prospective Analysis

The Study elaborated interactive relationship between development and environment in a long-term, 30-50 years time horizon. Geographic reference was a wider area, the Matrouh Governorate and the Mediterranean coast of Egypt. Considering the future development paths the analysis took into account global and regional trends and impacts, and identified conflicting zones, sectors and key actors, as well as needed adjustments.

Implications of Climatic Changes

The objective of this activity was to assess the possible implications of expected climatic change on ecosystems, land-use and sea-use practices, and other human activities of the coastal area of Fuka-Matrouh, and to propose suitable management and policy response options. Due to rising sea level the eastern part of the coast would be subjected to coastal erosion processes including flooding of backshore areas and depressions, whereas slight impacts are expected at the western part of the coast owing to its topography. Change in the rainfall and increase in evapotranspiration may lead to a reduction in the cultivated areas, and agriculture is likely to change towards even more intensive farms. Temperature rise will cause higher energy demands (air conditioning) for new developments, in particular in tourism sector. The change in climate is not expected to have any significant impact on the evolution of population distribution and demographic trends in the area.

Soil erosion, Desertification and Water Resources

The main objective of this activity was to gain the necessary knowledge to prevent the degradation and loss of agricultural land. The basic study was performed in two pilot zones representative enough to enable transfer of results to the wider study area. The product of the activity is an information on soil agriculture potential (derived from a number of input data, such as slope, texture, depth, rainfall, salinity, sodicity and other chemical and physical properties). This information enables an optimization of the land use conflicts resolution process, such as agriculture and grazing, tourism development and agriculture, or protection and delineation of ecologically sensitive areas, i.e. salt marshes.

Assessment of Natural Resources and Soil Conservation Issues Supported by Remote Sensing

This study provided an integrated survey of land resources of the study area. The applied methodology included the use and interpretation of satellite images, field survey, laboratory analysis and additional processing, as well as corrective image interpretation. The final product of the activity is the land system map composed of 3 Geographical Regions, 12 Land Systems and 25 Landscapes. The whole activity proved to be a cost-effective way of obtaining synthesized information on land resources of the Fuka-Matrouh area, and their suitability for different potential uses. Such an application brings more rationality into the

land use planning process. In addition, one of the services provided by this activity refers to the dissemination of knowledge and expertise to local experts who were directly participating in the main stages of the project.

Specially Protected Areas – Marine/Terrestrial Ecosystems and Cultural Heritage

The first task of this activity was the identification of the main terrestrial and marine ecosystems, and determination of the level of their ecological sensitivity. Among the sensitive marine ecosystems, Rass ElHekma, Abu Hashafa and bay with the Matrouh lagoon are the most important ones. On the terrestrial side, seven habitats were identified with information on status, distribution and ecology including the need for further research because of the lack of baseline information. Management measures have been proposed with regard to grazing control, as well as propagation of multipurpose and native species. A detailed survey of the wider area on the marine turtles nesting occurrence (Gulf of Hekma, Abu Hashafa Bay) was performed.

With regard to cultural heritage a wider area was examined (East, West and South of Matrouh) where the major sites were analysed (Abu Seir, Marina/El Alamein, Cleopatra Bath, Agiba Site, sites in the Oasis of Siwa). Finally, the management measures were proposed including the definition of the site zoning, with a core area, exclusion zone, buffer zone, and approaches and service area. In addition, other management measures were discussed, such as potential revenue generating facilities.

Geographical Information Systems (GIS)

From the very beginning of the Project the need was identified for efficient environmental information management, and Geographic Information Systems (GIS) was found to be the appropriate tool for that purpose. The main product of the activity is a geographic database developed for the study area which covers main natural, physical and socio-economic features of the area. The main application developed within this activity was land suitability analysis the results of which were used as important inputs for land classification schemes prepared as a part of the integrated coastal management Planning Study. In addition, the services provided by this activity include training and education of local teams. Training enabled the team members to carry out specific tasks based on accepted methodology and brought them to a desired level of efficiency. The objectives of education were to bring the team members to an understanding of the subject so that they can form independent opinions, and understand and discuss the methodology.

Carrying Capacity Assessment (CCA) for Tourism Development

The existing tourism development patterns of the Fuka-Matrouh coastal area (dominated by secondary residence resorts for domestic population) tend to produce tourist saturation of the area in a relatively short period.

Three possible scenarios of future tourism development were considered:

- continuation of the existing trend of almost uncontrolled development with short-term benefits and extensive use of resources,
- an enclave concept of tourism development - tourism oasis for foreigners with low contribution to local economic development,
- balanced, sustainable tourism development.

The sustainable option is based on the tourism product designed to attract domestic as well as international market and, as a result, to extend tourist season (this seems to have been recognized recently when the TDA put the requirement for each developer to follow 1 to 1 ratio between summer house resort beds and hotel beds; this measure was necessary to curb the practice of building almost solely tourist villages which do not provide any new long-term jobs or income for the local population, and from the economic point of view may be considered as poor investments). Carrying capacity related to this option was further elaborated using three main categories of parameters: a. the physical - ecological parameters, b. the socio-cultural parameters, c. the political - economic parameters.

Finally, the estimated maximum accommodation capacity of the entire area is between 80,000 and 100,000 beds. Having in mind the existing accommodation capacities together with the so-called "tourist resorts", the future commercial tourism development can count on around 40,000 to 50,000 additional beds. This, together with other relevant information, was an important input for planners in the preparation of the integrated coastal management Planning Study for the coastal area of Fuka-Matrouh

Integrated Coastal Management Planning Study for the Coastal Area of Fuka-Matrouh

Integrated Coastal Area Management Planning Study synthesized all the knowledge and recommendations gained by individual activities and sectoral studies. The study identified the main development issues, and the stakeholders that need to participate in the planning process. The topics that were studied include population, resources, employment, industry, transportation, social services, conservation and landscape. While all these topics had to be looked at in order to anticipate future demands for land, the Study suggested that the capacity of the local authority planners to influence development pattern had been limited since they were under control of other, higher-level Government departments, and the private sector interests.

The Study analyzed the overall development opportunities as well as constraints and threats, and formulated few scenarios of the Fuka-Matrouh area future. In addition, using the outputs from preceding activities, particularly Carrying Capacity Assessment (CCA) for Tourism Development, the Study formulated the overall structure or framework of a future development till the year 2020 by means of written statements, illustrated by diagrammatic plans.

Year	Total population	Planning zone 1		Planning zone 2				
		Subzone 1	Subzone 2	Subzone 3	Subzone 4	Subzone 5	Subzone 6	Subzone 7
2000	110,000	90,000	?	?	?	?	?	?
2010	200,000	120,000	8,000	14,000	12,000	16,000	10,000	20,000
2020	380,000	180,000	20,000	35,000	30,000	45,000	25,000	45,000

1–Marsa Matrouh, 2–Alam El Ram, 3-Garawla, 4-Hawala, 5-Baggush, 6-Hekma, 7-Fuka

Table 1: Population Distribution in the Study Area till Year 2020 according to the ICAM Planning Study Population Growth Projection (Maximal Capacities)

Figure 2: Development Concept

Year	Number of beds	Planning zone 1		Planning zone 2				
		Subzone 1	Subzone 2	Subzone 3	Subzone 4	Subzone 5	Subzone 6	Subzone 7
2000	40,000	?	?	?	?	?	?	?
2010	66,000	14,000	8,000	6,000	8,000	14,000	6,000	10,000
2020	100,000	20,000	15,000	8,000	12,000	20,000	10,000	15,000

1–Marsa Matrouh, 2–Alam El Ram, 3-Garawla, 4-Hawala, 5-Baggush, 6-Hekma, 7-Fuka

Table 2: Distribution of Tourist Accomodation Capacities in the Study Area till Year 2020 According to the Carrying Capacity Assessment for Tourism Development (Maximal Capacities)

The development concept proposed in the Fuka-Matrouh Project and shown within the study area boundaries is the result of the considerations not only of the resources and processes within the study area but also of the whole Mediterranean coast of Egypt, its development potentials as well as present development trends. This concept envisages the creation of an important development pole in the western coastal region. Instead of individual tourist resort projects sneaking into the coast and silently using it up, mostly excluding the local population as beneficiaries, the proposed concept aims at a comprehensive development of the western coastal region. This regional development concept has the following objectives:

- to support the national population decentralization policies attracting people from the overpopulated Nile valley,
- to support the idea of the North African coastal transportation and development corridor,
- to enable spatial dispersal of international tourist development which will provide reduced pressure on the sensitive coastal environments while ensuring more equitable distribution of benefits nation-wide,
- to introduce measures and technologies to develop most of the land suitable for agriculture (including the restoration of rangeland) to revitalize rural, mostly Bedouin communities, and take advantage of their intimate knowledge of this environment,
- to ensure diversification of the tourist product and activities (larger share of commercial and international tourism) providing for more jobs in tourism as well as in other tourism related sectors,
- to ensure protection of the area's natural and cultural heritage,
- to promote mixed-use, linear concept of peri-urban villages east and west of the Matrouh city, with tourism installations closer to the waterfront, residential or rural areas behind, and agriculture and light industry facilities (i.e. agroprocesing and handicrafts production) closer to the main transportation corridors.

Coastal system division	Coast-line (km)	Coastal area (km^2)	Tourist capacity (beds)	Local population	Total population	Degree of control	Main activities/uses
Critical zone (seafront 0.2 km)	170	20	-	-	-	Absolute	Beach activities
Dynamic zone (3.0 km)	-	300	100,000	100,000	200,000	High	Mixed – tourism, residential, public, buffer zones
Independent zone (the rest within the study area)	-	2280		280,000	280,000	Standard	Mixed – agriculture, residential, light industry, rural
Total	**170**	**2600**	**100,000**	**380,000**	**480,000**		

Table 3: Distribution of Population and Main Land-Uses according to the Linear Mixed-Use Development Concept

This kind of Planning Study should be the basis for stakeholder participation and for further examination in public before the final document of this type is formally adopted. Once approved, this kind of document should serve as a basis for the preparation of local land use plans and site plans, as well as subject plans such as tourism development master plan. One of the tasks of the National Committee for ICZM is to ensure statutory powers of regional and sub-regional coastal management plans (ICAM Planning Study with its planning scale and degree of detail represents the regional planning level, but in reduced geographic coverage), preferably through a national level document such as ICZM Plan or national coastal management guiding statements.

Although the ICAM Planning Study was an expected and needed output, equal attention during the joint work had been paid to the planning process itself. To this end, international consultants often applied an approach where contents emerged from the guided process. This methodology required all the team members to share responsibility for what they do, while consultants took the role of process facilitators. This approach encouraged the team members to take ownership of the activity outcomes.

Strategic Environmental Assessment (SEA) of the ICAM Planning Study

An important aspect in case of the coastal development of the Fuka-Matrouh area is a need to ensure tools to assess not only the individual projects within the usually very limited geographic area, but also whole development programmes or plans covering wider coastal segments (i.e. additive impacts of tourist villages in the whole Fuka-Matrouh coastal strip). For this purpose a Strategic Environmental Assessment of the ICAM Planning Study was chosen as an appropriate tool to deal with this issue. This will at least provide an opportunity for responsible authorities to anticipate cumulative impacts of a number of similar projects which, if considered individually, may not impose danger to the environment, but assessed as a whole may show quite a different picture.

The matrix method was used in predicting the magnitude and significance of various activities contained in the ICAM on the natural and man-made environment. The considered human activities are classified into six classes: transportation, urbanisation and services, industrialisation activities, agriculture and related activities, tourism activities, and complementary activities. The proposed development of the area includes the development of five new tourist coastal sub-zones, which together with greater Marsa Matrouh area will attract approximately 100,000 tourists. The local population is planned to increase to 380,000, making the total population of 480,000. The population increase is accompanied by the development of appropriate infrastructure, such as road network, utilities network and various services. Such tremendous population increase would generate a high volume of waste, both solid and liquid. Construction of residential and tourist houses, as well as infrastructure objects will affect the soil and existing water courses. In order to avoid severe degradation of the, so far, virgin environment due to waste generation, appropriate infrastructure should be developed before the development of sub-zones and the planned residential, tourist and industrial capacities. Since the area is lacking in fresh water it would be reasonable to consider the water reuse rather than its discharge into the sea after appropriate treatment. Before any decision on development, as a general rule, an Environmental Impact Assessment for each project should be implemented.

The proposed development of the area may create severe conflicts with the local population (Bedouins), with their culture, life style and traditional activities. To avoid the conflicts negotiations with tribe representatives at an early stage of project preparation would be mandatory.

7. INTEGRATION OF FUKA-MATROUH PROJECT INTO THE NATIONAL COASTAL MANAGEMENT PROCESS

The EEAA was given specifically the authority to "... participate with the concerned agencies and ministries in the preparation of the National Integrated Coastal Zone Management Plan for the Mediterranean Sea and the Red Sea" (Law for the Environment, No 4/1994). The ICZM activities in Egypt are initiated, co-ordinated and supervised by the Government (EEAA) and can therefore be regarded as a top-down approach. The institutional structure for implementation, in addition to the National Committee for ICZM, includes regional (Mediterranean Coast Department) and sub-regional levels (Alexandria branch office).

Although the national ICZM Plan should be the umbrella document that guides the overall coastal development, the coastal management process requires preparation of a number of other plans (strategic or operational plans / integrated (comprehensive, multi-sectoral), or subject (sectoral) plans at national, regional and local levels). Obviously there is a need to avoid confusion and the justified fear of a bureaucratic interpretation which might require the preparation of too many expensive and unnecessary planning documents.

The solution to the competing pressures for site specific, operational plans (as opposed to higher-level strategic or integrated plans) is to develop a structured coastal management programme identifying management priorities at the national, regional and local levels.

In a situation where an issue is well defined, management actions are simple and unlikely to cause conflicts between different user-groups, the first approach is to undertake immediate management actions or to prepare a subject (or sector) plan. Still, it is important to avoid the recent practice in the Fuka-Matrouh area which shows the danger of embarking on a large number of detailed site plans while the overall context and impact of those plans are lost.

The Fuka-Matrouh area is, to the contrary, a good example of the area where an integrated coastal management plan is needed because of negative development trends, conflicting issues/users and complex management problems. The wider Matrouh area (including the Fuka-Matrouh Project area), besides the need to be covered by a regional-level integrated plan, requires the preparation of a sub-regional plan, particularly if the intensive development concept, as proposed by this Project, is to be accepted.

The typical planning scale at the regional level is 1:100,000, and at the sub-regional level 1:25,000. Within this planning framework, the ICAM Planning Study for the Fuka-Matrouh area covers a geographically small but very important segment of the future regional level ICZM plan. Although the Project geographical extent is small, the development concept proposed in the Fuka-Matrouh Project is the result of considerations of much wider planning levels.

Regional plan is often the most difficult scale of coastal plan to develop. It bridges the gap between tangible local issues and strategic national guidance. Regional plan is also the first planning level which is sufficiently detailed to become spatially oriented. In addition, regional level ICZM planning process is very complex in terms of horizontal integration of sectoral

competent authorities, usually line ministries which will implement relevant policies. Participation in the planning process of all levels of government, including local stakeholders (governorate level), is another essential component of the planning process.

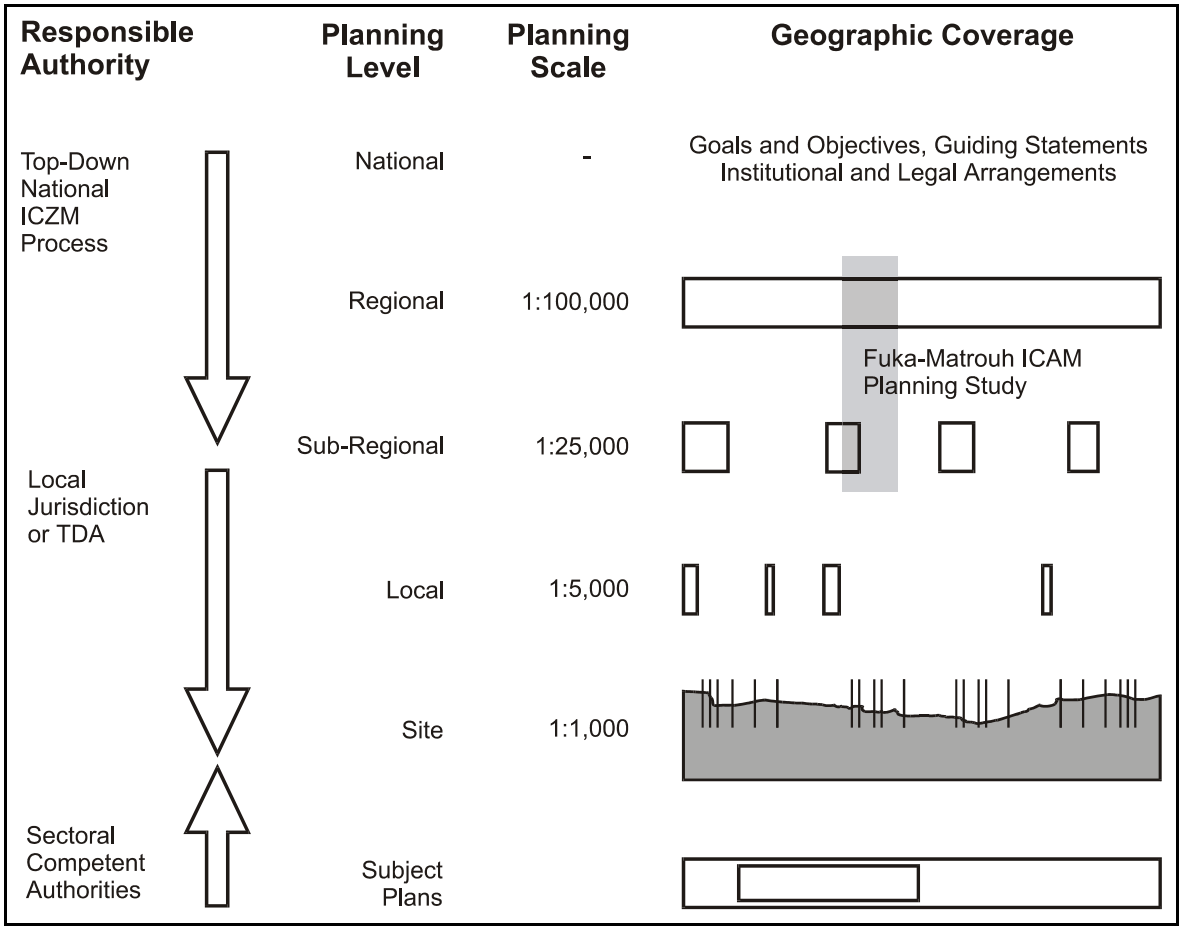

Figure 3: Coastal Planning Framework

This, so called vertical integration among administrative levels is even more important at the implementation stage.

All the integration issues mentioned when describing the regional level planning are typical of the whole coastal management process, and show the need for real power of the entities in charge of providing integration. The great majority of governments, including Egyptian, are established along sectoral divisions, delivering services through different government agencies. Taking this as a reality, actual day-to-day management of coastal resources in Egypt will, for most part, remain sectoral in the foreseeable future. What is to be integrated (co-ordinated, harmonised) is the planning and policy making process. To this end, power of the existing line agencies should be balanced with the real operational powers of co-ordinating bodies such as the National Committee for ICZM.

While the Fuka-Matrouh project has provided a comprehensive scientific and technical analysis, and proposed a sound and ambitious development concept, there are, as just mentioned, numerous administrative and socio-political issues that should be resolved if the coastal management goals are to be achieved.

8. PROPOSAL FOR FOLLOW-UP – ACTION PLANS

A. Urgent and Short-term Actions (Study Area and Governorate Level)

A.1. Guidelines for Regional Planning

A.1.1. Establishment of a Governorate Coastal Planning Commission

- representatives of scientific community, local authorities, business sector, NGOs, as well as other existing institutions dealing with development planning and environmental protection at the Governorate level
- promotion of the ambitious and knowledge based regional development concept
- co-ordination with the National Committee for ICZM, national planning institutions, EEAA, TDA, Coastal Protection Authority and other competent administrative authorities,
- initiation and co-ordination of the short, medium and long term actions

A.1.2. Preliminary designation of specially protected areas

- covers natural and cultural heritage and hazard-prone coastal areas
- subject plan with emphasised spatial reference (exclusion and buffer zones)
- based on existing information and expert opinions
- application of precautionary principle
- areas under pressure for tourism development to be elaborated first

A.1.3. Preliminary designation of the land suitable for agriculture

- application of soil capability analysis and land suitability analysis (methodology developed in the Fuka-Matrouh Project)
- application of land upgrading techniques (landscaping, water provision and feeder roads – methodology developed in the Qasr Rural Development Project)
- based on existing information and expert opinions

A.1.4. Control of the tourism development projects

- temporary moratoria on the tourist resort projects that endanger coastal resources or do not create adequate jobs and income for local population
- strict enforcement of the existing Environmental Guidelines for Development in the Coastal Areas until A.2. is completed

- strict enforcement of the requirement for each tourist establishment developer to follow 1 to 1 ratio between tourist village beds and hotel beds
- assessment of tourism development projects within the framework of SEA

A.2. Preparation of the General Structure Plan of the Governorate Coastal Area

- Considerations of national policies (population redistribution, tourism development)
- Local population projections
- Tourism development carrying capacity
- Land classification schemes (main land uses according to land suitability analysis)
- Infrastructure development

B. Medium and long term actions (Mediterranean coastal region of Egypt)

B.1. Preparation of the ICZM Plan for the Mediterranean coastal area

- Policy oriented research of critical issues
- Protected areas (natural and cultural)
- Protection against coastal hazards and effects of climatic changes
- Coastal land use planning (including Strategic Environmental Assessment)

B.2. ICZM Plan Implementation Process

- Institutional arrangements for implementation
- Human capacity building (on regional and local levels)
- Preparation of the regional, sub-regional and local land use plans
- Legal provision for Strategic Environmental Assessment (for ICZM Plan and regional plans while for local land use plans if appropriate)
- Environmental information management (including GIS and RS)
- Monitoring and evaluation (feedback process)
- Environmental education and participation programmes

B.3. Sectoral Projects

- Renewable energy project
- Coastal Environmental Information System based on GIS and RS technologies
- Low cost wastewater treatment technologies
- Regional oil spill response programme
- Food processing and agromarketing centre
- Handicraft centre

Annex I: List of Project Documents

1. Eid, El Mohamady; Misak, Raafat: Report on the Existing Documents of the Fuka and Siwa Areas - Egypt, Cairo, August 1990 (PAP/RAC)
2. Eid, El Mohamady: Integrated Planning and Management of Fouka Area (Egypt), Cairo, 1990 (PAP/RAC)
3. Draft CAMP Project for Fuka-Matrouh Area (Egypt), Athens, 1992 (MAP)
4. Agreement Relative to the Coastal Area Management Programme for the Coastal Area of Fuka Matrouh (Egypt), Athens, October 1992 (MAP)
5. Marine and Coastal Environment - Questionnaire, Split, March 1993 (PAP/RAC)
6. Ferrari, Giovanni: Proposal for the Study of Soil Erosion and Desertification in the Management Programme for the Coastal Area of Fuka-Matrouh (Egypt), Florence, April 1993 (PAP/RAC)
7. Beltagy, Ali Ibrahim: The Marine Ecosystems of Fuka-Matrouh Area (Egypt) - Status of Species and Habitats, Tunis, 1993 (SPA/RAC)
8. Kasparek, Max: Marine Turtle Conservation in the Mediterranean - Marine turtles in Egypt - Phase I: Survey of the Mediterranean Coast between Alexandria and El-Salum, Tunis, 1993 (SPA/RAC)
9. Ayyad, Mohamed Abdel-Gawad: The Terrestrial Ecosystems of Fuka-Matrouh Area (Egypt): Status - Protection and Management Measures, Tunis, 1993 (SPA/RAC)
10. Dragicevic, Miroslav; Sürücü, Feyza: Report of the Mission Concerning the Tourism Carrying Capacity of the Fuka-Matrouh Area, Split, September 1993 (PAP/RAC)
11. Fawzi, Mohamed *et al.*: Up-Dated On-Site Report for the Fuka-Matrouh Area, Egypt, Cairo, November 1993 (PAP/RAC)
12. Report of the Workshop on Geographical Informatioin Systems in Integrated Coastal Area Management (Alexandria, November 13-18, 1993), Split, November 1993 (PAP/RAC)
13. El Guindi, Mohamed Abdel Aziz; El Din Zulfikar, Mona Salah: A Legal Study of Environmental Legislations Relating to the Fuka Matrouh Area Project, 1994
14. Report of the Training Course on Soil Survey and Aerial Photo Interpretation (Marsa Matrouh, March 11-25, 1995), Split, March 1995 (PAP/RAC)
15. Esmael, Feisal A.: Cultural Heritage Sites of the North-Western Coast of Egypt, Tunis, 1995 (SPA/RAC)
16. Aruoba Celik,: Systemic and Prospective Analysis for an Environmentally Ffriendly Management, 1995 (BP/RAC)
17. Ayyad Mohamed,: A Framework for Accumulating Consequential Data and Knowledge, May 1995 (BP/RAC)

18. Abdel-Kader, Fawzi H., *et al.*: Soil Degradation and Desertification - Second Quarterly Progress Report (April-June 1995), Alexandria, June 1995 (PAP/RAC)

19. Land Based Sources of Pollution in Matrouh-Fuka Area, National Institute of Oceanography and Fisheries, Alexandria, 1995 (MEDPOL)

20. Assessment of Land Resources Supported by Remote Sensing, Palermo, September 1995 (RAC/ERS)

21. El-Raey, Mohamed, *et al.*: Invetory GIS Database and Suitability Analysis of Fuka-Matrouh Area (Egypt), Alexandria, December 1997 (PAP/RAC)

22. El-Raey, Mohamed, *et al.*: A Framework for Integrated Coastal Area Management Plan Fuka-Matrouh (Egypt), Alexandria, June 1998 (PAP/RAC)

23. El-Raey, Mohamed, Fawzy Mohamed, et al.: Strategic Environmental Assessment of the Integrated Coastal Area Management Plan of the Fuka-Matrouh Area (Egypt), Alexandria, December 1998 (PAP/RAC)

24. Klarić, Zoran, Komilis Panajotis,: Carrying Capacity Assessment for Tourism Development in Fuka-Matrouh Area, March 1999 (PAP/RAC)

25. Parpairis, Apostolos,: Integrated Coastal Area Management Planning Study for Fuka-Matrouh Area, April 1999 (PAP/RAC)