Mariut Lake and Valley ICZM PLAN

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Acknowledgements

The Mariut Lake and Valley ICZM Plan is the result of several months of work overcoming great challenges. Now is time to thank everyone who has made its successful development possible.

Firstly, we would like to acknowledge the Global Environment Facility and the World Bank that have focused their efforts on enhancing ICZM in the area of Alexandria. The World Bank team and the Project Management Unit of the ACZMP have actively supported the preparation of this ICZM Plan. Their help was invaluable to achieve stakeholders´ participation.

Sincere thanks are also due to all stakeholders that have contributed to the ICZM Plan; their knowledge and experience have improved the expert's views and perception of the Mariut area. Without their feedback and active contributions, the preparation of this plan wouldn't have been possible.

Acronyms

ACCNDP: Adaptation to Climate Change in the Nile Delta through Integrated Coastal Zone Management Project.
ACZMP: Alexandria Coastal Zone Management Project.
ALAMIM: Alexandria Lake Mariut Integrated Management.
CAPMAS: Central Agency for Public Mobilization and Statistics.
CEDARE: Centre for Environment and Development of the Arab Region and Europe.
CSIRO: Commonwealth Scientific and Industrial Research Organization.
CoRI: Coastal Research Institute.
EEAA: Egyptian Environmental Affairs Agency.
ETP: Easter Wastewater Treatment Plant.
GAFRD: General Authority for Fish Resources Development.
GOPP: General Organization for Physical Planning.
ICZM: Integrated coastal zone management.
MWRI: Ministry of Water Resources and Irrigation.
NARSS: National Authority for Remote Sensing and Space Science.
NGO: Non-Governmental Organization.
NIOF: National Institute of Oceanography & Fisheries.
NWRP: National Water Resources Plan.
MLV-ICZM: Mariut Lake and Valley Integrated Coastal Zone Management.
OECD: Organization for Economic Co-operation and Development.
RAG: Research Advisory Group.
RBO: Regional Branch Office.
RSLR: Relative sea level rise.
SC: Steering Committee.
SLR: Sea level rise.
SUP: Strategic Urban Plan for Alexandria City 2032.
SWOT: Strengths, Weakness, Opportunities and Threats.
TS: Technical Secretariat.
UNDP: United Nations Development Program.
WFD: Water Framework Directive.
WTP: Western Wastewater Treatment Plant.

1

Introduction

Alexandria hosts an increasing population that sprawls along its coastal area and around the lake and valley of Mariut. This zone also supports many and diverse economic activities as fisheries, industries, tourism or agriculture, that exert a vast pressure on their resources. Alexandria and the lake of Mariut currently face severe environmental and social impacts that challenge the sustainability of local livelihoods and potential developments. In fact, the pollution in Alexandria is so severe that this area is identified as a hot spot for the Easter Mediterranean Large Marine Ecosystem.

The Mariut Lake and Valley ICZM Plan (MLV-ICZM Plan) is one outcome of the Alexandria Coastal Zone Management Project (ACZMP) and contributes to the reduction of the pollution load to the East Mediterranean Large Marine Ecosystem by strengthening institutional mechanisms for the integrated management of Lake Mariut and Alexandria Governorate. This Project is jointly managed by the Egyptian Environmental Affairs Agency (EEAA) and the World Bank (WB) but funded by the Global Environmental Facility (GEF).

The development of the MLV-ICZM Plan lasted two years (2013 -2015) and gathered the relevant scientific information, spread among coastal stakeholders, contributed to build a consensus upon the vision for Alexandria and Lake Mariut and finally provided a tool, the ICZM Plan, to foster pollution reduction, evaluation and sustainable management of coastal resources.

1.1 General overview

The ACZMP is an international initiative aimed at reducing the pollution load to the East Mediterranean Sea Large Marine Ecosystem by 5% through a pilot package of low-cost pollution reduction interventions, improve institutional mechanisms for the sustainable management of coastal zones in Alexandria Governorate and completion of a Monitoring and Evaluation system and the documentation and dissemination of the project results for the purpose of up-scaling and replication.

The ACZMP, started in 2010, consists of three components:

- **Component 1:** Planning, Institutional Capacity and Monitoring Strengthening. This Component aims at improving institutional mechanisms for the sustainable management of coastal zones in Alexandria Governorate, together with the development of an integrated water quality monitoring network for Lake Mariut and the Mediterranean Sea.
- **Component 2:** Pollution Reduction. This Component focuses on a pilot package of low-cost pollution reduction interventions.
- **Component 3:** Project Management and Monitoring and Evaluation. This Component is devoted to develop a monitoring and evaluation system and the documentation and dissemination of the project results.

The MLV-ICZM Plan is developed as part of Component 1. The expected outcome of this Component is an increased capacity by the various relevant entities to manage the coastal zones in and around Alexandria in an integrated, participatory and sustainable manner, including planning, consensus building, and monitoring.

The MLV-ICZM Plan proposes a set of objectives and actions to improve the management of the coastal area. Objectives and Actions of the MLV-ICZM Plan are based on a sound analysis of the Mariut Lake and Valley and its coastal zone. This analysis is compiled in the document “Integrated Diagnosis of the Coastal Area between the Western Border of Lake Mariut and the Eastern Border of Alexandria Governorate” (MLV Integrated Diagnosis). This document includes the following contents:

Section I: Sectoral diagnoses:

- *Chapter 1:* Sources of Degradation of Water Quality in the Eastern Mediterranean Large Marine Ecosystem.
- *Chapter 2:* Physical processes in Alexandria Governorate.
- *Chapter 3:* Climate Change and Sea Level Rise Study for Alexandria Governorate Coastal Areas.
- *Chapter 4:* Report on Physical, Ecological, and Socioeconomic Characteristics.
- *Chapter 5:* Stakeholders Analysis.
- *Chapter 6:* Legal Analysis.

Section II: Integrated diagnosis:

- *Chapter 1:* SWOT Analysis.
- *Chapter 2:* Draft Maps of the Major Management Units.
- *Chapter 3:* Key Issues Analysis.
- *Chapter 4:* Key Issues Indicator System.

Annex V compiles all references and baseline information used for the development of the MLV Integrated Diagnosis.

1.2 Structure of the Mariut Lake and Valley ICZM Plan

The MLV-ICZM Plan is described in this document and its five Annexes gather the technical information necessary for its understanding and implementation. This document is structured in five chapters, the first of them devoted to introduce the plan itself. This first chapter also describes the public participation process carried out during the plan elaboration. Annex I lists key stakeholders involved during the public consultation process.

The current situation of Alexandria coastal areas and Mariut Lake and Valley is illustrated in Chapter 2. This briefly characterizes the complex system of Alexandria and Mariut, based on three components: Territory and Environment, People and Economy, and Stakeholders and Regulations. This knowledge provided the elements for the holistic understanding of the coastal system, which is revealed in the SWOT Analysis, herein included too. The identification of the Key Issues for the Integrated Coastal Zone Management of Mariut Lake and Valley are discussed at the end of this Chapter.

Afterwards, the Mariut Lake and Valley ICZM Plan is presented in Chapter 3. This defines the Egyptian ICZM context, and also provides the vision and mission of the Plan together with its objectives. So, four Strategic Objectives made of a total of eleven Operational Objectives, forms the ICZM Plan and they are described in detail in this chapter. The Actions are also listed in this chapter but they are gathered and fully described in the Annex II. This is made of 30 Action Factsheets, one per Action, and they provide their description, outcomes, stakeholders involved, costs, duration and action progress indicator.

The institutional arrangements and mechanisms necessary for the successful implementation of the plan are pointed out in Chapter 4. These arrangements involves the creation and adaption of certain structures to facilitate integration of sectoral interests or sound knowledge during the decision-making processes, introduce stakeholders needs and initiatives into planning stages, or build consensus regarding conflicting scenarios.

The different elements for the implementation strategy are compiled and presented in Chapter 5. The estimated budget requested for the implementation of the first ICZM Plan in Alexandria Governorate, the four Roadmaps considered for facilitating the temporal coherence of the implementation process as well as the progress monitoring system for the continuous evaluation of the implementation rate. This Chapter provides the fundamental information to assist the plan application. Annexes III and IV respectively presents the detailed budget for the implementation of the MLV-ICZM Plan and presents the Progress Indicator System to facilitate the use of the strategy described in Chapter 5.

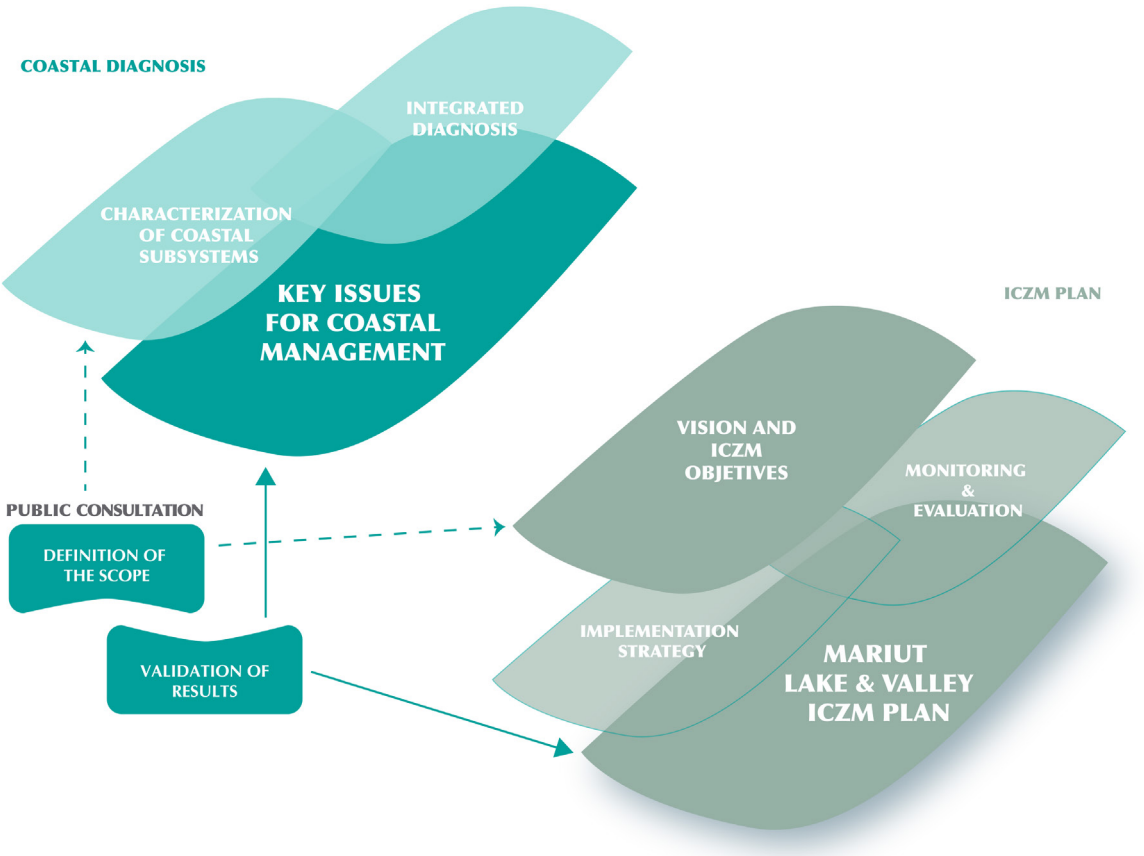


Fig. 1.1 Methodological approach.

1.3 Public Consultation

Public consultation and engagement are central elements of integrated coastal zone management processes. The participation of individuals and organizations from public and private sectors aims at developing the necessary constituency for the successful implementation of these ICZM processes.

During the preparation of the MLV – ICZM Plan, different participatory tools were applied in order to incorporate and address, as much as possible, the diverse concerns and interests of stakeholders. These participatory tools were individual interviews, group interviews and focus groups. These aimed at confronting views and interests to finally match their reasoning and validate the baseline information.

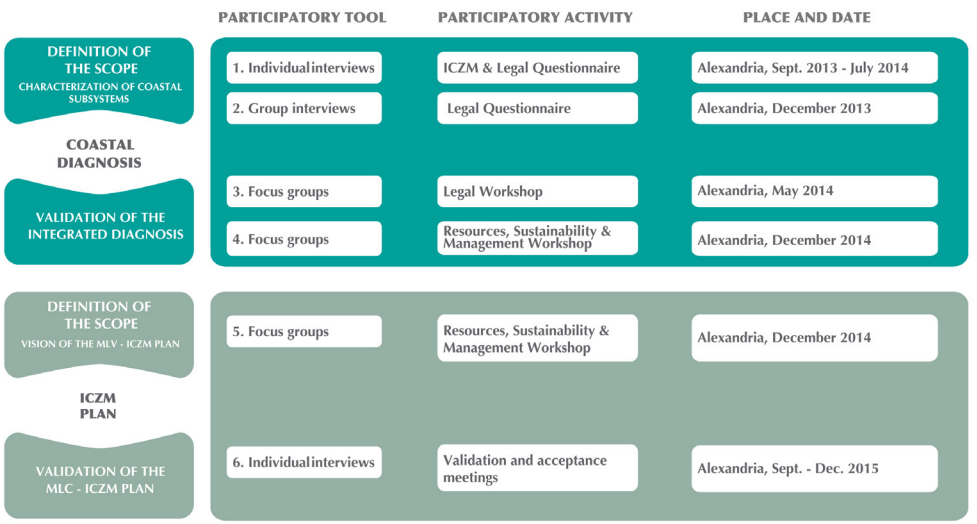


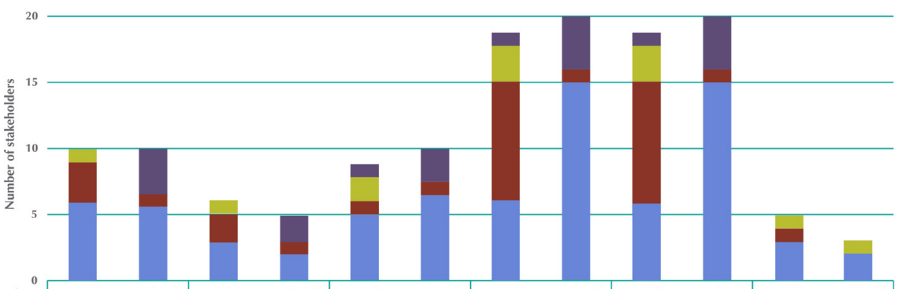
Fig. 1.2 Participatory mechanisms used during the diagnosis and planning phase.

The public consultation process was designed according to the needs of the two stages of the project: the coastal diagnosis and the ICZM planning. Actually, two processes were launched in each stage. The first process in each stage aimed at drafting and defining the general scope of the works, highlighting specific needs, conflicts and expectations. The second process was to validate and refine results and proposals. Figure 1.2 illustrates the specific participatory activities and tools used during diagnosis and planning stages.

The elaboration of the coastal diagnosis included individual and group interviews to define the scope of the integrated diagnosis. The validation of the diagnosis was carried out through focus groups. Specific participatory activities were organized as part of the special effort made during the Legal Analysis. This aimed at better understanding those social factors affecting the effectiveness of the existing regulatory system in the Lake Mariut. These activities guaranteed the participation of local communities, mostly fishermen.

The ICZM planning stage included focus groups to obtain the vision of the stakeholders that guided the scope of the MLV-ICZM Plan. Individual interviews with key stakeholders finally validated the plan.

The following figure presents the stakeholders participating in each participatory event and their characterization based on their administrative level (National, Local) and their nature (Authorities, Private Sector, Civil Society Organizations, Research Community).



Stakeholders administrative level	Local	National	Local	National	Local	National	Local	National	Local	National	Local	National
Objective of the participatory activity	Definition of the Scope		Definition of the Legal Scope		Definition of the Legal Scope		Validation of the Integrated Diagnosis		Definition of Planning Vision		Presentacion and acceptance ICZM Plan	
Participatory tool	1. Individual interviews		2. Group interviews		3. Focus Groups		4. Focus groups		5. Focus groups		6. Individual interviews	
Number of participants	20		11		19		39		39		8	
Reseach Community	0%	15%	0,00%	18,18%	5,26%	10,53%	2,56%	10,26%	2,56%	10,26%	12,50%	12,50%
Private Sector	5%	0%	9,09%	0,00%	10,53%	0,00%	7,69%	0,00%	7,69%	0,00%	0,00%	0,00%
Civil Society Organizations	15%	5%	18,18%	9,09%	5,26%	5,26%	23,08%	2,56%	23,08%	2,56%	12,50%	0,00%
Authorities	30%	30%	27,27%	18,18%	26,32%	36,84%	15,38%	38,46%	15,38%	38,46%	37,50%	25,00%

Fig. 1.3 Type and administrative level of stakeholders by participatory activity. (Please note that bars represent the number of stakeholders by participatory activity whereas the table provides the percentages of stakeholders by participatory activity).

Annex I presents the list of stakeholders participating in each of the six participatory activities.

The participation during the elaboration of the ICZM Plan has progressively increased, mostly because of the major involvement of local NGOs and the national authorities. It is worth noting that local private sector also showed an active participation.

Focus group during the “Resources, Sustainability and Management Workshop“, held in Alexandria (21st and 22nd December 2014).

2

Mariut Lake and Valley

The lake and valley of Mariut are located on the North coast of Egypt and are part of the Alexandria Governorate and the Nile Delta. This area extends over 60 km along the Mediterranean coast and its boundaries are the Western limit of the Alexandria Governorate and the Eastern border of Lake Mariut, as shown in Figure 2.1. It comprises 10 km landwards and 12 nautical miles seawards.

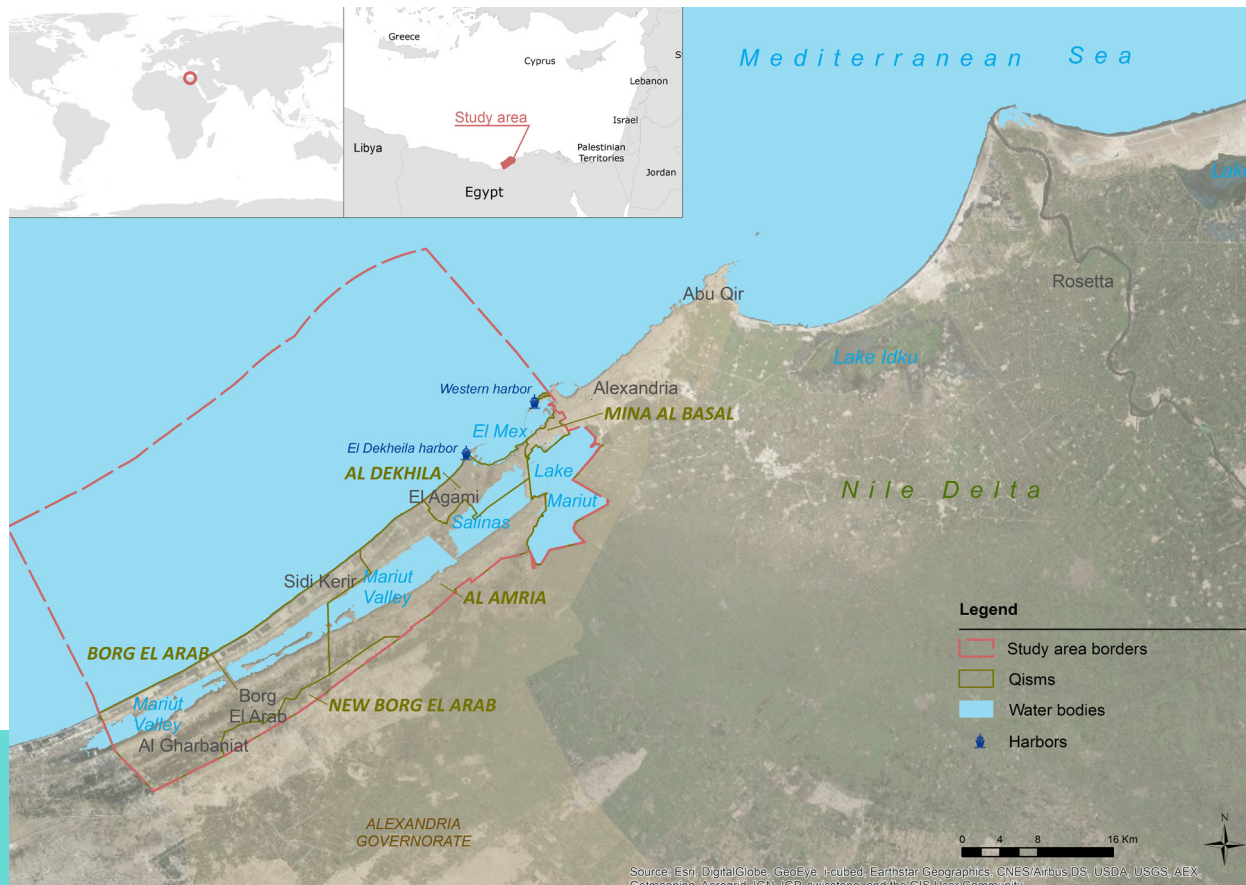


Fig.2.1 Study Area

1. SUMMARY OF THE COASTAL SYSTEM
Characterization of coastal subsystems

2. INTEGRATED DIAGNOSIS
SWOT analysis

3. KEY ISSUES FOR ICM
Issues analysis & selection of Key Issues

The study area encompasses five qisms (administrative divisions) and more than 650,000 inhabitants, including many economic and industrial activities and a highly diverse environment, namely coastal waters, sand dunes and beaches, freshwater and brackish lakes.

The elaboration of the Mariut Lake and Valley ICZM Plan required setting the baseline conditions of the planning area and identifying its managerial Key Issues. The methodological approach followed during the diagnosis phase aimed at understanding the functioning of the complex coastal system as a whole to avoid sectoral biases.

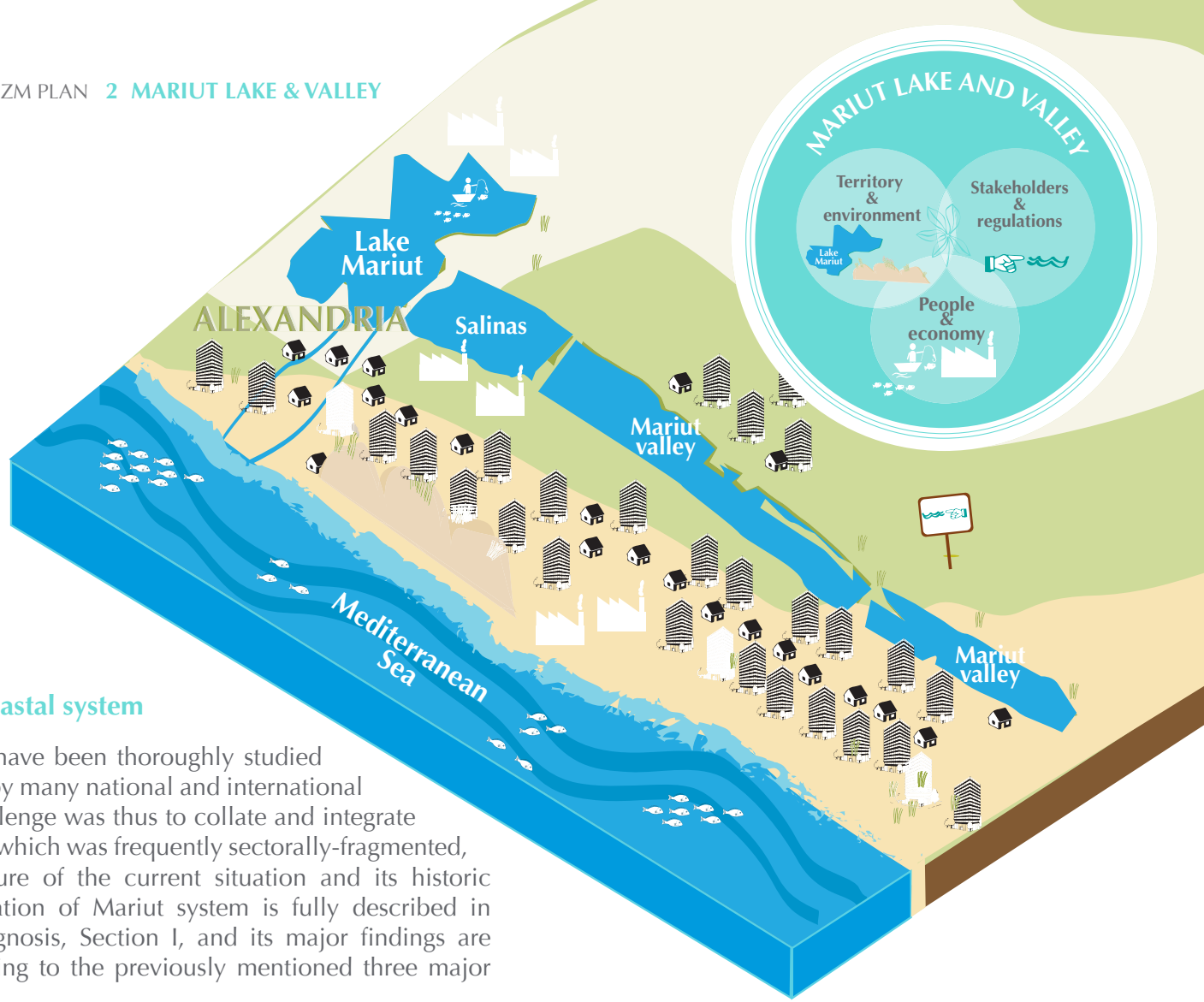
Three main subsystems were actually used to compile the information and to assembly the system, i.e.

Territory and Environment

People and Economy

Stakeholders and Regulations

Once the system was represented, the use of a SWOT Analysis contributed to interpret it holistically and identify a set of issues to consider when planning. These issues for coastal management were participatory analyzed to better define the scope of the ICZM Plan for Mariut Lake and Valley. Finally, the selected Key Issues were contrasted with the most relevant plans and projects currently ongoing in the area to refine their definition according to potential conflicts and synergies. The following sections clarify this process and its outcomes.



2.1 Summary of the coastal system

Mariut Lake and Valley have been thoroughly studied during the past decades by many national and international institutions. The first challenge was thus to collate and integrate the existing information, which was frequently sectorally-fragmented, to provide the full picture of the current situation and its historic evolution. The interpretation of Mariut system is fully described in the MLV Integrated Diagnosis, Section I, and its major findings are herein discussed according to the previously mentioned three major subsystems.

TERRITORY & ENVIRONMENT

The North coast has a moderate climate and is one of the wettest areas of Egypt, as the country is mainly an arid region. The area of Mariut is also characterized by the *khamaseen*, which is a remarkable climatic phenomenon consisting of a hot spring wind with velocities of up to 140 km/h, accompanied by desert sand and dust.

The landscape of the Mariut area is characterized by a mild topography and a low relief whose main geomorphological unit is the coastal plain. This is made of elongated ridges running parallel to the coast separated by lagoon depressions whose main water bodies are precisely Mariut Lake and Valley.

The territory under study is mainly occupied by human uses. Natural areas are spatially restricted to small patches between human developments and the study area does not include any Protected Area. Human uses include urban and tourism developments on the coastal front, unplanned urban sprawls around Lake Mariut and in Al Amria qism, agricultural lands on the south eastern part of the study area and industrial areas around Lake Mariut, as illustrated in Figure 2.2.

Fig. 2.2 Land uses in the study area

Lake Mariut is a shallow brackish water body that forms the southern boundary of the city of Alexandria. The abundance of natural resources in the area have supported flourishing economic activities, such as important commercial fisheries and agricultural production for centuries. Additionally, the development in the last years of many infrastructures around and inside the lake have facilitated an intense development of industrial activities. But the increased pressure due to human activities has caused an intense process of land-reclamation and its current extension is half the size of that in the fifties (Dumont, 2009). Indeed, Mariut Lake is about 62 km2 and has a depth ranging between 1 and 5 meters. The main water inputs, apart from superficial run-off, come from the agricultural drains and channels so Lake Mariut is also heavily polluted by industrial, agricultural and urban wastes. The El Mex pumping station is the only connection with the Mediterranean Sea and it maintains the water level around 2.0 m below mean sea level. El Mex represents one of the major sources of pollution into the East Mediterranean Sea.

Egypt's National Environmental Action Plan identifies Lake Mariut as the most polluted lake in Egypt.

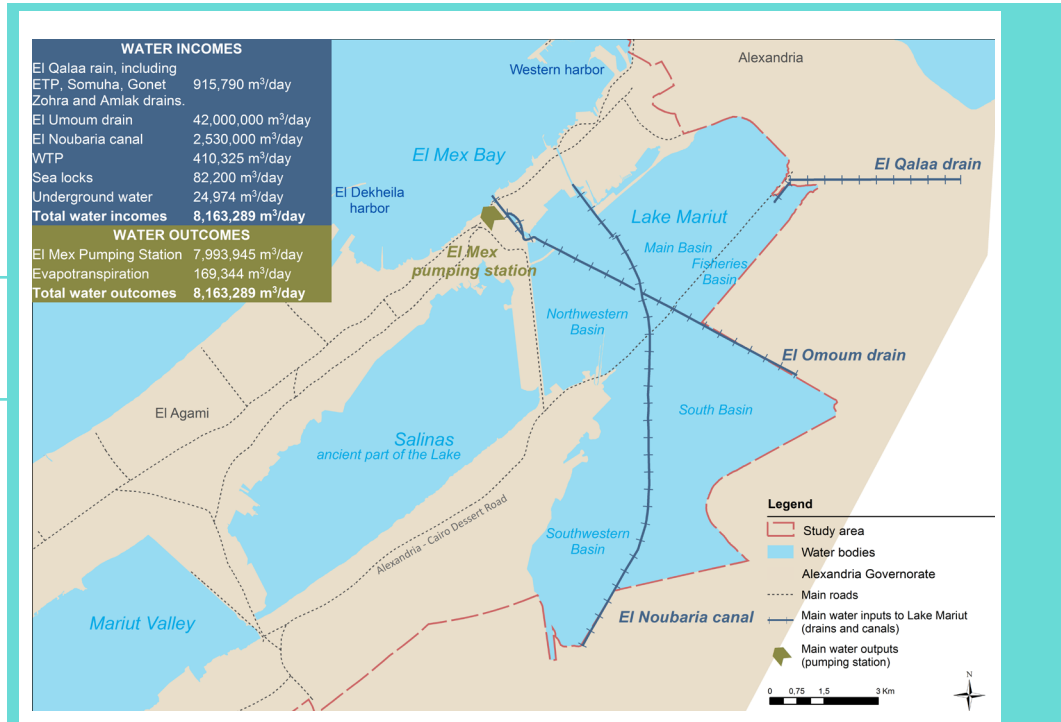


Fig. 2.3 Water balance in Lake Mariut

Besides, Lake Mariut is highly eutrophic. The spread of weeds (especially water hyacinth) on water surface contributes to the environmental degradation of the lake.

The Mariut Valley extends westwards from Mariut Lake. It is 35 km length, 2 to 5 km width and currently there is no water exchange between the valley and the lake. Water quality herein is better than in Mariut Lake and the Valley still hold traditional activities such as salt mines and aquaculture activities. However, several projected developments, such us the industrial expansion in Borg El Arab or the increase of aquaculture activities in middle lagoons, are threating the maintenance of the water quality. Stakeholders expressed this concern during the public consultation process.

The water reservoirs and production wells are very important too in the surroundings of Mariut Valley since groundwater resources are exploited for agricultural and domestic uses. In fact, there is an ongoing process of salinization of the groundwater, especially in the Borg El Arab and El Agami areas, because of the overexploitation of aquifers, leading to sea water intrusion, and wastewater discharges among others (El Maghraby, 2014).

Lake Mariut

The coastal front of Mariut Lake and Valley is characterized by long sandy beaches, with the exception of El Mex Bay where rocky shores provide protection to El Dekhiela and the Western Harbor. Unfortunately, most of the sand dunes and sabkhas ecosystems have disappeared during the last two decades due to the intensive urban and resorts development. This loss of natural ecosystems includes the reduction of their natural services as water reservoir and protection against storm surge flooding. Currently the beaches along this area only range between 60 and 90 meters wide.

The marine environment extends along the inner shelf down to a maximum depth of 100 m. This area provides suitable environmental conditions for seagrass meadows and sponges; however, recent studies indicate that meadows of *Posidonia oceanica* and *Cymodocea nodosa* have already disappeared in the area. Solid waste, oiling, ballast waters derived from shipping and industrial activities, together with extensive fishing and the use of trawling methods have negatively affected these sensitive marine ecosystems.

Finally, the effects of climate change can further modify the coastal system of Mariut Lake and Valley. Indeed, climate change will induce changes in driver variables as temperature, precipitation, variables defining wave climate, and sea level. Changes in these variables will most probably cause physical and derived socio-ecological impacts in the coastal area.

Sidi Kerir beach

The high-density informal settlements with deteriorating structures, and the rapid urban growth of surrounding areas over reclaimed wetlands and other low-lying areas make the area particularly vulnerable to climate change impacts. While climate change impacts may increase, the institutional capacity in Alexandria to manage these risks and prepare communities for potential future disasters and climate change impacts is limited. The current organizational set-up of the emergency response systems remain highly centralized with limited coordination between agencies horizontally and vertically down to the level of communities.

The following box presents trends and projections of driver variables in the area of Alexandria. This information is extracted from the Climate Change and SLR Study (MLV Integrated Diagnosis, Section I, Chapter 3). One of the main conclusions of this study is the necessity of a monitoring system that provides continuous and homogeneous series of driver variables at local scale. They will provide reliable trends and projections and will allow the subsequent assessment of coastal impacts. Currently, temperature and precipitations changes are based on the IPCC Fifth Assessment report (IPCC, 2013) projections at regional level and wave climate changes are only based on short and heterogeneous instrumental data series. Sea level trends are consistent for the area of Alexandria.

BOX 2.1

Climate change data for the area of Alexandria.

The IPCC Fifth Assessment Report and local studies provide results of observed and projected changes on driver variables:

Air Surface Temperature: the IPCC Fifth Assessment Report estimates an increase in temperature between 0.5 and 1.5 C in the near term, reaching 4 C in the long term (projected data).

Precipitation: the IPCC Fifth Assessment Report estimates a decrease between 0 and 10% in mean precipitation values, in the near, mid and long term (projected data). Precipitation projections are more uncertain than temperature projections.

Wave climate: based on instrumental data between 1985 and 2010, Iskander in 2013 indicated that there is a movement toward more local sea waves: a general increase in the mean significant wave height ranging between 2.6 and 2.9 cm/year and a decrease in wave period ranging from 0.01 to 0.26 seconds/year.

Sea level: climate change analyses indicate that mean sea level has risen between 1.69 and 1.78 mm/year for the period 1950-2009 (Veloqui, 2013). Subsidence in this area ranges between 0 and 0.5 m/year, increasing the relative sea level rise.

International organizations, such as the OECD in 2004, the World Bank in 2011 or UNESCO in 2013 have supported initiatives to assess the impacts of climate change in the Nile delta including the coastal zone of Alexandria.

In fact, the most relevant physical impacts of climate change analyzed in the Alexandria coastal area include flooding, beach erosion, drought and water salinization.

Specifically, the north part of Lake Mariut is highly exposed to the relative sea level rise and coastal flooding. Besides, western parts of Lake Mariut and surrounding areas of Mariut Valley are most subject to marine submersion (World Bank, 2011). These areas are highly populated and the age and low quality of the buildings, together with the lack of widespread basic services, increase their vulnerability.

PEOPLE & ECONOMY

Alexandria's strategic geographic situation in the Eastern Mediterranean Sea caused marine transportation and trade to be one of the most thriving economic sectors throughout its history. Nowadays Alexandria, which has four different ports, i.e.: El Dekhiela, Western Harbor, Eastern Harbor and Abu Qir, is still one of the most important city ports in North Africa. These ports host a variety of uses, from yachting to trading, the Western Harbor alone handling about 60% of the country's exports and imports (Alexandria Port Authority , 2015).

El Dekhiela and the Western Harbor are located in the study area. The latter one is divided into an inner and an outer part. The inner harbor is surrounded by five areas; the Arsenal, Mahmoudia, Phosphate, Passenger and Ras-El-Tin, only the latter with more than 40 quays. The outer harbor has more than 40 quays serving the Coal basin, the Arsenal quays, the Timber quays and the Petroleum basin. Water quality in coastal areas lying between these two ports is thus dramatically impacted not only because of the continuous discharges of the El Mex Pumping Station, but also by the frequent sewage discharges of ships and cargos and the indirect pollution resulting from loading and unloading industrial raw materials (native Sulphur, ammonia, nitrate- and phosphate- fertilizers, etc.) which are imported and exported from Alexandria.

Alexandria frequently evokes an exotic destination for international tourists and in fact is a demanded holiday location for local ones. The cultural and architectural heritages, the sandy beaches, mild weather and good communications make Alexandria and the Mariut coastal area a very competitive tourism brand and product receiving one million visitors during summer. Tourism resorts and villas are confined within the strip of land delineated between the road to Matruh and the shoreline.

As mentioned above, other economic activities with a long track record in the surroundings of Mariut are industry, aquaculture, agriculture and marine transportation. Industry developed intensively in the Alexandria Governorate during the 1970s and 80s, accounting for 40% of Egypt´s industry. Al Gharbaniat, Burg El Arab and Sidi Kerir stand up as the main industrial areas in Mariut area, comprising sectors such as oil refining, petro chemistry, metallurgical and mining, pharmaceutical, spinning, pulp and paper or processed food. However, the main sources of pollution are frequently outside Lake Mariut shores, entering the lake through effluent and water treatment plants or the diverse canals and drains. Therefore, the Mariut drainage basin is large enough to include effluents from the city of Alexandria and a large portion of the Nile's delta agricultural lands.

Farming activities are also developed in the proximities of Burg El Arab and along the valley of Mariut and the parallel Matruh road. Burg el Arab comprises extensive areas of barley and rice crops with sparse palms and olive trees, while along Matruh road small scale farmers cultivate small patches of figs.

Some crops, such as rice, require huge water resources, increasing water extraction and groundwater salinization.

Fig crops are displaced inwards by urban and tourism developments on the coastal front.

Fig crops along Matruh Road

The aquaculture sector is present in Mariut Valley too and it is based on small-developments and small hatcheries occupying a total area of 2.5 Km2. These activities are currently supported by public and private organizations so it is expected that their production will increase in the future. Some of the cultured species are European sea bass, gilthead sea bream, meagre, white grouper and tilapia.

According to the CAPMAS censuses of 1978 and 2008, the population of Alexandria has increased considerably over the past three decades, with a registered growth of 65% between 1976 and 2006. In the Mariut Lake and Valley area, the most populated zone is Mina Al Basal, located between the Lake and El Mex bay. It includes informal settlements lacking most basic infrastructures, such as sanitation, power and water supply or waste collection. The communities living in Mina Al Basal are mostly fishermen and their living conditions also include severe social and economic problems i.e. high illiteracy and low schooling rates, poor health conditions and lack of medical assistance.

Aquaculture facilities in Mariut Valley

Fisheries in Lake Mariut are exploited by approximately 7,000 fishermen and their annual catches are about 6,000 tons. This amount is however, very variable as waste dump and industrial sewage discharges, among other relevant factors impacting the quality of the land and the water in Mariut, frequently destroy breeding and nursery services, thus negatively affecting fisheries and other important ecosystem services.

Many health problems are detected in these communities, mostly related with exposure to high pollution levels in either water, air or food and aggravated by the poor living conditions. Finally, job losses among Lake Mariut fishermen and supporting sectors, such as the boat repair industry, worsen the social and economic conditions of the local communities of Mina Al Basal.

El Mex

STAKEHOLDERS AND REGULATIONS

A revision of existing studies in Mariut area and a survey for stakeholder analysis identified a constellation of 213 stakeholders in the Mariut Lake and Valley and the contiguous coastal zone.

This analysis, which is enclosed in the Stakeholders Analysis (MLV Integrated Diagnosis, Section I, Chapter 5), selected only 47 key stakeholders to participate in the ICZM Plan preparation (listed in Annex I). Then, the analysis of the competences of the 47 key stakeholders was carried out to identify those ones potentially able to induce changes in management of the study area. Results concluded that 6 from the 47 key stakeholders have the necessary influence and importance to encourage the improvement of the coastal management in the study area. These stakeholders are:

- Alexandria Governorate.
- Egyptian Environmental Affairs Agency (EEAA), under the Ministry of Environment.
- Ministry of Water Resources and Irrigation (MWRI).
- Ministry of Housing.
- Shore Protection Authority, under MWRI.
- General Authority for Fish Resources Development (GAFRD), under the Ministry of Agriculture and Land Reclamation.

Figures 2.4 and 2.5 show the characterization of the 47 key stakeholders according to their institutional nature (Authorities, Civil Society Organizations including NGOs, Private Sector, and the Research Community) and administrative level (National or Local).

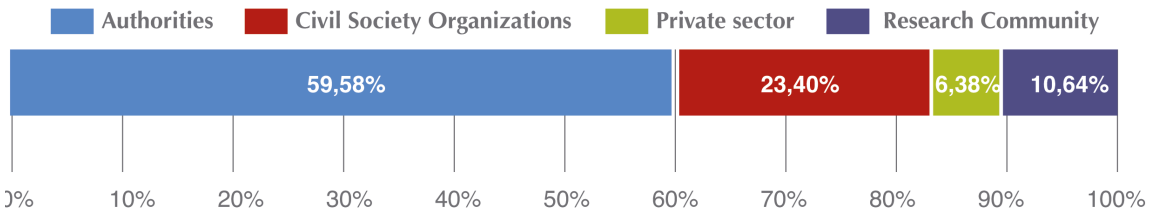


Fig. 2.4 Institutional nature of key stakeholders.

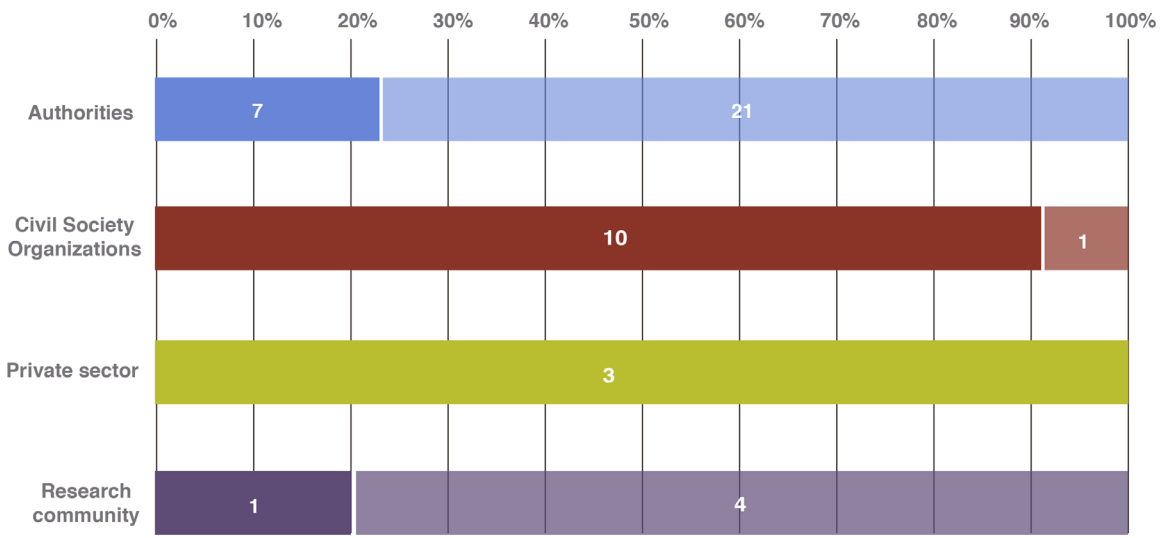


Fig. 2.5 Administrative level of key stakeholders.
(Dark colors represent Local Stakeholders whereas light colors represent National Stakeholders)

But an integrated management of the coastal system requires not only capable stakeholders, but also effective coordination between them. Coordination between stakeholders in the area of Mariut is still very poor. The main cause is the lack of effective mechanisms for inter-institutional coordination under the existing regulatory framework.

The analysis of the regulatory framework included the revision of several Presidential Decrees, Prime Ministers Decisions, Ministry and Presidential Decisions and Laws from 1962 to 2014 that regulate the management and protection of the coastal area and the water environment. Among them, two Laws are especially important for the management of the Mariut area: *Law 48 of 1982* and *Law of Environment 4 of 1994*, amended by *Law 9 of 2009*. The analysis of the regulatory framework is fully described in the MLV Integrated Diagnosis, Section I, Chapter 6.

BOX 2.2

Main water and environmental regulations

Law 48 of 1982: aims to protect water bodies including lakes, rivers and channels from pollution. Thus, it confers competences upon the MWRI for management and control of these water bodies, including monitoring of their water quality.

Law of Environment 4 of 1994 and its amendment Law 9 of 2009: focus on protection of the marine environment and coastal management. These Laws define the coastal area and ICZM. The latter law confers the competence to protect the water environment upon EEAA and eight institutions more.

Although these laws address the provision of competences for the management of water environments and establish mechanisms for the protection of water quality, the degradation of the water environment is still the major challenge.

The major constraints identified for the legal protection of water environment are:

- Unclear distribution of competences defined under Law 48 of 1982 and Law 4 of 1994 regarding protection and monitoring of water bodies. This overlap in water quality management was actually identified as the main regulatory problem in the study area. Indeed, stakeholders highlighted this point during the public consultation process.
- Low degree of Law enforcement due to poor consideration of the socio economic context during Laws development, outdating regarding technological and economic advances, the lack of capability of civil associations and decision makers, and the lack of awareness and public participation in regulations enforcement.
- Lack of punitive and incentive measures under water and environmental regulations.
- Lack of standards for water quality of receiving waters and water uses.
- Lack of fixed criteria for the provision of discharge licenses.
- Lack of legal procedures to evaluate climate change impacts on coastal areas.
- Low protection of the coastal setback lines.

2.2 Integrated Coastal Diagnosis

The previous chapter summarized the baseline conditions found during the diagnosis of Mariut Lake and Valley. It identified and described the local characteristics of the three main subsystems i.e.: Territory and Environment, People and Economy, and Stakeholders and Regulations. The full description, as above mentioned, is presented in the MLV Integrated Diagnosis, Section II, Chapter 1. The next step was to structure the major findings in a clear and straightforward manner, facilitating understanding of the coast by coastal managers.

The use of strategic planning tools as the SWOT Analysis aims to provide a holistic understanding of Mariut's coastal system. It facilitates the discernment of the most significant interrelations between the different subsystems of the coastal area.

The SWOT Analysis also contributes to the definition of the operational objectives for the ICZM Plan as it identifies specific assets and activities that should be maintained, avoided, promoted or prevented in order to progress towards a healthier Mariut Lake and Valley and a more sustainable use of local resources.

Table 2.1 and 2.2 summarize the outcomes of the SWOT Analysis. These results were validated and refined according to the discussions held in Alexandria during the Workshop "Resources, Management and Sustainability". These outcomes were structured into contributing and constraining factors and issues, distinguishing between those considered internal and external (Figure 2.6).

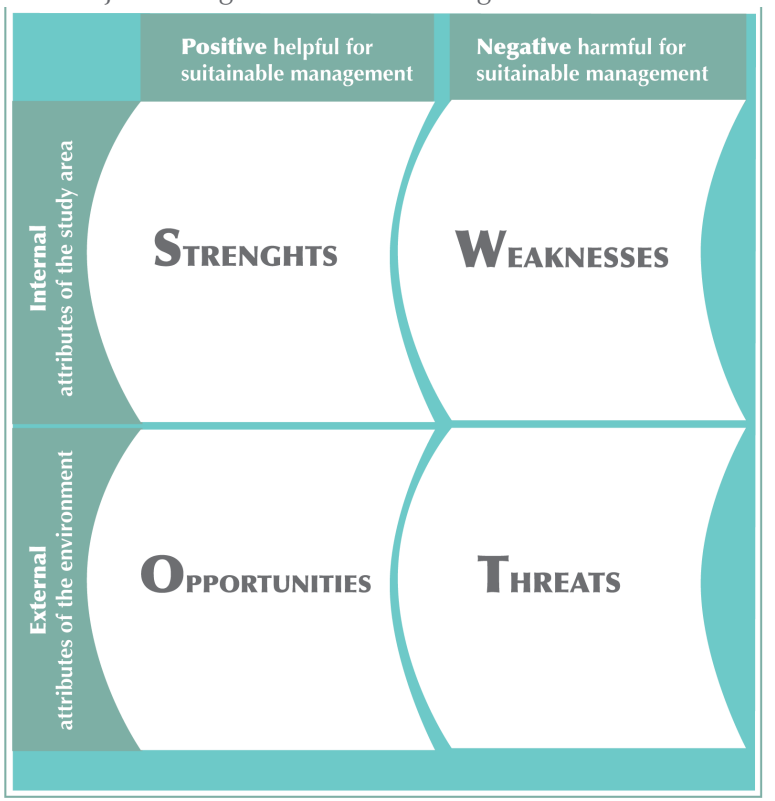


Fig. 2.6 SWOT components

The stakeholder consultation also contributed to identifying the geographical scope of these factors as illustrated in Figure 2.7.

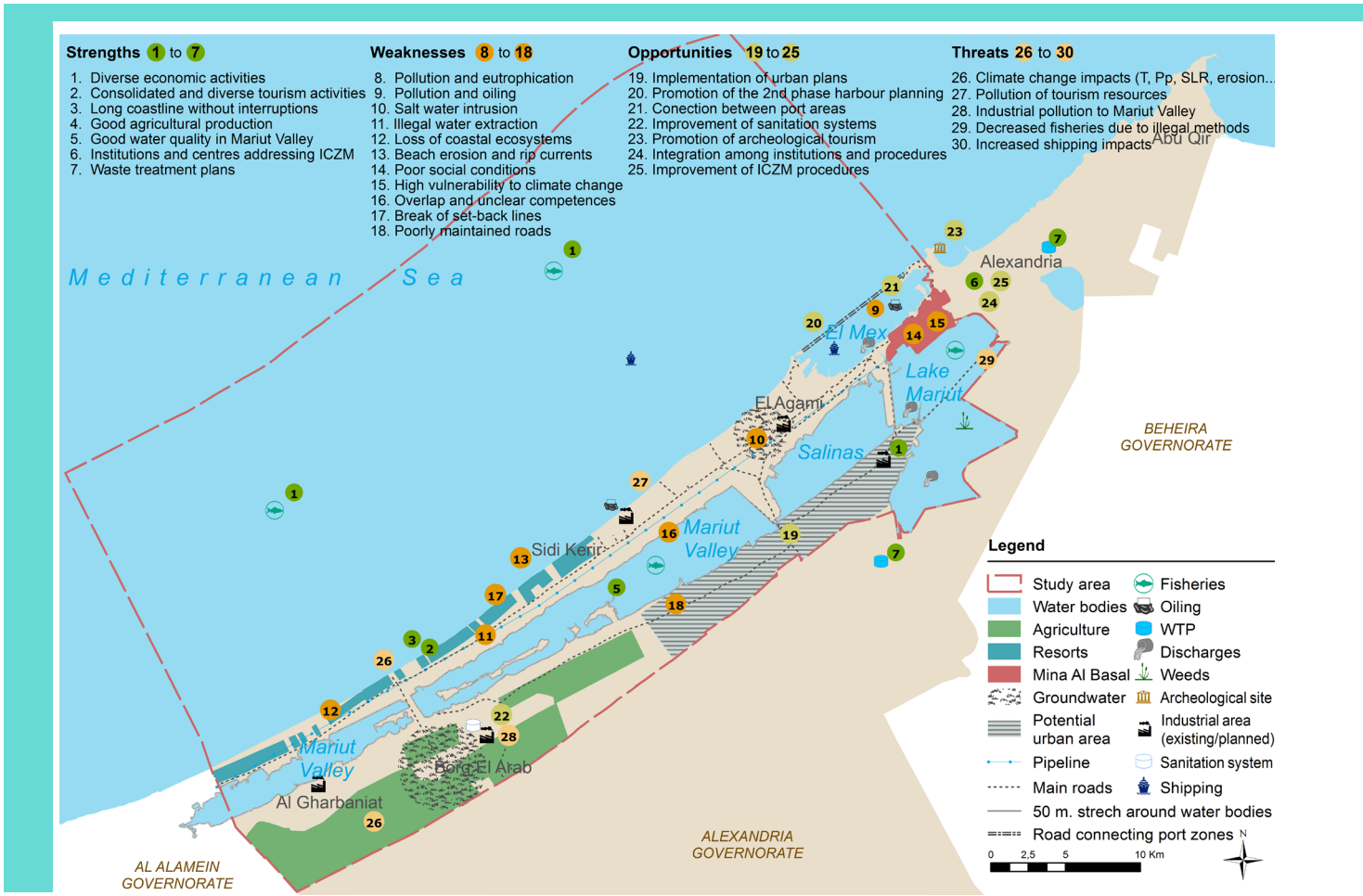


Fig. 2.7 SWOT Analysis of Mariut Lake and Valley.

STRENGTHS

TERRITORY AND ENVIRONMENT

- *Diversity of natural resources:*
  - o Fish stocks in Lake Mariut and Mediterranean Sea.
  - o Arable land.
  - o Fresh water in aquifers and more than 450 wells in the study area.
  - o Long coastline without interruptions (35 km between Sidi Kerir and the western border of Alexandria Governorate).
  - o Nice weather.
- *Strategic geographical position.*
- *Existence of communication infrastructures: highways to Cairo and Matruh, El Dekhiela and Western ports, airports and train connections.*
- *Good water quality in Mariut Valley.*

PEOPLE AND ECONOMY

- *Diversity of economic activities:*
  - o Fisheries in Lake Mariut and Mediterranean Sea.
  - o Aquaculture in Mariut Valley.
  - o Salt mines.
  - o Good agricultural production, including barley, rice or figs.
  - o Consolidated and diversified tourism activity attracting economic resources.
  - o Consolidated industry, including oil refineries, petrochemical, metal industries, chemical, pharmaceutical, spinning, paper and processed food.
  - o Marine transportation.
- *Cultural and archaeological heritage close to the study area.*

STAKEHOLDERS AND REGULATIONS

- *Existence of research centers specialized in water, coasts, oceanography and environment (NIOF, CoRI, University of Alexandria, Drainage Research Centre, etc.).*
- *Existence of agencies and institutions with competences on coastal management (EEAA, MWRI, GAFRD, Alexandria Governorate).*
- *Existence of international awareness and occasionally funding for coastal management initiatives, including ICZM and climate change.*
- *Relevant key-stakeholders are willing to participate and cooperate in the implementation of ICZM processes*

WEAKNESSES

TERRITORY AND ENVIRONMENT

- *Pollution and eutrophication of Lake Mariut, including organic matter, pesticides, heavy metals, bacteriological pollution, hydrogen sulfide causing terrible odor around Lake Mariut, etc.*
- *Presence of weeds in Lake Mariut.*
- *Low fresh water inflows to Lake Mariut.*
- *Contaminated fish in Lake Mariut.*
- *Pollution in port areas and coastal waters.*
- *Oiling in the area of SUMED and in ports.*
- *Solid waste on beaches.*
- *Beach erosion and rip currents dangerous to users.*
- *Saltwater intrusion, especially in Borg El Arab and El Agami areas (related to overexploitation and wastewater disposal, among others).*
- *Illegal extraction of water from the pipeline parallel to Matruh Road.*
- *Lack of natural areas in the coast.*
- *Occupation of dunes and sabkhas (decreased ecosystem services).*
- *Lack of environmental awareness.*
- *Lack of availability of coastal data.*
- *Poorly maintained roads.*
- *Lack of implemented urban plans.*
- *No long-term vision nor planning.*

Table 2.1 Strengths and Weaknesses.

PEOPLE AND ECONOMY

- *Poverty of fishermen communities, unemployment and lack of job opportunities.*
- *Decrease of fisheries.*
- *High illiteracy rate among fishermen and low schooling rates.*
- *Health problems and lack of medical assistance in fishermen communities.*
- *Lack of awareness regarding local communities (fishermen, small-scale farmers or Bedouins).*
- *High vulnerability to climate change (slums and informal settlements with lack of basic services and poor housing conditions).*
- *Lack of public access to the coast in many areas.*

STAKEHOLDERS AND REGULATIONS

- *Unclear institutional competences (especially between Alexandria Governorate, MWRI, EEAA, GAFRD):*
  - Unclear ownership of Lake Mariut.
  - Overlap of competences in the 50 m. stretch around water bodies.
  - Overlap in the management and control of the water environment.
- *Overlap in water and environmental regulations (Law 4 of 1994 -amended by Law 9 of 2009- and Law 48 of 1982).*
- *Low enforcement of water and environmental regulations and setback lines.*
- *Water and environmental regulations do not ensure environmental protection.*
- *Continuous governmental changes.*
- *Lack of capabilities/skills/capacities of coastal managers.*
- *Lack of coordination between stakeholders (i.e.: in water quality management).*
- *Complicated bureaucracy for solving problems.*

The main **strength** is the existence of many natural resources such as seawater and coastal lagoons, aquifers and fertile soil, long, sandy beaches, mild weather and a strategic geographical location, together with numerous cultural assets such as the rich archaeological and urbanistic patrimony. These resources have consolidated many economic activities such as fishing and aquaculture, farming and agriculture, transportation and trade, tourism and industry during centuries.

Another relevant strength is the presence of numerous research and development agencies and authorities settled in Alexandria. The National Institute of Oceanography and Fisheries, the Coastal Research Institute, the University of Alexandria, the Drainage Research Institute are just a glimpse of the scientific potential of Alexandria, especially in the fields of water and coastal resources. In fact, their collaboration with international donors has produced abundant scientific literature on the Nile delta and its lakes as Mariut, Manzala or Burullus.

Unfortunately, the intense development of the aforementioned economic sectors (industrial, agricultural, aquaculture-based, real estate…) in Mariut's catchment area has polluted and transformed the main basin and its surroundings during the past decades. Nowadays, the ongoing transformation which has taken place in Mariut has resulted in a lessening in quantity and quality of important ecosystem services such as freshwater reservoirs, fisheries stocks, and recreational uses. Indeed, the major **weakness** is water pollution, having an impact on lagoons, coastal waters and aquifers. The existing water quality monitoring system covers Lake Mariut and El Mex bay, but other water bodies, as Mariut valley, are out of the current water quality monitoring system. This fact jeopardizes the maintenance of good water quality in the valley and its economic activities.

Besides, there is an absence of restrictive water quality criteria during the preparation and implementation of development plans and policies, consistent with precautionary and cumulative impact analysis principles.
Another remarkable conclusion is the apparent failure of current environmental regulations to maintain high standards, together with their weak enforcement and overlap with other regulations, especially those relative to water quality and management.

Paradoxically, even the strength of having important scientific and technological centers addressing coastal and water management is also limited by the scarce environmental awareness of local communities in general, and managers and technicians in particular. Precisely, the lack of awareness of the benefits of collaborative behavior is responsible for the numerous constraints regarding data sharing, knowledge transfer and effectiveness of sound decision-making, as well as for the limitations affecting the enforcement of regulations. This fact strongly contrasts with the willingness to collaborate revealed by numerous key stakeholders.

OPPORTUNITIES

TERRITORY AND ENVIRONMENT

- *Inclusion of secondary treatment in Eastern and Western Treatment Plants.*
- *Emerging solid waste management plan.*
- *Development of a sanitation system in the Borg El Arab area.*
- *Implementation of urban development plans (urban expansion in Al Amria, Borg El Arab and New Borg El Arab), and improvement of transportation networks.*
- *Road connection between El Dekhiela and the Western harbor.*

PEOPLE AND ECONOMY

- *Promotion of the second phase of the Western Harbor Management Plan.*
- *Promotion of tourism based on archaeological heritage.*

STAKEHOLDERS AND REGULATIONS

- *Good management system within the Alexandria Governorate capable to induce changes in Lake Mariut's management.*
- *Progress on the National Strategy of ICZM.*
- *International funding for ICZM initiatives.*
- *Capacity building for coastal managers in collaborative management.*
- *Improvement of environmental awareness.*
- *Improvement of coordination mechanisms among stakeholders, including all administrative levels, economic sectors and the research community.*

THREATS

TERRITORY AND ENVIRONMENT

- *Climate change impacts:*
  - *Increased RSLR and coastal retreat.*
  - *Flooding of low-lying areas: northern and north-eastern borders of Lake Mariut.*
  - *Impacts on water availability and increased salinization of aquifers.*
- *Earthquakes and tsunamis.*
- *Pollution, as a threat for tourism and agriculture activities.*
- *Industrial development in Borg El Arab would affect Mariut Valley water quality.*
- *Increased shipping activities would affect coastal and marine environments.*
- *Enlargement of infrastructures in and around Lake Mariut.*
- *Overexploitation and pollution of groundwater, together with new developments and water needs, threat the sustainability of aquifers in the Borg El Arab area.*

PEOPLE AND ECONOMY

- *Climate change impacts on economic activities and employment:*
  - *Increased temperature is a threat for agriculture production.*
  - *Increased temperature of water would affect fisheries and aquaculture.*
  - *SLR and erosion of beaches affect tourism activities.*
- *Climate change impacts on population:*
  - *Flooding of densely populated areas around Lake Mariut with high vulnerability.*
  - *Population migration.*
- *Loss of agriculture lands due to urbanization, especially in the Borg El Arab area.*
- *Decreased fisheries stocks, due to illegal fishing methods in Lake Mariut and the Mediterranean Sea.*
- *The use of cages in aquaculture would decrease water quality in Mariut Valley, affecting the sustainability of aquaculture activities.*

STAKEHOLDERS AND REGULATIONS

- *Lack of legal awareness of environmental liability reduces the capacity of Public Budgets to support ICZM processes*

Table 2.2 Opportunities and Threats.

The most relevant **threat** weighed by most stakeholders was the importance of pollution trends in Mariut, since if no actions are taken there is a serious danger that ecological services and ecosystem health will worsen in the short-term both in the already affected Mariut Lake as in the still healthy Mariut Valley. Unfortunately, this threat is strengthened by the limited generalized awareness on environmental liability, which also contributes to limit the capacity of Public Budgets to implement recovery and remediation measures, such as ICZM processes.

Climate change is also a remarkable threat in the study area. Coastal hazards increased by changes in driver variables together with high vulnerabilities of local communities around Lake Mariut may result in severe impacts. Physical impacts such as temporal and permanent flooding, beach erosion, droughts and water salinization can induce derived socio-ecological impacts as for instance population migration, a decrease of fresh water and fisheries production, loss of arable lands and beaches, flooding of industrial areas, and damages to the archaeological heritage. However, quantifying the future impacts of climate change is limited by the lack of reliable data series, both in terms of temporal and spatial scale. Reliable data series would allow the design of specific adaptation and mitigation measures in the area.

Finally, two very relevant **opportunities** have been also identified during the diagnosis phase, i.e. the existence of an ICZM framework in the Mariut area and the relevance of Mariut Lake, Alexandria and the Nile delta for international donors. The first one includes the Protocol on ICZM in the Mediterranean, which is part of the Barcelona Convention and was transposed into the Egyptian Legislation by means of Law 9 of 2009, and the Draft National ICZM Strategy, which already identified a set of priorities for coastal management. On the other hand, international donors are keen on investing in the area since the Nile delta is one of the most important hot spots worldwide as regards climate change, affecting issues of global concern such as coastal risks (as a result of the construction of the Asuan Dam), pollution of large marine ecosystems in the Eastern Mediterranean or adaptation to climate change, especially to relative sea level rise impacts.

2.3 Key Issues for Integrated Coastal Management

Identification of Key Issues is the cornerstone for achieving the transition from the diagnosis phase to the effective planning stages. Understanding the functioning of the coastal system is crucial for developing a Plan which is clearly focused on its objectives and actions, as the Key Issues represents the priorities for management. A preliminary list of 20 Issues was made based on three major sources of information, the Draft National ICZM Strategy, the Integrated Coastal Diagnosis, and public consultation.

These issues, which are shown in Figure 2.9 were then evaluated to identify the final Key Issues for the integrated management of the coastal area.

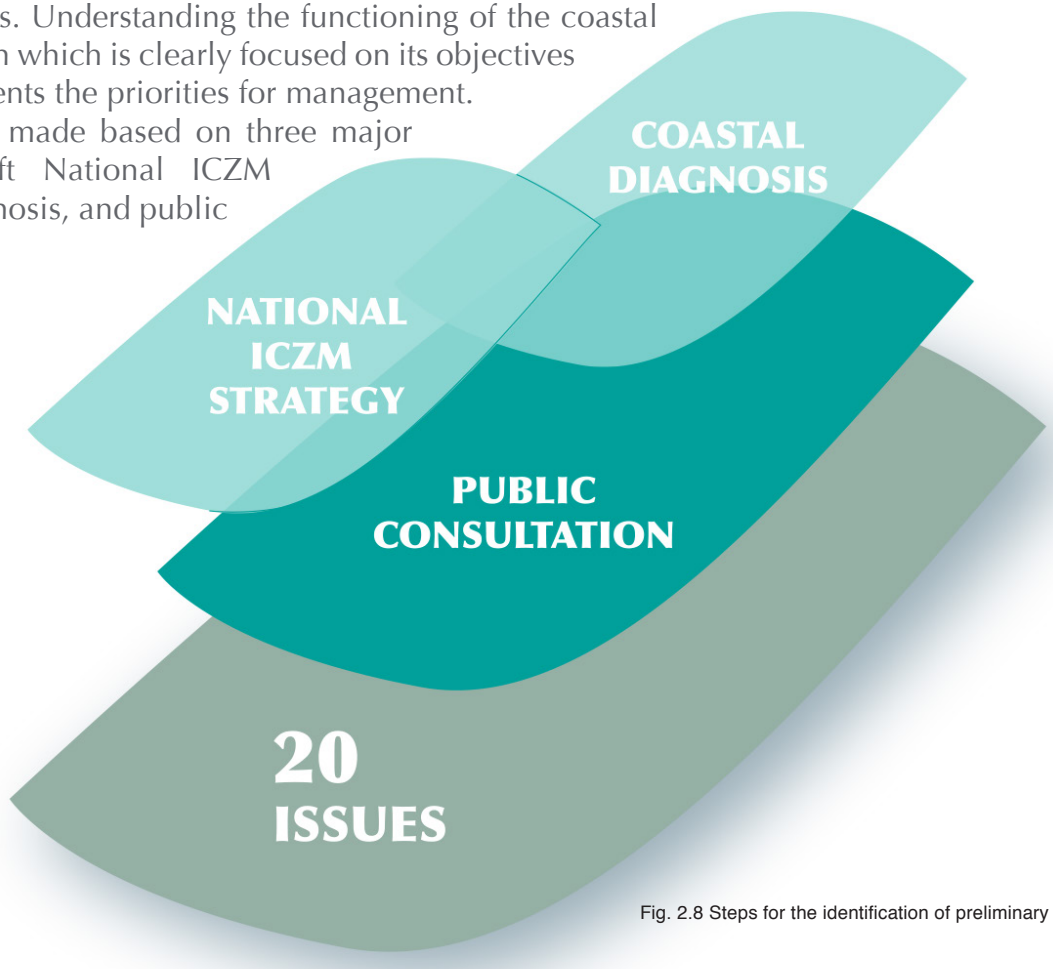


Fig. 2.8 Steps for the identification of preliminary Issues.

Codes & Issues

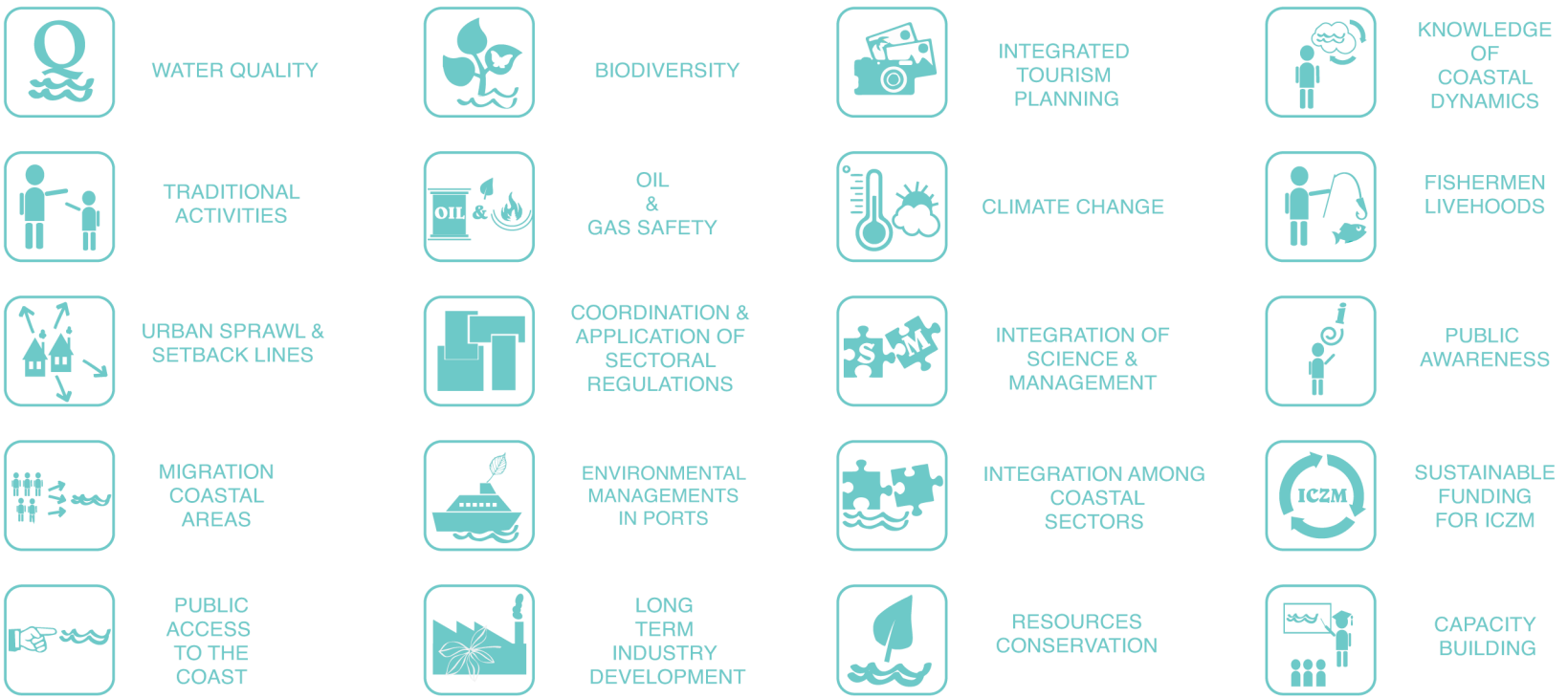


Fig. 2.9 Preliminary Issues.

This evaluation consisted in interpreting their Importance and Relevance to better capture the full picture of the complex relational system. Identifying those sensitive issues than can trigger broader changes to the overall system is the final outcome as they will constitute the main management priorities for the Mariut Lake and Valley ICZM Plan.

Figure 2.10 shows the steps followed during evaluation and identification of the Key Issues, but the complete description of the methodology, including partial results are discussed in the MLV Integrated Diagnosis, Section II, Chapter 3.

Importance was evaluated by key stakeholders participating in the "Resources, Management and Sustainability" workshop. It stands for the magnitude of the significance of a given issue for achieving the aims of the project.

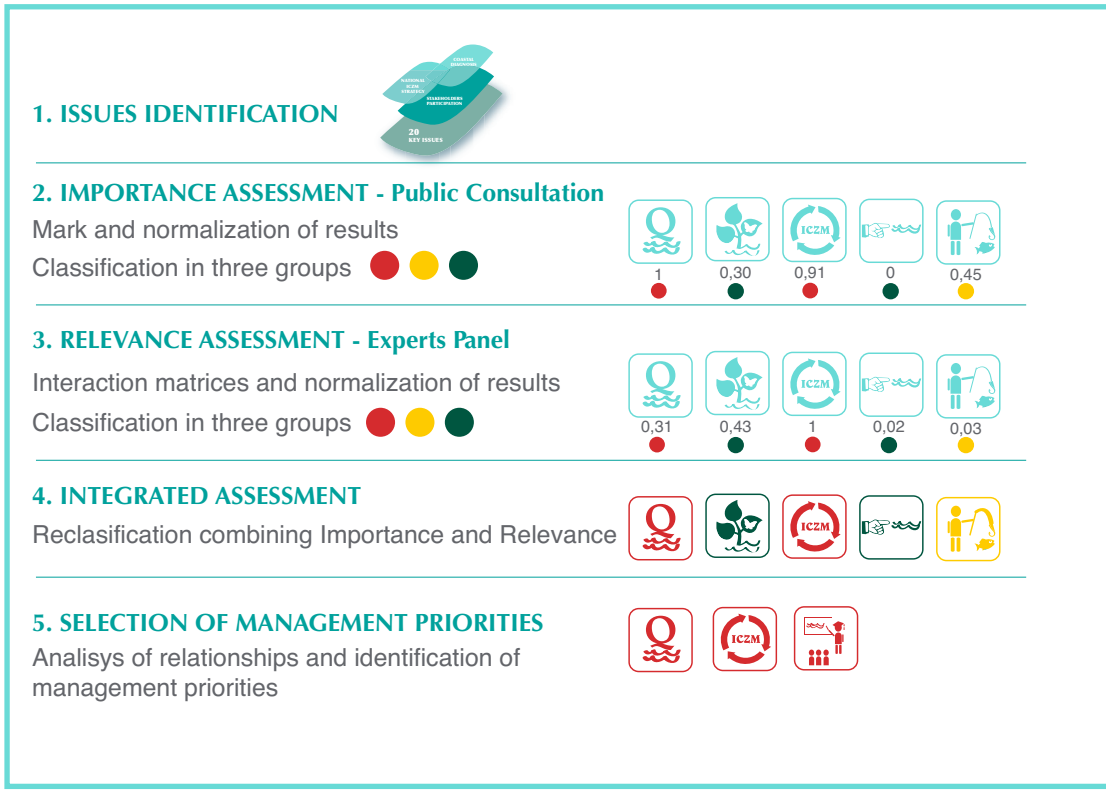


Fig. 2.10 Methodology for the selection of Key Issues.

Relevance, in contrast, is related to the power that each specific issue has to facilitate or impede the consecution of ICZM, and it was evaluated by a panel of coastal managers.

The final selection of the Key Issues was the result of combining both dimensions into one single classification. The results of this analysis are illustrated in Figure 2.11.

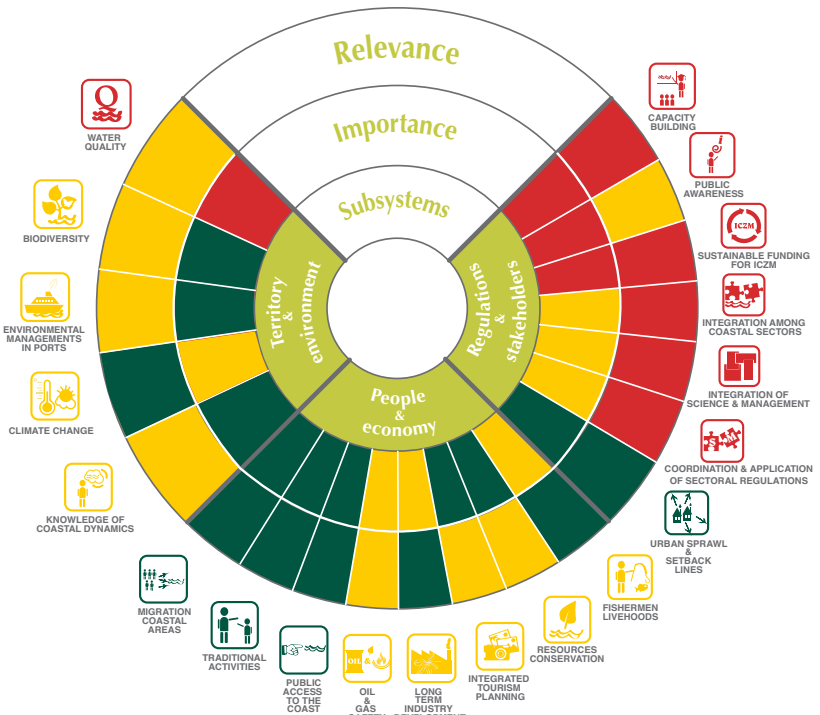


Fig. 2.11 Selection of Key Issues.

Seven Key Issues were thus prioritized as management objectives and build a set of strategic objectives for the MLV-ICZMP. A brief description of each of them is provided in the following sections.

WATER QUALITY

Water quality represents the major challenge. Lake Mariut is heavily polluted and its valley may be further threatened by industrial developments and aquaculture expansion. The sources of degradation of water quality in Mariut Lake include domestic sewage, agriculture and industrial discharges containing organic matter and heavy metals. It causes a severe eutrophication in the Lake. Pollution in Lake Mariut affects fisheries and human health, and threats the opportunities of urban or tourism developments around the lake.

Monitoring and management of water quality is the key to improve water quality in the Mariut area. Currently, many institutions overlap in the management and control of water quality. It causes the duplication of efforts and the lack of common strategies to face water quality challenges. Although these institutions have made big efforts to improve the water quality monitoring system, it covers the Mariut lake but not the valley. Besides, the lack of awareness (social and institutional) and of long term strategies for improving water quality are some of the causes of the persistence of this problem.

SUSTAINABLE FUNDING FOR ICZM

Funding is one of the main constraining factors to implement ICZM plans and continue with management policies in the medium and long term. In fact, stakeholders showed this concern during the public consultation process.

Then, this Key Issue refers to the provision of long term and sustainable funding procedures to implement the MLV-ICZM Plan and subsequent ICZM policies and initiatives in Alexandria Governorate. The various stakeholders involved (institutions and local stakeholders –i.e., industries, tourism agencies, fishermen and aquaculture companies-) should agree and make a commitment regarding the support of funding strategies for local ICZM.

COORDINATION & APPLICATION OF SECTORAL REGULATIONS

Sectoral regulations and laws are usually established without considering interactions with other sectors. Besides, social and economic conditions are not carefully assessed when defining sectoral laws. This causes overlaps and gaps in regulations and competences, leading recurrently to conflicts among stakeholders. For instance, the coexistence of different laws for the management of water environment *(Law 4 of 1994 and Law 48 of 1982)* requires a bigger coordination effort at institutional level. This Key Issue stresses the necessity of coordination among stakeholders to define comprehensive laws and regulations, ensuring its applicability.

INTEGRATION OF SCIENCE & MANAGEMENT

Decisions regarding coastal resources and activities should be based on scientific knowledge in order to ensure their sustainability and applicability. As mentioned in previous sections, Alexandria hosts numerous research centers including marine and coastal research centers as NIOF and CoRI. There are some communication channels between research centers and management institutions but there is a lack of formal and regular communication and collaboration mechanisms between them. Accordingly, this topic refers to participation of scientific institutions in management and decision-making processes in the area of Mariut.

INTEGRATION AMONG COASTAL SECTORS

The Mariut area hosts many different human and economic activities such as industry, tourism, marine transportation, agriculture and fisheries and aquaculture, urban development and social affairs. The cooperation between sectors requires the mutual understanding and the identification of common targets.

This Key Issue focuses on the relationships between the different sectors and activities of Mariut area, including public institutions and private organizations. This Key Issue also addresses the relationships among government agencies in different sectors. Horizontal integration and coordination seek for the identification of synergies and the development of common strategies.

PUBLIC AWARENESS

Stakeholders highlighted the lack of social and environmental awareness of the society and private sector. Then, this Key Issue refers to the level of information and conscience the society has regarding the status of the environment, the consequences of water pollution, the life conditions of local communities, the risks caused by climate change and the economic challenges of the study area. It also covers the awareness of private stakeholders, including associations and companies. The public awareness may modify social behavior and promote the involvement of citizens into the planning processes.

CAPACITY BUILDING

Training and capacity building was one of the Issues identified during the consultation activities. Stakeholders emphasized the need of increasing the ability of institutions to perform functions in a sustainable manner. In this regard, one of the major challenges is the frequent changes in high-managerial positions as this significantly impacts the existing capacities at institutional or decision-making levels.

This Key Issue discusses the needs of increasing the capacity of institutions and technicians on coastal management. Institutions with competences in coastal areas (especially EEAA, MWRI and Alexandria Governorate) should ensure that their staff have a sound knowledge on the coastal challenges, on ICZM and on collaborative management.

CLIMATE CHANGE

During the analysis of Issues, climate change obtained medium values of Importance and Relevance, and was thus not selected as a Key Issue.

However, Climate Change should be taken into account in the planning phase, since it is a crosswise issue that will no doubt induce changes in other issues and Key Issues of the coastal area at mid and long term.

The Climate Change and SLR Study (MLV Integrated Diagnosis, Section I, Chapter 3) compiled existing information about observed and projected climate change impacts in the area of Alexandria. Flooding, coastal retreat and saltwater intrusion are some of the physical impacts that may cause derived socioeconomic impacts as population displacement, a decrease in water quality and quantity and losses in various economic resources, hence affecting urban development and economic activities in the area (tourism, agriculture, industry and fisheries). According to El Raey, 2010, a SLR scenario of 30 cm would displace more than 500,000 people from the area of Alexandria, while more than 70,000 would lose their jobs. The OECD, in 2004, assessed the impacts of climate change on different sectors. This study concluded that a SLR scenario of 25 cm would affect for instance the 63% of vegetation areas, the 31 % of tourism areas and the 56% of industrial areas.

Therefore, Climate Change will have an important effect on other Issues such as Water Quality, Migration to Coastal Areas, Biodiversity, Resources Conservation, Integrated Tourism Planning or Long term Industry Development.

2.4 Relevant initiatives contributing to ICZM

The identification of Key Issues for ICZM will deeply determine the planning process. There is therefore a clear need to compare current initiatives, which may be relevant or address the selected Key Issues. The following table summarizes recent initiatives were found that address relevant ICZM dimensions in the area of Alexandria:

Project	Donor – implementation agency	Budget (millions of USD)
Alexandria Coastal Zone Management Project (ACZMP)	WB – GEF – EEAA	7.15
Strategic Urban Plan for Alexandria City 2032 (SUP)	UNDP – Ministry of Housing, Utilities and Urban Development: GOPP	5.0
Adaptation to Climate Change in the Nile Delta through ICZM Project	UNDP – CoRI, SPA (MWRI)	16.84
Alexandria LAke Maryut Integrated Management (ALA-MIM)	European Union (SMAP III) – Alexandria Governorate – EEAA-CEDARE	0.60
PEGASO project	European Union (FP 7) –Universitat Autonoma de Barcelona – Egyptian partners: NARSS and NIOF	8.97

Table 2.3 Main projects related to ICZM in Alexandria and Mariut area.

A brief summary of these initiatives is presented in the following sections:

ALEXANDRIA COASTAL ZONE MANAGEMENT PROJECT

The objective of the ACZMP is to improve the institutional mechanisms for sustainable coastal zone management in Alexandria, and in particular to reduce land-based pollution discharges to the Mediterranean Sea.

Three main outcomes are identified for the ACZM Project, i.e.:

- **Low-cost interventions for pollution reduction**
- **The development of an integrated water quality monitoring network for Lake Mariut and El Mex Bay,**
- **A numerical model for the 6,000 Feddan basin of Lake Mariut to estimate the overall impact of the project in the East Mediterranean.**

Particularly, the monitoring program has already contributed to improve the coordination of the large number of institutions involved in the management of the water quality in Lake Mariut. The design of the integrated water quality monitoring program was based on the assessment and integration of three previous monitoring systems, managed by:

- EEAA Alexandria Regional Branch Office (EEAA Alexandria RBO).
- General Authority for Fish Resources Development, under the Ministry of Agriculture.
- Drainage Research Institute, under the Ministry of Water Resources and Irrigation.

The resulting monitoring program includes the preparation of monthly reports on the physical, chemical and bacteriological results of the sampling stations at Lake Mariut. These reports are distributed among different stakeholders by the EEAA Alexandria RBO, which is also be responsible for the coordination of the monitoring system.

Besides, the ACZMP is developing a GIS and a web site to facilitate the publication of water quality data in Lake Mariut. Other activities developed under the ACZMP aim at implementing low cost interventions for pollution reduction. A pilot project has been executed at the Western Treatment Plant. Here, circa 13% of the total water effluent (50,000 out of 400,000 m3/day) is treated by a biofilm. This biofilm treatment amounts to only 12% of the total cost of a chemical secondary treatment. Finally, the ACZMP also supports GAFRD by removing weeds from Lake Mariut, and increasing the inflow of fresh water into the lake.

STRATEGIC URBAN PLAN FOR ALEXANDRIA CITY 2032

The objective of the SUP is to improve the quality of life and the built environment of the city of Alexandria. The main expected outcomes include:

- **A Strategic Urban Plan for Alexandria city to guide development until year 2032.**
- **Improved capabilities of the Regional Centre and Local Partners.**
- **An Urban Management Strategy and Guidelines to implement a sound efficient management framework.**

The project adopted a wide participatory framework aiming to access the largest possible number of stakeholders. The SUP Vision for Alexandria was already settled according to the current situation and the needs expressed by many stakeholders.

Some of the most relevant issues identified are shown in the next Table.

The main problems addressed by the SUP are

URBAN	ENVIRONMENTAL	INSTITUTIONAL
Urban density	Erosion of beaches	Lack of an effective registration system
Growth of informal areas	Salt water intrusion	Lack of coordination and weak cooperation among stakeholders
Inconsistencies in land uses	Salt water intrusion	Centralization of decision making
Destruction of cultural and architectural heritage	Sea level rise	Weak law enforcement
Deterioration of public transport	Pollution	
Poor road conditions		
Traffic congestion		

Table 2.4 Main problems addressed by the SUP.

The transformation of these issues into challenges to be addressed by the SUP contributed to define its six lines of action:

1. Achieve a balanced and comprehensive development of the local economy.
2. Develop a good communication network for public transport
3. Provide an opportunity for the growth of the scheme to the city's outskirts list.
4. Urban growth of the city westwards.
5. Improving infrastructures and environmental quality.
6. Encourage community participation.

The following figure was shown during the Workshop "Resources, Sustainability and Management" held in Alexandria in 2014. This figure displays an example of the expected spatial incidence of the SUP, still in discussion. Finally, some of the issues that were specifically addressed by the SUP included the improvement of public infrastructures and urban sprawl in the Al Amria, Borg El Arab and New Borg El Arab qisms. However, the specific actions planned and their geographical scope have not been finalized yet.

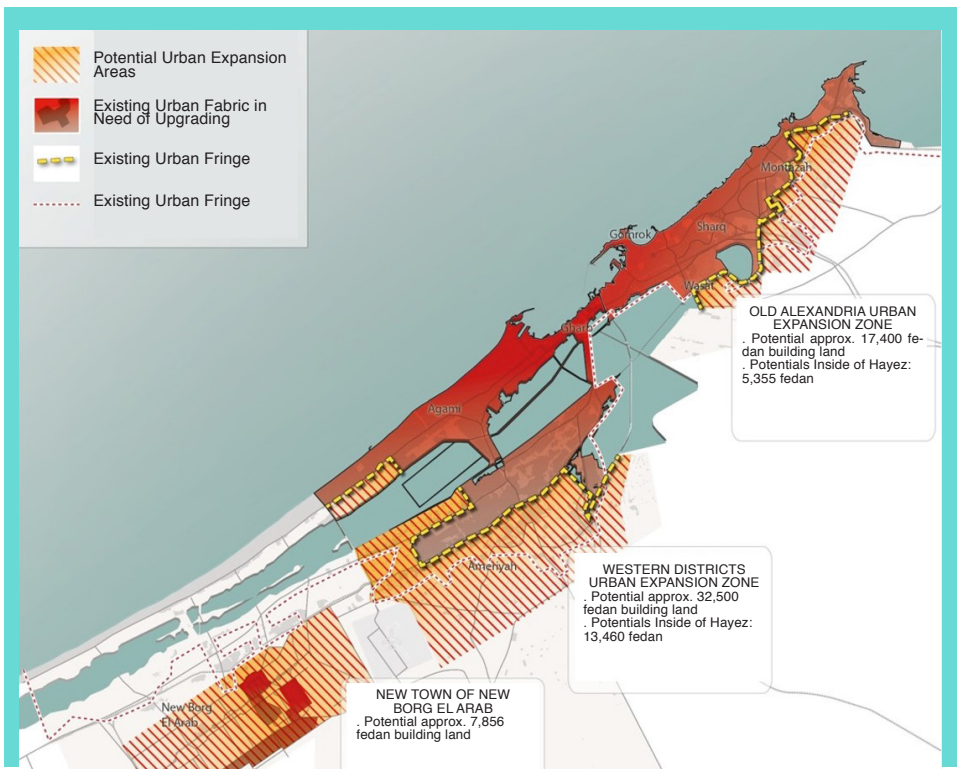


Fig. 2.12 Example of the expected spatial incidence of the SUP.

ADAPTATION TO CLIMATE CHANGE IN THE NILE DELTA THROUGH INTEGRATED COASTAL ZONE MANAGEMENT IN EGYPT

The goal of the project is to enhance Egypt's resilience and reduce its vulnerability to Climate Change impacts, this is intended throughout the integration of sea level rise risk management into the definition of Egypt's Low Elevation Coastal Zone in the Nile Delta, using the "adaptive capacity approach" for both human and natural systems. This project has resulted in three major outcomes to date:

- **Strengthening the regulatory framework and institutional capacity to improve resilience of coastal settlements and infrastructures.**

- **Implementation of strategies and measures that facilitate adaptation to climate change im pacts, particularly SLR in vulnerable coastal areas of the Nile Delta.**

- **Establish monitoring and knowledge-based management systems to facilitate adaptive management in the face of unfolding climate change impacts.**

Finally, four components for the implementation of the project are set. On the one hand, the first deals with the regulatory framework and institutional capacity, while the second establishes on-the ground measures for the evaluation of SLR impacts on both human and natural systems, and the third manages the knowledge and information gathered and produced to facilitate its proper integration in the planning process. On the other hand, the forth component is devoted to manage and monitor progress in the implementation of the project and in the achievement of results.

ALEXANDRIA LAKE MARYUT INTEGRATED MANAGEMENT (ALAMIM) PROJECT

Alexandria Lake Maryut Integrated Management (ALAMIM) Project is one of the eight Regional Projects financed by the European Commission's Short and Medium Term Environmental Action Programme SMAP III around the Mediterranean in the light of the rapid deterioration of this sensitive area.

Within this context, the ALAMIM Project aims at promoting sounder and more sustainable development of the Coastal Zone of Alexandria through the promotion of integrated management of Lake Mariut Zone. The Project targets Alexandria Governorate, the Regional Bureau of EEAA, relevant local and national authorities, industries, local communities and NGOs, private sector, investors, and visitors, through:

- Assisting in the development of a sound integrated management action plan for this zone encompassing environment protection, economic development and the needs and interests of all stakeholders.
- The development and institutionalization of Lake Maryut Management and Monitoring units at Alexandria Governorate and the regional bureau of EEAA.
- Human Resources Capacity building of local and national institutions.
- Building public awareness and encouraging stakeholders' participation.

PEGASO PROJECT

The main objective of PEGASO was to build on existing capacities and develop common novel approaches to support integrated policies for the coastal, marine and maritime realms of the Mediterranean and Black Sea Basins in ways that are consistent with and relevant to the implementation of the ICZM Protocol for the Mediterranean.

The major outcomes of the PEGASO project are:

- **Constructing an ICZM governance platform as a bridge between scientist, end-user communities and decision makers, going far beyond a conventional bridging.**
- **Refine and further develop efficient and easy to use tools for making sustainability assessments in the coastal zone (indicators, accounting methods, models and scenarios). They will be tested and validated in a multi-scale approach for integrated regional assessment through a number of relevant pilot sites. One of the Mediterranean pilot sites is the Nile Delta.**
- **Implementation of a Spatial Data Infrastructure (SDI), following the INSPIRE Directive, to organize and standardize spatial data to support information sharing on an interactive visor, to make it available to the ICZM Platform, and to disseminate all results of the project to the end users and interested parties.**

The pilot case of the Nile Delta encompassed the coastal area of Beheira, and the Kafr El Sheikh and Dakahlia Governorates, which limits with the Alexandria Governorate to the east.

Although the Alexandria Governorate and Lake Mariut are not included within the Nile Delta pilot site, the PEGASO project has a strong link with the Alexandria area. On the one hand, the PEGASO project defines an ICZM Plan for the Nile Delta facing some of the managerial Key Issues affecting Alexandria (i.e.: water quality, climate change, coordination among stakeholders…). On the other hand, the Nile Delta Coastal Group -created under the PEGASO framework- comprises research centers from Alexandria (NIOF and CoRI), as well as authorities that play an important role in the management of the Mariut area, including GAFRD, EEAA, and GOPP.

DISCUSSION

Some of the most relevant issues identified during the diagnosis of Mariut Lake and Valley have already been addressed by these important initiatives, i.e.: climate change, water quality, integration of science-policy. However, the total impact of these projects on these Key Issues cannot be fully estimated as they are still ongoing.

Nevertheless, their progress and expected actions have been taken into account to facilitate synergies and avoid redundancies or gaps in the definition of the scope of the MLV-ICZM Plan. The following Table identifies which Key Issues are addressed by these initiatives:

	Water quality	Sustainable funding for ICZM	Capacity Building	Coord. and application of sectoral regulations	Integration among science and management	Integration among coastal sectors	Climate change
ACZMP	Yes	No	Yes	No	Partial	Yes	No
SUP	No	No	Yes	No	Partial	Partial	Yes
CC DELTA	No	No	Yes	Yes	Yes	Yes	Yes
ALAMIM	Partial	Partial	Yes	No	No	Yes	No
PEGASO	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 2.5 Key Issues addressed by previous projects.

The analysis of these project, throws out the following conclusions:

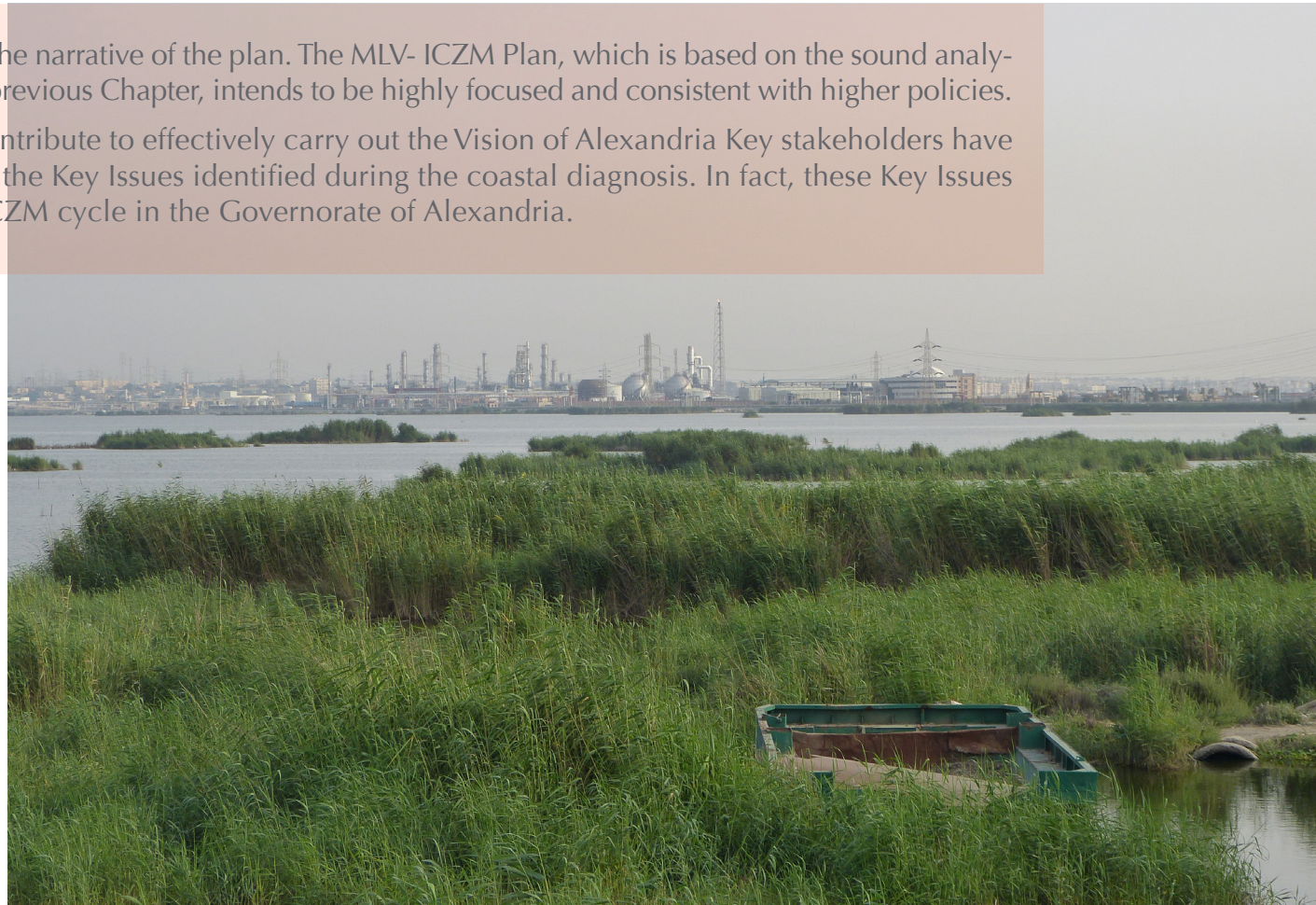
- The SUP should consider the impact of priority projects in the water environment.
- ACZMP, SUP, and PEGASO promote participatory activities and coordination among stakeholders. However, they do not establish formal participation and coordination mechanisms.
- The ACCNDP address the study of climate change impacts and organizes capacity building on climate change and coastal management.
- The ALAMIM project proposes institutional structures for ICZM but they should be reviewed and updated.
- The PEGASO project does not cover the Alexandria Governorate.
- Many stakeholders do not know current initiatives in Alexandria (when questioned at our workshops they manifested to be unaware of their existence).

3

Mariut Lake and Valley ICZM Plan

This section provides the narrative of the plan. The MLV- ICZM Plan, which is based on the sound analysis summarized in the previous Chapter, intends to be highly focused and consistent with higher policies.

The ICZM Plan will contribute to effectively carry out the Vision of Alexandria Key stakeholders have in mind, by managing the Key Issues identified during the coastal diagnosis. In fact, these Key Issues are to focus the first ICZM cycle in the Governorate of Alexandria.



Lake Mariut

3.1 ICZM context in Egypt

In the year 1994 the ICZM Department was created within the Egyptian Environmental Affairs Agency. Since then, some ICZM plans such as the Marsa Matruh - El Sallum or Fuka - Matruh, have been developed, and even a National Strategy for ICZM has been drafted.

In the international arena, Egypt signed and ratified the Protocol on ICZM in the Mediterranean Sea, thus contributing to its enforcement. In 2009, Egypt also amended its Law for the Environment, 1994, to update the national environmental legislation according to this Protocol.

Alexandria was already part of the ALAMIM project, which in 2008 represented the first efforts to promote ICZM in Lake Mariut, and was also influenced by the PEGASO project in 2012. Egypt has still not executed any of such ICZM efforts successfully, but these projects are establishing favorable conditions for ICZM to be effectively implemented in the area.

In this context, the MLV-ICZM Plan identifies the management priorities for the Mariut area and contributes to develop a model for the integrated management of the Alexandria Governorate.

3.2 Vision and Mission

The Vision of the ICZM Plan for the Lake and Valley Mariut was agreed upon the stakeholders participating in the workshop "Resources, Sustainability and Management". This workshop ended up agreeing upon the future of the city and governorate of Alexandria. This consensus built provides the long-term vision for the lake and valley of Mariut, i.e.:

"To return the environment of the Alexandria Governorate to the time where waters were clean, the air was unpolluted and the natural resources suitably and sustainable utilized by local citizens. To achieve this by following a new path that is based on government working with all local stakeholders to prepare and implement spatial and urban plans that are inclusive and transparent, and that promote social wellbeing while promoting industrial and agricultural activities that are non-polluting and that create a strong economic base for those living in the Governorate now and in the future."

Visioning participatory activity.

According to this Vision, the Mission of the MLV - ICZM Plan is as follows:

"Creating enabling conditions for the coordination and integration of all stakeholders to improve the environmental quality of Lake Mariut and its valley and therefore to ensure the sustainability of fisheries, agricultural and industrial activities and to improve quality of life of local communities."

The MLV-ICZM Plan proposes a set of Objectives and Actions based on the sound diagnosis of the Mariut area. The contribution of each step of the diagnosis to the definition of the Objectives and Actions of the ICZM Plan is shown in Figure 3.1.

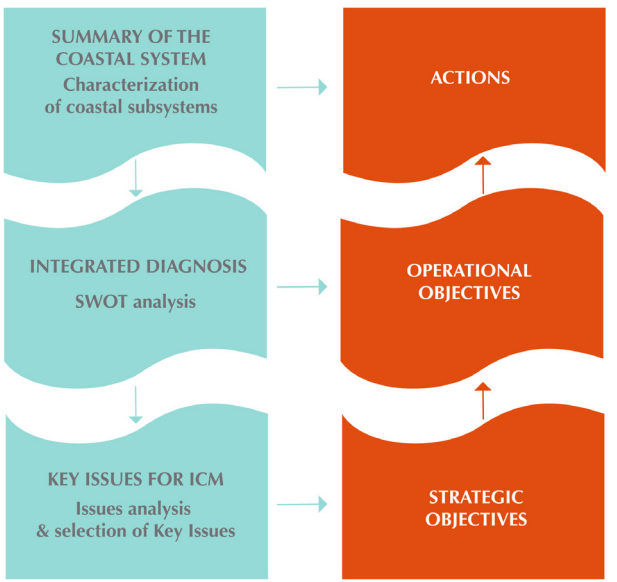


Fig. 3.1 Methodology approach for the definition of Objectives and Actions.

Two levels of objectives are proposed to better determine the set of highly-focused actions. The first one is the Strategic level that fixes specific lines of action. Strategic Objectives are based on the Key Issues. Figure 3.2 illustrates the way in which the Key Issues inspired the development of the four Strategic Objectives.

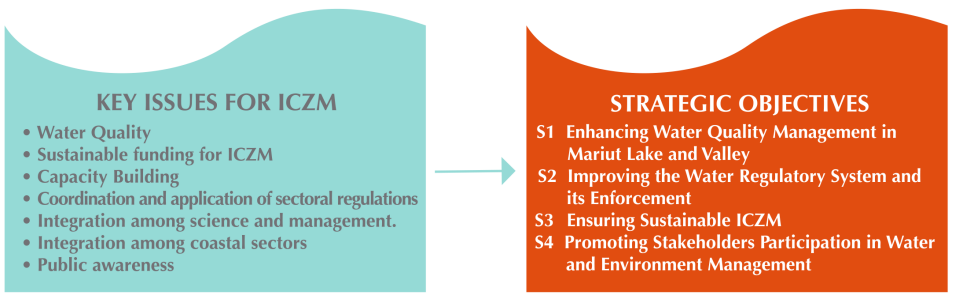


Fig. 3.2 Definition of Strategic Objectives.

The Strategic Objectives will be further characterized by the definition of Operational Objectives, which constitute the second level of objectives. These Operational Objectives are in turn inspired by the Integrated Diagnosis, i.e.: the SWOT Analysis, which facilitated translating the major findings of the diagnosis of the coastal system into the definition of 11 Operational Objectives.

Finally, each Operational Objective will be implemented through specific Actions, inspired by the sectoral needs of the Mariut area.

The following paragraphs thoroughly describe the Strategic and Operational Objectives mentioned above and provide the rationale for the definition of the 30 planned Actions. These actions are fully described in Annex II.

S1: ENHANCING WATER QUALITY MANAGEMENT IN LAKE MARIUT AND VALLEY

Water quality was identified by both technicians and local stakeholders as the most relevant issue for the management of coastal resources in the Mariut area. The decline of fisheries and many of Mariut's ecosystem services have highly impacted the livelihoods of local people. In Mariut Valley, water quality is better than that in Lake Mariut, and thus still supports some aquaculture activities. However, aquaculture, together with the development of new industrial areas might threat the water quality of the valley. Climate change is also increasing the pressure on water quality because of, for instance, salinization processes.

In spite of the large number of institutions managing water quality in Lake Mariut, information exchange between them is still limited. The integration and improvement of the three existing monitoring programs of water quality in Lake Mariut carried out by the ACZMP has significantly contributed to improve inter-institutional coordination. The S1 Strategic Objective continues this task and aims at strengthening water quality management, and more specifically, that of the monitoring system. It will also focus on reinforcing the mechanisms for coordination among stakeholders, particularly those related to spatial planning.

The following table presents the two Operational Objectives of S1 and includes the SWOT components addressed by these Operational Objectives.

SWOT	OPERATIONAL OBJECTIVE	
S. Good water quality in Mariut Valley. **W.** Saltwater intrusion, especially in Borg El Arab and El Agami areas (related to overexploitation and wastewater disposal, among others). **T.** The use of cages in aquaculture would decrease water quality in Mariut Valley, affecting the sustainability of aquaculture activities. **T.** Climate change impacts.	*S1 O1*	Increasing the Temporal and Spatial Scope of the Water Quality Monitoring System.
W. Lack of implemented urban plans. **O.** Development of a sanitation system in the Borg El Arab area. **O.** Implementation of urban development plans (urban expansion in Al Amria, Borg El Arab and New Borg El Arab), and improvement of transportation networks. **T.** Industrial development in Borg El Arab would affect Mariut Valley water quality. **T.** Overexploitation and pollution of groundwater, together with new developments and water needs, threat the sustainability of aquifers in the Borg El Arab area.	*S1 O2*	Ensuring the Adoption of Water Quality Criteria under Future Development Plans.

S. Strength / **W.** Weakness / **O.** Opportunity / **T.** Threat

Table 3.1 S1: Operational Objectives.

S1-O1: Increasing the Temporal and Spatial Scope of the Water Quality Monitoring System

The monitoring system set up by the ACZMP provides physical, chemical and bacteriological results together with the analysis of the temporal evolution of these measurements. This information is valuable for the identification of hot spots within the lake, the identification of illegal discharges and for the analysis of temporal patterns.

However, this monitoring system doesn't cover the whole of the Mariut basin and does not consider the long-term evolution of water quality. Therefore, this Operational Objective addresses and strengthens these two areas of action. The first area of action aims at including Mariut Valley in the water quality monitoring system (Figure 3.3). Water quality records in Mariut Valley will then provide information to assess the status of the water body and set the baseline conditions to analyse the potential impacts to water quality of the planned economic activities (mainly aquaculture, industry, and urban developments), in this basin.

The second area of action focuses on obtaining reliable datasets that allow analysing long-term processes affecting water quality; and more specifically, the impacts of climate change on water quality. In this regard, the project "Adaptation to CC in the Nile Delta through ICZM" addresses the study of the saline water intrusion and its possible behavior under different scenarios of climate change and sea level rise. Its results can contribute to the development of this operational objective, setting the appropriate variables to assess the impacts of climate change on water quality.

Fig. 3.3 Water quality monitoring system.

Two actions will form this Operational Objective:

1. Extending the water quality monitoring system to Mariut Valley.
2. The development and implementation of a set of indicators to monitor climate change effects on water quality.

S1-O2: Ensuring the Adoption of Water Quality Criteria under Future Development Plans

The development pressure in Mariut Lake and Valley is very intense as their surroundings hold a large number of industrial and agricultural activities. Informal urban development has expanded acutely and increased insalubrious living conditions along the Mariut basin, as well as increased consumption pressure on freshwater resources. This pressure includes groundwater withdrawal and water pollution because of sewage discharges.

New urban and industrial developments will significantly increase the water demand, so any development plan, as the Strategic Urban Plan for Alexandria City, should carefully consider specific cumulative impacts on water quality and validate explicit water management measures to minimize the deterioration of the ecological status of the Mariut basin.

This strategic objective proposes then mechanisms to facilitate communication and coordination between stakeholders responsible for spatial-planning and water quality management.

Specifically, two actions will be developed:

3. Including water quality assessment procedures into development plans and projects.
4. Establishing the communication framework for managers of water quality and urban development.

S2: IMPROVING THE WATER REGULATORY SYSTEM AND ITS ENFORCEMENT

The existing regulatory system is made of a large number of laws and regulations, some of the most relevant include Law 48 of 1982, Law 123 of 1983, Law 124 of 1983, the Presidential Decree 465 of 1983 and Law 12 of 1984, Law 4 of 1994 and its Amendment of 2009. But, even if this regulatory framework has been updated and improved during the past years, the general aggravation of the environmental status in the Mariut area specifically, and in the water environment of Egypt in general, calls for reconsidering not only the regulatory system but also its enforcement practices and mechanisms.

In fact, the ICZM Plan for the Nile Delta -proposed under the PEGASO project- defined one specific activity to reconsider existing Laws and regulations. This Strategic Objective, in line with PEGAGO project, identifies three major areas of improvement and sets one operational objective for each of them. Simplifying regulations regarding targets for environmental quality, fostering regulation efficiency when achieving targets, and strengthening enforcement practices and policy. In the following sections, these operational objectives are introduced and their actions listed.

SWOT	OPERATIONAL OBJECTIVE	
W. Water and environmental regulations do not ensure environmental protection.	*S2 O1*	Updating Water and Environmental Regulations
W. Overlap in water and environmental regulations (Law 4 of 1994 -amended by Law 9 of 2009- and Law 48 of 1982). **W.** Unclear institutional competences (especially between Alexandria Governorate, MWRI, EEAA, GAFRD)	*S2 O2*	Increasing Efficiency of Water and Environmental Regulations
W. Low enforcement of water and environmental regulations and setback lines.	*S2 O3*	Enforcing the Application of Water and Environmental Regulations

S. Strength / **W.** Weakness / **O.** Opportunity / **T.** Threat

Table 3.2 S2 Operational Objectives.

S2-O1: Updating Water and Environmental Regulations

The Legal Analysis, included in MLV Integrated Diagnosis, Section I, Chapter 6, concluded that environmental and water regulations do not ensure the protection of the water environment. Law 4 of 1994 (amended by Law 9 of 2009) and Law 48 of 1982 establish standards and legal limits of pollutants for water discharges. However, these Laws do not establish water quality standards for other elements of the water cycle nor water bodies, and do not specifically address the relationship between water quality and water uses.

This Operational Objective aims at establishing a comprehensive and updated set of standards for the water environment. This set will include specific standards for receiving waters as well as for the different uses, thereby complementing the update of discharge limits to facilitate the comprehensive regulation of water quality.

This objective follows the approach of the European Water Framework Directive (WFD) in setting the target of achieving good potential ecological status and good surface water chemical status of heavily modified water bodies, such as Lake Mariut, in the entire European Union and Associated Members. The WFD defines "good chemical status" in terms of compliance with all the quality standards established for chemical substances at European level. The Directive also provides a mechanism for renewing these standards and establishing new ones by means of a prioritization mechanism for hazardous chemicals. This will ensure at least a minimum chemical quality, particularly in relation to very toxic substances, all over the European Union.

The implementation of this Operational Objective requires in fact the coordination of the stakeholders involved in the management of water quality, i.e: EEAA, MWRI, GAFRD, research centers, and so forth.

The Operational Objective will be achieved through three Actions:

5. Updating discharge emission limits.

6. Establishing receiving water standards for Lake Mariut, Mariut Valley and waterways.

7. Establishing water quality standards for water uses.

Industries, infrastructures and urban uses in and around Lake Mariut.

S2-O2: Increasing Efficiency of Water and Environmental Regulations

This Operational Objective aims at supporting the authorities with competences in water and environmental regulations to solve the existing constraints in the regulatory framework to warrantee that their objectives are achieved.

Some of the examples found in the diagnosis refer to the overlap of competences and regulations, as the case of overlapping competences in setback lines around water bodies.

This point is especially important in Mariut Lake and Valley as they host most of the critical activities: industries, fisheries, polluted discharges, public infrastructures development, etc. But as most of the constraints are detected by the same stakeholders, this operation objective will set up specific communication channels to facilitate the reporting in regulatory constraints and proposals for increasing the efficiency of the regulations.

This second Operational Objective will be developed through the following three Actions:

8. Detecting and solving overlaps in water and environmental regulations.

9. Adjusting procedures to consider the socio-economic context under the Law drafting process.

10. The development of agreements for collaboration between the Legal Unit and competent stakeholders.

S2-O3: Enforcing the Application of Water and Environmental Regulations

The third Operational Objective focuses on applicability of the regulatory framework, as environmental violations are frequent in Mariut Lake and Valley, especially when it comes to industrial water discharges. It is then necessary to strengthen mechanisms for a more effective application of water and environmental regulations, for instance by rewarding environmentally friendly actions and punishing illegal infringements with dissuasive economic fines. Competent stakeholders raised particularly these needs during the consultation process.

This objective will encompass the following three Actions:

11. The establishment of a single Legal Unit.

12. Strengthening mechanisms for the surveillance and punishment of water quality violations.

13. Strengthening mechanisms for the incentive of environmentally friendly actions.

S3: ENSURING SUSTAINABLE ICZM

Integrated Coastal Zone Management processes require a set of formal and informal structures and mechanisms to run properly and allow developing governance practices. These enabling conditions include management structures to foster integration of administrative actors and coordination mechanisms between key stakeholders to promote collaborative planning. The inclusion of academia into this framework for ICZM is especially relevant to support local science-based decision-making and delineate uncertainties regarding the regional impacts of global processes such as relative sea level rise or global warming.

This Strategic Objective aims, hence, at developing a robust framework for local ICZM processes. It includes the establishment of specific ICZM structures to increase coordination and collaboration between key stakeholders, whether they are administrators or administered science-providers or science-users. Indeed, the support of science to coastal management is especially important in Mariut Lake and Valley, where the challenges posed by climate change or the intense environmental degradation on economic activities and resource-dependent communities, call for resolute actions towards restoration and rehabilitation of these productive ecosystems.

Finally, guaranteeing a solid funding mechanism for ICZM will highly determine the feasibility in achieving the MLV-ICZM Plan vision and goals. This objective aims too to launch a group of measures and tools to facilitate the sustainability of ICZM processes in Mariut Lake and valley.

Following Table presents the three Operational Objectives of S3 and includes the SWOT components addressed by these Operational Objectives.

SWOT	OPERATIONAL OBJECTIVE	
S. Existence of agencies and institutions with competences on coastal management (EEAA, MWRI, GAFRD, Alexandria Governorate). **O.** Good management system within the Alexandria Governorate capable to induce changes in Lake Mariut's management.	*S3 O1*	Developing the Institutional Framework for Local ICZM
S. Existence of research centres specialized in water, coasts, oceanography and environment (NIOF, CoRI, University of Alexandria, Drainage Research Centre, etc.).	*S3 O2*	Integrating Science and Management
S. Existence of international awareness and occasionally funding for coastal management initiatives, including ICZM and climate change. **O.** International funding for ICZM initiatives. **T.** Lack of legal awareness of environmental liability reduces the capacity of Public Budgets to support ICZM processes.	*S3 O3*	Ensuring a Sustainable Funding System for Local ICZM

S. Strength / **W.** Weakness / **O.** Opportunity / **T.** Threat

Table 3.3 S3 Operational Objectives.

This objective is in line with the activities proposed under the PEGASO and ALAMIM projects. They address the establishment of management structures to improve coordination among stakeholders and to support ICZM in the long term:

- PEGASO defined a set of activities to improve the ICZM institutional capacity in neighbor governorates (Beheira, Kafr El Sheikh and Dakahlia), to enhance coordination between scientists and managers and to fund ICZM in the long term.
- ALAMIM proposed an institutional organizational structure for the integrated management of Lake Mariut.

S3-O1: Developing the Institutional Framework for Local ICZM

This Operational Objective aims at defining local ICZM institutional structures to maximize coordination and cooperation between all stakeholders with competences in coastal resources. Coordination committees and institutional agreements between public administrations are thus necessary to strengthen coastal management by reducing conflicts and increasing synergies among key-stakeholders.

There are some initiatives devoted to improve the integrated management of this area, such as the Lake Mariut Development Committee. Unfortunately these initiatives have evolved into advisory committees formed by several institutions, but lacking the capacity to induce real changes in the coastal system.

ICZM structures are necessary for the development of a comprehensive governance system which allows an effective and agreed management of Mariut Lake and Valley. Besides, these structures are also necessary for the later implementation of other Strategic Objectives defined within the Plan.

Among the most relevant ICZM structures included in this objective is the leader of the local ICZM process, i.e.: a high level decision making body that will gather key stakeholders with competences in management of Mariut Lake and Valley: the ICZM Steering Committee.

The Technical Secretariat will be created to support the Steering Committee by coordinating and enforcing local ICZM processes. Both structures will guide the implementation of the Plan so the development of their capacities is included in this objective.

Thus, this Operational Objective will include:

14. Establishing the ICZM Steering Committee and its Technical Secretariat.

15. Enhancing capacity-building of the ICZM Steering Committee, its Technical Secretariat and the Technical Units on collaborative management and water and environmental quality.

S3-O2: Integrating Science and Management

This objective addresses the integration of science and management, to facilitate that decision-making is based on sound knowledge. This shall ensure the effectiveness of policies and progress towards a more sustainable use of the coastal zone. In fact, the high research capacity existing in Alexandria in the fields of water quality, ecological conservation, coastal protection and climate change, among others, shall efficiently assist competent authorities to make decisions and to define policies. But the current communication channels between academia and public administrations are limited, and it causes that research lines do not usually meet management needs.

Communication should better integrate science and management, so that science developers and science users are sharing interests, doubts and concerns regarding coastal management and looking for potential solutions together. The integration of research centers with competent stakeholders will be improved through the establishment of a specific forum where both sectors can debate and agree on convenient research lines.

Decision making processes should also be supported by a continuous evaluation of the status of the coastal system, and its evolution under the ICZM process. This evaluation will be developed by a specific unit that will monitor the status of the coastal system and will report to the ICZM Technical Committee.

This Operational Objective will include three Actions:

16. Establishing the Research Advisory Group.

17. The development of a Research Agenda.

18. The launch of the ICZM Monitoring Unit.

S3-O3: Ensuring a Sustainable Funding System for Local ICZM

The third Operational Objective defines a sustainable funding system for ICZM processes in the Alexandria Governorate. This system includes:

- The implementation of the MLV-ICZM Plan, including the establishment of (ICZM) management structures
- The maintenance of management structures
- Upcoming stages of the MLV-ICZM Plan

The funding system will provide governmental funds together with other institutional and private funds, on a co-funding basis. These sources will support the day to day functioning of ICZM institutional structures.

This funding system will also look for additional resources from international donors. These donors will cover sectoral and ad hoc needs requiring special investments (i.e. risks assessments, facilities for wastewater treatments, etc.). A specific unit will be created to be fully in charge of establishing and coordinating these funding mechanisms.

This Operational Objective will encompass four Actions:

19. Establishing the Financial Resources Unit.

20. Guaranteeing the provision of national ICZM funds to local ICZM processes.

21. Ensuring the equitable distribution of stakeholders funding.

22. Obtaining funding from international donors.

S4: PROMOTING STAKEHOLDERS PARTICIPATION IN WATER AND ENVIRONMENT MANAGEMENT

Hardly can ICZM work efficiently unless stakeholders participate in the implementation and monitoring of the interventions which are part of the ICZM Plan. At the same time, stakeholders´ awareness is crucial to foster active participation. Unfortunately, today there are neither structures nor strategies to promote stakeholder participation into the management of Mariut Lake and Valley and not even to raise stakeholders' initiatives to higher decision making levels.This strategic objective is developed by three different operational objectives including 8 actions. These operational objectives, which are described below, are listed as follow:

SWOT	OPERATIONAL OBJECTIVE	
W. Lack of environmental awareness. **O.** Improvement of environmental awareness.	*S4 O1*	Promoting Stakeholders Awareness
W. Lack of coordination between stakeholders (i.e.: in water quality management). **W.** Lack of capabilities/skills/capacities of coastal managers. **O.** Capacity building for coastal managers in collaborative management.	*S4 O2*	Promoting Stakeholders Participation
S. Relevant key-stakeholders are willing to participate and cooperate in the implementation of ICZM processes **W.** Lack of availability of coastal data.	*S4 O3*	Increasing Collaboration on Coastal Management

S. Strength / **W.** Weakness / **O.** Opportunity / **T.** Threat

Table 3.4 S4 Operational Objectives.

S4-O1: Promoting Stakeholders Awareness

This Operational Objective aims at creating the necessary social awareness to understand, accept and embrace the ICZM process in Mariut Lake and Valley. A unit is then necessary to deal with the implementation of a comprehensive public awareness program addressing water and environmental status of Mariut Lake and Valley, management objectives and procedures, and activities developed in and around Mariut water bodies.

Raising awareness is to change perceptions and behaviors regarding the use and management of water resources and the environment in general. Communication strategies, tools and targeted messages to different stakeholders groups are then necessary. Awareness raising will also contribute to increase transparency in decision-making and trust among stakeholders by improving their relationships.

This Operational Objective will comprise three Actions:

23. Activating the Communication Unit.

24. Designing awareness campaigns regarding water and environmental quality.

25. The development of online dissemination tools for ICZM initiatives.

Fishermen at a discharge point.

S4-O2: Promoting Stakeholders Participation

This objective focuses on participation of all stakeholders with interests in Mariut Lake and Valley. This participation requires the existence of formal mechanisms that ensure the inclusion of all stakeholders into the management of Mariut Lake and Valley.

The Coastal Forum will be the main structure for stakeholder's participation during planning and management. It will include administrations, the private sector, NGOs, and civil associations. This Forum will provide the platform to discuss issues and priorities for the management of Mariut Lake and Valley, especially during the decision-making process. It will also provide the framework for progressing towards a transparent and collaborative management of Mariut Lake and Valley, by reducing conflicts and mistrust between public agencies and users.

The list of stakeholders included in the Coastal Forum will be reviewed and updated, to ensure that unseen stakeholders become part of this structure. A thorough knowledge of the interests and concerns of a majority of stakeholders will help to improve understanding and empathy towards other stakeholders needs.

Promoting stakeholders participation also tackles the need of increasing their capacity, including that of institutional and private sector stakeholders. In this regard, this Operational Objective strengths previous training activities organized under the ACCNDP and ALAMIM projects.

Three actions will be included in this Objective:

26. Establishing the Coastal Forum to discuss priority issues for coastal management.

27. Capacity-building of coastal managers on collaborative management.

28. Capacity-building of private sectors (industries, farmers, aquaculture) on water quality management.

S4-O3: Increasing Collaboration on Coastal Management

Once the structures for participation are established, this Operational Objective focuses on the definition of collaboration tools. This objective has a double approach: on the one hand, it addresses the need to ensure collaboration processes through regulatory mechanisms, and on the other, it develops shared working tools for stakeholders. Both approaches are herein explained.

The inclusion of collaborative management procedures within the regulations of key stakeholders compel them to participate in the Mariut Lake and Valley ICZM process, at the same time that they support and standardise participation and collaboration.

Besides the regulatory procedures, the design and development of shared working tools for the management of Mariut Lake and Valley will increase collaboration among stakeholders. In this sense, information and data sharing within an agreed structure will provide benefits to all stakeholders, improving their interest and their commitment for collaboration.

This Operational Objective will encompass two Actions:

29. The inclusion of collaborative management procedures within the regulations of key stakeholders.

30. The design of an innovative tool to promote and provide shared ICZM information.

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

Table 3.5 Strategic and Operational Objectives and Actions of the MLV-ICZM Plan.

4

Institutional Arrangements

The MLV-ICZM Plan is to promote an overall change in the management of the Mariut area. In fact, much of the challenge lies on encouraging collaborative management among stakeholders, including public institutions, the research community, private entities and the wider public. To achieve this, new procedures and structures need to be established to facilitate the consensus building and stakeholder's participation in the management of Mariut Lake and Valley.

The previous chapter introduced a set of Actions aiming at establishing specific structures or units. These structures define an ICZM institutional framework necessary to boost collaborative management in the area of Mariut.

This chapter describes these ICZM structures classified into three different categories, i.e., policy-making, executive and advisory. A full description of the ICZM structures is included in Annex II.

4.1 ICZM Structures

Institutional structures and arrangements are essential for implementing ICZM processes in Mariut Lake and Valley. Their composition and functioning are herein described. The scope of these structures is now limited to Mariut Lake and Valley although they are flexible enough to admit new stakeholders as the geographical or thematic scope is enlarged.

BOX 4.1.
Institutional structures

- Policy-making structure: the ICZM Steering Committee will be the highest decision-maker as regards implementation of the MLV-ICZM Plan. It will be responsible for the formulation of local ICZM policies and will encourage coordination among sectors, as well as guiding the ICZM process in the Mariut area.
- Executive structures: the ICZM Technical Secretariat will be the most relevant technical body, under the supervision of the ICZM Steering Committee. This Technical Secretariat will host different technical units specialized in managerial Key Issues. It will also coordinate and perform different ICZM initiatives and technical assignments which are part of the plan's implementation process.
- Advisory structures: these structures are to support stakeholder consultation and participation. In fact, they are to provide policy–making and executive structures with sound knowledge and strategic thinking on coastal management. The Coastal Forum will enable the formal participation of all key stakeholders into ICZM processes, favoring consensus building on long-term objectives. The Research Advisory Group and the ICZM Monitoring Unit will be other advisory structures aiming at supporting decision-making based on sound scientific knowledge, integrating available data and information.

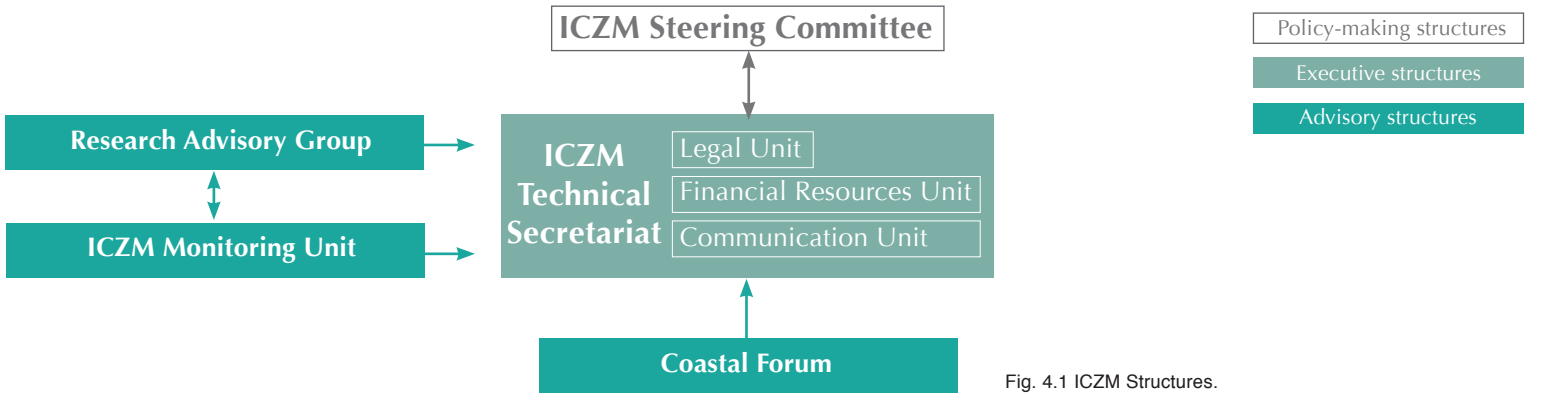


Fig. 4.1 ICZM Structures.

POLICY - MAKING STRUCTURE

The **ICZM Steering Committee** is to lead the ICZM process in the Mariut area by providing policy oversight and guiding the plan implementation. This committee will be composed of high-level policy makers with power to induce changes in the Mariut area. The committee will integrate sectoral interests during the policy-making process and assist in resolving policy conflicts. Additionally the ICZM Steering Committee is to serve as liaison with the National ICZM Committee and ensure the adequacy of local ICZM process to the National ICZM Strategy.

During the first cycle of ICZM in the Mariut area, the ICZM Steering Committee will be composed of representatives from the Alexandria Governorate, the National ICZM Committee, the EEAA Alexandria RBO, the Ministry of Water Resources and Irrigation, and the Ministry of Housing (GOPP). The ICZM Steering Committee will be composed of a maximum of seven members to facilitate discussions and agreements among them.

Functions of the ICZM Steering Committee

Facilitate the resolution of intersectorial conflicts, and conflicts arising from policies or activities developed in Mariut Lake and Valley.

Report and raise proposals to competent stakeholders.

Adapt national ICZM initiatives to Mariut Lake and Valley.

Review and approve technical proposals raised by the ICZM Technical Secretariat.

Formulate ICZM initiatives, strategic objectives and perspectives for Mariut Lake and Valley.

Supervise the implementation of the MLV – ICZM Plan.

Lead the financial strategy to support the ICZM process after the ACZMP.

EXECUTIVE STRUCTURES

The **ICZM Technical Secretariat** will be the technical body in charge of implementing all ICZM initiatives in Mariut Lake and Valley. The ICZM Technical Secretariat will include three technical units that are to carry out specific assignments addressing Key Issues for the management of the study area. Their activity will be supervised and approved by the ICZM Technical Secretariat. These technical units are described below:

– **Legal Unit:** will be responsible for improving the regulatory framework. This unit will promote collaboration between stakeholders involved in water and environmental regulations.

– **Financial Resources Unit**: will be in charge of obtaining the necessary funds to warrant the implementation of ICZM processes in the Governorate of Alexandria. The Financial Resources Unit will design a sustainable funding system and will be in charge of estimating annual budgets for the implementation of ICZM processes.

– **Communication Unit:** will be in charge of implementing comprehensive public awareness campaigns for the wider public and a set of capacity building programs for the technicians and managers working in ICZM institutional initiatives.

In sum, the technical units will lead and promote communication between competent stakeholders and will provide them with the necessary information for the decision-making process, but they will not assume any responsibility which is already the competence of any previously existing authorities.

The organizational structure of the ICZM Technical Secretariat will adapt to subsequent cycles of ICZM, establishing new technical units as new Key Issues arise. The skills and capabilities of the technicians forming the ICZM Technical Secretariat will include a multidisciplinary staff with skills in ICZM and collaborative management.

Functions of the ICZM Technical Secretariat

Execute ICZM Steering Committee mandates and proposals.

Provide technical advice and propose ICZM initiatives to the ICZM SC.

Coordinate and implement all donor-funded activities regarding ICZM.

Coordinate all Actions for the implementation of the MLV – ICZM Plan.

Monitor the implementation of the MLV - ICZM Plan.

Promote vertical and horizontal integration.

Act as liaison between the ICZM Steering Committee and the technical units.

Ensure communication and organization among technical units.

Coordinate and organize the participation of the advisory boards.

Manage and distribute funding among ICZM institutional structures.

Organize capacity-building activities for the ICZM institutional structures.

Functions of the Legal Unit

- Coordinate those actions related to the improvement of the legal framework (Actions 5, 6, 7, 8, 9, 12, 13 and 29).
- Report and raise up legal proposals and initiatives to the ICZM TS.
- Identify conflicts and discrepancies among water and environmental laws and regulations, and propose and draft legislative amendments to the ICZM TS.
- Maintain regular communication with competent stakeholders.
- Provide legal advice to the ICZM Steering Committee through the ICZM TS.
- Cooperate with the National ICZM Committee in the definition and drafting of ICZM regulations, through the ICZM SC.

Functions of the Financial Resources Unit

- Design the ICZM funding system.
- Coordinate the implementation of Actions related to the establishment of a sustainable funding system for ICZM (Actions 20, 21, 22).
- Raise all its activities and initiatives to the ICZM Technical Secretariat.
- Determine annual costs and define funding incomes.
- Identify and submit proposals to international calls regarding ICZM, coastal risks and sustainable development of economic activities (in collaboration with the RAG).
- Promote investment for the MLV ICZM process.
- Provide advice to the ICZM Technical Secretariat about funding distribution and accounting.

Functions of the Communication Unit

- Coordinate Actions related to public awareness (Actions 24, 25, 27, 28).
- Raise all activities and initiatives to the ICZM Technical Secretariat.
- Develop public awareness campaigns, including the organization of participatory workshops.
- Prepare brochures regarding ICZM activities.
- Create and maintain a web site on ICZM.
- Carry out national communications regarding ICZM in Mariut Lake and Valley.
- Collaborate with the ICZM Technical Secretariat in promoting communication between ICZM structures.
- Collaborate in the organization of capacity building programs.

Together with the ICZM Technical Secretariat and its technical units, the Alexandria EEAA Regional Branch Office (EEAA RBO) will have a significant role in the implementation of the MLV-ICZM Plan. The Alexandria EEAA RBO is currently the agency in charge of managing the water quality monitoring system of Lake Mariut. Therefore, it will be primarily involved in executing those Actions aimed at enhancing the management of water quality. Besides, the Alexandria EEAA RBO, in collaboration with the ICZM Technical Secretariat, will foster communication among stakeholders regarding water quality, oversee water quality policies and support a continual improvement of water quality management in the area.

ADVISORY STRUCTURES

The advisory structures will aim at enhancing consultation to key stakeholders and integrating sound scientific knowledge into the planning process.

The Coastal Forum will be the body in charge of fostering any key stakeholders with interests in the Mariut area to participate into the ICZM process, either for implementing, evaluating or pursuing its stages. The Coastal Forum will facilitate discussions regarding management priorities, development models, and any existing conflicts among key stakeholders. The Coastal Forum will then contribute to set up the basis for identifying shared solutions and management initiatives. The Coastal Forum will operate at two levels:

1) *ICZM level*: open to any stakeholders willing to debate relevant issues and priorities for the management of Mariut Lake and Valley, especially during the decision-making stage. Stakeholders include authorities, professional organizations, civil society associations, the research community, companies, national committees, and NGOs identified during the Stakeholders' Analysis (MLV Integrated Diagnosis, Section I, Chapter 5), which are summarized in Annex I.

2) *Technical level*: Specific Advisory Boards will be periodically formed to address the different issues raised by the technical units, acting as validation boards. Specific Advisory Boards will be composed of stakeholders with competences and interests in particular issues.

Fig. 4.2 Levels of operation and examples of Specific Advisory Boards.

Functions of the Coastal Forum

Communication and networking between stakeholders.

Raise sectoral challenges related to the management of Mariut Lake and Valley to the ICZM Technical Secretariat.

Propose initiatives for the improvement of water and environmental quality, as well as for social and economic development to the ICZM Technical Secretariat.

Provide advice to the technical units regarding specific issues.

The **Research Advisory Group** will be the forum where scientists and managers will meet to enforce the integration of science and management. Scientists will provide sound knowledge during decision–making processes and managers will raise up research priorities to further support decision-making. This advisory group will be composed of various research centers in Alexandria:

- National Institute of Oceanography and Fisheries.
- Coastal Research Institute.
- Drainage Research Institute.
- National Authority for Remote Sensing and Space Science.
- Department of Environmental Studies, Faculty of Science, University of Alexandria.

Upcoming ICZM stages will include new research centers related to new Key Issues, such as the Oceanography and Archaeological Departments of the University of Alexandria, the Environmental and Climate Research Institute of the National Water Research Centre, etc.

Functions of the Research Advisory Group

Develop the research agenda (Action 17).

Discuss ICZM priorities and challenges from the scientific point of view with the ICZM Technical Secretariat.

Provide scientific advice to the ICZM Technical Secretariat.

Provide data to the ICZM Monitoring Unit.

Report on “Coastal Challenges” every 3 years.

The Research Advisory Group will collaborate with the ICZM Monitoring Unit, in terms of provision of data and of collaboration for the development of the "Coastal Challenges" report. This report will address the annual progress reports of the ICZM Monitoring Units and the last scientific and technological advances.

The ICZM Monitoring Unit is to report on the evolution of the Mariut area and the impacts of the ICZM process in this area. This ICZM Monitoring Unit will be responsible for implementing and updating the Key Issues Indicator System regularly. This indicator system is detailed in MLV-Integrated Diagnosis, Section II, Chapter 4.To do so, this unit will also compile existing data from different stakeholders. It will also deliver annual progress reports to the ICZM Technical Secretariat, which will ultimately be responsible for designing and implementing corrective measures to achieve the desired objectives. Finally, the ICZM Monitoring Unit will include a specific Water Quality Observatory to specifically assess the progress of water quality and water quality management in the Mariut area.

Functions of the ICZM Monitoring Unit

Raise all activities and initiatives to the ICZM Technical Secretariat.

Compile existing data regarding water and environment in Mariut Lake and Valley.

Implement and improve the Key Issues Indicator System. This Indicator System will evaluate the progress of the coastal status after the implementation of ICZM initiatives.

Annual report on progress made in water and environmental sustainability to the ICZM Technical Secretariat.

Collaborate with the EEAA Alexandria RBO in the management of water quality data.

4.2. Functioning of the ICZM institutional structures

ICZM is a dynamic process so in addition to describing the management structures, it is necessary to understand their relational system. This section illustrates the mechanisms and procedures which will be established to facilitate the efficient performance of ICZM in the Mariut area.

The ICZM Technical Secretariat will the structure in charge of evaluating and directing the performance of the management system. This secretariat will compile, register, coordinate and analyze information coming from the technical units and advisory boards and will reflect it in the ICZM proposals which will be presented to the ICZM Steering Committee for their approval. In fact the Technical Secretariat will be responsible for articulating the vertical coordination (from the national to the local level), as well as the horizontal integration of the Plan, by translating sectoral and stakeholder needs into the policy cycle process.

TOP-DOWN APPROACH

The relational system involved in the Top-Down approach will include mandatory and consultative communications between the ICZM Steering Committee, the ICZM Technical Secretariat, and advisory boards as the Research Advisory Group and the Coastal Forum. Figure 4.3 illustrates this relational system.

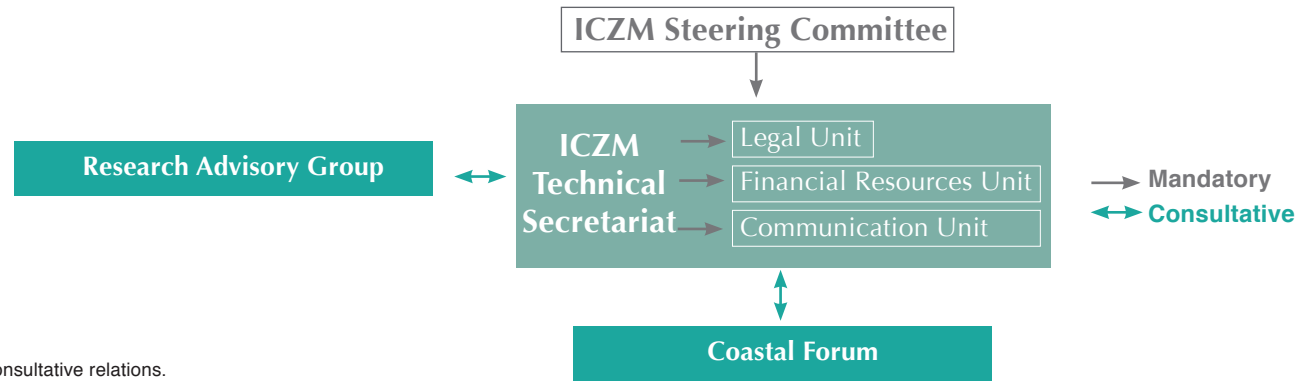


Fig. 4.3 Mandatory and consultative relations.

The ICZM Steering Committee is the leader in the policy-making process and sets up the lines of action for the ICZM Technical Secretariat. This Secretariat will distribute responsibilities among its technical units and will open consultative processes with the Research Advisory Group and the Coastal Forum related to upcoming objectives during the policy-making process, for their participation.

BOTTOM-UP APPROACH

This approach will serve to upraise specific proposals directly from the stakeholders. Therefore the different advisory boards are to channel these proposals to the ICZM Technical Secretariat for their analysis. The secretariat will raise its conclusions to the ICZM Steering Committee for their final consideration. As illustrated in Figure 4.4 all communications involved in this approach are proposal-based.

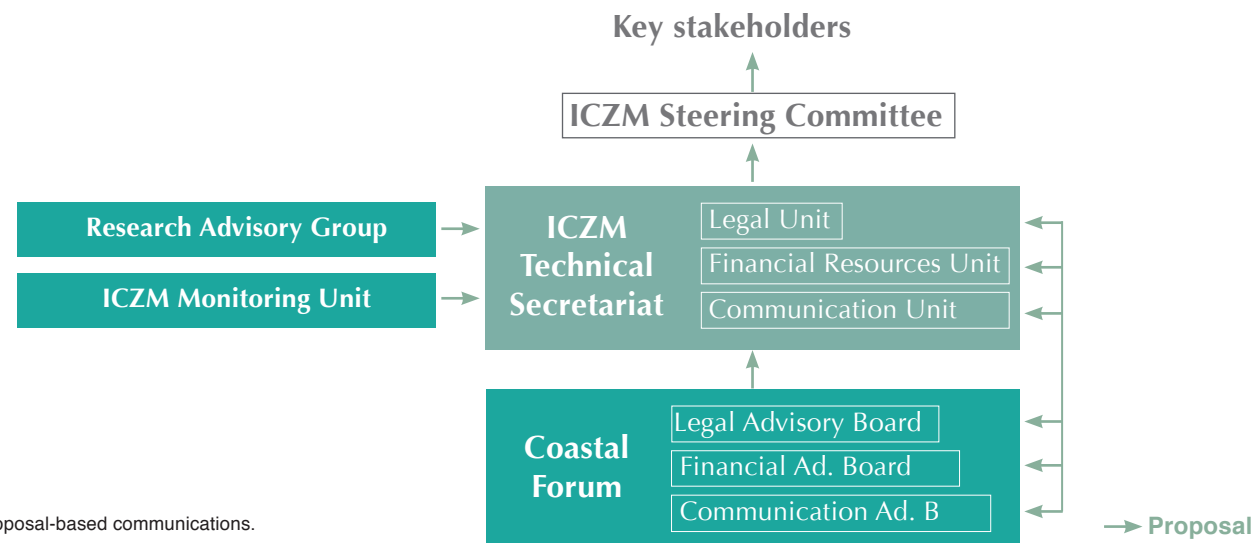


Fig. 4.4 Proposal-based communications.

5

5. IMPLEMENTATION, MONITORING AND EVALUATION OF THE MLV-ICZM PLAN

The implementation process of the Mariut Lake and Valley ICZM Plan entails thirty actions to be carried out in the next five years (2016-2020). Four roadmaps are then herein proposed to guide the implementation process and guarantee its temporal coherence and overall consistency. Each action is fully described in an individual factsheet, compiled all of them in the Annex II. These Action Factsheets include a brief description, timeline of application, stakeholders involved and progress indicators. The Action Plan consists therefore of the Roadmaps and Action Factsheets, which combined are to provide a useful assistance to the executive authority throughout the implementation process.

This Section also includes the estimation of the implementation costs of the MVL-ICZM Plan. The estimated budget considers the installation and operational costs of each action, so the MLV-ICZM Plan differentiates the implementation cost per year. This cost breakdown enables a more precise follow-up of the planned investments. The detailed breakdown is included in Annex III.

Finally, the ICZM Progress Indicator System to guide the adaptive management process is described. The approach developed will facilitate the evaluation of the implementation rate and objectives achievement, as well as the identification of constraints and hindering factors. Annex IV presents indicators and indices of the ICZM Progress Indicator System.

5.1 Action Plan

Roadmaps establish the temporal framework in which Actions should be implemented, gathering those Actions strongly related, and ensuring temporal coherence between Actions and Objectives.

The MLV – ICZM Plan includes four time-bounded roadmaps, namely:

Roadmap 1: Establishing the ICZM Institutional Framework.

Roadmap 2: Enhancing Participation and Capacity.

Roadmap 3: Increasing Knowledge of Mariut Lake and Valley.

Roadmap 4: Adapting Procedures and Regulations.

ROADMAP 1. ESTABLISHING THE ICZM INSTITUTIONAL FRAMEWORK

TEMPORAL DEVELOPMENT

Action		2016	2017	2018	2019	2020
14	Establishing the ICZM Steering Committee and its Technical Secretariat.	Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
19	Establishing the Financial Resources Unit.	Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
20	Guaranteeing the provision of national ICZM funds to local ICZM processes.		Execution	Execution	Execution	Execution
21	Ensuring the equitable distribution of stakeholders funding.		Execution	Execution	Execution	Execution
22	Obtaining funding from international donors.			Execution	Execution	Execution
11	The establishment of a single Legal Unit.	Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
10	The development of agreements for collaboration between the Legal Unit and competent stakeholders.		Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
23	Activating the Communication Unit.	Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
15	Enhancing capacity-building of the ICZM Steering Committee, its Technical Secretariat and the Technical Units on collaborative management and water and environmental quality.	Execution	Execution	Execution	Execution	Execution

Execution

Functioning & maintenance

Table 5.1 Roadmap 1.

ROADMAP 2. ENHANCING PARTICIPATION AND CAPACITY

TEMPORAL DEVELOPMENT

Action		2016	2017	2018	2019	2020
4	Establishing the communication framework for managers of water quality and urban development.	Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
26	Establishing the Coastal Forum to discuss priority issues for coastal management.		Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
24	Designing awareness campaigns regarding water and environmental quality.			Execution	Execution	Execution
25	The development of online dissemination tools for ICZM initiatives.			Execution	Execution	Execution
27	Capacity-building of coastal managers on co-llaborative management.		Execution	Execution	Execution	Execution
28	Capacity-building of private sectors (industries, farmers, aquaculture) on water quality management.		Execution	Execution	Execution	Execution
29	The inclusion of collaborative management procedures within the regulations of key stakeholders.			Execution	Execution	Execution

Execution

Functioning & maintenance

Table 5.2 Roadmap 2.

ROADMAP 3. INCREASING KNOWLEDGE OF MARIUT LAKE AND VALLEY

TEMPORAL DEVELOPMENT

Action		2016	2017	2018	2019	2020
18	The launch of the ICZM Monitoring Unit.		Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
1	Extending the water quality monitoring system to Mariut Valley.		Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
2	The development and implementation of a set of indicators to monitor climate change effects on water quality.			Execution	Functioning & maintenance	Functioning & maintenance
16	Establishing the Research Advisory Group.		Execution	Functioning & maintenance	Functioning & maintenance	Functioning & maintenance
17	The development of a Research Agenda.		Execution	Execution	Execution	Execution
30	The design of an innovative tool to promote and provide shared ICZM information.			Execution	Execution	

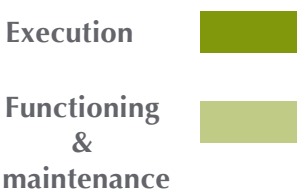


Table 5.3 Roadmap 3.

ROADMAP 4. ADAPTING PROCEDURES AND REGULATIONS

TEMPORAL DEVELOPMENT

Action		2016	2017	2018	2019	2020
3	Including water quality assessment procedures into development plans and projects.					
6	Establishing receiving water standards for Lake Mariut, Mariut Valley and waterways.					
7	Establishing water quality standards for water uses.					
5	Updating discharge emission limits.					
8	Detecting and solving overlaps in water and environmental regulations.					
9	Adjusting procedures to consider the socio-economic context under the Law drafting process.					
12	Strengthening mechanisms for the surveillance and punishment of water quality violations.					
13	Strengthening mechanisms for the incentive of environmentally friendly actions.					

Table 5.4 Roadmap 4.

5.2 Funding

The budget for the implementation of the Mariut Lake and Valley ICZM Plan has been estimated based on the Action costs. For each action, man power, facilities and consultancy works were considered and their rate distribute during the action implementation according to its roadmap.

The total budget of the MLV ICZM Plan is 6.5 million US $, which will be distributed in five years. Table 5.5 distributes the budget per roadmap while Figure 5.1 breakdown the estimated costs per year and concept.

ROADMAP 1. ESTABLISHING THE ICZM INSTITUTIONAL FRAMEWORK	47 %
ROADMAP 2. ENHANCING PARTICIPATION AND CAPACITY	6 %
ROADMAP 3. INCREASING KNOWLEDGE OF MARIUT LAKE AND VALLEY	24 %
ROADMAP 4. **ADAPTING PROCEDURES AND REGULATIONS**	23 %

Table 5.5 Budget distribution per Roadmap

Roadmap 1 includes those Actions related to the establishment of policy-making and executive structures. The total cost of implementing Roadmap 1 is 3,065,000 USD, over five years. Approximately, 96% of this cost is related to installation costs (offices, equipment, etc.) and personnel (directives, senior and junior officers and support staff). The existing human resources and facilities could cover this cost, through the reallocation of staff and offices from public institutions to the new institutional structures. The remaining 4% is mostly devoted to the organization of annual capacity building activities for the staff of the institutional structures. Mean annual training costs are estimated at 18,000 USD.

Roadmap 2 encompasses those Actions focused on enhancing communication and collaboration among stakeholders. The total cost of this Roadmap is 413,000 USD, distributed over five years. In contrast to Roadmap 1, this budget is mainly (89%) allocated to the development of awareness, communication and capacity building activities, not to installation and personnel costs.

Roadmap's 3 total budget is 1,577,500 USD over four years. This Roadmap comprises two main types of Actions:

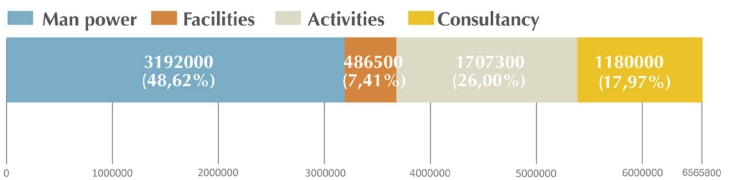
- Actions aimed at establishing the advisory structures and their functioning: about 27% of the budget.
- Actions aimed at developing research projects and improving the water quality monitoring system: about 73% of the budget.

The budget assigned to **Roadmap 4** amounts to 1,510,000 USD. This amount is allocated to the development of studies to set water standards and to improve the water and environmental regulatory system.

Considering the overall budget, costs related to manpower and facilities amount to 56% of the total budget. Expenses related to the development of specific projects and activities comprise the remaining 44%. As mentioned before, costs related to recruitment and offices could be covered through the reallocation of existing resources.

The temporal distribution of the expenses is shown in the following figure. The first year of implementation of the plan is devoted to launch institutional structures; therefore, most costs are related to manpower and facilities. Functioning costs in terms of personnel and facilities are similar for all years.

As of the second year, costs related to the development of specific projects increase, especially during the second and third year, including contracting consultancy services. The fourth and the fifth year also have costs related to the development of projects by the existing ICZM institutional structures.



The detailed breakdown is included in Annex III.

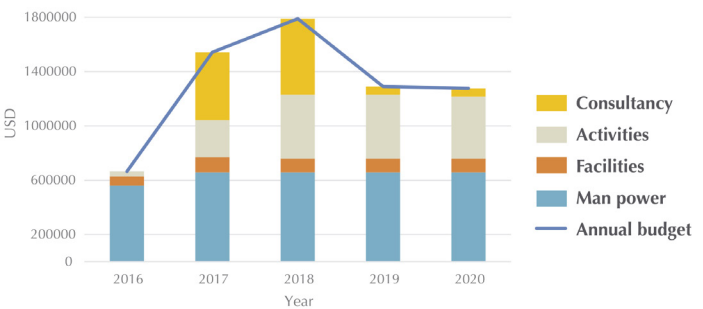


Fig. 5.1 Costs breakdown per year and concept.

5.3 Monitoring

The MLV-ICZM Plan requires a monitoring system to regularly evaluate the implementation progress. This system is to be used by managers to improve their own performance (adaptive management) and their reporting mechanisms (accountability).

The ICZM Progress Indicator System is based on international guidelines and inspired by existing proposals of ICZM monitoring systems in Egypt. It is composed of a set of 30 indicators that informs on the implementation progress by evaluating the achievement of each action (Action Progress Indicator). These Indicators are defined according to one or two variables which are measured and normalized from 1 to 3 in line with the established thresholds. Annex IV includes the full description of this Progress Indicator System, which summarizes the following:

- Actions.
- Action Progress Indicator code: the acronym I. is followed by the number (code) of the Action. Progress of the Action n is assessed by the Action Progress Indicator I.n.
- Weight of variables to obtain the Action Progress Indicator.
- Description of the variables: coded by “a” and “b”.
- Measure of the variable.
- Threshold: values and thresholds for each variable. The desirable progress is represented by 3 whereas 1 represents the worst condition.

5.4 Evaluation and Readjustment

The ICZM Progress Indicator System is designed for evaluating the development in the Plan implementation. The final aim is to detect deficiencies and bottlenecks to guide the adaptive management process. This system consists in a set of Progress Indices that estimate per Objective the success in the actions implementation according to the Progress Indicator System.

One specific Index has been built for each Operational Objective. A Panel of Experts weighed each Action Progress Indicator in line with their contribution to objectives accomplishment. Subsequently the Operational Objective Indexes were also weighed similarly to formulate the corresponding Strategic Objective Indexes.

ACTION PROGRESS INDICATOR	OPERATIONAL OBJECTIVE PROGRESS INDEX	STRATEGIC OBJECTIVE PROGRESS INDEX
I.1	S1 O1	S1
I.2		
I.3	S1 O2	
I.4		

Table 5.6 Relation between Action and Objectives

This approach links the evaluation of the Action implementation with the Objective achievements so that any constrain occurred during the application of the MLV-ICZM Plan could be easily detected, as illustrated in Box 5.1.

BOX 5.1.

Representation of Progress Indices.

Strategic Objective Indices can be represented to easily understand the overall progress of the MLV – ICZM Plan and to identify those Strategic Objectives facing difficulties for implementation.

Figure 5.2 represents a hypothetical example, in which the implementation of the Strategic Objectives S1 and S2 were more successful than the implementation of S3 and S4. Therefore, special efforts and measures should be taken to improve the progress of S3 and S4.

The ICZM Progress Indicator System also allows representing how is the progress of a specific Strategic Objective, through representing its Operational Objectives Indices. Following previous example, Figure 5.3 shows the progress of the Operational Objectives corresponding to the Strategic Objective S2.

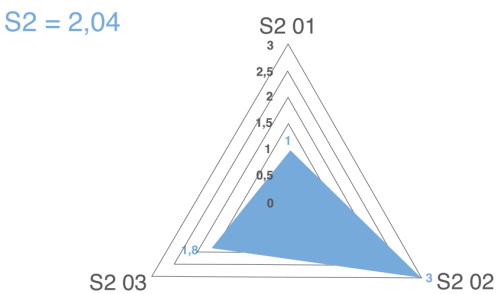


Fig. 5.3 Example of progress of Operational Objectives of S2.

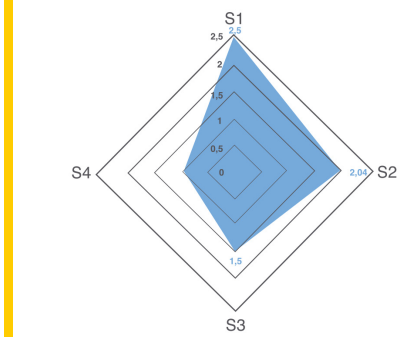
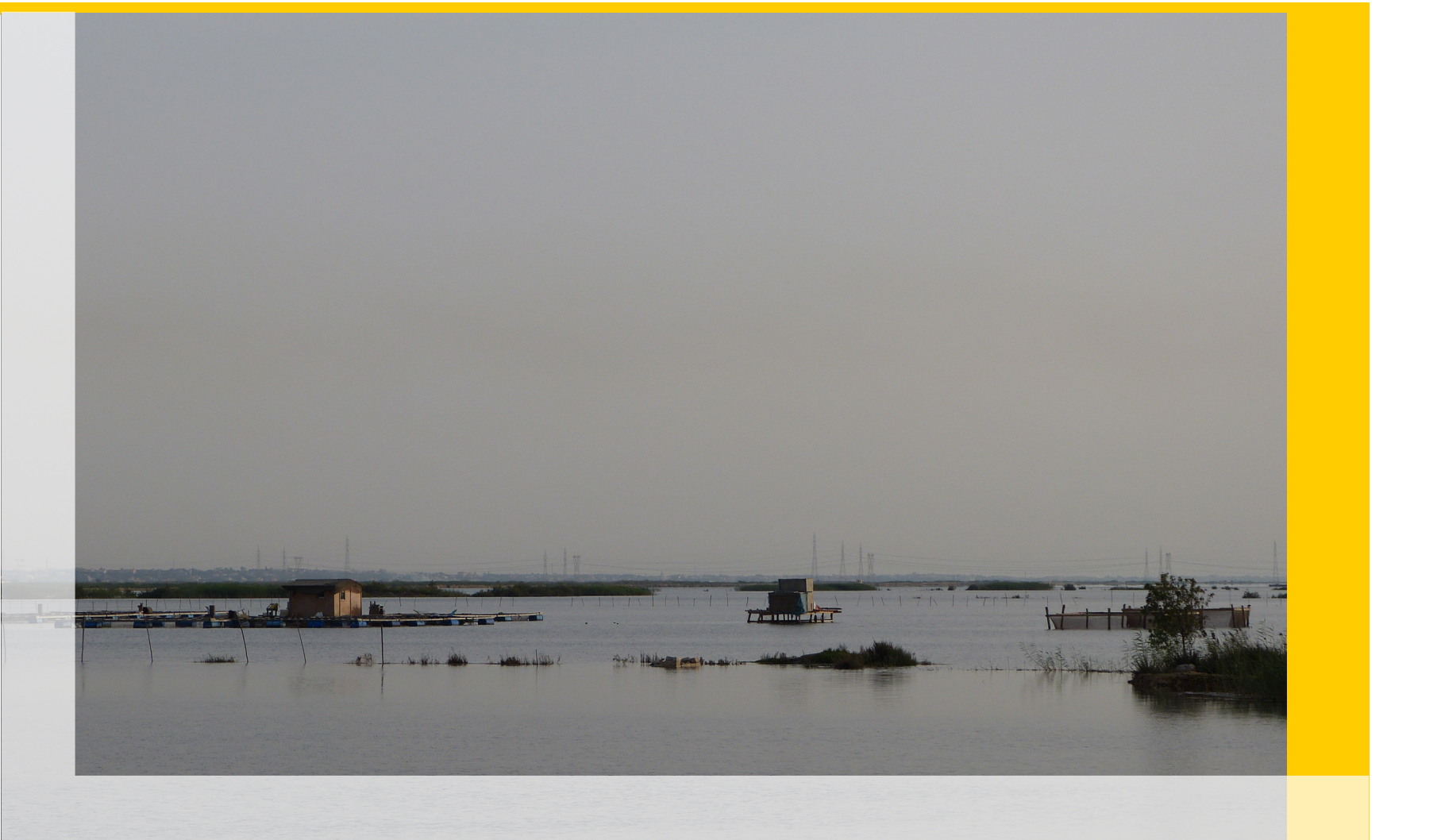


Fig. 5.2 Example of representation of all Strategic Objective Indices.



Annexes

ANNEX I: STAKEHOLDERS PARTICIPATION

Key Stakeholders				Participatory activities during the Integrated Coastal Diagnosis				Participatory activities during the ICZM Plan	
CODE	STAKEHOLDER	TYPE	LEVEL	DEFINITION OF THE SCOPE Individual Interviews	DEFINITION OF LEGAL SCOPE Group Interview	DEFINITION OF LEGAL SCOPE Focus groups	VALIDATION OF INTEGRATED DIAGNOSIS Focus groups	DEFINITION OF PLANNING VISION Focus groups	PRESENTATION & ACCEPTANCE OF ICZM PLAN Individual groups
1	Alexandria Businessmen Association	Private sector	Local			Yes	Yes	Yes	
2	Alexandria Governorate - Assistance Secretary General	Authorities	Local	Yes		Yes	Yes	Yes	Yes
3	Alexandria Potable Water and Sanitary Drainage Company	Private sector	Local	Yes	Yes	Yes	Yes	Yes	
4	Aquaculture Society For Maryout Valley	Civil Society Organizations	Local	Yes			Yes	Yes	
5	Aquaculture Society, Amria	Civil Society Organizations	Local				Yes	Yes	
6	Chamber of Commerce	Private sector	Local				Yes	Yes	
7	Cooperative Society for Fishermen in Mariut	Civil Society Organizations	Local				Yes	Yes	
8	Egyptian Authority for Marine Safety	Authorities	National						
9	Fishermen Syndicate (Lake Mariut)	Civil Society Organizations	Local	Yes	Yes		Yes	Yes	
10	Fishermen Syndicate (Mediterranean Sea)	Civil Society Organizations	Local				Yes	Yes	
11	Friends of the Environment	Civil Society Organizations	National	Yes	Yes	Yes	Yes	Yes	
12	Lake Mariut Development Committee	Authorities	Local				Yes	Yes	
13	Mariut fishers society	Civil Society Organizations	Local				Yes	Yes	

Key Stakeholders				Participatory activities during the Integrated Coastal Diagnosis				Participatory activities during the ICZM Plan	
CODE	STAKEHOLDER	TYPE	LEVEL	DEFINITION OF THE SCOPE Individual Interviews	DEFINITION OF LEGAL SCOPE Group Interview	DEFINITION OF LEGAL SCOPE Focus groups	VALIDATION OF INTEGRATED DIAGNOSIS Focus groups	DEFINITION OF PLANNING VISION Focus groups	PRESENTATION & ACCEPTANCE OF ICZM PLAN Individual groups
14	Ministry of Agriculture - Directorate of Agriculture Alexandria	Authorities	National	Yes					
15	Ministry of Agriculture - General Authority for Fish Resources Development (western sector, responsible for El Behera, Alex and Matrouh)	Authorities	Local	Yes	Yes	Yes	Yes	Yes	Yes
16	Ministry of Defense - Coastal Guard Department	Authorities	National				Yes	Yes	
17	Ministry of Electricity	Authorities	National				Yes	Yes	
18	Ministry of Finance	Authorities	National						
19	Ministry of Health and Population	Authorities	National						
20	Ministry of Housing - General Organization for Physical Planning	Authorities	National	Yes		Yes	Yes	Yes	Yes
21	Ministry of Housing - Local Urban Planning for West Delta	Authorities	National	Yes		Yes	Yes	Yes	
22	Ministry of Industry and Foreing Trade - General Organization for Industrial Development	Authorities	National				Yes	Yes	
23	Ministry of Interior - Water Body Police	Authorities	National	Yes		Yes	Yes	Yes	
24	Ministry of Investment - General Authority for Investment	Authorities	National	Yes	Yes	Yes	Yes	Yes	
25	Ministry of Petroleum	Authorities	National						
26	Ministry of Planning	Authorities	National				Yes	Yes	
27	Ministry of State for Environmental Affairs - Alexandria Local Branch Office	Authorities	National	Yes	Yes	Yes	Yes	Yes	Yes
28	Ministry of State For Environmental Affairs - Department of Coastal Zone Management	Authorities	National				Yes	Yes	

Key Stakeholders				Participatory activities during the Integrated Coastal Diagnosis				Participatory activities during the ICZM Plan	
CODE	STAKEHOLDER	TYPE	LEVEL	DEFINITION OF THE SCOPE Individual Interviews	DEFINITION OF LEGAL SCOPE Group Interview	DEFINITION OF LEGAL SCOPE Focus groups	VALIDATION OF INTEGRATED DIAGNOSIS Focus groups	DEFINITION OF PLANNING VISION Focus groups	PRESENTATION & ACCEPTANCE OF ICZM PLAN Individual groups
29	Ministry of State For Environmental Affairs - Egyptian Environmental Affairs Agency	Authorities	National			Yes	Yes	Yes	Yes
30	Ministry of Tourism- Tourist Development Authority	Authorities	National	Yes	Yes				
31	Ministry of Tourism, Alexandria Office	Authorities	Local	Yes					
32	Ministry of Transportation - Alexandria Port Authority	Authorities	Local	Yes	Yes	Yes	Yes	Yes	
33	Ministry of Transportation - Marine and Harbour Authority	Authorities	National				Yes	Yes	
34	Ministry of Transportation - Marine Transport Sector	Authorities	National				Yes	Yes	
35	Ministry of Water Resources and Irrigation	Authorities	National			Yes			
36	Ministry of Water Resources and Irrigation - National Water Research Center - Coastal Research Institute	Research Community	National				Yes	Yes	
37	Ministry of Water Resources and Irrigation - Shore Protection Authority	Research Community	National	Yes	Yes	Yes	Yes	Yes	
38	National Authority for Remote Sensing and Space Science	Research Community	National				Yes	Yes	
39	National Center for Planning State Land-Use	Authorities	National			Yes	Yes	Yes	
40	National Committee for Risk Reduction and Disaster	Authorities	National				Yes	Yes	
41	National Institute of Oceanography & Fisheries	Research Community	National	Yes	Yes	Yes	Yes	Yes	Yes
42	Pioneers of the Environment	Civil Society Organizations	Local			Yes	Yes	Yes	
43	Qisms and Shyakhas representatives	Authorities	Local	Yes		Yes	Yes	Yes	

Key Stakeholders				Participatory activities during the Integrated Coastal Diagnosis				Participatory activities during the ICZM Plan	
CODE	STAKEHOLDER	TYPE	LEVEL	DEFINITION OF THE SCOPE Individual Interviews	DEFINITION OF LEGAL SCOPE Group Interview	DEFINITION OF LEGAL SCOPE Focus groups	VALIDATION OF INTEGRATED DIAGNOSIS Focus groups	DEFINITION OF PLANNING VISION Focus groups	PRESENTATION & ACCEPTANCE OF ICZM PLAN Individual groups
44	Local Union of NGOs in Alexandria	Civil Society Organizations	National	Yes			Yes	Yes	Yes
45	Social Society Administration	Civil Society Organizations	National				Yes	Yes	
46	University of Alexandria	Research Community	Local			Yes	Yes	Yes	Yes
47	Fishermen	Civil Society Organizations	Local		Yes				

ANNEX II: ACTION FACTSHEETS

ROADMAP 3

Action 1. Extending the water quality monitoring system to Mariut Valley.

Description

During public consultation, stakeholders highlighted the good status of water quality in Mariut Valley. In fact, the valley supports an expanding aquaculture sector. However, there are no historical and/or regular records of water quality parameters in Mariut Valley. The existing water quality-monitoring program only covers Lake Mariut and it has been recently updated under the ACZMP.

This Action aims at extending the existing water quality monitoring system to the valley of Mariut. The monitoring system in Mariut Valley will cover all basins of Mariut Valley, providing physicochemical and pollutants (including heavy metal) information at different monitoring stations.

Results of this water quality monitoring system will provide useful information to assess the evolution of water quality in this area and will aid in the identification of environmental impacts related to urban and industrial developments around Mariut Valley. The availability of water quality information covering the whole Mariut area (including lake and valley) will provide a comprehensive understanding of the sources of degradation of water quality in the area, and the relationships between pollution processes occurring in the valley.

The agency in charge of designing and implementing the monitoring system in Mariut Valley is EEAA Alexandria RBO. This agency is currently in charge of managing the water quality monitoring system in Lake Mariut.

Outcomes

Comprehensive assessment of water quality in coastal lagoons.

Related Actions

Related actions: 2, 3.

Key stakeholders

- EEAA Alexandria RBO.
- ICZM Technical Secretariat.
- ICZM Monitoring Unit.
- Research centers.

Estimated duration

4 years (1st year: design and installation / 3 following years: operation).

This Action will start after the finalization of the ACZMP; that is, during the second year of implementation of the MLV-ICZM Plan. The monitoring system in Mariut Valley will be permanent.

Budget

80,000 USD/year.

This amount includes a monthly analysis of physicochemical parameters and heavy metals in water samples (in 8 monitoring stations).

Action Indicators

I.1 a. Implementation of the monitoring system in Mariut Valley.

ROADMAP 3

Action 2. The development and implementation of a set of indicators to monitor climate change effects on water quality.

Description	Climate change can have a variety of impacts on water quality. Higher water temperatures and changes in precipitation can affect water quality. In addition, sea level rise may affect freshwater quality by increasing the salinity of coastal rivers and causing saltwater intrusion. However, there are no specific studies of the impact of climate change on Alexandria's water quality. The water quality monitoring system in Lake Mariut only focuses on short term assessments. This monitoring system provides results of physicochemical parameters and comparisons between present and baseline water quality data, but it does not analyze long-term effects of climate change on water quality. Therefore, this Action aims at improving the existing water quality monitoring system, in order to obtain necessary datasets to evaluate the impacts of climate change on water quality. In this regard, this Action encompasses the design of a climate change monitoring module to assess climate change impacts on water quality, including: - Definition of variables - Monitoring points, methods and timing - Identification of parameters already evaluated under existing monitoring systems The agency in charge of improving the monitoring system is EEAA Alexandria RBO. The design of the climate change monitoring module will require the collaboration of public agencies and research centers. Research centers in Alexandria have developed projects related to climate change in the Nile Delta and in Alexandria, so they can actively contribute to this Action.
Outcomes	Datasets to evaluate climate change impacts on water quality. Increased collaboration between institutions and research centers.
Related Actions	Previous actions: 1 Other related actions: 3, 5, 6, 17.
Key stake-holders	– EEAA and its Regional Alexandria RBO. – ICZM Monitoring Unit. – Research centers.
Estimated duration	3 years (1st year: design and installation / 2 following years: operation). This Action will start on the 3rd year of the MLV-ICZM implementation.
Budget	No extra costs. Costs will be included under the budgets of the ICZM Monitoring Unit and EEAA Alexandria RBO.
Action Indicators	I.2 a. Implementation of the monitoring program to assess long-term climate change impacts on water quality.

ROADMAP 4

Action 3. Including water quality assessment procedures into development plans and projects.

Description	Urban and industrial development can cause negative impacts on water quality in Mariut Lake and Valley and its groundwater system. Currently, urban and industrial development strategies, plans and projects do not include specific environmental impact assessments for water quality (water quality is the most important issue in the study area, as stakeholders pointed out during public consultation). Therefore, this Action aims at including water quality impact assessments into the urban and industrial development strategies, plans and projects. To do so, this Action addresses the definition of criteria and procedures to 1) assess the impacts of development strategies, plans and projects on water quality, and 2) to define preventive and corrective measures. These procedures will cover, at least: - The assessment of future water demand and water availability, including carrying capacity assessments. - The assessment of needs in terms of collection and treatment of sewage. - Definition of preventive and corrective measures. The final approval of urban and industrial development strategies, plans and projects will require the development of water quality impact assessments. This Action requires the collaboration of those stakeholders involved in urban planning (spatial planning) and water quality.
Outcomes	Long term planning. Increased collaboration between institutions.
Related Actions	Previous actions: 4. Other related Actions: 5, 6.
Key stakeholders	– EEAA and its Regional Alexandria RBO. – Ministry of Housing / GOPP. – Alexandria Governorate. – National Center for Planning State Land-Use. – ICZM Technical Secretariat.
Estimated duration	5 years (1st year: implementation / 4 following years: monitoring and readjustment). This Action will be implemented during the first year of the MLV - ICZM Plan implementation.
Budget	No extra costs (under ICZM Technical Secretariat budget).
Action Indicators	I.3 a. Formal adoption of procedures

ROADMAP 2

Action 4. Establishing the communication framework for managers of water quality and urban development.

Description	Action 3 requires the previous establishment of a communication framework for institutions with competences in water quality and spatial planning. This Action is devoted to the establishment of a communication channel between EEAA, GOPP, and the Alexandria Governorate to debate and agree about how to include water quality criteria and procedures into urban and industrial development strategies, plans and projects. Research centers should also participate in the definition of these criteria and procedures. The Strategic Urban Plan for Alexandria City till 2032 is currently (during 2015) being developed. Actions 3 and 4 are two of the first activities to be implemented under the MLV-ICZM Plan, even before the creation of the ICZM Technical Secretariat. Once the ICZM Technical Secretariat is operational, it will coordinate Actions 3 and 4 and it will organize annual communication activities and meetings.
Outcomes	Agreed procedures to assess impacts of urban and industrial plans on water quality. Increased collaboration between stakeholders.
Related Actions	Subsequent actions: 3.
Key stakeholders	– EEAA Alexandria RBO. – ICZM Technical Secretariat. – Ministry of Housing /GOPP. – Alexandria Governorate. – NIOF and other research centers.
Estimated duration	5 years (1st year: implementation / 4 following years: operation). This Action will be developed during the first year of the MLV ICZM Plan implementation phase. Communication channels will be permanent structures to ensure communication between managers and authorities with competences in water quality and spatial planning.
Budget	1,000 USD /year.
Action Indicators	I.4 a. Number of stakeholders officially involved in communication channels. I.4 b. Regularity of communication between water quality managers and urban developers.

ROADMAP 4

Action 5. Updating discharge emission limits.

Description	Currently, two Laws regulate the discharge of pollutants to water bodies: - Law 48 of 1982: establishes discharge emission limits in waterways, including lakes, rivers and channels. - Law 4 of 1994 (amended by Law 9 of 2009): establishes discharge emission limits in coastal waters and provides a list of prohibited substances. However, these discharge emission limits do not ensure the protection of water environments, due to: outdating of discharge limits (1982), lack of unified criteria between Laws, discharge license approval on a case-by-case basis, lack of receiving water standards and poor consideration of cumulative effects of polluted discharges. Therefore, this Action aims at reviewing and updating discharge emission limits; i.e.: the permissible levels of pollutants in domestic, industrial and agricultural discharges to water bodies. To this end, this Action will include the analysis of the current environmental situation and human pressures, the analysis of cumulative effects, and the analysis of receiving water standards (Action 6). This Action is strongly linked with Actions 6, 7 and 8. EEAA Alexandria RBO and the Legal Unit will coordinate these Actions to unify efforts and to develop a comprehensive set of solutions to improve the regulatory framework.
Outcomes	Legal protection of water quality. Comprehensive water and environmental regulations based on scientific research.
Related Actions	Previous actions: 11, 6, 7, 8. Other related Actions: 8, 9.
Key stakeholders	– Legal Unit. – EEAA Alexandria RBO. – MWRI. – Ministry of Environment. – Ministry of Public Health.
Estimated duration	3 years (second, third and fourth year of MLV-ICZM Plan implementation period).
Budget	No extra costs (under ICZM Technical Secretariat and Legal Unit budget).
Action Indicators	I.5 a. Budget allocated to develop studies for updating discharge emission values. I.5 b. Discharge emission values legally updated.

ROADMAP 4

Action 6. Establishing receiving water standards for Lake Mariut, Mariut Valley and waterways.

Description	Water quality control in Mariut area includes the water quality monitoring system of Lake Mariut and the provision of legal discharge emission limits. However, there are no standards or environmental objectives for the water quality of receiving water bodies. Inspired by the European Water Framework Directive, this Action aims at establishing receiving water standards in Mariut Lake and Valley. The definition of reference conditions will be based on the sound analysis of existing status and pressures on Mariut Lake and Valley, considering relations and synergies between environmental, social and economic features. The definition of receiving water standards will also consider the principle of prevention introduced by the WFD. Receiving water standards will define physical, chemical and biological parameters to be achieved in Lake Mariut and its Valley. They can be defined in terms of maximum concentrations or in terms of pollution reduction objectives. EEAA Alexandria RBO and the Legal Unit will coordinate the implementation of Actions 5, 6, 7, 8 and 9.
Outcomes	Improved water and environmental quality.
Related Actions	Previous actions: 11. Subsequent actions: 5, 7. Other related actions: 8, 9.
Key stakeholders	– Legal Unit. – EEAA Alexandria RBO. – MWRI. – Companies (industries, agriculture, and aquaculture). – Civil society organizations. – Local communities around Lake Mariut.
Estimated duration	2 years (second and third year of MLV-ICZM Plan implementation period).
Budget	1,000,000 USD.
Action Indicators	I.6 a. Budget allocated to develop studies for the definition of receiving water standards. I.6 b. Establishment of reference conditions.

Action 7. Establishing water quality standards for water uses.

Description	Egyptian regulations establish water quality standards only for drinking water and seawater swimming pools. Specifically, Law 27 of 1978 regulates drinking water quality standards. This Actions aims at establishing water quality standards for industrial, agricultural and recreational (bathing) uses, and at reviewing drinking water standards. The establishment of standards will require the collaboration of coastal stakeholders. The MWRI and EEAA will agree on industrial water standards with the Ministry of Industry; agricultural water standards with the Ministry of Agriculture; and bathing water standards with the Ministry of Public Health. Private sector and NGOs will also participate in the definition of standards for the various water uses. . The ICZM Technical Secretariat will coordinate this Action.
Outcomes	Legal standards for water uses. Water quality security.
Related Actions	Other related Actions: 5, 6, 8, 9.
Key stake-holders	– Legal Unit. – EEAA and its Alexandria RBO. – MWRI. – Ministry of Industry. – Ministry of Agriculture. – Ministry of Public Health. – EEAA. – Industries. – Friends of Environment.
Estimated duration	2 years (second and third year of MLV-ICZM Plan implementation period).
Budget	No extra costs (included under Action 6).
Action Indicators	I.7 a. Budget allocated to develop studies for the definition of water quality standards for different water uses. I.7 b. Water uses standards established and reviewed.

ROADMAP 4

Action 8. Detecting and solving overlaps in water and environmental regulations.

Description

The most important legal problem related to water and environmental regulations is the confusing distribution of competences among EEAA, MWRI, Alexandria Governorate, GAFRD…) related to the management of Mariut Lake and Valley.

In this regard, Law 4 of 1994 (amended by Law 9 of 2009) and Law 48 of 1982 overlap in the management and control of water environments, including the control of water quality. Besides, two authorities have competences regarding management of the 50 m stretch surrounding water bodies.

A clear (and agreed) definition of competences would reduce conflicts among coastal institutions. The clarification of gaps or duplicities in regulations would allow an easier understanding and therefore an easier application of regulations, increasing their efficiency.

Therefore, this Action aims at clarifying the unclear distribution of competences regarding the management and control of water quality. This Action will also address the current overlap in the responsibility for managing the 50-metre stretch surrounding water bodies.

This Action includes the assessment of alternatives to integrate Law 4 of 1994 (Law 9 of 2009) and Law 48 of 1982 into a single regulation for the control of the water environment. Water quality management requires a single regulation for both coastal and inland waters, which includes updated limits of emission values (Action 6) and avoids case-by-case license provision.

The Legal Unit will coordinate this Action in collaboration with EEAA Alexandria RBO, the Ministry of Justice and the Alexandria Governorate.

Once the mentioned overlaps are resolved, this Action will identify and solve other gaps and overlaps related to:

- coastal management,
- public access to the coast,
- update of regulations according to the 2014 Constitution, etc.

Outcomes

Clarified competences in and around Mariut Lake and Valley.
More efficient management of Lake Mariut and Mariut Valley.
Practicability of laws and regulations.

Related Actions

Previous actions: 11.

Key stakeholders

– Legal Unit and ICZM Technical Secretariat.
– Alexandria Governorate.
– EEAA and its Alexandria RBO.
– GARFD.
– Research centers.
– Water Bodies Police.
– MWRI.

ROADMAP 4

Action 8. Detecting and solving overlaps in water and environmental regulations.

Estimated duration	2 years (third and fourth year of MLV-ICZM Plan implementation).
Budget	No extra costs (included under Action 6).
Action Indicators	I.8 a. Institutions benefit from competences simplification I.8 b. Resolved overlaps in water and environmental regulations.

S2: IMPROVING THE REGULATORY SYSTEM AND ITS ENFORCEMENT
S2-02: Increasing Efficiency of Water and Environmental Regulations

ROADMAP 4

Action 9. Adjusting procedures to consider the socio-economic context under the Law drafting process.

Description	The Legal Analysis emphasized that Laws and regulations do not consider the social, cultural and economic situation of local communities and companies. As a result, Laws establish unattainable standards provoking/causing a low degree of regulation enforcement. Therefore, this Action is devoted to reinforce and develop adequate procedures to consider the socio-economic context during Law drafting processes. The Legal Unit will coordinate this Action in collaboration with the Ministry of Justice. The first step of this Action is to define how the socioeconomic context will be included into Law drafting processes. Then, the Legal Unit will identify and analyze the main gaps in regulations related to the socioeconomic context and will maintain regular communications with the Ministry of Justice to look for agreed solutions. Public participation will have an important role in the identification of socio economic aspects that should be considered during Law drafting processes.
Outcomes	Increased enforcement of regulations.
Related Actions	Previous actions: 11. Other related actions: 8, 12, 13.
Key stakeholders	– Legal Unit. – Ministry of Justice. – Local communities. – Private sector.
Estimated duration	2 years (third and fourth year of MLV-ICZM Plan implementation).
Budget	No extra costs (costs included in the Legal Unit budget).
Action Indicators	I.9 a. Procedures for Law drafting cover the socio economic context.

ROADMAP 1

Action 10. The development of agreements for collaboration between the Legal Unit and competent stakeholders.

Description

The Legal Unit enhances collaboration between stakeholders and provides them with technical support for decision-making processes. The Legal Unit and authorities with competences in water and environmental issues (MWRI, EEAA, GAFRD, Alexandria Governorate, Ministry of Justice…), will establish formal communication channels in order to ensure that the assignments of the technical unit meet stakeholders' needs.

Therefore, this Action aims at developing agreements for collaboration and communication between the Legal Unit and the above-mentioned authorities. The ICZM Technical Secretariat will foster the signature of agreements addressing the establishment of regular communication channels between the Legal Unit and relevant stakeholders (at least two meetings per year).

Outcomes

Fluid communication between ICZM institutional structures and stakeholders.
Increased collaboration among agencies.

Related Actions

Previous actions: 1, 11. Subsequent actions: 5, 6, 7, 8, 9, 10, 12, 13.

Key stakeholders

- ICZM Technical Secretariat.
- Legal Unit.
- EEAA and its Alexandria RBO.
- MWRI.
- Ministry of Housing.
- Ministry of Agriculture.
- Ministry of Justice.
- Alexandria Governorate.
- GAFRD.
- Water Bodies Police.

Estimated duration

5 years (1st year: implementation / 4 following years: operation)
This Action will start during the second year of the MLV-ICZM Plan implementation period.

Budget

No extra costs (costs included under ICZM Technical Secretariat and Legal Unit budgets).

Action Indicators

I.10 a. Agreements developed to ensure communication between technical units and competent stakeholders.
I.10 b. Regularity of communication between technical units and competent stakeholders.

ROADMAP 1

Action 11. The establishment of a single Legal Unit.

Description

The Legal Unit is the technical unit under the ICZM Technical Secretariat that will promote activities aimed at improving the regulatory framework. In this regard, the Legal Unit will support activities related to:

- Updating water and environmental regulations, considering the socio economic context.
- Clarifying distribution of competences.
- Promoting stakeholders participation and capacity building.

For that, the Legal Unit will support two types of stakeholders:

1) those stakeholders who define and enact laws and regulations (i.e. Ministry of Justice);

2) those stakeholders with competences in water and environmental management (i.e. MWRI, EEAA, Alexandria Governorate, GAFRD…).

Communication between the Legal Unit and stakeholders will be permanent (Action 10).

Functions

- Coordinate those actions related to the improvement of the legal framework (Actions 5, 6, 7, 8, 9, 12, 13 and 29).
- Report and raise up legal proposals and initiatives to the ICZM Technical Secretariat.
- Identify conflicts and discrepancies among water and environmental laws and regulations, and propose and draft legislative amendments to the ICZM Technical Secretariat.
- Maintain regular communication with competent stakeholders.
- Provide legal advice to the ICZM Steering Committee through the ICZM Technical Secretariat.
- Cooperate with the National ICZM Committee in the definition and drafting of ICZM regulations, through the ICZM Steering Committee.

This technical unit addresses and unifies two structures proposed by the Alamim project: Legal Affairs and Director of Supervision and Legal Affairs Bureau.

Outcomes

Increased efficiency and applicability of laws and regulations.
Increased collaboration between stakeholders.
Non-duplicity of efforts and functions.
Technical support regarding laws and regulations provided.

Related Actions

Previous actions: 14. Subsequent actions: 5, 6, 7, 8, 9, 10, 12, 13, 29.

ROADMAP 1

Action 11. The establishment of a single Legal Unit.

Key stake-holders	– ICZM Technical Secretariat. – Ministry of Justice. – MWRI. – EEAA and the Alexandria RBO. – GAFRD. – Ministry of Industry. – Alexandria Governorate.
Estimated duration	5 years (1st year: installation / following 4 years: operation). The Legal Unit will be established during the first year of the MLV – ICZM Plan implementation and it will be a permanent ICZM structure.
Budget	Installation costs: 6,000 USD. Operational costs: 70,000 USD/year.
Action Indicators	I.11 a. Recruitment of permanent staff for the Legal Unit. I.11 b. Approved legal proposals raised up to the ICZM Technical Secretariat.

ROADMAP 4

Action 12. Strengthening mechanisms for the surveillance and punishment of water quality violations.

Description	Water and environmental regulations are usually neglected in the vicinities of Lake Mariut and Valley. Environmental violations are not always punished due to the lack of a comprehensive punitive framework. Water and environmental regulations include some punitive measures such as fines, but these fines are so low that they do not preclude environmental infringements. Therefore, this Action is devoted to improve the compliance of water and environmental regulations by strengthening mechanisms for the surveillance and punishment of environmental infringements. This Action includes: - Assessment and improvement of coordination mechanisms among EEAA, MWRI and Water Bodies Police regarding the surveillance of environmental infringements. - The inclusion of punitive principles into water and environmental regulations. These principles include 1) rehabilitation at the transgressor's expense, 2) criminalization of water quality violations, 3) commensurate the fines according to the extent of damage and 4) publication of environmental violations. - Update fines established under existing regulations. The Legal Unit will be in charge of coordinating this Action, in collaboration with the Alexandria Regional Branch Office of EEAA. EEAA, MWRI and the Water Bodies Police will actively participate in the definition of coordination mechanisms and procedures to improve surveillance of water discharges to Lake Mariut and Valley.
Outcomes	Systems for controlling and reducing pollution. Comprehensive punitive framework under water and environmental regulations.
Related Actions	Previous actions: 11, 10. Other related actions: 5, 6, 8.
Key stakeholders	– Legal Unit. – Ministry of Justice. – EEAA Alexandria RBO. – MWRI. – Water Bodies Police. – GAFRD.
Estimated duration	3 years (1st year: implementation / 2 following years: enforcement). Action 12 will start during the third year of the MLV-ICZM Plan implementation.
Budget	Consultancy: 180,000 USD.
Action Indicators	I.12 a. Activation of procedures in collaboration with competent stakeholders. I.12 b. Application of punishment mechanisms.

Action 13. Strengthening mechanisms for the stimulation of environmentally friendly actions.

Description	The Legal Analysis carried out during the diagnosis phase highlighted the need to strengthen incentive policies for environmentally friendly actions. Besides, the National Water Resources Plan 2017 (NWRP) proposes the introduction of financial incentives to promote clean industrial products and defines measures to encourage the use of environmentally friendly agricultural methods. Law 4 of 1994, in Article 17, established economic instruments to stimulate environmentally friendly actions. However, more than 20 years after its promulgation, this Article has not been activated. Therefore, this Action aims at launching incentive policies for environmentally friendly actions. Incentive measures will address the implementation of technologies and procedures for pollution abatement and the use of renewable energies, among others. Incentive measures will include tax exemption, subsidies, scientific support, etc. The ICZM Technical Secretariat and its Legal Unit will coordinate this Action.
Outcomes	Increased environmental awareness of private entities. Systems for controlling and reducing pollution.
Related Actions	Previous actions: 1, 10. Other related actions: 12.
Key stake-holders	– ICZM Technical Secretariat and its Legal Unit. – Ministry of Justice. – Ministry of Environment. – Ministry of Industry.
Estimated duration	3 years (first year: implementation / 2 following years: enforcement). This Action will start on the third year of the MLV - ICZM plan implementation.
Budget	110,000 USD /year.
Action Indicators	I.13 a. Establishment of environmental incentives. I.13 b. Application of environmental incentives.

ROADMAP 1

Action 14. Establishing the ICZM Steering Committee and its Technical Secretariat.

Description

The ICZM Steering Committee (ICZM SC) and the ICZM Technical Secretariat (ICZM TS) are the core of ICZM institutional structures. The ICZM SC is the highest decision maker and it will provide policy oversight and guide the ICZM process. It will serve as a liaison with the National ICZM Committee. The Alexandria Governorate, the National ICZM Committee, EEAA Alexandria RBO, MWRI and the Ministry of Housing (GOPP) will compose the ICZM SC during the first cycle of ICZM. The ICZM TS is the highest technical body regarding all ICZM initiatives in Mariut Lake and Valley. It is the executive body of the ICZM SC and it will lead, coordinate and facilitate the implementation of the MLV - ICZM Plan.

Functions of the ICZM Steering Committee

- Facilitate the resolution of intersectorial conflicts, and conflicts arising from policies or activities developed in Mariut Lake and Valley.
- Report and raise proposals to competent stakeholders.
- Adapt national ICZM initiatives to Mariut Lake and Valley.
- Review and approve technical proposals raised by the ICZM TS.
- Formulate ICZM initiatives, strategic objectives and perspectives for Mariut Lake and Valley.
- Supervise the implementation of the MLV – ICZM Plan.
- Lead the financial strategy to support the ICZM process after the ACZMP.

Functions of the ICZM Technical Secretariat

- Execute ICZM Steering Committee mandates and proposals.
- Provide technical advice and propose ICZM initiatives to the ICZM SC.
- Coordinate and implement all donor-funded activities regarding ICZM.
- Coordinate all Actions for the implementation of the MLV – ICZM Plan.
- Monitor the implementation of the MLV - ICZM Plan.
- Promote vertical and horizontal integration.
- Act as liaison between the ICZM Steering Committee and the technical units.
- Ensure communication and organization among technical units.
- Coordinate and organize the participation of the advisory boards.
- Manage and distribute funding among ICZM institutional structures.
- Organize capacity-building activities for the ICZM institutional structures.

ROADMAP 1

Action 14. Establishing the ICZM Steering Committee and its Technical Secretariat.

Outcomes	Easy resolution of inter sectoral conflicts. Vertical and horizontal integration.
Related Actions	Subsequent actions: 11, 18, 19, 23
Key stake-holders	– EEAA and its Alexandria RBO. – National ICZM Committee. – Alexandria Governorate. – MWRI. – Ministry of Housing (GOPP).
Estimated duration	5 years (1st year: installation / following 4 years: operation). This is one of the first actions to be implemented within the MLV – ICZM Plan (after Actions 3 and 4). ICZM SC and ICZM TS will be permanent structures.
Budget	Installation costs: 29,000 USD. Operational costs: 270,500 USD/year.
Action Indicators	I.14 a. Official establishment of the ICZM SC and its TS.

ROADMAP 1

Action 15. Enhancing capacity-building of ICZM Steering Committee, its Technical Secretariat and Technical Units on collaborative management and water and environmental quality.

Description	Technicians and managers involved in the ICZM implementation must have specific skills on collaborative management and must clearly understand the key water and environmental issues of Mariut Lake and Valley. Members of the ICZM SC, ICZM TS and its technical units will receive regular training to create favorable conditions to spread collaborative management among coastal stakeholders. Training on collaborative management and water and environmental quality will include training courses, workshops and conferences. The ICZM Technical Unit will organize and coordinate these training programs.
Outcomes	Enforced collaborative management. Increased skills of the staff of ICZM institutional structures.
Related Actions	Previous actions: 1, 11, 14, 18, 19, 23.
Key stake-holders	– ICZM Technical Secretariat and its Communication Unit. – ICZM Steering Committee. – Communication Unit. – Legal Unit. – Financial Resources Unit. – ICZM Monitoring Unit.
Estimated duration	5 years (one week each year).
Budget	15,000 USD/year (except first year: 30,000 USD).
Action Indicators	I.15 a. ICZM Technical Secretariat and technical unit's staff trained.

Action 16. Establishing the Research Advisory Group.

Description

The Research Advisory Group (RAG) is the advisory body where scientists and managers meet to enforce the integration of science and management. Scientists provide scientific support during decision–making processes and managers raise up research priorities to further support decision-making. The provision of scientific knowledge decreases the inherent uncertainty related to coastal management.

NIOF, CoRI, NARSS and the University of Alexandria will compose the RAG during the first ICZM implementation phase. Upcoming ICZM cycles or phases will include new research centers related to new key issues.

Functions of the Research Advisory Group

- Develop the research agenda (Action 17).
- Discuss ICZM priorities and challenges from the scientific point of view with the ICZM Technical Secretariat.
- Provide scientific advice to the ICZM Technical Secretariat.
- Provide data to the ICZM Monitoring Unit.
- Report on "Coastal challenges" every 3 years.

The RAG will maintain continuous communication with the ICZM Monitoring Unit. The RAG will facilitate the provision of data to the ICZM Monitoring Unit. Besides, the RAG will prepare the "Coastal Challenges" report every years, considering the main conclusions of the progress reports made by the ICZM Monitoring Unit.

Outcomes

Advise public institutions regarding management questions.
Improved communication between scientists and managers.

Related Actions

Previous actions: 14.

Key stakeholders

- ICZM Technical Secretariat.
- National Institute of Oceanography & Fisheries.
- Coastal Research Institute.
- National Authority for Remote Sensing and Space Science.
- Department of Environmental Studies, Faculty of Science, University of Alexandria.

Estimated duration

4 years (1st year: installation / following 3 years: operation).
The Research Advisory group will be created during the second year of the implementation of the plan and it will be a permanent body.

Budget

Installation costs: 3,500 USD.
Operation costs: 1,000 USD /year.

Action Indicators

I.16 a. Representation of research centers.
~~I.16 b. Acceptance of advice raised to the ICZM Technical Secretariat.~~

ROADMAP 3

Action 17. The development of a Research Agenda.

Description	Decision making processes should be based on a sound knowledge of the coastal area. To do so, coastal managers need updated scientific information of the status of coastal resources and their planned uses in the medium and long term. This Action is devoted to developing a yearly Research Agenda that defines research priorities based on management needs. Research priorities will be agreed upon by coastal managers and scientists. The Research Agenda will define and provide annual funds to support research projects dealing with scientific needs for coastal management (i.e.: reduction of water pollution, control of weeds, reduction of coastal risks, data collection, etc.).
Outcomes	Coordinated management of needs and scientific knowledge of Mariut lake and Valley. Facilitation of technological transfer.
Related Actions	Previous actions: 16.
Key stakeholders	– ICZM Technical Secretariat. – Research Advisory Group. – EEAA and its Alexandria RBO. – MWRI. – Ministry of Housing. – Alexandria Governorate. – GAFRD.
Estimated duration	4 years. This Action will start during the second year of the MLV – ICZM Plan implementation, after the creation of the Research Advisory Group.
Budget	200,000 USD /year.
Action Indicators	I.17 a. Projects funded under management priorities.

Action 18. The launch of the ICZM Monitoring Unit.

Description

The ICZM Monitoring Unit is under the umbrella of the ICZM TS and its main assignment is to evaluate the progress of Mariut Lake and Valley as a result of the application of ICZM. This unit will compile existing data from different stakeholders for their analysis, assessment and regular dissemination. The ICZM Monitoring Unit will prepare annual progress reports for the ICZM TS.

The composition of the ICZM Monitoring Unit will consist of technicians and scientists of the Department of Environmental Sciences of Alexandria University. It will ensures an external audit of the ICZM process.

The ICZM Monitoring Unit will host the Water Quality Observatory.

Functions

- Raise all activities and initiatives to the ICZM Technical Secretariat.
- Compile existing data regarding water and environment in Mariut Lake and Valley.
- Implement and improve the Key Issues Indicator System. This Indicator System will evaluate the progress of the coastal status after the implementation of ICZM initiatives.
- Annual report on progress made in water and environmental sustainability to the ICZM Technical Secretariat.
- Collaborate with the EEAA Alexandria RBO in the management of water quality data.

Outcomes

Scientific assessment to support decision-making processes provided.

Related Actions

Previous actions: 14. Subsequent actions: 2, 4.

Key stakeholders

- ICZM Technical Secretariat.
- University of Alexandria.
- EEAA and its Alexandria RBO.
- MWRI.
- Ministry of Housing / GOPP.
- Alexandria Governorate.

Estimated duration

4 years: (1st year: implementation year / 3 following years: operation).

Action 18 will start during the second year of implementation of the plan and the ICZM monitoring unit will be permanent.

Budget

Implementation costs: 9,000 USD

Operational costs: 104,000 USD/year.

Action Indicators

I.18 a. Development of ICZM progress reports.

ROADMAP 1

Action 19. Establishing the Financial Resources Unit.

Description One of the main concerns of stakeholders is the lack of funds to implement ICZM plans. In fact, Egypt has made important efforts to develop the ICZM National Strategy and ICZM Plans, but none of them has been implemented. This deficiency motivated the creation of the Financial Resources Unit. This technical unit (under ICZM TS) will be in charge of obtaining the necessary funds to implement the MLV – ICZM Plan and following stages, as well as the various cycles of ICZM in Alexandria. The Financial Resources Unit will design a sustainable funding system and will be in charge of estimating annual budgets for the implementation of ICZM processes.

The ICZM funding system will include three components:

- Permanent funds coming from national budgets (Action 20).
- Permanent funds based on a cost – sharing basis, including public and private stakeholders (Action 21).
- Supplementary funds, from international donors, to 1) develop specific pilot cases, projects and specific initiatives, and to 2) improve research lines and priorities (Action 22).

The first two components will sustain the daily ICZM implementation process whereas the third component will provide supplementary funds for the development of specific projects and pilot cases.

The Financial Resources Unit will unify the functions of three structures proposed by the ALAMIM project: the Administrative and Financial Affairs office?, the Investment Bureau and the Lake and Valley Maryut Development Fund.

Functions

- Design the ICZM funding system.
- Coordinate the implementation of Actions related to the establishment of a sustainable funding system for ICZM (Actions 20, 21, 22).
- Raise all its activities and initiatives to the ICZM Technical Secretariat.
- Determine annual costs and define funding incomes.
- Identify and submit proposals to international calls regarding ICZM, coastal risks and sustainable development of economic activities (in collaboration with the RAG).
- Promote investment for the MLV ICZM process.
- Provide advice to the ICZM Technical Secretariat about funding distribution and accounting.

ROADMAP 1

Action 19. Establishing the Financial Resources Unit.

Outcomes	Enhanced sustainable and long-term ICZM processes.
Related Actions	Previous actions: 11. Subsequent actions: 20, 21, 22.
Key stake-holders	– ICZM Technical Secretariat. – Ministry of Finance
Estimated duration	5 years (1st year: implementation / 4 following years: operation). The Financial Resources Unit and the ICZM TS will be created during the first year of implementation of the MLV-ICZM Plan.
Budget	Implementation costs: 12,000 USD Operational costs: 140,000 USD/year.
Action Indicators	I.10 a. Agreements developed to ensure communication between technical units and competent stakeholders. I.10 b. Regularity of communication between technical units and competent stakeholders.

ROADMAP 1

Action 20. Guaranteeing the provision of national ICZM funds to local ICZM processes.

Description	The first component of the ICZM funding system is the provision of funds from national budgets. This Action aims at defining a permanent scheme of national funding to local ICZM processes in Mariut Lake and Valley. At national level, EEAA has permanent staff and facilities for ICZM development. However, there are no funding mechanisms to ensure ICZM at local level. The Financial Resources Unit and EEAA will agree and establish a permanent funding scheme for local ICZM in Mariut Lake and Valley. This funding scheme will be framed by the national funds for ICZM.
Outcomes	Long-term ICZM implementation.
Related Actions	Previous actions: 19. Other related actions: 21, 22.
Key stake-holders	– Financial Resources Unit. – Ministry of Finance – EEAA.
Estimated duration	4 years (1st year: implementation / 4 following years: operation). This Action will be developed yearly from the second year of implementation of the MLV – ICZM Plan, once the Financial Resources Unit is launched.
Budget	1,000 USD/year.
Action Indicators	I.20 a. Approval of permanent funding from national budgets. I.20 b. Funds allocated to local ICZM processes from national budgets.

ROADMAP 1

Action 21. Ensuring the equitable distribution of stakeholders' funding.

Description

The second component of the ICZM funding system is the provision of funds based on a cost-sharing basis. Stakeholders have responsibilities on the status of the coastal area, in terms of environmental conservation, water quality degradation, social and economic development, etc. Besides, ICZM addresses the interests and concerns of all stakeholders.

This Action aims at implementing cost-sharing mechanisms involving all stakeholders of the coastal area. To do so, this Action includes the provision of funds from:

1. Existing (or new) property and environmental taxes and fees, such as:
   - Annual property tax.
   - Industrial tax.
   - Road tax.
   - Occupation of public lands, including coastal and hydraulic public domain.
   - Discharge fees (related to Action 5).
   - Water extraction fees.
2. Planning agreements, aimed at improving the efficiency of urban interventions: urban developers agree on the provision of services related to ICZM with relevant authorities.
3. Coastal management services provided by the ICZM Technical Secretariat, such as:
   - Environmental monitoring.
   - Provision of updated data.
   - Provision of GIS tools and databases.
   - Support the organization of dissemination and participatory activities.
4. Creation of public-private partnerships, between the private sector, public agencies and banks (or other funding organizations).

This Action includes the analysis of the degree of environmental responsibility of each stakeholder in terms of water and environmental quality, in order to identify those stakeholders with major obligations. This Action also includes the definition of mechanisms to ensure participation and commitment of those stakeholders.

ROADMAP 1

Action 21. Ensuring the equitable distribution of stakeholders' funding.

Outcomes	Awareness raised. Participation of stakeholders in coastal management enforced.
Related Actions	Previous actions: 19. Other related actions: 5, 20, 22.
Key stake-holders	– Financial Resources Unit. – Ministry of Finance. – Public institutions. – Private companies.
Estimated duration	3 years. This Action will be developed continuously from the third year of implementation of the MLV – ICZM Plan.
Budget	5,000 USD/year.
Action Indicators	I.21 a. Funds allocated to local ICZM processes from public and private stakeholders (shared funding).

ROADMAP 1

Action 22. Obtaining funding from international donors.

Description	The third component of the ICZM funding system is the provision of funds from international donors. International funding is a supplementary component of the ICZM funding system. The basis of this financial system is the provision of national funds from public budgets and cost-sharing schemes. International calls usually address integrated coastal management initiatives, coastal risks (climate change and tsunamis), water quality improvement, environmental conservation, sustainable tourism development, aquaculture initiatives, improving technologies for pollution abatement, training, etc. This Action will promote the identification of international calls related to coastal management and the submission of proposals in collaboration with public or private entities and research centers. The Financial Resources Unit will establish collaboration channels with the Research Advisory Group to increase synergies regarding the submission of proposals for international funding.
Outcomes	Increased collaboration between research centers and other institutions. Funds obtained for specific research projects, development of pilot cases, etc.
Related Actions	Previous actions: 19. Other related actions: 20, 21.
Key stakeholders	– Financial Resources Unit. – Research centers.
Estimated duration	3 years. This Action will be developed continuously from the third year of implementation of the MLV – ICZM Plan.
Budget	2,500 USD/year.
Action Indicators	I.22 a. Budget obtained from international donors. I.22 b. Diversity of international donors.

S3: ENSURING SUSTAINABLE ICZM
S3-03: Ensuring a Sustainable Funding System for Local ICZM

ROADMAP 1

Action 23. Activating the Communication Unit.

Description

The Communication Unit is the agency in charge of implementing public awareness campaigns and capacity building programs in collaboration with the ICZM TS. The ICZM TS will recruit specific staff for the Communication Unit with skills in communication and organization of environmental awareness and educational activities.

This technical unit is similar and addresses the similar functions as the Environmental Awareness and Information structure proposed by ALAMIM.

Functions

- Coordinate Actions related to public awareness (Actions 24, 25, 27, 28).
- Raise all activities and initiatives to the ICZM Technical Secretariat.
- Develop public awareness campaigns, including the organization of participatory workshops.
- Prepare brochures regarding ICZM activities.
- Create and maintain a web site on ICZM.
- Carry out national communications regarding ICZM in Mariut Lake and Valley.
- Collaborate with the ICZM Technical Secretariat in promoting communication between ICZM structures.
- Collaborate in the organization of capacity building programs.

Outcomes

Increased information dissemination and awareness raised.
Enhanced capacity building.

Related Actions

Previous actions: 14. Subsequent actions: 24, 25, 27, 28.

Key stakeholders

– CZM Technical Secretariat.

Estimated duration

5 years (1st year: installation / 4 following years: operation).
The Communication Unit will be established in the first year of the MLV – ICZM Plan implementation and it will be a permanent body.

Budget

Installation costs: 9,000 USD.
Operational costs: 98,000 USD/year.

Action Indicators

I.23 a. Recruitment of permanent staff for the Communication Unit.

Action 24. Designing awareness campaigns regarding water and environmental quality.

Description	Environmental awareness in the study area needs to be improved, as stakeholders emphasized during the participatory workshop held on December 2014 in Alexandria. Therefore, this Action aims at developing awareness-raising campaigns regarding environmental sustainability, including: public conferences, exhibitions, information posts and advertising, awareness campaigns in beaches during summer months, activities in schools, high schools and universities, as well as advertising in tv, radio, newspapers or local magazines. Awareness-raising campaigns for targeted groups will be organized defining specific messages and resources (targeted groups include, among others, local communities, fishermen, and industries). The Communication Office will prepare annual plans to design awareness-raising campaigns.
Outcomes	Increased knowledge of Mariut Lake and Valley. Awareness raised on ICZM and environmental sustainability. Increased stakeholder participation.
Related Actions	Previous actions: 23. Subsequent actions: 25.
Key stakeholders	– Communication Unit.
Estimated duration	3 years. This Action will be a permanent activity from the third year of implementation of the Plan, once the Communication Unit is operational.
Budget	50,000 USD/year.
Action Indicators	I.24 a. Development of awareness and education campaigns

ROADMAP 2

Action 25. The development of online dissemination tools for ICZM initiatives.

Description	Together with the development of awareness campaigns (Action 24), this Action aims at improving general awareness on ICZM. Internet is the best means for information dissemination, so it is the most suitable medium to publish and create awareness about ICZM. This Action addresses the development of online dissemination tools, including: - To design, develop and maintain a website informing about ICZM initiatives, provide ICZM documentation, legal information, publish the agenda of the awareness-raising campaigns, create a forum for public discussion, publish some data regarding ICZM, etc. The public forum will provide information regarding society's concerns on coastal problems and challenges. - Online social networks. - Creation of multimedia products including videos and brochures to be uploaded to video sharing sites and other digital platforms. The Communication Unit will be in charge of developing and publishing online dissemination tools.
Outcomes	Increased Awareness on ICZM. Increased stakeholder participation.
Related Actions	Previous actions: 23, 24. Other related actions: 30.
Key stake-holders	– Communication Unit.
Estimated duration	3 years. This Action will be a permanent activity from the third year of implementation of the plan onwards, once the Communication Unit is operational.
Budget	15,100 USD/year.
Action Indicators	I.25 a. Growth of web-site visitors. I.25 b. Availability of ICZM online documents.

Action 26. Establishing the Coastal Forum to discuss priority issues for coastal management.

Description

The Coastal Forum is the advisory body that gathers all key stakeholders with interests in Lake Mariut and Mariut Valley, including authorities, professional organizations, civil society associations, the research community, companies, national committees, and NGOs, to debate about management priorities. This debate will consist in identifying current concerns and setting new challenges for coastal management. The Coastal Forum will set the basis for identifying shared solutions and management initiatives, since consensus building and collaborative mechanisms will be promoted.

The Coastal Forum will operate at two levels:

1) ICZM level: all stakeholders will discuss issues and priorities for the management of Mariut Lake and Valley, especially during the decision-making stage. This Forum is made of all key stakeholders identified during the diagnosis phase, including administrations, the private sector, NGOs, and civil associations.

2) Technical level: Specific Advisory Boards will be periodically formed to address the issues raised by the technical units. These specific advisory boards will provide advice to the technical units, acting as validation boards. This will ensure that the assignments and initiatives proposed by the technical units are accepted by other related stakeholders.

Functions of the Coastal Forum

- Communication and networking between stakeholders.
- Raise sectoral challenges related to the management of Mariut Lake and Valley to the ICZM Technical Secretariat.
- Propose initiatives for the improvement of water and environmental quality, as well as for social and economic development to the ICZM Technical Secretariat.
- Provide advice to the technical units regarding specific issues.

Outcomes

Consensus regarding coastal management priorities.
Awareness raised on the social and economic needs of local communities around Lake Mariut.
Collaboration among public institutions and private stakeholders.
Increased stakeholder participation.

ROADMAP 2

Action 26. Establishing the Coastal Forum to discuss priority issues for coastal management.

Related Actions	Previous actions: 14.
Key stake-holders	– ICZM Technical Secretariat. – Key stakeholders of the MLV – ICZM Plan.
Estimated duration	4 years (1st year: installation / 3 subsequent years: operation). The Coastal Forum will be launched during the second year of the implementation of the plan and it will be a permanent advisory board.
Budget	6,000 USD/year.
Action Indicators	I.26 a. Participants of different stakeholder groups. I.26 b. Approval of proposals raised to the ICZM Technical Secretariat.

ROADMAP 2

Action 27. Capacity building of coastal managers on collaborative management.

Description

Collaborative management consists in the establishment of a variety of concerted agreements between agencies and communities. It contributes to achieving changes in the behavior of stakeholders and institutions as new procedures and mechanisms to allow integration of information and consensus building are set.

However, collaborative management represents a new approach with regards to current planning and management strategies, and it requires comprehensive training of technicians and managers of public institutions, as they will have a relevant role in fostering communication channels and collaborative procedures with other institutions for a more effective coastal management. The Communication Office, in collaboration with institutions involved in the management of the Mariut area, will organize annual training programs on collaborative management and ICZM. The definition of training programs will have the following phases: defining a capacity-building model, identification of training priorities, implementation of the training program and monitoring of results.

Outcomes

Coastal managers have the necessary skills, knowledge and attitudes to undertake the different tasks involved in management of Mariut Lake and Valley.
Institutions are capable of facing ICZM processes.

Related Actions

Previous actions: 23. Other related actions: 15, 28.

Key stakeholders

- Communication Unit.
- MWRI.
- EEAA and its Alexandria RBO.
- Ministry of Housing / GOPP.
- Ministry of Agriculture.
- Alexandria Governorate.
- GAFRD.

Estimated duration

4 years (one week per year).
This Action will be a permanent activity from the second year of implementation of the plan, once the Communication Unit is operational.

Budget

15,000 USD/year (consultancy).

Action Indicators

I.27 a. Trained coastal managers on collaborative management.

ROADMAP 2

Action 28. Capacity building of private sectors (industries, farmers and aquaculture) on water quality management.

Description	Private sectors play a very important role in water quality management in Lake Mariut and its valley. They operate in the surroundings of these water bodies, causing pollution and exploiting natural resources. This Action aims at training companies (private sector) on water quality management. This Action addresses the organization of specific training programs for industries, agriculture and aquaculture companies and fishermen. Training programs will include an assessment of capacity needs. In general, contents of the training courses will include: tools and technologies for pollution reduction, impacts of pollution on the environment, water and environmental legislation, etc. The Communication Office will organize annual training programs, addressing the following phases: definition of a capacity-building model, identification of training priorities, implementation of the training program and monitoring the results.
Outcomes	Awareness raised among private companies.
Related Actions	Previous actions: 23. Other related actions: 13, 15, 27.
Key stakeholders	– Communication Unit. – Industries. – Agriculture companies. – Aquaculture companies. – Fishermen.
Estimated duration	4 years (one week per year). This Action will start on the second year of the MLV-ICZM Plan implementation, once the Communication Unit functions.
Budget	30,000 USD/year.
Action Indicators	I.28 a. Training programs organized for private companies and associations (industries, farmers and aquaculture).

ROADMAP 2

Action 29.The inclusion of collaborative management procedures within the regulations of key stakeholders.

Description	Collaborative management is a continuous problem-solving process, requiring debate, negotiation and consensus building. This Actions aims at establishing the basis for promoting collaborative management between coastal stakeholders. Key stakeholders will formally adopt collaborative management procedures to ensure that collaborative management is assumed at institutional level. Formal adoption of collaborative management requires the definition of clear objectives, tools and mechanisms of collaborative management within each institution
Outcomes	Increased collaboration among public institutions.
Related Actions	Other related actions: 26.
Key stake-holders	– ICZM Technical Secretariat. – Legal Unit. – MWRI. – EEAA and its Alexandria RBO – Ministry of Housing / GOPP. – Ministry of Agriculture. – Alexandria Governorate. – GAFRD.
Estimated duration	3 years. This Action will start on the third year of implementation of the LV – ICZM Plan.
Budget	2,500 USD/year.
Action Indicators	I.29 a. Institutions assuming collaborative management procedures.

Action 30. The design of an innovative tool to promote and provide shared ICZM information.

Description	Many institutions and research centers, such as EEAA, MWRI, CoRI, NIOF or Alexandria University, obtain data related to the coastal system. Indeed, some web sites publish water quality data (i.e: **www.nodc-egypt.org**). However, most data are not publicly available and coastal stakeholders complain about the lack of available coastal data (as they stated during the public consultation process). This Action aims at designing a tool to provide/share coastal data, specifically that related to the Mariut area. This tool will provide homogenous spatial information of Mariut Lake and Valley, the coastal stretch and port areas. The compilation, homogenization and spatial representation of coastal information will improve decision-making and coastal awareness. This tool will provide information to two different types of users: 1) competent stakeholders that need data to support their decision-making processes; and 2) the wider public which is interested in coastal management. The ICZM Technical Secretariat will coordinate this Action in collaboration with stakeholders. Stakeholders will design the tool in terms of scope, structure, main contents, availability and suitability of existing data, and potential users and uses. Stakeholder participation will ensure that the ICZM tool covers stakeholders' needs, and therefore, the involvement of all stakeholders in the future development and maintenance of the tool. . This Action also covers the establishment of agreements with stakeholders for data sharing and publication. This Action is the first step for developing a data sharing tool. Upcoming ICZM cycles will continue this task by implementing this tool and extending its geographical scope throughout the Alexandria Governorate.
Outcomes	Promote coordination and collaboration between stakeholders. Create the basis for the provision and publication of coastal management data. Improve stakeholders' awareness.
Related Actions	Previous actions: 26. Other related actions: 25.
Key stakeholders	– ICZM Technical Secretariat. – Research centers. – EEAA and its Alexandria RBO. – MWRI. – Ministry of Housing / GOPP. – Alexandria Governorate. – GAFRD.
Estimated duration	2 years. This Action will start on the third year of implementation of the MLV-ICZM Plan.
Budget	I13,000 USD/year.
Action Indicators	I.30 a. Stakeholders involved in the design of the shared tool. I.30 b. Agreements established for the implementation of the data-sharing tool.

ANNEX III: BUDGET DESCRIPTION

	Action	Action cost	Type of cost	USD per type of cost	Description	2016	2017	2018	2019	2020
1	Extending the water quality monitoring system to Mariut Valley.	320,000	Man power	0			80.000	80.000	80.000	80.000
			Facilities	0						
			Activities	320,000	Water sample analysis					
			Consultancy	0						
2	The development and implementation of a set of indicators to monitor climate change effects on water quality.	0	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	0						
3	Including water quality assessment procedures into development plans and projects.	0	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	0						
4	Establishing the communication framework for managers of water quality and urban development	5,000	Man power	0						
			Facilities	0						
			Activities	5,000	Meetings	1.000				
			Consultancy	0						
5	Updating discharge emission limits.	0	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	0						
6	Establishing receiving water standards for Lake Mariut, Mariut Valley and waterways.	1,000,000	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	1,000,000			500,000	500,000		
7	Establish water quality standards for water uses.	0	Man power							
			Facilities							
			Activities							
			Consultancy							

Action		Action cost	Type of cost	USD per type of cost	Description	2016	2017	2018	2019	2020
8	Detecting and solving overlaps in water and environmental regulations.	0	Man power	0						
			Facilities	0						
			Activities	320,000						
			Consultancy	0						
9	Adjusting procedures to consider the socio-economic context under the Law drafting process.	0	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	0						
10	The development of agreements for collaboration between the Legal Unit and competent stakeholders.	0	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	0						
11	The establishment of a single Legal Unit.	356,000	Man power	350,000	Senior & junior experts	70,000	70,000	70,000	70,000	70,000
			Facilities	6,000	Workstations	6,000				
			Activities	0						
			Consultancy	0						
12	Strengthening mechanisms for the surveillance and punishment of water quality violations.	180,000	Man power	0						
			Facilities	0						
			Activities	0						
			Consultancy	180,000				60,000	60,000	60,000
13	Strengthening mechanisms for the incentive of environmentally friendly actions.	330,000	Man power	0						
			Facilities	0						
			Activities	330,000	Awareness program Funding for incentives			110,000	110,000	110,000
			Consultancy	0						
14	Establishing the ICZM Steering Committee and its Technical Secretariat.	1,381,500	Man power	1,260,000	Directive, Senior & junior experts an assitants	252,000	252,000	252,000	252,000	252,000
			Facilities	106,500	Workstations & office	40,500	16,500	16,500	16,500	16,500
			Activities	0	Meetings	7,000	2,000	2,000	2,000	2,000
			Consultancy	0						

Action		Action cost	Type of cost	USD per type of cost	Description	2016	2017	2018	2019	2020
15	Enhancing capacity building of the ICZM Steering Committee, its Technical Secretariat and the Technical Units on collaborative management and water and environmental quality.	90,000	Man power	0		30,000	15,000	15,000	15,000	15,000
			Facilities	0						
			Activities	90,0000	Training courses					
			Consultancy							
16	Establishing the Research Advisory Group.	6,500	Man power	0			3,500	1,000	1,000	1,000
			Facilities	0						
			Activities	6,500	Meetings					
			Consultancy	0						
17	The development of a Research Agenda.	800,000	Man power	0			200,000	200,000	200,000	200,000
			Facilities	0						
			Activities	800,000	Research fund.					
			Consultancy	0						
18	The launch of the ICZM Monitoring Unit.	425,000	Man power	392,000	Senior & junior experts		98,000	98,000	98,000	98,000
			Facilities	33,000	Workstations & office		15,000	6,000	6,000	6,000
			Activities	0						
			Consultancy	0						
19	Establishing the Financial Resources Unit.	712,000	Man power	700,000	Senior & junior experts	140,000	140,000	140,000	140,000	140,000
			Facilities	12,000	Workstations	12,000				
			Activities	0						
			Consultancy	0						
20	Guaranteeing the provision of national ICZM funds to local ICZM processes.	4,000	Man power	0			1,000	1,000	1,000	1,000
			Facilities	0						
			Activities	4,000	Travels&meetings					
			Consultancy							

Action		Action cost	Type of cost	USD per type of cost	Description	2016	2017	2018	2019	2020
21	Ensuring the equitable distribution of stakeholders funding.	15,000	Man power	0						
			Facilities	0						
			Activities	15,000	Travels & meetings			5,000	5,000	5,000
			Consultancy	0						
22	Obtaining funding from international donors.	7,500	Man power	0						
			Facilities	0						
			Activities	7,500				2,500	2,500	2,500
			Consultancy	0						
23	Activating the Communication Uni.	499,000	Man power	490,000	Senior & junior experts	98,000	98,000	98,000	98,000	98,000
			Facilities	9,000	Workstations	9,000				
			Activities	0						
			Consultancy	0						
24	Designing awareness campaigns regarding water and environmental quality.	151,000	Man power	0						
			Facilities	0						
			Activities	151,000	Lecturers & multimedia products			50,500	50,500	50,500
			Consultancy	0						
25	The development of online dissemination tools for ICZM initiatives.	45,300	Man power	45,300						
			Facilities	0				15,100	15,100	15,100
			Activities	0						
			Consultancy	0						
26	Establishing the Coastal Forum to discuss priority issues for coastal management.	24,000	Man power	0						
			Facilities	0						
			Activities	24,000	Meetings		6,000	6,000	6,000	6,000
			Consultancy	0						

Action		Action cost	Type of cost	USD per type of cost	Description	2016	2017	2018	2019	2020
27	Capacity building of coastal managers on collaborative management.	60,000	Man power	0						
			Facilities	0						
			Activities	60,000	Training courses		15,000	15,000	15,000	15,000
			Consultancy	0						
28	Capacity building of private sectors (industries, farmers, aquaculture) on water quality management.	120,000	Man power	0						
			Facilities	0						
			Activities	120,000	Training courses		30,000	30,000	30,000	30,000
			Consultancy							
29	The inclusion of collaborative management procedures within the regulations of key stakeholders.	7,500	Man power	0						
			Facilities	0						
			Activities	7,500	Meetings			2,500	2,500	2,500
			Consultancy	0						
30	The design of an innovative tool to promote and provide shared ICZM information.	26,000	Man power	0						
			Facilities	0						
			Activities	26,000	Meetings & trainings			13,000	13,000	
			Consultancy	0						
ANNUAL TOTALS						665,500	1,543,000	1,790,100	1,290,100	1,277,100
TOTALS								**6,565,800**		

ANNEX IV: MLV-ICZM PLAN MONITORING SYSTEM

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
1	Extending the water quality monitoring system to Mariut Valley.	I.1	1	a. Implementation of the monitoring system in Mariut Valley	= degree of implementation of the monitoring system	3: monitoring stations installed and functioning 2: monitoring system designed 1: no advances
2	The development and implementation of a set of indicators to monitor climate change effects on water quality.	I.2	1	a. Implementation of the monitoring program to assess long term climate change impacts on water quality	= degree of implementation of the monitoring program to assess long term effect of climate change on water quality	3: monitoring program functions 2: monitoring program designed 1: no advances
3	Including water quality assessment procedures into development plans and projects.	I.3	1	a. Formal adoption of procedures	= degree of implementation of procedures to include water quality assessment into development plans	3: procedures are formally adopted 2: agreed procedures 1: no advances
4	Establishing the communication framework for managers of water quality and urban development.	I.4	0,5	a. Number of stakeholders officially involved in communication channels	= number of stakeholders (related to water quality and spatial planning) that sign agreements to establish communication channels *100 / total number of stakeholders related to water quality and spatial planning	3: > 70 % 2: 20 - 70 % 1: < 20%
			0,5	b. Regularity of communication between water quality managers and urban developers	= regularity of meetings	3: once a year 2: one every two years 1: < one every two years

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
5	Update discharge emission limits.	I.5	0,5	a. Budget allocated to develop studies for updating discharge emission values	= allocated budget (LE)*100/ required budget (LE) for the updating of discharge emission values	3: >80% of required budget 2: 50 - 80% of required budget 1: <50% of required budget
			0,5	b. Discharge emission values legally updated	= approval of discharge emission values and type	3: discharge emission values and prohibited substances list updated and approved 2: discharge emission values updated and approved 3: discharge emission values updated
6	Establishing receiving water standards for Lake Mariut. Mariut Valley and waterways	I.6	0,5	a. Budget allocated to develop studies for the definition of receiving water standards	= allocated budget (LE)*100/ required budget (LE) for the definition of receiving water standards	3: >80% of required budget 2: 50 - 80% of required budget 1: <50% of required budget
			0,5	b. Establishment of reference conditions	= type of references established	3: physicochemical and bacteriological references established 2: physicochemical references established 1: no references established
7	Establishing water quality standards for water uses.	I.7	0,5	a. Budget allocated to develop studies for the definition of water quality standards for different water uses.	= allocated budget (LE)*100/ required budget (LE) for the definition of standards	3: >80% of required budget 2: 50 - 80% of required budget 1: <50% of required budget
			0,5	b. Water uses standards established and reviewed	= type of standards established	3: drinking water and swimming water standards reviewed and new standards for agricultural and industrial uses established 2: standards for agricultural and industrial uses established 1: no standards modified or proposed

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
8	Detecting and solving overlaps in water and environmental regulations.	I.8	0,5	a. Institutions benefit from competences simplification	= institutions benefit from simplifying competences	3: competences of MWRI. EEAA and other stakeholders clarified under regulations 2: competences of MWRI and EEAA clarified under regulations 1: no institution benefit from simplifying competences
			0,5	b. Resolved overlaps in water and environmental regulations	= resolved overlaps regarding the management of the coastal and water environment	3: resolved overlaps regarding the management of water quality and other related to the coastal management 2: resolved overlaps regarding the management of water quality 1: no overlaps resolved
9	Adjusting procedures to consider the socio-economic context under the Law drafting process.	I.9	1	a. Procedures for Law drafting cover the socio economic context	= existing procedures to include the socio economic context	3: procedures are implemented 2: draft procedures 1: no procedures
10	The development of agreements for collaboration between the Legal Unit and competent stakeholders.	I.10	0,5	a. Agreements developed to ensure communication between the Legal Units and competent stakeholders.	= number of agreements signed*100 / number of competent stakeholders related to the regulatory framework	3: > 70% 2: 20 - 70% 1: < 20%
			0,5	b. Regularity of communication between the Legal Unit and competent stakeholders	= regularity of communications from the Legal unit to competent stakeholders	3: twice a year or more 2: once a year 1: < one a year

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
11	The establishment of a single Legal Unit.	I.11	0,5	a. Recruitment of permanent staff for the Legal Unit.	= permanent staff in the Legal Unit	3: >80% of required budget 2: 50 - 80% of required budget 1: <50% of required budget
			0,5	b. Approved legal proposals raised up to the ICZM Technical Secretariat.	= approved proposals by the ICZM TS * 100 / proposals raised up by the Legal Unit	3: discharge emission values and prohibited substances list updated and approved 2: discharge emission values updated and approved 3: discharge emission values updated
12	Strengthening mechanisms for the surveillance and punishment of water quality violations.	I.12	0,5	a. Updating of procedures in collaboration with EEAA. MWRI and Water Bodies Police	= updating of procedures established in collaboration with competent stakeholders	3: >80% of required budget 2: 50 - 80% of required budget 1: <50% of required budget
			0,5	b. Punishment mechanisms and fines are updated in regulations.	= number of changes in water and environmental regulations	3: regulations are updated to include modern punitive principles and fines 2: only punitive principles or fines are updated 1: regulations are not updated
13	Strengthening mechanisms for the incentive of environmentally friendly actions.	I.13	0,5	a. Establishment of environmental incentives.	= approval of environmental incentives	3: approval of environmental incentives 2: draft incentives 1: not developed
			0,5	b. Application of environmental incentives.	= number of companies benefit from environmental incentives*100/ number of companies	3: > 50% 2: 20 - 50% 1: < 20%

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
14	Establishing the ICZM Steering Committee and its Technical Secretariat.	I.14	1	a. Official creation of the ICZM Steering Committee and its Technical Secretariat.	= official publication of the creation of the ICZM Steering Committee and its Technical Secretariat	3: published 2: draft 1: no official publication
15	Enhancing capacity building of the ICZM Steering Committee, its Technical Secretariat and the Technical Units on collaborative management and water and environmental quality.	I.15	1	a. ICZM Technical Secretariat and technical units staff trained.	= number of trained staff *100 / total staff of the ICZM TS and its technical units	3: > 70 % 2: 20 - 70 % 1: < 20%
16	Establishing the Research Advisory Group.	I.16	0,5	a. Representation of research centres	= number of research centres in the RAG*100 / number of research centres	3: > 70 % 2: 20 - 70 % 1: < 20%
			0,5	b. Acceptance of advice raised to the ICZM Technical Secretariat.	= number of scientific recommendations included within management policies*100 / number of scientific recommendations	3: > 70 % 2: 20 - 70 % 1: < 20%
17	The development of a Research Agenda.	I.17	1	a. Projects funded under management priorities.	= number of projects funded under management priorities*100/ total number of research projects	3: >40 % 2: 20 - 40 % 1: < 20%
18	The launch of the ICZM Monitoring Unit.	I.18	1	a. Development of ICZM progress reports.	= type of reports developed by the ICZM Monitoring Unit	3: annual ICZM progress report and special reports 2: annual ICZM progress reports 1: no ICZM progress reports

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
19	Establishing the Financial Resources Unit.	I.19	1	a. Recruitment of permanent staff for the Financial Resources Unit.	= permanent staff in the Financial Resources Unit	3: permanent staff hired 2: temporal staff hired 1: no staff hired
20	Guaranteeing the provision of national ICZM funds to local ICZM processes.	I.20	0,5	a. Approval of permanent funding from national budgets.	= approval of permanent funding from national budgets	3: signed approval of permanent funding for MLV ICZM processes 2: draft approval of permanent funding for MLV ICZM processes 1: no advances
			0,5	b. Funds allocated to local ICZM processes from national budgets.	= allocated budget (LE)*100 / required budget (LE)	3: >80% 2: 50 - 80% 1: <50%
21	Ensuring the equitable distribution of stakeholders funding.	I.21	1	a. Funds allocated to local ICZM processes from public and private stakeholders (shared funding).	= allocated budget (LE)*100 / required budget (LE)	3: >80% 2: 50 - 80% 1: <50%
22	Obtaining funding from international donors.	I.22	0,5	a. Budget obtained from international donors.	= allocated budget (LE) for coastal management projects *100 / budget (LE) of coastal management projects developed in the area	3: >40% 2: 20 - 40% 1: <20%
			0,5	b. Diversity of international donors.	= number of international donors funding coastal management projects in the area	3: > 3 2: 1 - 3 1: < 1

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
23	Activating the Communication Unit.	I.23	0,5	a. Recruitment of permanent staff for the Communication Unit.	= permanent staff in the Communication Unit	
			0,5	b. Communication activities developed.	= number of communication activities developed*100 / communication proposals raised up to the ICZM TS	3: > 70 % 2: 20 - 70 % 1: < 20%
24	Designing awareness campaign regarding water and environmental quality.	I.24	1	a. Development of awareness and education campaigns.	= coverage of awareness and education campaigns	3: awareness campaigns include media programs and specific awareness campaigns for local communities. private entities and schools 2: some of them are developed 1: no awareness campaigns are developed
25	The development of online dissemination tools for ICZM initiatives.	I.25	0,5	a. Growth of web-site visitors.	= website visitors*100 / potential website visitors	3: > 50 % 2: 20 - 50 % 1: < 20 %
			0,5	b. Availability of ICZM online documents.	= number of ICZM available documents for download	3: agendas and summaries of all dissemination activities. legal documents. guidelines. progress reports and bibliography available for download 2: only some information available 1: no documents available for download

ACTION INDICATOR		VARIABLES				
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
26	Establishing the Coastal Forum to discuss priority issues for coastal management	I.26	0,5	a. Participants of different stakeholder groups.	= number of participants by stakeholders groups	3: all stakeholders groups are represented by 3 or more different stakeholders 2: all groups are represented by less than 3 stakeholders 1: only some groups are represented
			0,5	b. Approval of proposals raised to the ICZM Technical Secretariat.	= approved proposals by the ICZM TS * 100 / agreed proposals raised up by the Coastal Forum	3: > 70 % 2: 20 - 70 % 1: < 20%
27	Capacity building of coastal managers on collaborative management.	I.27	1	a. Trained coastal managers on collaborative management.	= number of trained staff *100/total staff of institutions with competences on coastal management	3: > 70 % 2: 20 - 70 % 1: < 20%
28	Capacity building of private sectors (industries. farmers. aquaculture) on water quality management.	I.28	1	a. Organization of training programs for private companies and associations (industries. farmers. aquaculture).	= number of training courses per sector	3: yearly training courses for industries. aquaculture and agriculture sectors 2: yearly training courses for one or two sectors 1: no yearly training courses
29	The inclusion of collaborative management procedures within the regulations of key stakeholders.	I.29	1	a. Institutions assuming collaborative management procedures.	= number institutions assuming collaborative management procedures*100 / number of institutions (among key stakeholders)	3: > 70 % 2: 20 - 70 % 1: < 20 %

ACTION INDICATOR	VARIABLES					
	Action	***I, code***	***Var, weight***	***Description***	***Measure***	***Threshold***
30	The design of an innovative tool to promote and provide shared ICZM information.	I.30	0,5	a. Stakeholders involved in the design of the shared tool.	= number of key stakeholders involved in the tool design*100/ number of key stakeholders	3: > 50 % 2: 20 - 50 % 1: < 20 %
			0,5	b. Agreements established for the implementation of the data-sharing tool	= number of key stakeholders engaged by formal agreements to implement the shared tool*100/ number of key stakeholders	3: > 50 % 2: 20 - 50 % 1: < 20 %

METHOD OF CALCULATION OF STRATEGIC AND OPERATIONAL OBJECTIVES INDICES

Operational Objective Indexes are calculated by the weighted aggregation of several Action Progress Indicators. as simplified in the next formula:

S-O = ∑ (Wn * I.n)

where:

S-O: Operational Objective Index

Wn: Weight of the Action Progress Indicator I.n

I.n: Action Progress Indicator

Strategic Objective Indexes are calculated by the weighted aggregation of several Operational Objectives Indices. as simplified in the next formula:

S = ∑ (WS-O * S-O)

where:

S: Strategic Objective Index

WS-O: Weight of the Operational Objective Index

S-O: Operational Objective Index

STRATEGIC AND OPERATIONAL OBJECTIVES INDICES			
STRATEGIC OBJECTIVE	**STRATEGIC OBJECTIVE INDICES**	**OPERATIONAL OBJECTIVES**	**OPERATIONAL OBJECTIVES INDICES**
S1: Enhancing Water Quality Management in Mariut Lake and Valley	S1= 0.5 * S1-O1 + 0.5 * S1-O2	S1-O1: Increasing the Temporal and Spatial Scope of the Water Quality Monitoring System	S1-O1= 0.5 * I.1 + 0.5 * I.2
		S1-O2: Ensuring the Adoption of Water Quality Criteria under Future Development Plans	S1-O2= 0.6 * I.3 + 0.4 * I.4
S2: Improving the Water Regulatory System and its Enforcement	S2= 0.3 * S2-O1 + 0.4 * S2-O2 + 0.3* S2-O3	S2-O1: Updating Water and Environmental Regulations	S2-O1= 0.4*I.5 + 0.3*I.6+ 0.3*I.7
		S2-O2: Increasing Efficiency of Water and Environmental Regulations	S2-O2= 0.5*I.8 + 0.3*I.9 + 0.2*I.10
		S2-O3: Enforcing Application of Water and Environmental Regulations	S2-O3= 0.4*I.11 + 0.3*I.12 + 0.3*I.13
S3: Ensuring Sustainable ICZM	S3= 0.35 * S3-O1 + 0.35 * S3-O2 + 0.3 * S3-O3	S3-O1: Developing the Institutional Framework for Local ICZM	S3-O1= 0.7*I.14 + 0.3*I.15
		S3-O2: Integrating Science and Management	S3-O2= 0.4*I.16 + 0.2*I.17 + 0.4*I.18
		S3-O3: Ensuring a Sustainable Funding System for Local ICZM	S3-O3= 0.3*I.19 + 0.3*I.20 + 0.3*I.21 + 0.1*I.22
S4: Promoting Stakeholders Participation in Water and Environment Management	S4= 0.5 * S4-O1 + 0.3 * S4-O2 + 0.2 * S4-O3	S4-O1: Promoting Stakeholders Awareness	S4-O1= 0.4*I.23 + 0.3*I.24 +0.3*I.25
		S4-O2: Promoting Stakeholders Participation	S4-O2= 0.4*I.26 + 0.3*I.27 +0.3*I.28
		S4-O3: Increasing Collaboration on Coastal Management	S4-O3= 0.5*I.29 + 0.5*I.30

ANNEX V: REFERENCES OF THE MLV INTEGRATED DIAGNOSIS.

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