



DAMIETTA GOVERNORATE ENVIRONMENTAL ACTION PLAN



Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency

Entec UK Ltd., ERM

UK Department for International Development

SEAM Programme



Damietta Governorate Environmental Action Plan



Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency

Entec UK Ltd., ERM

UK Department for International Development

SEAM Programme

February 2005

FOREWORD BY THE MINISTER OF STATE FOR ENVIRONMENTAL AFFAIRS



The National Environmental Action Plan (NEAP) of Egypt recognizes that the protection of the environment and natural resources is integral to achieving sustainable development. It also recognises that sustainable development can only be achieved with the full participation and involvement of local people. With this in mind the NEAP provides a National framework that supports the implementation of locally prioritized environmental strategies and actions that have been identified in a participatory manner through Governorate Environmental Action Plans (GEAPs).

The National Government has recently given greater attention to the importance of decentralised environmental management and it is with this aim that the Ministry of Environment is keen to promote the introduction of GEAPs in all Governorates. It therefore gives me great pleasure to endorse Damietta's Environmental Action Plan which I am sure will be of tremendous help in tackling environmental problems and the protection of natural resources while achieving sustainable development.

I would like to extend my thanks to UK Department for International Development (DFID) and the Support for Environmental Assessment and Management Programme (SEAM) for all their hard work and generous support in helping Damietta Governorate and its stakeholders, beneficiaries and citizens prepare their GEAP.

I would also like to extend my thanks to Dr. Mohamed Fathy El Baradie, Governor of Damietta, and everyone who contributed to the preparation of the GEAP for all the sincere effort they put into it hoping that supporting and implementing the proposed actions in the GEAP will improve environmental planning and services in Damietta Governorate and preserve the natural resources and contribute to sustainable development in Egypt.

A handwritten signature in black ink that reads "Maged George". The signature is written in a cursive, flowing style.

Eng. Maged George Elias

Minister of State for Environmental Affairs

FOREWORD BY THE GOVERNOR OF DAMIETTA



Damietta Governorate continues to give great attention to the different environmental issues facing the Governorate in light of the urban, industrial and agricultural development that is currently taking place. For that, a serious strategy for the protection and improvement of the environment was prepared to provide a secure and stable atmosphere for citizens whereby public health can be protected by ensuring a proper environment.

The past century, and in particular the last three decades saw serious degradation in environmental conditions in the whole world, leading central governments to realize that such serious issues cannot possibly be addressed without real partnership with local government administrations and civil society and other international organizations. In this view, SEAM Programme, a leading environmental management programme implemented by the Egyptian Environmental Affairs Agency (EEAA) and supported by the UK Department for International Development (DFID) was established.

For this reason, Damietta Governorate participated in the Programme's second stage (SEAM II) with the objective of improving environmental planning and supporting environmental services while tackling some environmentally related problems facing low-income areas. Damietta Governorate Environmental Action Plan (GEAP) succeeded in developing a realistic plan that reflects the community's environmental priorities through a wide scope of consultation covering the Governorate and its villages. Environmental-sector working groups comprising key stakeholders and decision makers were also formed to contribute to the Governorate's environmental profile as well as agree on priority environmental projects and actions.

Finally, it gives me great pleasure to express my thanks and appreciation to all those who exerted relentless efforts in developing this comprehensive environmental plan to become the first realistic, implementable GEAP in Damietta Governorate, full of hope that its targeted objectives will be achieved to correct the Governorate's environmental path within the framework of the Governorate's comprehensive environmental system .

Dr. Mohamed Fathi El-Baradei

Governor of Damietta



ACKNOWLEDGEMENTS

The Support for Environmental Assessment and Management Programme (SEAM) implemented by the Egyptian Environmental Affairs Agency (EEAA) would like to offer special thanks to all those who contributed to the development of Damietta Governorate's Environmental Action Plan (GEAP).

Every attempt has been made to reflect the contributions made by primary and secondary stakeholder groups who participated in its preparation during the GEAP process. This is based on our recognition that the Environmental Action Plan is owned and managed by the people of Damietta.

We would like to offer particular thanks to the Governor of Damietta, without whose personal interest and generous support this GEAP would not have been possible.

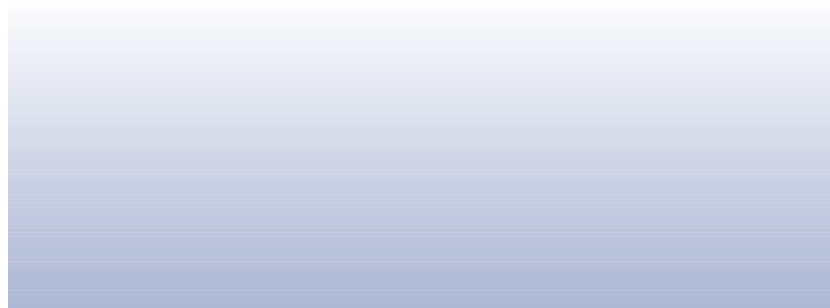
GLOSSARY/ACRONYMS

BCM	Billion Cubic Metres
BOD	Biochemical Oxygen Demand
CDA	Community Development Association
CEP	Community Environment Project
COD	Chemical Oxygen Demand
Danida	Danish International Development Agency
DFID	Department for International Development
DDWC	Damietta Drinking Water Company
EEAA	Egyptian Environmental Affairs Agency
EHDR	Egyptian Human Development Report
EIA	Environmental Impact Assessment
ELO	Environmental Liaison Officer
EMPS	Environmental Management and Planning System
EMS	Environmental Management System
EMU	Environmental Management Unit
EPAP	Environmental Pollution Abatement Programme
EQI	Environmental Quality International
Feddan	Area of Land (4,200 m ²)
GDEA	General Department for Environmental Affairs
GEAP	Governorate Environmental Action Plan
GIS	Geographical Information Systems
GOFI	General Organisation for Industrialisation
GOPP	General Organisation for Physical Planning
HCE	High Council for Environment
KVA	Kilo Volt Ampere
LE	Abbreviation for Egyptian pound
LGU	Local Government Unit
Markaz	Administrative District
mmhos/cm	millimhos per centimetre
MSME	Micro Small and Medium Enterprises
NA	Not Applicable
na	not available
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organisation
NO ₂	Nitrogen Dioxide
NOPWASD	National Organisation of Potable Water and Sanitary Drainage
pm	Particulate Matter
ppm	Parts per million
RPC	Regional Planning Centre
SEAM	Support for Environmental Assessment and Management
STW	Sewage Treatment Works
SWM	Solid Waste Management
TCOE	Technical Co-ordination Office for the Environment
ToRs	Terms of Reference
TSP	Total Suspended Particles
WTP	Waste Treatment Plant
WHO	World Health Organisation

CONTENTS

	Page No.
1.0 Damietta at a Glance	1
2.0 Setting the Scene	2
2.1 What is this plan	2
2.2 Why does Damietta Governorate need an Environmental Action Plan	2
2.3 Principles of GEAP Preparation	3
2.4 How was the plan prepared	3
2.5 Whose Plan is it	3
3.0 The 25 Year Vision	5
4.0 Priority Issues	6
5.0 Annual Cost of Environmental Degradation	8
6.0 What Actions are Needed	10
6.1 Objectives, Policies, Targets, Actions and Programmes	10
6.2 Delivering the Plan	10
6.3 The GEAP is a Flexible, Adaptable Tool	10
6.4 Improving solid waste management	11
6.5 Improving sanitation	14
6.6 Improving potable water supplies	17
6.7 Water Resource Management	20
6.8 Developing Agriculture and Fisheries	23
6.9 Industry	27
6.10 Preservation of Biodiversity & Nature Conservation Management	32
6.11 Improve Coastal Zone Management	34
7.0 What Actions Can We Take Now?	36
7.1 Developing partnerships	36
7.2 Government's role	36
7.3 An important role for the private sector	37
7.4 Community based actions	38
8.0 Institutional Strengthening and Capacity Building	39
8.1 Environmental Management and Planning System	39
8.2 Key Environmental Directorates	41
8.3 Institutional strengthening of other organisations	43
8.4 Public awareness and education	43
8.5 Training	45
9.0 Implementing the Plan	47
9.1 Implementation priorities	47
9.2 Responsibilities	48

10.0	Financing the Plan	50
10.1	Risks of doing nothing	50
10.2	Costs of implementation	51
10.3	Mechanisms for raising resources	52
11.0	The GEAP Cycle	54
11.1	Monitoring the plan	54
11.2	Annual Evaluation	54
11.2	GEAP as an ongoing process	54
12.0	Conclusions	56
 Boxes		
Box 2.1	GEAP Methodology	4
Box 8.1	Environment Management and Planning System	44
Box 9.1	GEAP Implementation Responsibilities	48
Box 10.1	Mechanisms for Raising Funds	53
Box 11.1	GEAP Cycle	55
Box 12.1	GEAP Benefits to be Expected by Stakeholder Groups	57
 Appendix		
Appendix 1	Acknowledgements	58
Appendix 2	List of GEAP Publications	63





1 DAMIETTA AT A GLANCE

Location:

- Lower Egypt, bordered on all sides by Dakhaleya Governorate and Port Said except for its northern border, which faces the Mediterranean Sea.

Area

- 1029 km²

Climate

- Mean air temperature is 21.3° C ranging from a maximum of 36° C in August to a minimum of 8° C in January.
- Average annual rainfall is 100 mm with precipitation greatest in winter

Population

- Total population in 1999 was 953,450
- 72% rural, 28% urban
- Population growth rate is 2.1%
- Population density is 926.56 persons/km².
- Age distribution: 30% < 15 years (10% from 0-6 years), 60% 15-59 years, and 10% > 60 years.

Settlements

- There are 4 Markazes, 11 Cities, 44 local Units, 35 Satellite Villages and 722 Ezbas
- Percentage of population in Damietta's 4 Markazes according to 1999 figures: Damietta (43.8%); Faraskour (18.94%); Kafr Saad (24.42%); El Zarka (10.08%).

Economic base

- GDP per Capita LE4281.0 in 2001-2 (Ranked 9 out of 26 Egyptian Governorates)
- Damietta is not a poor governorate, 2000 figures indicate that .03% of the population are considered to be ultra poor.

Agriculture

- Main winter crops include long clover (59.7%) and wheat (21.3%). In summer rice [73.6%] and vegetables (21%) dominate. Other vegetables and maize are cultivated in approximately 70% and 24% respectively of the nili cropped area.
- 73.4% (115,893) of the total land area is cultivated.
- The existing reclaimed area amounts to 3685 feddans although a further 13,000 feddans is currently under reclamation.

- Salinity levels range from 800 ppm inland to 30,000 ppm around the coast and Lake Manzala.
- The majority of land holdings (86.4%) in Damietta Governorate are less than 2 feddans.
- 18.6% of the population work in Agriculture.

Fisheries

- Fish production comes from three main sources; aquaculture (69.48%), inland fisheries (10.36%) and marine fisheries (20.16%).

Livestock

- Damietta produces approximately 110860 tons of milk a year which is used to process a variety of dairy products.

Industry

- Based on 1996 CAPMAS census data, the Governorates industrial enterprises employ around 53% of Damietta's total workforce compared to 13.9% industrial employment on the national level. Some 50% of the total workforce are employed in MSMEs, whilst larger facilities, employ 3%.
- In the MSME's furniture and wood manufacturing industries account for 64.7% and 23.3% respectively of Damietta's total industrial output.

Employment

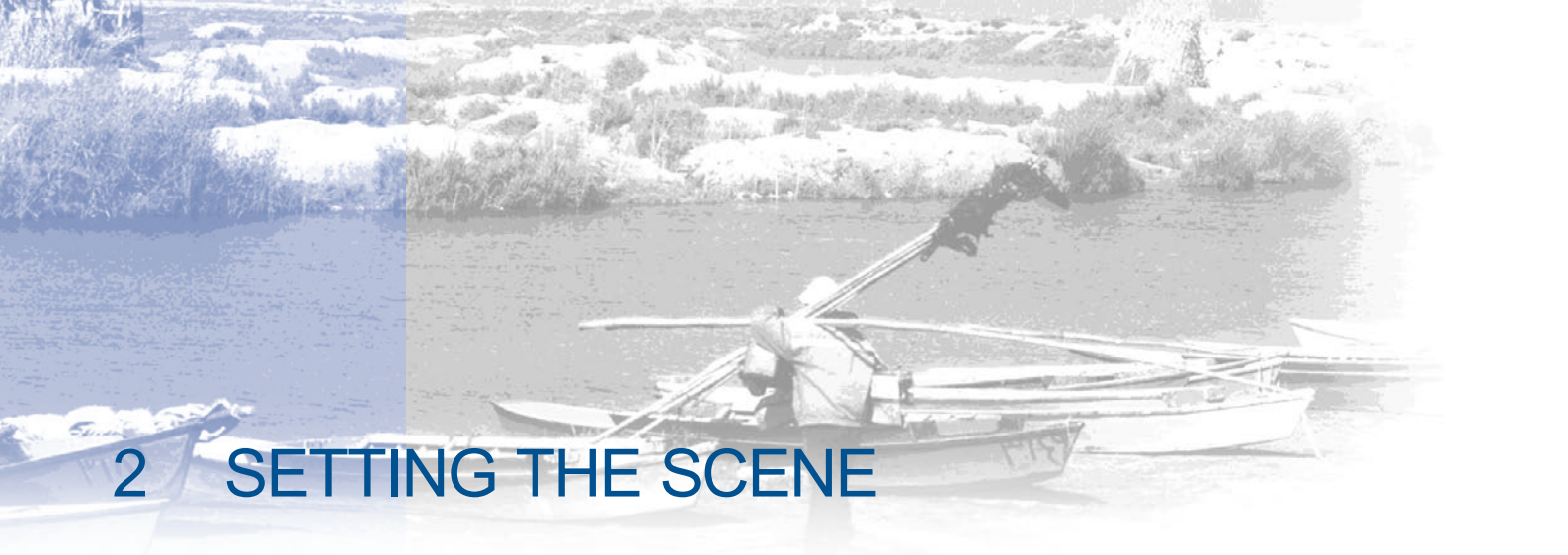
- Although Transformational Industries (furniture related) are supposed to be the largest employer in Damietta figures are incomplete, Agriculture employs 18.6% of the workforce, Education 16% of the workforce and Wholesales 11 %.
- Only 6.4% of the population above the age of 15 are unemployed.

Essential services

- 97% of the governorate have access to drinking water services which mainly come from the Nile.
- 80% of the governorates daily sewage is treated.
- 98% of the population has access to electricity.

Education

- In 2001 Damietta's literacy rate was 70.1%.
- In 1996 4% of the population were University Graduates and 18.72% had a high school education.



2 SETTING THE SCENE

2.1 What is the Plan?

This document describes Damietta Governorate's Environmental Action Plan (GEAP). The GEAP lays the foundations for actions that will enhance the quality of life of those living in Damietta by providing the Governorate with a set of locally prioritised environmental strategies and actions that will result in real environmental and public health improvements. The plan will also help protect the environment from adverse environmental impacts that might be associated with existing or new development.

The plan reflects the views and aspirations of primary and secondary stakeholders that have participated in its preparation. It identifies issues that will need to be addressed to achieve the governorates future environmental vision and adopts practical and affordable solutions to prioritised environmental problems that are of concern to the Governorate. Through a set of objectives, strategic policies and improvement programmes, the GEAP gives direction and guidance to agencies, organisations and individuals whose actions will determine whether the vision is achieved.

The plan proposes actions in line with the national 5 year plan (2002-2007) for Economic and Social Development. In particular in providing adequate sanitation and potable water facilities for all urban centres. The priority issues of the draft National Environmental Action Plan, released in 1992, are also addressed in the areas of improved solid waste management,

water and land use. The actions also contribute towards Egypt meeting its obligations under international protocols, including Agenda 21 of the Rio Convention and the Millennium Development Goals.

Other reports produced in preparation of the GEAP include:

- Damietta Environmental Profile, which outlines the governorates environmental conditions and priority issues and;
- Supporting reports covering water, land, air, health, social dynamics and environmental economics etc.

A full list of those who contributed to the preparation of the GEAP are provided in appendix 1. A full list of reports generated from the GEAP's preparation are provided in appendix 2.

2.2 Why do we need an Environmental Action Plan?

Like other Governorates in Egypt, Damietta lacks an environmental action planning system. The GEAP process aims to resolve this by providing Governorate departments involved in environmental management with a practical approach to environmental planning and management. Used successfully it should help the Governorate to better address:

- The efficient provision and management of Governorate infrastructure and environmental services (solid waste; potable water; sanitary drainage);
- The planning, management and sustainable use of the Governorates natural resources (land, water, air, fisheries and cultural).
- The prevention and control of the impacts of pollution on the Governorates natural resources.

Besides helping the Governorate prioritise and implement a set of agreed actions and targets, the environmental planning and management system also introduces monitoring and evaluation procedures that are designed to help the Governorate assess the performance of prioritized initiatives. Once assessed, prioritised initiatives not seen to be performing receive further attention when the plan is updated and the next set of prioritized actions are agreed. In so doing a sustainable environmental action planning process is set in place. The benefits of such a practical



Economic/financial benefits - such as improved planning and resource allocation, optimising the efficiency of utility services, avoiding excessive costs for treating increasingly polluted water's and contaminated areas, reduced medical and lost productivity costs due to illness related to environmental factors, optimised land use planning for better returns, and improved opportunities to identify and invest in environmentally appropriate technology;

Human and social benefits, - such as improved health through provision of environmental services and training, better planned living and working environments, increased civic pride, greater scope to participate in project and programme design and implementation. This will come from consultation, involvement and an increased awareness of environmental issues, and an understanding of the impacts of certain bad practices, and the benefits of improved habits;

Natural environmental resource benefits, - such as improved and safer quantities/quality of irrigation and industrial water, improved land drainage and soil conservation, and improved water quality in Lake Manzala to aid the fishing industry.

planning tool are substantial and many of these are listed in the above three categories:

2.3 Principles of GEAP Preparation

Damietta's GEAP has been prepared according to the following set of agreed principles:

Participatory – preparation of the GEAP relies on stakeholder participation, which occurs through workshops, focus group discussions and interviews held throughout the Governorate.

Transparent – preparation of GEAP priorities reflects the interests and aspirations of a wide range of stakeholder groups.

Prioritisation of Environmental Concerns – through participation, the GEAP draws up a list of prioritised actions and targets to address stakeholder and Governorate concerns

Mainstreaming Environment – the GEAP is a mechanism through which a sustainable system of environmental management and planning is institutionalized.

Strategic – the GEAP supports decentralised environmental planning and management and provides the Governorate with a long-term strategic vision for environmental improvement.

2.4 How was the Plan Prepared?

The GEAP process began with the formation of environmental sector working groups. Once formed the groups, (comprised of representatives from government, the community, NGOs and the private sector), prepared technical reports on the status of each of Damietta's environmental sectors these reports concentrated on the main issues and concerns. This process was supplemented by extensive consultation with a wide range of stakeholders across Damietta's markazes, which led to the preliminary identification of a number of different environmental issues and priorities. Information from the technical reports and stakeholder consultations was then drawn together to form Damietta's Environmental Profile.

The consultation process began in October 2001 and consisted of the following:

- A *GEAP Survey* (in 10 cities and 75 villages with a total of 2,462 respondents) to provide quantitative information,

mainly related to the problems individuals face with environmental service delivery. The information collected focused on water, waste and sanitation systems.

- A *Village Profile* (in 75 villages) in three parts to provide secondary statistics and primary village level data related to environmental service delivery and related problems.
- *Focus Group Discussions* (in 27 villages) with LGU officials, farmers, students and male and female employees to support findings from the above and provide explanations about the causes and effects of environmental problems.

The above processes used participatory and community based methodologies to collect quantitative and qualitative information, which proved invaluable. It not only helped refine aspects of the environmental profile but also provided decision makers with information they could use to improve their ability to address people's real needs. The consultation process also helped to raise environmental awareness in the community and has already stimulated action by them.

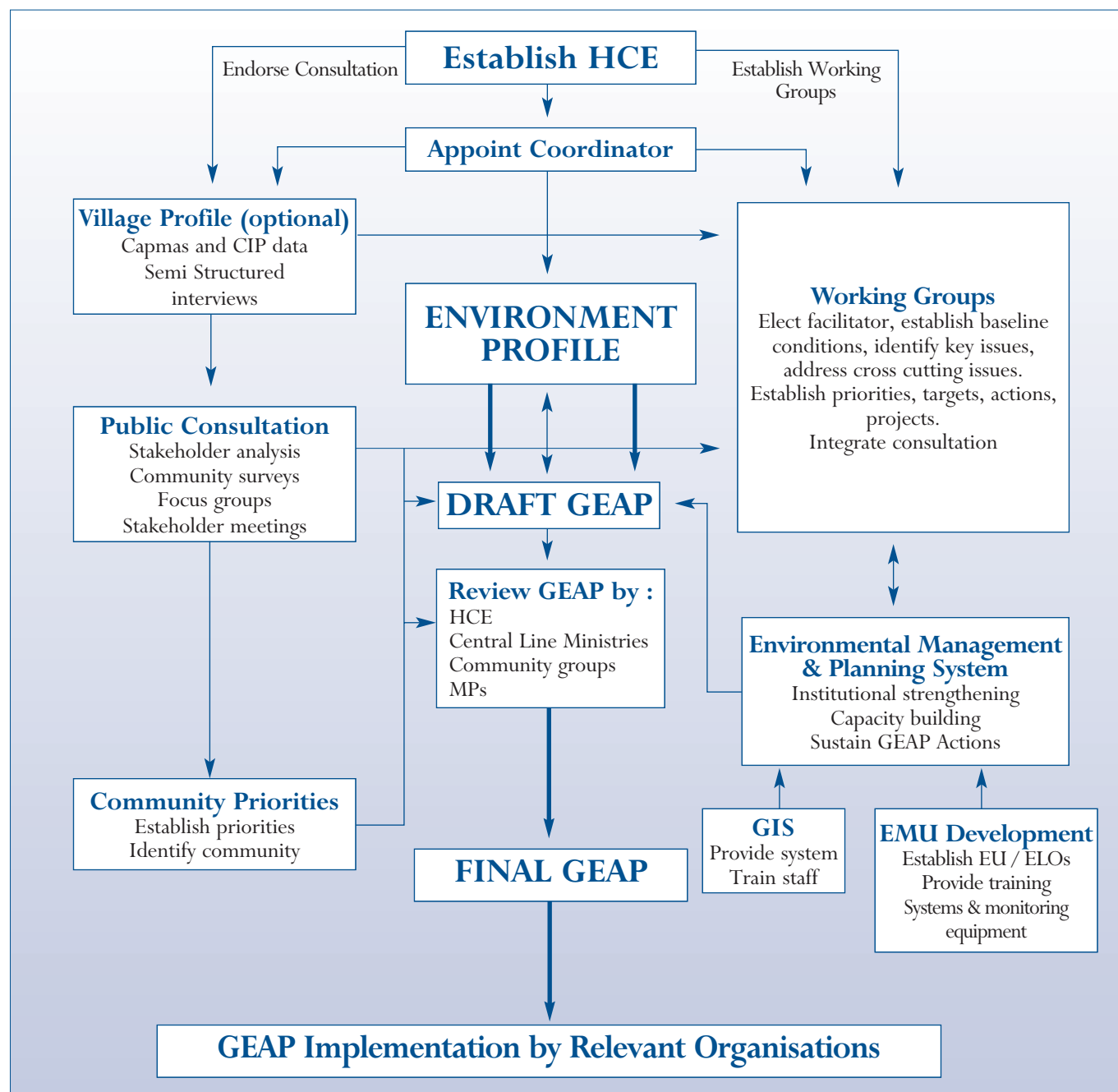
The GEAP methodology (Box 2.1) shows that consultation is central to the process. During the GEAP's periodic updating new information will be added to the Plan.

2.5 Whose Plan Is It?

This plan belongs to Damietta residents. It was prepared through a participatory process that collected and considered the views and interests of a wide number of different stakeholder groups living across the Governorate and as such reflects their environmental concerns and aspirations.



BOX 2.1 GEAP METHODOLOGY





3 THE 25 YEAR VISION

The GEAP's overall aim is to improve the quality of the environment and the lives of all persons living and working in the Governorate. To do this effectively natural resources must be used wisely to ensure that future generations are still able to reap the benefits of a well-managed environment.

In satisfying this vision, the GEAP recognises that people require education and gainful employment, as well as access to services including good water supply, health facilities, waste collection and disposal, electricity and leisure facilities.



Damietta Governorate vision therefore aims to create:

A healthy environment: in which all people have access to a clean and healthy living environment which includes access to uncontaminated drinking water, clean air and good sanitation.

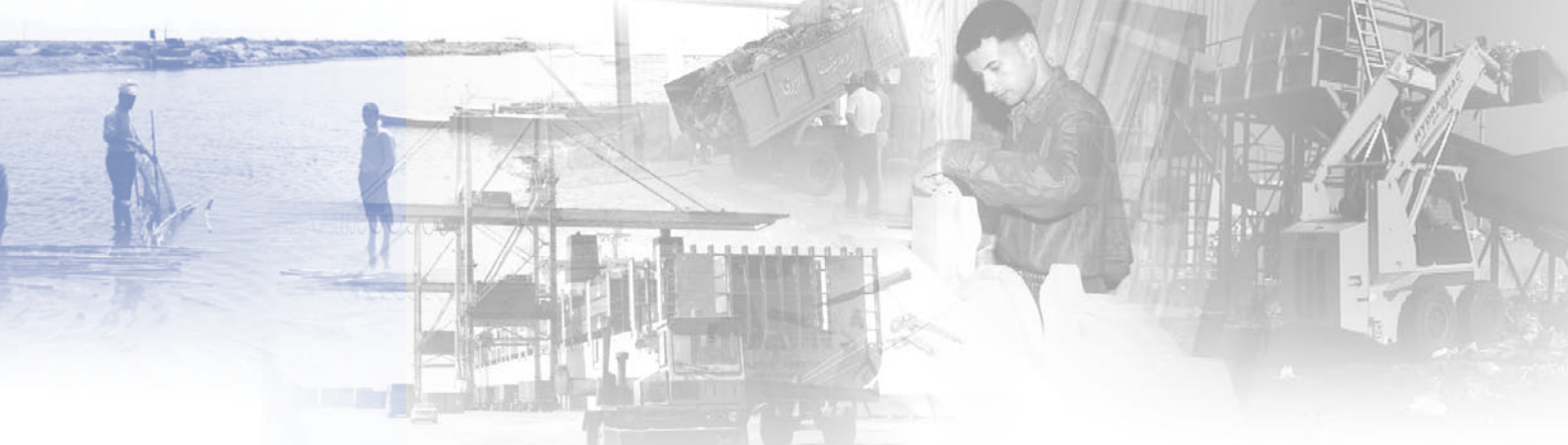
Sustainable development: in which the management and development of the Governorates resources continue to develop without compromising the ability of future generations to meet their own needs.

Integrated development: in which government departments involved in environmental management develop planned and coordinated responses to environmental issues.

Institutional sustainability: in which the institutional capacity of departments involved in environmental management is strengthened so that they are better able to deliver services.

Shared responsibility: in which governorate departments involved in environmental management coordinate with each other and wider stakeholder groups to plan and deliver sustainable initiatives that improve the environment.

An involved community: which is informed and participates in the delivery of initiatives that improve the environment and support the GEAP process.



4 PRIORITY ISSUES

Extensive stakeholder consultation throughout the GEAP process identified that more than a third (34.6%) of the respondents ranked the environment and environmental services together as the Governorates first issue of concern. The top 5 priority issues are listed below in order of perceived importance. Of these the top 3 were considered to be the most pressing concerns and were regarded as critical areas where early interventions are needed.

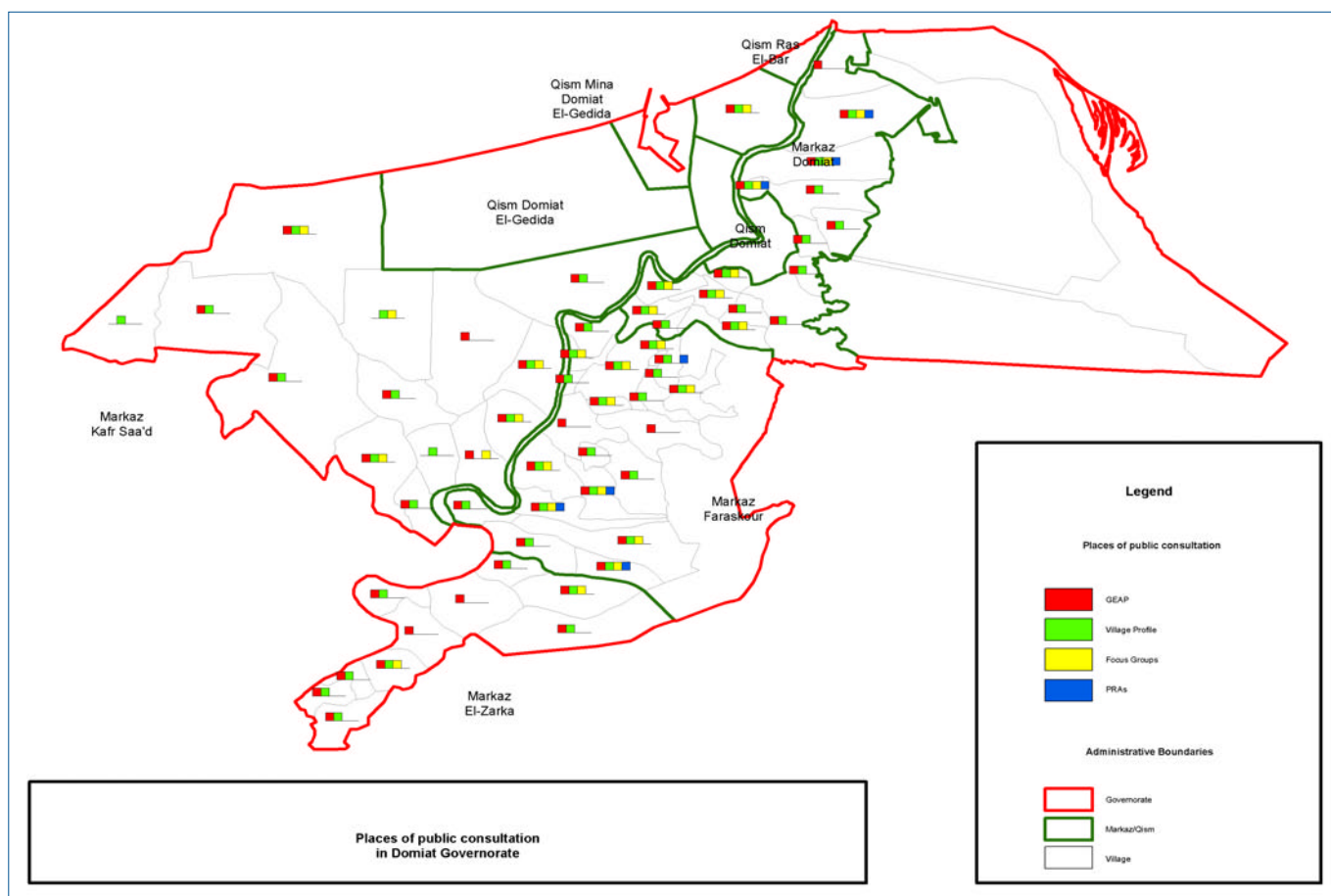
High Priority

Rank	Issue	Typical Concerns
1	Solid Waste Management	Inadequate waste management, irregular service, uncontrolled dumping, waste disposed in canals, open areas and/or burnt. Blocked drains, canals, deteriorating sanitary conditions, contaminated water, spread of related disease. Communities and Governorate staff lack sufficient environmental awareness.
2	Sanitation	Lack of a comprehensive sanitation network, uncovered drains, poor maintenance of existing sanitary services, waste overflow onto streets, contaminated drinking water, polluted canals, spread of related disease, lack of awareness.
3	Water Supply and Water Quality	Shortage of potable water, low water pressure, ineffective pumps, lack of consistent electricity (for pumping), lack of treatment stations, insufficient financial resources, poorly maintained and unclean water pipes.

Lower Priority

Rank	Issue	Typical Concerns
4	Pollution of Water Ways	Lack of a sanitation network, lack of canal coverage, pollution of irrigation and drainage canals, inadequate management, crop pollution, spread of disease (i.e. Bilharzia), lack of environmental awareness.
5	Lack of environmental awareness	Lack of environmental awareness and poor provision of basic services forces people to adopt unhygienic behavioural practices. This is compounded by a general lack of coordination among government departments responsible for delivering services. Insufficient funding and lack of a long term approach means that government are unable to educate their own staff on the importance of environmental awareness let alone the general public.

Places of Community Consultation



Although Damietta is considered one of Egypt's wealthiest governorates many of the poor live in deprived and unhealthy environments. While three quarters of the population live in rural areas, the distinction between rural and urban areas has become increasingly unclear. Recent figures suggest that the population of the larger cities (i.e. Damietta City) are contracting whilst the population of villages and satellite towns is increasing placing ever greater pressure on existing rural services and agricultural land. Indeed according to 1999 CAPMAS data roughly 60% of those living in rural areas as opposed to 22% of those living in urban areas did not have access to networked sanitation. Those without access rely on septic tanks, which have to be regularly emptied to avoid open pollution. The solid waste problem is no better, solid waste systems in place are largely inadequate, collection coverage is poor and waste collection services infrequent, which causes daily health risks. Rural areas on the other hand have to rely on less formal waste collection services and therefore the extent of the problem differs from village to village.

The largest cause of morbidity in Damietta Governorate is Bilharzia found in stagnant water and poorly cleaned irrigation canals. These problems undoubtedly affect the poor more than any other groups of society. They are less prepared and therefore more vulnerable to diseases that may result from poor living or working conditions. Through extensive consultation the GEAP process has been able to identify people's environmental priorities and now through its environmental action plan many of these issues will be addressed.



Sanitation Treatment Plant, Horany village





5 ANNUAL COST OF ENVIRONMENTAL DEGRADATION

An economic study to identify the costs of environmental degradation in Damietta Governorate was undertaken as part of the GEAP process. Whilst the study was able to identify and cost a number of important environmental problems, its findings were limited by time and the lack of available data. This said, it does provide the governorate with useful information that it can use to address a number of very important environmentally related issues that in 2002 cost the governorate close to LE 190 million pa.

The monetary valuation of environmental degradation, or quantification of the cost of environmental degradation, involves many scientific disciplines including environmental, physical and biological, health sciences and epidemiology, and environmental economics. Environmental economics relies heavily on other fields within economics, such as econometrics, welfare economics, public economics, and project economics. The cost of environmental degradation includes many aspects. Some costs are economic. These include reduced productivity of agricultural land due to erosion, salinity or other forms of land degradation; medical treatment costs and lost work days for illnesses associated with environmental pollution; reduced fishery catch due to pollution and overexploitation; and losses in tourism revenues due to pollution and/or natural resource degradation. Other costs are associated with reduced well-being and quality of life. These include an unclean environment such as inadequate waste management; pain and suffering from ill health and disability; the risk of mortality from pollution; and the loss of recreational quality and natural heritage due to degradation of natural resources.

When estimating the cost of environmental degradation in a governorate of a country, a question may be raised about the extent to which the cost is internal to the governorate or absorbed by the central government. On the one hand, the central government may provide transfers to the governorate for subsidized health services, or some health services might be fully financed by the central government. On the other hand, the governorate and its citizens may pay direct or indirect taxes to the central government. This might be in the form of income taxes, value added or sales taxes, or taxes levied on imported

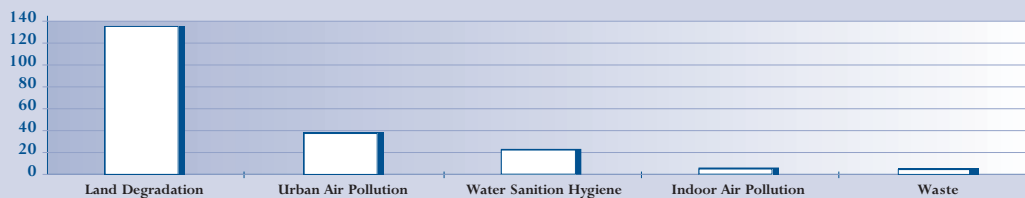
goods and services. Thus it is difficult to precisely estimate the cost of environmental degradation borne by the governorate itself.

While the statistics and indicators suggest that some types of environmental problems are likely to be less than in other parts of the country, they are not insignificant and still have large costs. Moreover, land and water resources can be expected to be an area of high priority due to the location of Damietta in the Nile Delta.

The following Box provides a summary of the estimated socio-economic costs of environmental degradation in Damietta Governorate. More detailed information can be found in the main cost of environmental degradation report.



Annual Cost of Environmental Degradation – Damietta Governorate (million LE per year)



The cost of agricultural land degradation represents 50% of the total cost. The cost of urban air pollution (24%), inadequate water, sanitation, hygiene (16%), solid waste (5%) and indoor air pollution (4 to 5%) are substantially less.

- The Social and Economic Cost of Mortality (the present value of estimated lifetime earnings or value of statistical life) is approximately LE 40 million.
- The Cost of Morbidity which mainly includes cost of health services, medication, value of time lost to illness and care giving, and reduced well-being is close to LE 25 million. Roughly 70% of these costs are associated with inadequate water, sanitation and hygiene.

Agricultural Land Degradation

- The total annual cost of soil salinity factoring in yield losses is in the order of LE57 - 83 million.

More than 45% of the cropped area is devoted to saline sensitive crops with an E_{Ce} threshold level of ≤ 2 dS/m. An additional 67 thousand feddans are cropped by moderately sensitive crops with salinity threshold levels of ≤ 3 dS/m. Average agricultural crop yields in Damietta are almost 20 % lower than for Egypt as a whole. While there might be many reasons for the lower yields (including on-farm technologies, and infestation by insects or disease), soil and irrigation water characteristics are likely to be important factors. The lack of tile drainage systems for about 60% of cultivated land in Damietta is likely to compound the problems of soil salinity and water logging. High mixing ratios of saline drainage water and irrigation water can further exacerbate soil salinity and yield losses.

Urban Air Pollution

- The Health effects and costs of Urban Air Pollution range from between LE 26-42 million pa (mean LE 34 million).

Particulate matter (PM) or Total Suspended Particulates (TSP) of less than 10 micros in diameter are particularly associated with the incidence of respiratory related deceases. The costs related to premature death are between LE 21- 36 million and represent 85% of the annual costs.

Water, Sanitation and Hygiene

- The annual cost associated with health effects of water, sanitation and hygiene is estimated between LE 18 - 27 million, with a mean estimate of almost LE 23 million

The above figure is made up of costs associated with diarrhoeal illness, bilharzia, hepatitis and typhoid. The total annual cost of diarrhoea is approximately LE 14 - 24 million, diarrhoeal child mortality accounts for 25% of this cost, diarrhoeal morbidity 60%. The total annual cost of bilharzia is close to LE 2,960 and this makes up 13% of the overall costs. The total annual cost of hepatitis A, typhoid and paratyphoid is approximately LE 317,000 and this makes up 2% of the total costs.

Indoor Air Pollution

- The annual cost of indoor air pollution is estimated at LE 4 - 8 million

These costs are related to the two types of illness related to indoor air pollution; acute respiratory illness (ARI) and Chronic obstructive Pulmonary disease (COPD).

Waste Management

- The annual cost of inadequate waste management is estimated to be in the range of LE 5.7 - 7.9 million, with a mean estimate of LE 6.8 million

More than 75 % of this cost is associated with inadequate household waste collection and general cleanliness. It should be noted however that these cost estimates do not include issues related to industrial, hazardous, and hospital waste due to lack of data and difficulty in estimating the impacts and costs. For similar reasons, the estimated costs do not include potential impacts of inappropriate land fills and dumpsites on nearby residents or land and water resources. It is uncertain how many households would benefit from an improvement in waste collection services in rural and urban Damietta. If 50 - 75% of households benefited from improvements, the social benefit would be in the order of LE 4.2-6.3 million per year. This represents the annual social cost of inadequate waste services.



6 WHAT ACTIONS ARE NEEDED?

6.1 Objectives, Policies, Targets, Actions and Programmes

Actions are required to achieve the Governorates vision. Objectives and 10 year targets have been established to address priority issues. Policies and programmes have been designed to enable practical and affordable actions to be taken to meet agreed targets and objectives. In brief these are:

- **Objectives** outline What? needs to be done and generally relate to improving the provision, upgrading, management, and maintenance of key environmental services or to protecting, conserving, and sustainably developing the Governorate's natural resources.
- **Policies** outline How? the objective(s) will be realized, and outlines the framework in which actions are to be taken and indicates how they can be achieved.
- **Targets**, which aim to address the objective(s) are set for a 10 year time scale. As far as possible they are quantified and measurable so that proposed actions can be judged in terms of their success at meeting the targets.
- **Programmes** are sets of actions that will contribute to meeting the targets. They vary widely in their scale (from Governorate-wide to community level), means of implementation and technical requirements.

This Action Plan framework has been established for each of Damietta's main environmental issues, these include; Water Resources, Water Supply and Sanitation, Agriculture, Industry, Urban Development, Coastal Zone Management, Solid Waste Management and Biodiversity.

The Action Plan also includes a number of representative Projects, many of which propose action at a community level in support of the above programmes. These projects are outlined in Section 7. A full list of CEP project reports is available in Appendix 2.

6.2 Delivering on the Plan

To successfully deliver on its GEAP objectives and targets the Governorate must strengthen its organisational capacity, with the aim of raising environmental awareness amongst stakeholder groups and facilitating increased involvement in GEAP actions

by organizations and communities throughout Damietta. The consultation process confirmed that, in addressing the priority issues, the GEAP programmes should focus on institutional strengthening, awareness raising and extension services backed up by enforcement of environmental standards. This could involve running environmental awareness programs, introducing incentives to encourage the adoption of environmentally friendly practices and plans that comply with environmental standards or enforcing environmental rules and regulations and imposing fines and penalties on those that break the law.

6.3 The GEAP is a Flexible, Adaptable Tool

This GEAP document is not intended to be a complete list of all the environmental issues that need to be addressed in Damietta. It is a living document, which at any moment in time reflects a synthesis of the Governorate's priority environmental issues identified by representatives from different stakeholder groups throughout Damietta. To operate effectively, the custodians of the Plan must bear the following in mind:

Environmental action planning is an iterative, pragmatic process: the GEAP should be reviewed regularly to assess whether priorities have changed, or the emphasis needs to be shifted by modifying existing actions or introducing new ones. All targets need to be realistic and achievable, which means that they cannot always be translated into quantifiable targets.

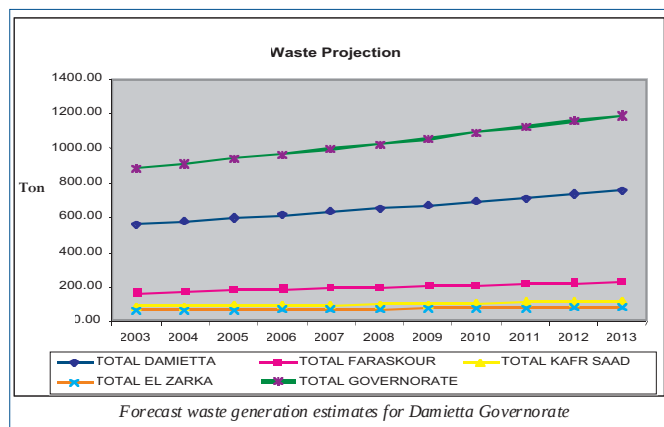
Partnerships between various stakeholders will add value to GEAP actions: inevitably, if improvements to environmental services are to be made, a lead needs to be taken by directorates and departments at Governorate and Markaz level. However, this does not preclude the fact that other major stakeholders like local communities, businesses and NGOs all have significant contributions to make in improving the Governorate's environmental services. With this in mind it is clear that wherever possible partnership approaches should be encouraged. The importance of this approach is further emphasised in Chapter 7.

The costs, and potential benefits, of GEAP actions and outcomes should be assessed: the estimated level of investment required to achieve the kind of environmental service improvements that are needed, is described in further detail in Chapter 10.

6.4 IMPROVING SOLID WASTE MANAGEMENT

Rationale

A little over 1 million people live in Damietta Governorate (2004), and they generate close to 880 tonnes of municipal solid waste every day (320,000 tonnes pa). In addition, significant commercial and industrial waste is generated, particularly from the many wood processing and furniture manufacture workshops in the area. As a result of population growth and an increase in the quantity of waste generated per person forecasts predict that over the next 10 years generated waste is likely to grow to about 1200 tonnes/day (438,000 tonnes pa).



Current waste management practices in Damietta Governorate are generally poor, leading to potential environmental, health and safety impacts, through the pollution of ground and surface waters, exposure of workers to waste and impacts on air quality from waste burning. In addition, there are significant visual impacts on residents and tourists from littering and dumping of waste.



Faraskour Transfer Station

Waste collection services in urban areas vary in terms of quality, frequency and efficiency. In rural areas the services, which are provided, are often basic. Improvements are needed to collection services to reduce the incidents of overflowing waste bins and reduce open dumping. Inefficiencies in collection are often related to inadequately maintained collection vehicles, poor staff moral or due to difficulties experienced by collection vehicles not being able to collect waste from the narrow streets.

Since 2003 Damietta City's waste collection system has



improved with the use of a private sector company responsible for collecting and transporting waste. However, this new arrangement is in the early stages of testing and systems of solid waste collection in other Markazes are still generally weak.



Collection equipment of the private sector company operating in Damietta City

Waste is disposed at Damietta Governorate's 6 dump sites. Operational practices at these dump sites are generally basic, and environmental protection measures minimal. For example, there is no lining to protect ground water and minimal use of cover material to reduce odours and wind blown litter. Consequently there is no control of methane gas.

Damietta Governorate has established two composting plants one in Ras El Bar and the other in Shata however, all other recycling and recovery practices are informal. Waste pickers recover plastic from residential properties and collection points, and metal scrap from enterprises. In addition dump site waste pickers operate, without appropriate control.

There is a general lack of awareness and education amongst residents and other stakeholders on the potential impacts of poor waste management or the measures that can be taken to reduce these impacts.

The institutional and legal framework in solid waste management needs strengthening, particularly in relation to capacity for monitoring and enforcement. The extensive illegal dumping that is currently taking place can be reduced through increased awareness and strengthened monitoring and enforcement.

It is estimated that over 14 tonnes per day of healthcare waste (about 5300 tonnes per year) is generated from the hospitals and clinics in the Governorate. Generally, operational practices to segregate and properly store the hazardous components of this waste stream are inadequate and have the potential to cause severe health and safety impacts.

Damietta Governorate recognises the need for improving solid waste management and a 10-year strategy and implementation plan has recently been developed (August 2004). Many of the current problems are a result of poor cost recovery, and the strategy includes plans for financing improvements. It is important for the improvement plans to build on the successful aspects of the current system and on existing initiatives, such as improved waste collection through private sector participation in Damietta City.

Objectives

- To provide an effective and affordable solid waste management system for all the Governorate's urban and rural settlements.

Policies

- Adopt an integrated waste management approach to solve the waste problems within the Governorate.
- Minimise waste generation and promote re-use, recycling and composting practices.
- Develop a sustainable waste management system through actions to achieve full cost recovery and therefore provide a framework for enhanced private sector participation.

- Ensure the safe handling, storage, transport and disposal of all hazardous healthcare wastes.
- Enhance conditions for municipal workers to improve performance and efficiency, and reduce staff turnover.
- Upgrade and rehabilitate existing dump sites and develop new improved disposal facilities.
- Improve education and raise awareness of residents and other stakeholders throughout the Governorate.
- Strengthen monitoring and enforcement, and therefore reduce illegal dumping.

10 Year Targets and Programmes

Adopt an Integrated Waste Management Planning Approach to Optimise Existing Systems and Develop Improved Services

- Develop and implement a municipal solid waste management strategy and a 10-year implementation plan for Damietta Governorate.
- Assign specific responsibility for implementation of the Strategy and Plan to a new Solid Waste Management Unit in Damietta Governorate.
- Monitor the implementation of the Strategy and modify approaches as necessary to ensure further improvements.

Strengthen Financial, Institutional and Legal Frameworks for Solid Waste Management

- Develop a sustainable waste management system by increasing revenues for waste management and achieving full cost recovery (note that fees should only be increased once some improvements have been made so that credibility has been achieved).
- Improve the efficiency of fee collection through a focus on the priority debtors.
- Reduce illegal dumping and other poor practices through strengthening monitoring and enforcement of waste management.
- Strengthen the collection systems for waste management data and information, and use the information to plan further improvements and monitor implementation.

Improve Collection and Transfer Efficiency and Extend Services to Low-Income Urban and Rural Areas

- Refurbish and upgrade existing solid waste collection equipment (trucks, trailers and tractors), purchase new equipment as required, and improve maintenance workshops.
- Plan and construct 6 transfer stations located in parts of the Governorate from which it is too far to haul waste directly to

the landfill site at Shata (i.e. 3 in Faraskour Markaz, 1 in El Zarka Markaz, and 2 in Kafr Saad Markaz).

- Improve the terms and conditions of the collection teams to increase efficiencies and reduce staff turnover.

Provide Properly Controlled Disposal Sites to Reduce Impacts and Clean-up Illegal Dump Sites

- Plan and develop an engineered sanitary landfill at Shata, by upgrading the existing site, to receive most of Damietta's municipal waste.
- Upgrade and improve the operation of existing disposal sites at Ezbet El Borg and Ras El Bar.
- Refurbish and upgrade equipment used at disposal sites, and purchase new equipment as required, to strengthen operational practices.
- Provide and operate weighbridges at all 3 disposal sites to monitor waste flows.
- Develop a log of all illegal dump sites and plan and implement a clean-up programme, starting with priority sites that cause the highest potential impacts.

Strengthen Recycling and Composting Activities

- Enhance composting activities through expanding the existing composting plants at Shata and Ras El Bar.
- Maximise the recovery of waste materials that can be re-used or recycled by strengthening the organisation of the informal waste picking activities.
- Encourage re-use and recycling activities at wood processing and furniture workshops.



Testing Waste disposal during the construction of El Zarka Transfer Station

Segregate and Dispose Safely all Hazardous Healthcare Wastes

- Develop and introduce procedures for segregating all hazardous healthcare waste into secure storage containers, and

train all staff that handle these wastes.

- Provide safe containers to hospitals and clinics for specific hazardous healthcare waste.
- Plan and construct 3 new incinerators (with gas-cleaning technology) for hazardous healthcare waste.
- Provide secured cells at the disposal sites to accommodate the ash from the incinerators.



Compost Plant, Ras El Bar

Increase Efficiencies in Services through Private Sector Participation

- Plan for the phased introduction of private sector services in waste management, learning lessons from existing service provision in Damietta City and elsewhere in Egypt.
- Establish an economic framework that will encourage the private sector to invest in waste collection, treatment and disposal.

Increase Awareness of Residents and other Stakeholders on Solid Waste Management

- Plan and implement an awareness raising and education campaign, linked to the phased introduction of waste management improvements.
- Promote and encourage public participation in waste management improvements (e.g. community-based clean-up campaigns, segregation at source, etc).

6.5 IMPROVE SANITATION

Rationale

Until the mid 1980's most cities and villages focused their resources on providing water supply systems and less on providing sewage systems. Indeed, Damietta's first sewage treatment plant in the village of Mit El Kholy (550 m³/day capacity) was only completed in 1986. Since then however, the Governorate has made significant progress, it now has 20 sewage systems consisting of gravity sewers, pumping stations and sewage treatment plants which in their entirety treat approximately 96,000 m³/day

of sanitary sewage, equivalent to 60% of the governorates total daily sanitary sewage of 160,000 m³/day. The amount of treated sewage has now reached 140,000m³/day, equivalent to about 80% of the Governorates daily sanitary sewage.

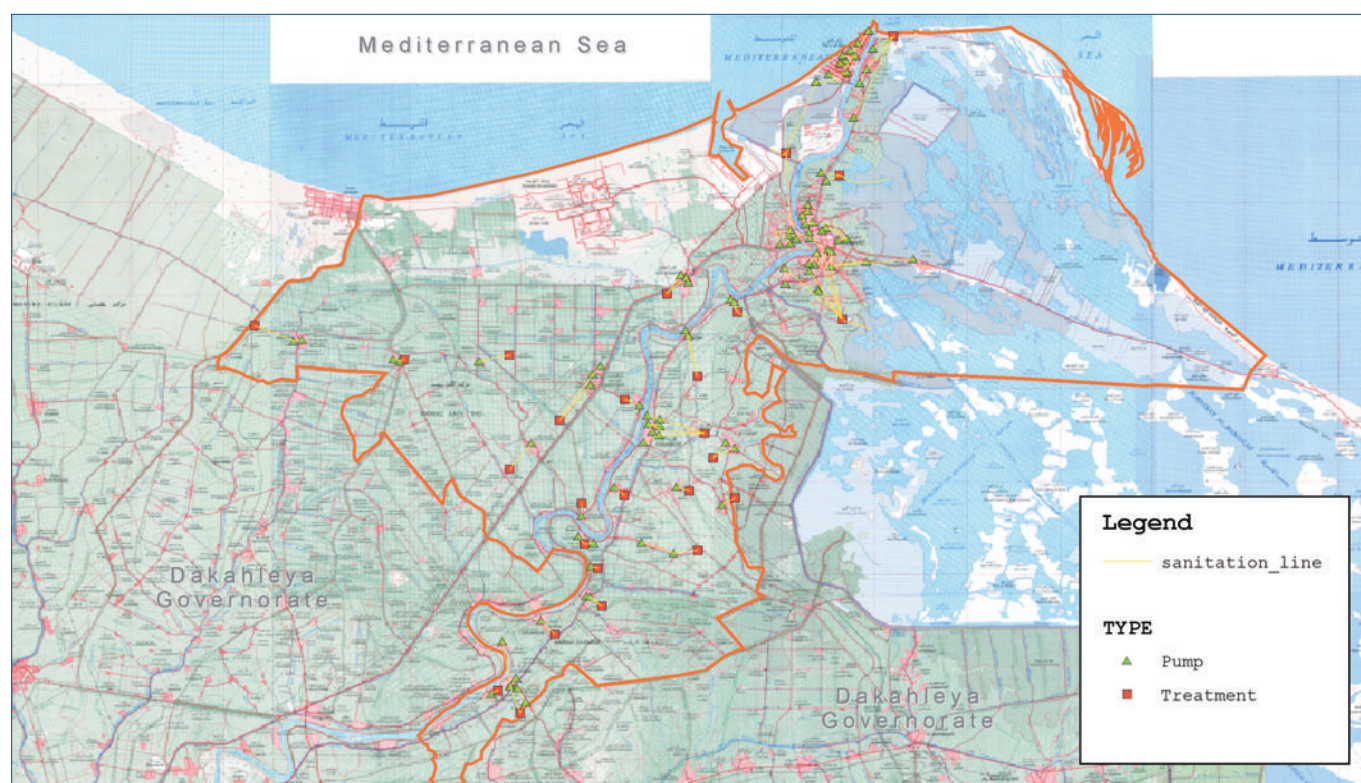
The following table provides a list of governorate sanitation projects that are either planned or under construction.

The projects have been designed with projected raw sewage figures in mind (see figure). They are expected to increase the sanitation service level to 166,000 m³/day which is equivalent to providing a sanitation service to 85% of the Governorate (200,000 m³/day)

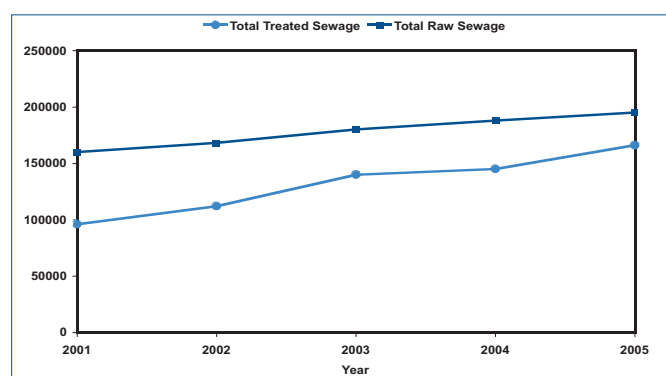
List of Sanitation Projects that are either Planned or Under Construction (2004)

I. Projects Planned as a part of the Governorate Development Plan (Operational projects requiring expansion and/or upgrade)		
No.	Project	Comments
1	Expansion of Westany sewage treatment plant	Pumping stations and sewerage networks
2	Expansion and upgrading of sewerage project in Adleya (first phase)	Completion of sewerage networks and expansions
3	Expansion and upgrading of sewerage project in Khayata	Including Ezbet El-Ratma and EzbetTabl
4	Expansion and upgrading of sewerage project in Rahamna	Land for expansion is secured
5	Expansion of sewerage treatment plant in Berasheya	
6	Expansion of sewerage project in Kafr Saad	
7	Construction of sewerage project in Basarta	
8	Expansion of sewerage treatment plant in Sharabas (second phase)	Work has started in Ezbet-Mansi pumping station
9	Sewerage project in Kafr Soleiman	
10	Sewerage project in Mit Abou-Ghaleb	
11	Sewerage project in Kafr El-Batikh	
12	Sewerage project in Serw	
13	Sewerage project in Rouda	
II. Central Projects		
14	Sewerage project in Damietta and Senaneya	Including villages of Ananeya, Ezbet El-Lahm, and Shat-Greiba
15	Sewerage project in Sheikh Dorgham and Kafr Hamido	Second phase of Ezbet El-Borg project
16	Sewerage project in Dahra, Salemeiya, and Nagareen	Second phase for Faraskour project (under study)
17	Sewerage project in Kafr Saad (first phase)	
18	Sewerage project in the villages of Tawfikieya, Kafr El-Manazla, Ismaileya, Kafr Shahata, El-Sadeiya El-Qebleya and El-Bahareya	Second phase of Kafr Saad project (under construction)
19	Sewerage project in the villages of Seif El-Din, Ezbet El-Baz, Alei-El-Din, El-Salam	Project assigned to a contractor
20	Sewerage project in Mit El-Khouli Abdellah	
21	Sewerage project in the village of Mohamedeiya	
22	Sewerage project in Nasseria village	
23	Sewerage project in Rakayba and Gamasa El-Balad	Project approval secured and will connect to Gamasa treatment plant
24	Sewerage project in El-Sawalem	
25	Sewerage project in El-Hourani and Mit El-Shoyokh	Study of expansion
26	Expansion and upgrading of sewage treatment plant in the city of Damietta	Under study
27	Expansion and upgrading of sewage treatment plant in the city of Ras El-Barr	Assignment made, under study

Sanitation Network in Damietta Governorate



Historically, City sanitation has been managed by local administrative units (coordinated by the general authority of sanitation) whilst at Markaz and village level sanitation has been managed by management units. From an institutional and financial point a view the sector suffers from a lack of centralized decision-making and inadequate funding which hinders its ability to meet operating and maintenance costs and prevents it hiring additional staff or improving the financial conditions of current workers.



Projected Raw Versus Treated Sewage Until 2005

In an effort to improve the situation a Presidential Decree (No 135/2004) was recently issued to establish a National level drinking water and sanitation holding company, to bring both sectors under one governing body. Damietta's sanitation sector is expected to fall under the new arrangement, a move that is expected to greatly improve its institutional and financial capabilities.

Recently, the Governorate's department of housing and utilities has completed the following sewage projects:

- An expansion and upgrading of sewage treatment plants in

the following villages; Ghoneimeya, Adleya and Kafr El-Arab.

- A sewage project in the village of Sherbas (Markaz Damietta) and Sharabas (Markaz Faraskour)
- A pumping station project for the region of El-Bahr in the village of Mit Abul-Azab

The National Organization for Potable Water and Sanitary Drainage (NOPWSD) and the governorates department of housing and utilities sanitation authority are continuing to expand and improve the governorates sanitation services in order to reduce village dependence on septic tanks whose waste is currently vacuumed and discharged in drains.

Illegal discharge into drains, either from untreated sewage, or septic tank vacuuming into drains poses a great danger to public health and the environment. Industrial wastewater is another problem as industrial establishments do not have any industrial wastewater treatment units in their facilities (e.g. some dairy factories discharge their effluent to Moheb and Sayalah drain). Furthermore, waste streams from either smaller factories (i.e. gas stations, laundries, chicken farms) that discharge their waste into the municipal wastewater network or commercial establishments (i.e. hospitals, slaughterhouses, schools, etc) can be detrimental to the receiving wastewater treatment plants. The same holds true for some of the primitive local bakeries, which often discharge mazot to the network.

Currently, plans are being made to assess the potential for using the treated wastewater for irrigating trees etc. Sludge from sewage treatment plants on the other hand is sold already used as a soil amendment. The following table provides a list of sanitation projects to be introduced over the next 10 years.

A List of the Planned Projects over the next two 5-year Plans (2007-2017)

Projects to Cover Villages and Ezbas not currently covered with sanitation services	
No.	Project
Markaz Damietta	
1	Ezab El-Nahda
2	Awlad Hamam
3	El-Khalifeya
4	Bahry part of Senaneya
Markaz Faraskour	
5	El-Ghawabeen
6	El-Atwa
7	El-Obeydeiya
8	El-Tarha
9	Awlad Khalaf
10	Kafr El-Shennawy
11	Abu-Greida
12	El-Azazma
13	Karam and Rezouk (to connect to El-Nasreya project)
14	El-Arbacen, El-Guindy, and Hagaga
15	Ezbet El-deidei in El-Berasheya
16	Tafteesh El-Serw
Markaz Kafr Saad	
17	Kafr Mit Abu-Ghaleb (under the El-Sawalem project)
18	El-Basateen and Keheil
19	El-Reyad and El-Hawashem
20	Om El-Rizk and El-Awayed
21	Dar El-Salam
22	El-Hoseineya
23	Om El-Reda

Objectives

- To extend sanitation coverage to all villages and Markazes in Damietta Governorate.
- To ensure proper treatment of industrial facilities, and prevent discharge of waste that does not follow the relevant environmental laws to drains or to the sewage network.

Policies

- Create a water and sanitation holding company to ensure greater coordination of water supply and sanitation activities.
- Strengthen the sectors institutional capacity and increase funding to optimize the sectors performance.
- Utilize the reuse of treated wastewater as an additional source of water.

Ten Year Targets and Programmes

Strengthen the Capacity of the Sanitation Sector

- Support the implementation of a joint water and sanitation holding company issued recently as a Presidential Decree.
- Increase the sanitation sector budget allocated to allow it to operate at the optimal capacity.

Expand Sanitation Services to all Areas within the Governorate

- Complete all partially completed sanitation projects to increase the level of sanitation coverage in Damietta.
- Complete treatment plants for existing factories, to improve the situation of industrial waste discharge to water ways.
- Complete all projects under the Governorate development plan.
- Implement all central projects in villages and cities.
- Extend sanitation services to four villages in Damietta Markaz, twelve in Faraskour Markaz, and seven in Kafr Saad Markaz that are currently not covered.

Maximise reuse of treated Wastewater and Sewage Sludge

- Identify opportunities for safely irrigating crops using treated wastewater
- Encourage the reuse of treated effluent from wastewater treatment plants

Improve Management of the Sanitation Sector

- Reach a negotiated agreement between the Ministry of Health and Ministry of Water Resources and Irrigation regarding the enforcement of Law 48/year 1982 to ensure that regulatory authorities and sewage treatment plant operators work together to reach a reasonable way of dealing with those that fail to meet effluent standards.
- Stop the discharge of treated and/or untreated industrial waste into the governorates municipal wastewater network.

6.6 IMPROVE POTABLE WATER SUPPLY

Rationale

Access to sufficient quantities of clean and reliable potable water is clearly essential to both community and business in Damietta Governorate. Surface water provides Damietta's primary source of drinking water, groundwater is not utilised as a resource for drinking water. In 1984 in response to weak water production rates (43 million m³/pa) the governorate issued a decree (decree no 357/1984) to establish a public Drinking Water Company (Damietta Drinking Water Company), which would be responsible for water production and distribution.

Over the years this arrangement has ensured that the company maintains a certain amount of autonomy over decision-making and financial self-sufficiency, which has helped streamline the water sectors operation. Today the company produces upwards of 103 million m³ of water a year due mainly to the upgrading of its three main water treatment plants in Damietta, El-Boston and Kafr Soleiman whose capacity has been respectively increased from 130 l/sec to 350 l/sec, 600 l/sec to 1,450 l/sec, and 600 l/sec to 1,200 l/sec, respectively. The company has also installed 25 new compact water treatment units and upgraded 4 existing compact units in El Rouda, Kafr El Bateekh (2 units), and Kafr Mit Abou-Ghaleb. As the following table indicates in 2000/2001, traditional surface water treatment plants contributed 67 % of the total water production whilst compact units contributed 33%.

Water Production in Damietta Governorate (2000-2001)

Water Treatment Plant	Total Production (m ³ /day)
Main (Conventional) Plants	
Damietta	25,120
El-Bostan	88,098
Kafr Soleiman	93,981
Total Conventional	207,199
Compact Units	
Faraskour/ 2 units	3,583
El Serw/ 2 units	3,583
Sharabas/ 1 unit	1,791
Mit Abou-Ghaleb/ 2units	3,543
Kafr Mit Abou-Ghaleb/ 3 units	9,982
Kafr El-Shenawy/ 3 units	5,374
Rouda/ 1 units	4,047
Adleya/ 1 units	1,791
Kafr El-Batikh (1) /3 units	15,367
Ezab El-Nahda/ 2 units	3,583
Daqahla/ 3 units	6,665
Kafr El-Batikh (2)/ 3 units	15,799
Kafr El-Meyasrah/2 units	3,583
Seif El-Deen/ 2 units	3,583
Seif El-Deen/ 1 unit	11,479
El-Rahamna/ 1 unit	3,925
Total Compact	97,678
Grand Total	304,877

All conventional (large) water treatment plants and compact units abstract water from the Nile, at locations upstream of the Faraskour dam. No abstraction is practiced from any of the canals nor is groundwater abstraction practiced in the Governorate for drinking purposes. This helps prevent the risk of reduced water levels resulting from irrigation shifts and ensures a better quality of water.



Compact Unit, Dakahla Village

At present 97% of the governorate has access to drinking water services and only those living in the sparsely populated ezbas region in Kafr Saad continue to rely on water tankers or stand-pipes for their water supply. The governorates quantity of water supply is generally sufficient and only comes under a strain in urban areas during summer months when holidaymakers visit the governorate. This said however water consumption in Damietta is only 150 litres/per/day, which is less than the National average norm of 200 to 250 liters/per/day.

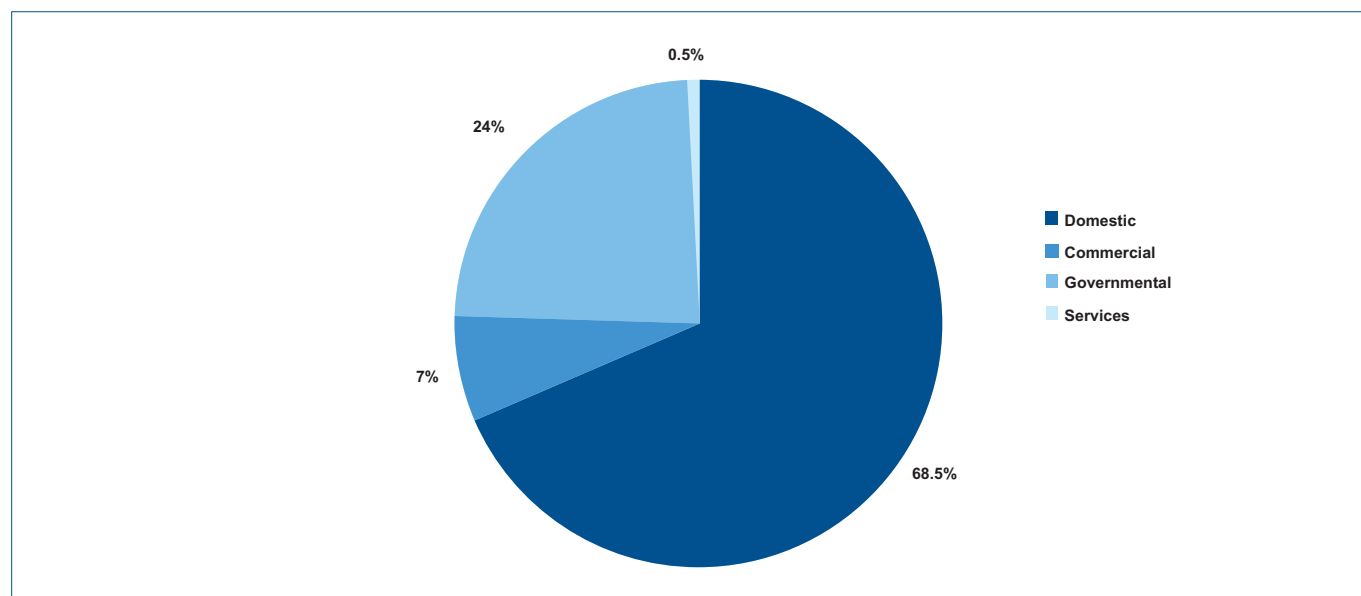
Water tariffs average approximately 0.326 LE/m³ but the average cost of producing water is approximately 0.425 LE/m³, which means that there is a noticeable difference between the cost of producing water and the revenue generated from selling it. The effect of this is further compounded by the fact that only 70% of water subscribers end up paying for their water, as following table clearly demonstrates.



Water Treatment Plant, Bostan Village

Water Sale Quantities (2003-2004)

Category of Use	Quantity Paid for (m ³)	Price (Piasters)		Comments
		from	to	
Domestic	43,457,937	23	27	Houses
Commercial	4,390,300	50	85	Farms, stores, restaurants, companies
Governmental	15,019,143	40	53	Local units, Schools, hospitals, awqaf,
Service	38,100	35	35	Mosques, churches youth centers, community development agencies
Total	62,905,480			

Water Consumption in Damietta by Category

As far as water quality is concerned the Damietta Drinking Water Company (DDWC) rehabilitated roughly 61% of its 824 km water supply network, which has reduced network water losses from 38% in 1986 to 25% in 2003/2004. The DDWC also operates water quality analysis laboratories in Damietta's main water treatment plants and has established a water quality

committee consisting of representatives from the DDWC, department of Health and environmental authorities to oversee sampling of water for water quality analysis.

The following table from Damietta's regional development plan (1997-2017) outlines a proposed list of water service projects that are expected to be completed by 2017.

Damietta's Regional Development Plan for the Water Sector (1997-2017)

Increase drinking water production by 30% to meet the expected increase in demand, and providing drinking water coverage to 100% of the population	Estimated cost (million LE)		Level of completion (end of 2004)
1. El-Adleya water treatment plant, 800 l/sec	150	178	95%
- Completion of 23 km water network to villages in Faraskour, passing by El-zarqa	20		---
- Completion of water network to Ezbet El-Borg	8		75%
2. Completion of rehabilitation and replacement of El-Bostan water treatment plant*	15		---
3. Five compact units, 10,000 m ³ /day (2,000 m ³ /day per unit)	10		---
4. Completion of renovation of filters in Kafr Soleiman water treatment plant, 200 l/sec	5		30%

* not planned until now

Objectives

- To provide a clean drinking water to the population of Damietta Governorate.
- To ensure the economic sustainability of the drinking water supply sector.

Policies

- To conserve water resources and protect them from human and industrial pollution.
- To increase the amount of treated water and improve its quality in all parts of the Governorate.
- To extend and/or rehabilitate water treatment plants and properly maintain the water supply network.
- To ensure the economic sustainability of the drinking water sector through revised water pricing and more efficient collection.
- To provide the Damietta Drinking Water Company with institutional support to ensure its effective operation.

Ten Year Targets and Programmes

Increase production of drinking water by 30% to meet projected demands and extend water supply to 100% of the population

- Complete Adleya water treatment plant.
- Complete the 23 km long transmission pipeline for Faraskour villages which pass through El Zarka.
- Complete the Ezbet El-Borg transmission pipeline.
- Complete necessary rehabilitation of El-Bostan water treatment plant



Reduce the gap between cost and revenues for water supply by the year 2006

- Revise the water pricing structure, such that the first 15 m³ a month are charged a fee to cover the production cost and increase the price for additional water usage.
- Improve the efficiency of water bill revenue collection especially in Governmental buildings

Improve quality and pressure of supplied water through the network

- Reduce the amount of unaccounted for losses from 25% to 10% by the year 2008, by rehabilitating the remaining 320 km long water supply network.
- Assess whether Damietta City's elevated tanks are suitable for use. If they are not suitable consider constructing new ones to help store water and stabilize water pressure in the network.



Institutional capacity building

- Review the water sectors existing institutional structure and consider merging it with the sanitation sector, through a single holding company to manage both sectors
- Build up staff capacity in the drinking water sector to ensure effective operation and maintenance of the water supply system, through expanding the coverage of the awareness and training courses

Raise awareness levels related to protection of water resources

- Raise public awareness to prevent sewage and solid waste disposal into water ways.

6.7 IMPROVED AND BETTER COORDINATED WATER RESOURCE MANAGEMENT

Rationale

Water resource management is a cross-cutting environmental issue that covers a number of different sectors (i.e. agricultural, industrial and domestic water supply and use) which are dealt with in greater detail in other sections of this GEAP. This section is focussed on the management of Damietta's primary water resource, the Nile.

Damietta depends almost entirely on the Nile's Damietta Branch for its water needs. Other water resources include; a) groundwater which is brackish and heavily affected by seawater intrusion (levels of groundwater salinity range from 15,000 ppm in the south to 45,000 ppm along the Mediterranean coast and Lake Manzala) and therefore is not utilised for drinking water purposes or widespread irrigation, b) rainwater which is not considered a dependable water resource and c) Lake Manzala which is known for its fishing industry. Drinking water abstraction is restricted to the Nile's Damietta Branch.

An average of 3.5 billion m³ of water each year flows through the Zefta Barrage to satisfy Damietta's water needs.

Annual Nile Water Use in Damietta Governorate

Water Use	Annual Water Allocation (in million m ³)
Dakhaleya Governorate water needs	300
Pumping from Nile through 4 pump stations	915
Gravity flow to feeder canals	100
Salam Canal	1,260
Drinking water	108
Direct irrigation from Nile	97
Discharge into Lake Manzala	720
Total	3,500

Four pump stations (Bossat, El-Balamon, Kafr Saad and El Rossay) are used to pump roughly 700 to 900 million m³ of water out of the Nile each year into an extensive network of irrigation canals. The quality of water in these canals is comparable to water in the Damietta Branch though it begins to de-

riorate in lower level canals. The El-Salam canal is one of Damietta's largest canals, it receives approximately 2 billion m³ of drainage water each year from the Bahr Hadous, Lower and Upper Serw and Faraskour drains. The drainage water is then mixed with another 2 billion m³ of freshwater from the Nile (Damietta Branch) and released to irrigate land in Western Suez (200,000 feddans) and North Eastern Sinai (440,000 feddans).



Upper Serw Drain

A main source of canal pollution comes from dumping solid waste into canals. Although the government has taken steps to reduce this problem by covering a number of canal reaches (especially through urban areas where the problem is worst) unless major steps are taken to make sure that solid waste never reaches the canals in the first place the problem will continue to exist. A further source of canal water pollution occurs when drain and canal water are mixed to augment canal discharge during periods of increased demand, especially near canal ends. However, using mixed water to irrigate often affects the soils alkalinity/ salinity levels which limits the production of certain crops.

Drains are another major factor affecting the quality and distribution of water resources in Damietta. Currently 5 drains serve Damietta Governorate three on the eastern side of the Damietta branch and two on the western side.

Some of the drain water from the lower Serw is used to supplement canal ends during water shortages whilst 2000 feddans of land is directly irrigated from undiluted drain water. Similarly, water from Drain No 1 is used to feed Bahr Sandila, Wastany and El-Rekabia Canals during water shortages. Furthermore,

Annual Discharge from the five major drains in Damietta Governorate

Drain	Annual Discharge
Eastern side of Damietta Branch	
Upper Serw	214 million m ³ into the Nile
Lower Serw	737 million m ³ into the El Salam Canal and Lake Manzala
Faraskour	376 million m ³ into Lake Manzala
Western side of Damietta Branch	
Drain No 1	643 million m ³ into Mediterranean Sea
Senaneya	Into the Mediterranean

drain water from Drain No 1 also supplements the Om Dongol canal with 75,000m³ of water each year which goes towards serving 15,000 feddans of reclaimed land to the west of Damietta's Nile Branch.

According to Egypt's 2001 National Water Resources Plan (NWRP), the stretch of the river Nile from Aswan to the Delta Barrage receives wastewater discharge from 67 agricultural drains of which 43 are considered to be major drains. Analysis of water quality samples taken at their Nile discharge points indicate that only a few of the 43 drains comply with Egyptian Standards (Law 48/1982 - Article 65) that regulate the quality of drainage water which can be mixed with fresh water. The remaining drains exceed these standards by one or more parameters. The worst water quality was found in Khour El-Sail Aswan, Kom Ombo, Berba and the Etsa drains which was found to discharge the highest organic load [i.e. 570 ton COD/d; 21.7 ton BOD/d]. Based on analysed results and measured drain flow rates, the 43 drains discharge around 516 tons of COD, 158 tons of BOD and 3.4 tons of heavy metals each day into the Nile (upstream of the Delta Barrage).

Downstream of the Delta Barrage, the most significant sources of pollution affecting the Nile come from the Upper Serw Drain (which serves some 60,000 feddans) and the Upper Serw pump station. Lead levels downstream of the Upper Serw Drain's discharge point have been found to be beyond maximum allowable limits, indicating the probable presence of industrial pollution. (Several drinking water treatment plant intakes are located downstream of the discharge point but they are sufficiently treated so don't present a health risk for people living in Damietta and Port Said Governorates who depend on the river for their drinking water). However fishing communities practicing fish cage farming along this stretch of the river may be affected by pollution in the Nile. The government is currently spending 40 million LE to improve the quality of water by redirecting drain water from the Upper Serw Drain into the Lower Serw Drain. The work also involves upgrading the Lower Serw pump station to cope with the additional flow.



Upper Serw Pump Station

High groundwater levels affect a large portion of agricultural land in Damietta. To improve the situation a number of cov-

ered drains and expanded open drains have been constructed to help drain the land of excess water. East of the Nile more than 30,000 feddans of covered drainage has been developed in and around Ghunaymia, Sharabas, Bahr El-Gheit, El-Sayala and Faraskour and studies are presently being undertaken to serve another 8,600 feddans in El-Atwy. In addition to this feasibility studies are being carried out to establish a network of open drains for another 41,400 feddans in the north-eastern part of Damietta Governorate whilst west of the Nile, roughly 32,000 feddans has been provided with covered drainage with a further 43,000 feddans planned.

Lake Manzala receives around 6-7 million m³ of water each day. The majority of this water comes from 7 main drains, the Bahr El-Baqar and Hadous Drains alone account for well over half of the lakes water supply. Other sources include water from the Mediterranean, which helps flush out pollutants. However, rising levels of pollution (Lead, Cadmium, Arsenic, pesticides and PCBs) from these drains are threatening the lakes fishing industry. Indeed figures from the National Water Resources Plan, 2000 indicate that some concentrations of toxic pollutants were more than 10 times the maximum allowable limit. With this in mind health risks from fish need to be critically evaluated and a decision taken regarding the consumption of Lake Manzala fish catch.

Besides the aforementioned Governorate initiatives and other more routine activities like water-ways maintenance, canal lining and bank protection etc a number of central programmes have been initiated by the Ministry of Water Resources and Irrigation (MWRI) to strengthen decentralized district water resource management. They include a Water Quality Management Unit, an integrated water resource management initiative, irrigation improvement projects and an irrigation advisory service etc. Although these initiatives have yet to start, when they do it is important that they are coordinated with initiatives that other departments (i.e. agriculture, industry, sanitation, water supply etc) are implementing. This will ensure more effective coverage.

Objectives

- To improve the quality and management of Damietta's Water Resources, especially the Nile.

Policies

- Protect all water resources from pollution through greater enforcement and increased awareness.
- Reduce the pollution levels of drains and canal systems.
- Strengthen the institutional capacity of those involved in water resource management and encourage integrated action.
- Optimise the use of all water resources available in the Governorate.
- Minimize risk to public health from polluted water.

Ten Year Targets and Programmes

Safeguard the Nile's (Damietta branch) water quality

- Reduce levels of industrial pollution being dumped into the Nile through stricter law enforcement.
- Ensure that all industries install wastewater treatment plants to meet wastewater discharge standards.
- Complete work on the Lower Serw pump station.
- Reduce pollution from improperly treated or untreated domestic wastewater.
- Minimize cross border pollution through a coordinated national Nile River protection action plan.

Improve the quality of drain water. (keep its ambient water quality within acceptable limits for drainage water reuse according to law 48/82)

- Minimize the dumping of solid waste in drains and canals by developing solid waste management programs in villages.
- Minimize pollution from domestic liquid wastes in villages not served by sewage systems by developing local collection and treatment systems.
- Minimize fertilizer, pesticide and herbicide pollution by raising awareness and providing bio-degradable alternatives promoted by GEAP.
- Raise public awareness of health hazards and the cost of pollution.

Improve the quality of canal water.

- Continue the canal and drain covering programme.
- Minimize the risk of drainage water reuse practices by raising awareness among farmers and regularly monitoring drain and canal water quality.
- Minimize pollution of drain water from agricultural, municipal and industrial sources, to allow for safer reuse.

Secure acceptable water for fisheries/aquaculture

- Reduce pollution levels in Lake Manzala through a lake protection action plan.
- Minimize the health risk from polluted fish by providing clean alternatives (i.e. brackish groundwater) to aquaculture water.
- Improve the management of water resources.
- Enhance coordination between departments involved in the management of water resources and encourage joint and complimentary initiatives.
- Build the capacity of district engineers and other staff involved in water resource management

- Support and strengthen MWRI's decentralized water resource management initiatives at Governorate level.
- Establish a water quality protection committee at Governorate level to facilitate water quality activities between the different government departments (i.e. health, water resources and irrigation, environment, municipalities, agriculture, surface water and environment police, and NGOs)
- Enhance the role of the private sector and encouraging the establishment of water user associations and water boards.



Herna Drain

6.8 DEVELOPING AGRICULTURE AND FISHERIES

Rationale

Damietta's main agricultural activities include cropping, animal production and fisheries, with 73.4% of the governorates land area under cultivation and 20% dedicated to fisheries (e.g. aquaculture). Principle winter crops include long clover (59.7%) and wheat (21.3%) whilst rice (73.6%) and vegetables (21%) predominate during summer months. Cotton covers 66.4% of the permanent cropped area, and 5743 feddans of land is used to cultivate fruit trees. Damietta's soil and water characteristics and high fertilizer use (especially nitrogen-based fertilizers - 300kg/feddans/pa) allow for high cropping intensities (190%) and moderate yields. However, the average size of land holdings (2.5 feddans) poses significant constraints on more efficient production techniques. Furthermore, informal settlement growth on agricultural land results in loss of land. Between 1992 and 1995 roughly 1000 feddans of agricultural land was lost in this way (11,000 violations were recorded).



Many of Damietta's soils, particularly those in: Ezbet; El-Borg; El-Sayala; El-Sawahel and Damietta City are affected by high levels of salinity/alkalinity and increasingly high water tables. Furthermore, use of salty or mixed agricultural drainage water and low, on-farm irrigation efficiencies, has worsened salinity and sodicity levels and reduced crop yields. This said however, the Governorate frequently applies soil improvement techniques such as subsoiling, adding gypsum, land levelling (using laser technology) and on farm water management to reduce soil degradation and improve water use and crop productivity. Furthermore, the National Tile Drainage programme aimed at lowering the water table now covers 39% of Damietta's cultivated land area and is continuing to expand its coverage. Use of pesticides in Damietta is widespread (1.3 kg per feddans) but integrated pest control programmes are now instigated on 60% of Damietta's cotton fields.

Large amounts of agricultural residuals and residues are produced each year. Roughly 60% of agricultural residue is directly used as animal feed by farmers the rest is either stored or burnt. Pilot demonstrations on how best to reuse and recycle

agricultural residue into compost, biogas and silage have been undertaken in several Damietta districts.

The quality of irrigation water is moderate throughout the Governorate except in Kofour El-Ghab, which depends on salty agricultural drainage water for irrigation.. The quality of both surface and underground water is generally poor. Excessive use of nitrogen based fertilizers has contributed to nitrate contamination of surface, subsurface and groundwater sources. Current application rates of 700kg/ha are higher than world averages of 28kg/ha. With this in mind nitrate leaching into the Governorates water body has become a significant potential source of water pollution. Salinity levels of groundwater resources vary from 800 ppm to 30000 ppm around the coast and from 1000ppm to 3000 ppm in the Delta.



Furthermore, pressure and associated pollution from increased population, industrialisation, intensive agriculture, inadequate treatment of industrial and municipal waste water, agricultural run-off and solid waste disposal along watercourses and the banks of the Nile's Damietta Branch all contribute to a reduction in the governorates general water quality. The incidence of water related diseases such as bilharzia, typhoid and hepatitis (3174; 84; and 212 cases respectively in 2001) are high.

Lake Manzala provides a particularly good example of deteriorating water quality. The lake receives roughly six million m³ of water each day, 48% of which comes from the Bahr Hadous Drain (particularly polluted) whilst the rest comes from 5 other main drains, industry, agriculture, household waste, fertilizers and pesticides and human wastewater from the islands located in and around the lake. Pollution from these water sources and reduced levels of sea water entering the lake has resulted in the level of many heavy metals in the lake exceeding permissible limits by more than a factor of 20. Indeed in terms of most of the standard chemical parameters (TDS, COD, BOD, sulphates) the recorded levels show excesses of between 3 and 10 times the permissible limits. These conditions have caused mutations in fish species which may in turn affect the health of resident fishing communities. Lake Manzala's fish production has also been greatly affected by land reclamation of large areas of the lake.



Land Reclamation, Lake Manzala

Whilst pollution is certainly a problem the Governorate has built a number of wastewater treatment plants in Damietta's Districts to address the issue. It is clear from the above evidence that Lake Manazala needs its own management body in order to protect its future use.

Fish production comes from three main sources; aquaculture [69.5%], inland fisheries [10.4%] and marine fisheries [20.1%].



Aquaculture Farming

During 2000, the governorate's fish production amounted to an equivalent of 13% of Egypt's total national production [724 thousand tons]. Indeed for cities such as Ezbet El-Borg and Damietta, fish production represents the single largest source of income. In total the industry employs roughly 20 000 people and supports many more. However, problems associated with water quality, high salinity, low levels of technology, insufficient fish fry stock, inorganic and organic pollution and a high percentage of illegal fish farmers as well as unlicensed fishermen will need to be tackled if the Governorate is to protect the future of its fishing industry.

Damietta is also one of Egypt's leading livestock and dairy producers however, the fragmented nature of these activities means that monitoring and managing them is difficult.

Objectives

- To promote the development of sustainable agriculture and

fisheries production.

- To introduce measures that prevent soil contamination and degradation.
- To increase livestock and fishing production.
- To improve Lake Manzala's environment and promote sustainable exploitation of the lakes resources.
- To make safe and full use of agricultural residues.



Inland Fishing

Policies

- Improve on-farm water use and irrigation efficiency to reduce soil degradation and improve crop yields.
- Reduce excessive use of fertilizers and pesticides on agricultural land to prevent land and water contamination
- Encourage use of organic fertilizers, compost, biogas and silage from farm residue and the use of bio control methods.
- Promote soil conservation programmes to protect soil structure and fertility.
- Encourage livestock and dairy industries to comply with environmental standards.
- Strengthen enforcement of penalties on main polluters.
- Improve animal health programmes and increase livestock and poultry production.
- Develop an environmental action plan for Lake Manzala to reduce pollution in the lake and increase fish production.
- Strengthen the capacity and upgrade the skills of agricultural and fisheries and animal production staff.

10 Year Targets and Programmes

Increase Fisheries Production in Lake Manzala

- Place the management of Lake Manzala's resources under a single agency so that activities aimed at improving the lake's environment and fish stock can be better coordinated.
- Prepare a development action plan which should set out how the lakes natural resources should be exploited on a sustainable basis. This could be achieved through agreement between GAFRD and GARPAD under the framework of MALR and MWRI.



Marine Fishing

- Reduce the amount of pollution entering the lake from known sources [i.e. Bahr Hadous Drain] by treating the waste in treatment plants before redirecting it back into the lake and regularly monitoring the pollution load of the lake.
- Increase the amount of sea water entering the lake in order to reduce pollution loads and replenish the lakes water on a regular basis.
- Encourage the transformation of traditional fish farming into developed semi-intensive systems.
- Develop extension services for fishermen.
- Mitigate the effects of declining sea fish population in Lake



Fish Cage Farming

Manzala and develop fisheries and ancillary services for sustainable inland and aquaculture catchments.

- Review the water allocation policy towards in pond aquaculture, on the basis of economical return per unit (m³) of water compared to other crops in the same region.

Improve land Conservation

- Update the Governorate's soil classification map, (last carried out in 1978), to assist agricultural planning.
- Continue subsidising soil improvement techniques to improve productivity (adding gypsum to control sodicity, subsoiling, land levelling etc).
- Continue to improve land drainage and reduce salinity to improve crop productivity through the rehabilitation and renewal of drainage tiles and regular open drain and tile maintenance.
- Reduce loss of agricultural land for urban and industrial use through stricter law enforcement.
- Promote extension programmes that provide practical guidance to farmers on sustainable farming.
- Prevent the illegal disposal of wastes into irrigation canals and drains, through increased awareness and enforcement measures, including the imposition of penalties for violations.

Improve Water-use Efficiency by 20%

- Use gated pipes and land levelling technology to improve water-use efficiency, at farm level and increase yields.
- Encourage the use of more flexible irrigation systems [i.e. continuous flow] to prevent soil degradation.
- Develop a Governorate strategy for the safe reuse of treated municipal wastewater and sewage sludge.
- Improve irrigation and drainage maintenance and control aquatic-weeds and seepage from main canals.
- Continue to extend National Tile Drainage Programme.
- Encourage farmer's participation in the operation, maintenance of the irrigation/ drainage systems.

Improve Agricultural Chemicals and Residues Use

- Encourage the rational use of chemical fertilizers, especially nitrogen-based fertilizers, and substitution by organic and bio-fertilizers.
- Provide continuous support (i.e. training, pesticide advice etc) to the National Integrated Pest Management (IPM) Programme.
- Enhance the bio-control of pests in cotton fields as well as for other crops.
- Encourage the reuse of farm residues in making compost, bio-gas and/or silage.

6 WHAT ACTIONS ARE NEEDED?

- Introduce an Agricultural Extension Service to farmers to encourage the adoption of environmentally-friendly practices and existing new technologies.
- Increase investment on modern technologies to improve processing of agricultural crops, milk and fish into food products.
- Develop programmes to reduce agricultural losses of crop yields through improvement in post harvest handling, transport, storage and marketing of field crops, vegetables and fruits; and refrigeration of milk and fish.
- Improve mechanical weed control on roads, canals and ditches and introduce carp fish into waterways to control aquatic weeds in around Lake Manzala.
- Encourage greater coordination among relevant ministries and administration departments [agriculture, fisheries etc] in all aspects of environmental water resource management with clear responsibilities assigned to relevant bodies.
- Strengthen the Governorate's capacity to manage land, water, fisheries and natural resources through an integrated approach to development.

Enhance livestock and Poultry Production

- Encourage animal breeders, specialist, veterinarians, and farmers to upgrade their skills and attend training courses to improve their knowledge of new practice. The Governorate could support this by increasing awareness of new farming knowledge.
- Increase breeding and fattening of male buffalo by providing soft interest loans to buffalo farmers.
- Improve animal productivity and reproductive efficiency through selective breeding programmes.
- Enhance the quality of fodder production for different species.
- Increase livestock and poultry vaccination coverage against infectious diseases.
- Encourage the food and dairy industries to comply with sustainable environmental standards and to satisfy the aim of the main target groups: farmers, villagers, and the Governorate.



Strengthen Institutional Capacity

- Improve government institutional capabilities to plan, monitor, and manage water resources.
- Where appropriate, shift greater responsibility in managing water resources over to the private sector.

6.9 REDUCING INDUSTRIAL POLLUTION

Rationale

Damietta industry is dominated by micro enterprises that account for 99.45% of the Governorates industrial base. A further .054% is made up of small and medium enterprises whilst the remaining .01% are large industries. Historically, industrial activities have been mixed with other land uses however, more recently the establishment of dedicated industrial zones in New Damietta City (500 feddans) and Damietta Port (190 feddans) together with an international coastal road have helped in stimulating the growth of new and more formal patterns of industrial development. The following table provides an indication of the distribution of the most dominant industries in Damietta, most are concentrated in Damietta Kesm and Damietta Markaz.

Most Dominant Industries in Damietta Governorate and National Total.

Industry Sector	No.of MSMEs	% of Governorate Total	National Total MSMEs	% of National Total
Manufacture of furniture	18507	64.7	70878	26.1
Manufacture of wooden, cork and straw products	5518	19.3	19251	28.7
Wood sawing	1147	4%	6100	18.8
Manufacturing of clothes (except fur products)	992	3.5	55189	1.8
food products	460	1.6	18744	2.4
Manufacture of other various metallic products	441	1.5	32575	1.3
Shoes making	336	1.2	9285	3.6
Milling (crops, starch and animal fodder)	235	0.8	13986	1.7
Dairy Industry	196	0.7	3319	5.9
Manufacture of non metallic mineral products	180	0.6	8934	2

Furniture and wood industries which account for some 64.7% of Damietta's industry are considered to be the worst polluting industries followed by the Dairy sector which pollutes to a lesser extent.



Most furniture industries are represented by small workshops usually clustered in village areas with the highest concentration being in Shoara village, Damietta Markaz. The most polluting phase of furniture and wood industry relates to its finishing phase where use of polyester, polyurethane lead to localized emissions of harmful solvent based substances. Several interventions are needed to address this problem, including the mandatory use of painting booths and the transition to water based paints. Recent studies in Shoara however have indicated that the use of high volume low pressure spray guns instead of traditional guns is the most direct approach to significantly reduce the release of harmful solvent emissions and reduce material consumption.

The Dairy sector continues to face the problem of whey waste disposal but a solution to this problem cannot be easily identified because of the industries small scale nature. Currently untreated effluent from Dairy factories is not connected to pub-

lic sewers because it has a high organic load which does not comply with sewage discharge limits outlined in Law 93/1962.



Eissa Dairy

Environmental Issues associated with Industries in Damietta

Sector	Liquid wastes	Air emissions	Solid waste	Environmental/health impact
Furniture Manufacturing:				
Furniture Manufacturing	Liquid waste from paint guns and attendant solvents and paint sludge resulting from spray booths.	A considerable amount of harmful hazardous volatiles are emitted	- Wooden pieces and saw dust are generated from the wood cutting - Empty containers of utilized hazardous material add to the solid waste	Emissions of hazardous volatiles and particulates from painting material have a toxic nature that affects human health. High incidence of respiratory diseases due to high levels of volatile organic compound (VOCs).
Food Industry:				
1) Dairy Industry	Liquid waste effluents originate from: - Whey generated from cheese manufacturing. - Washing and cleaning of vessels, and tools used. - Spoiled raw materials and products (milk). - Floor washing. - Raw materials spills.	No serious air emissions.	Solid waste is generated from spoiled or rejected products and plastics as well as broken glass bottles and papers.	- Wastewater fermentation (anaerobic decomposition) may cause bad odour - When discharged into the sewer system: - Corrosion of the public sewer system - Oxygen depletion in the receiving water body - Poisoning the aquatic life
Misir Dairy	- Wastewater without treatment (480 m³/day). - Mainly whey and other wastes. Whey BOD 25000-3000 mg/L Other wastes BOD 300 mg/L TDS 1500-2000 mg/L PH 4.5-6.5	- Heavy black smoke from boiler units.	- Solid waste accumulation in the form of scrap and dissolved material	- Air Pollution. - Pollution of the Sayala drain. - Health effects on the employees because of the steam leaks. - Possible effects on the marine life(if present)
2) Other Industries	Liquid waste effluents originate from: - Washing and cleaning of vessels, tools, and equipments used. - Floor washing. - Raw materials spills.	Gaseous emissions released from burning Mazot in furnaces	Solid waste is generated from spoiled, broken or returned unsold products (e.g. biscuits)	
Edfina for Food Industries	- 30-40 m³ of water per ton of fish processed. - High organic loads. - High levels of oil and grease. - High loads of caustic soda. - This untreated wastewater is released to the Nile.	- Emissions of CO₂, CO, and NO, (Generally within the limits).	- Accumulation of scrap and discarded material.	- Pollution of the Nile Water. - Affect fish and other aquatic organisms. - High sound levels can cause deafness on the long run.
Textiles Industry:				
1) Spinning, weaving and finishing	Wet operations produce wastewater that is characterized by having high values of BOD and COD	Fibers and dust may originate during cotton spinning	Generated solid waste includes fabric and yarn scrap	Air emissions could cause respiratory system problems
2) Knitting operations	No wastewater (i.e. dry operation)	No air pollution	Generated solid waste includes threads and fibers	No health hazard involved
3) Other textiles industries	No wastewater (i.e. dry operation)	No air pollution	Generated solid waste includes threads, pieces of textiles and paper	No health hazard involved
Damietta for Spinning and weaving	Not Applicable	- High cotton dust concentration in the workplace. - Great amount of smoke is released to the air daily (because of mazot usage).	Not Applicable	- Workers suffer from high dust concentration
Basic Metals Manufacturing				
Basic Metals Manufacturing	No wastewater (i.e. dry operation)	No air pollution	Generated solid waste includes metallic scrap	High noise levels? No health hazard involved

Industrial Locations in Damietta Governorate



A serious, but more localized problem is caused by marble workshops, in terms of high dust emissions and levels of noise. These workshops are highly complementary to furniture workshops and are mostly located in residential areas. Efforts to control dust emissions have been tried by a number of workshops without much success. High noise levels affect employees and the surrounding residents.

Both Damietta's industrial zones face a number of pollution control issues. This is mainly due to incomplete infrastructure which has made it difficult for industries to comply with environmental standards. In New Damietta's industrial zone, for instance wastewater is not treated before it reaches the city's compact wastewater treatment unit. However, this situation will soon be resolved once the new wastewater treatment plant is completed by the end of 2005. Damietta's Industrial Free Zone on the other hand has recently put in place a sewage system that transports sewage to Ras El Barr.

As far as solid waste disposal is concerned neither zone has an organized formal solid waste management system, instead the responsibility of waste disposal falls on individual industrial facilities that transfer it to the City Dump.



Industrial Zone, New Damietta City

Other issues that need to be addressed include the high cost of industrial land in both zones (New Damietta LE180/ m², Free

Zone \$3.5/m² pa for factories, \$7/m² pa for storage area) and inadequate and costly electricity. At present industries receive 1KVA/ 500m² and have to pay a further LE360 for each additional KVA. This means many industrial units use generators, which besides adding further costs to industrial establishments the impact of diesel generators on air quality and noise is substantial and likely to increase in the future if a solution to the high cost of electricity is not found. Both the high cost of land and

electricity have certainly contributed to low occupancy rates in both the Free Zone [>5%] and New Damietta [28%]. Indeed in some cases high prices have led facilities to change their activity to storage, work by batch order or close down altogether. To encourage further industrial development in both these zones land prices and power costs will need to be reduced. The Governorate has asked the two industrial zones to lower their land prices but to date no action has been taken.

While growth in the dedicated industrial zones faces the above constraints, small and medium industries in Damietta continue to grow. An attempt to assimilate the increase in the MSMEs outside residential areas is currently being considered through the conversion of 80 Feddans of land into a zone for new MSME facilities on the Ras El Bar-Damietta road.

Objectives

- To minimize pollution from industrial sources through technological modernization
- To minimize the proliferation of industrial activities within residential areas.
- To ensure that industrial and hazardous wastes are safely disposed.

Policies

- Require that industry comply with Egyptian Laws and Standards regarding industrial emissions.
- Provide incentives to industries to encourage them to invest in new pollution abatement equipment.
- Only issue new licenses to those located in designated industrial zones.
- Provide serviced and adequately priced plots in the new industrial zones to help MSMEs relocate without incurring substantial costs

6 WHAT ACTIONS ARE NEEDED?

- Ensure that each industry introduces formal systems of waste disposal that deal adequately with hazardous waste.



Misr-Italy Mills Company, New Damietta City Industrial Zone

10 Year Targets and Programmes

Ensure safe management and disposal of industrial and hazardous waste.

- Identify main hazardous/industrial waste producers and the types and volume of waste they produce. Based on these findings introduce industrial and hazardous waste management systems, target larger formal industries and those in industrial zones first where waste management systems can be better applied.
- Lessen landfilling activities which occur on the fringes of Lake Manzala to reduce environmental contamination and associated health risks.
- Conduct regular inspections to ensure that industrial and hazardous waste is segregated at source.
- Establish waste transfer stations to control and manage industrial and hazardous waste streams.
- Raise awareness of industrial and hazardous waste segregation amongst MSME's and monitor their compliance.
- Encourage reuse of Dairy whey (composting plants and bread making etc)
- Expand the capacity and upgrade city dump sites to meet the general waste disposal needs of Damietta's expanding Industrial zones (i.e. Free zone in Damietta Port, Industrial zone in New Damietta).

Reduce the level of Industrial pollution in residential areas

- Develop an action plan to reduce levels of industrial pollution in residential areas, this should include the following actions;
- Provide polluting industries situated in residential areas with realistic relocation options away from residential areas.
- Consider establishing industrial zones for MSME's and provide them with incentives (i.e. lower land and power prices) to move. Consider providing soft financing to cover transfer costs to the industrial zones.

- Create suitable subdivisions and modular workshops in industrial zones for MSME's.
- Complete conversion of 80 Feddans of land on the Ras El Bar-Damietta road to a zone for new MSME facilities.
- Only issue new licenses to MSME's located in industrial zones.
- Introduce measures that ensure that MSME's upgrade their technology to reduce levels of pollution and noise created from treatment and finishing processes. Financial support (soft finance loans) should be channelled to the industry modernization centre (IMC) to support this transition.

Reduce pollution loads from wastewater treatment plants and large Industry

- Complete New Damietta City waste water treatment plant and enforce applicable laws on industries connected to New Damietta City network.
- Ensure that large industries introduce necessary pollution abatement equipment to comply with Egyptian Laws and Standards on levels of pollution.

Raise environmental awareness in Industry

- Working alongside NGOs and training institutions support LGUs in developing awareness raising material to demonstrate the problems of industrial waste and provide illustrative solutions. Similar material should also be developed to raise awareness on the health impacts of certain industrial processes (i.e. furniture spraying etc) and what measures can be taken to minimise risk.
- Using the Environmental Officers Manual support EMUs in conducting awareness raising campaigns on environmental law and compliance issues.



Targets and Actions for Damietta's Other Main Industrial Sectors

Main Industries	Objectives	Targets/ Actions
DAIRY SME'S	Control Environmental Impact Establish collection infrastructure Maximise the net economic return from whey Target	Target 1. No illegal disposal of Whey Actions - Establish storage tanks and spraying equipment of adequate capacity for collected whey at the compost plant. - Support the establishment of a collection system for whey through a collection contractor. - Consider the possibility of avoiding collection fees to ensure acceptability. - Support the provision of storage tanks of adequate capacity for the whey at the Dairy MSME's - Train training composting plant workers on the incorporation of whey in the process. - Public awareness on the benefits of using pasteurized milk. Target 2. At least 75% of generated whey is used to produce high value products Actions - The collection system should be incrementally separated into two streams: whey used in food products, and that used in composting. - This is based on: - The economics of collection and transportation of whey, taking into consideration the time and quality constraints. - Secured agreements with whey generators on one side and users on the other to ensure sustainability.
FURNITURE	Reduce harmful emissions from the spraying process. Reduce exposure to workers in the spraying Ensure that the industries introduce environmentally sound technologies and locate to environmentally safe locations.	Target 1. Encourage the use of high efficiency spray guns and confine spraying to spray booths in order to reduce exposure to harmful emissions. Actions - Introduce awareness raising programmes to paint workshop owners on the health and long term cost benefits of using high efficiency spray guns and spray booths. - Establish a collection and disposal system for paint sludge resulting from spraying booths. - Encourage paint workshops to partner with spray booth operators and introduce penalties for non compliance. - Ensure that empty containers are not reused and are safely recycled or disposed of. Target 2. Ensure that no spraying occurs in residential areas. Actions - Coordinate inspections to close down unlicensed workshops or legalise their status in new industrial zones provided they meet the required standards. - Investigate the potential for reducing solvent concentration in solvent based paints to a point which is less harmful to the environment but still provides the acceptable finish that the market demands. - Relocate spraying MSME's to industrial zones.
MARBLE	Control Dust Emissions from Marble MSMEs in residential Areas. Move the bulk of industrial activity outside residential areas.	Target 1. Only low emission Marble MSME's should be allowed to locate in residential areas. Actions - Support technological upgrading of existing workshops. (New technology is currently being used in only one workshop in the New Damietta Industrial zone). - Provide awareness to workers in the proper use of modern technology, protective clothing and its health benefits. - Marble MSME's not able/ willing to modernize should be given adequate time to relocate to the new industrial zones. Target 2. Gradual relocation of marble MSME's away from residential areas. Actions - Coordinate inspections to close down unlicensed marble MSME's in residential areas. - Provide serviced and adequately priced plots in the new industrial zones to help MSME's relocate without incurring substantial costs - Marble MSME's not able/ willing to modernize should be given adequate time to relocate to the new industrial zones.

6.10 PRESERVATION OF BIODIVERSITY & NATURE CONSERVATION MANAGEMENT

Rationale

Natural resource use in Damietta is intensive, important habitats are being destroyed and degraded at an accelerated rate. Of most concern is the damage to Lake Manzala. Covering 20% of the surface area of the Governorate, Lake Manzala sustains Damietta's fishing communities and is an internationally important wintering ground for water birds. All indications are that Lake Manzala is a wetland in distress subject to a host of human activities with cumulative impacts that are difficult to assess. The lake has been reduced in size, by more than 40% due to land reclamation and is severely polluted as it is a sink for industrial, domestic and agricultural wastewater. Wetland management is complicated by the fact that the lake falls under the jurisdiction of several Governorates and there is a lack of consensus, coordination and cooperation among key stakeholders.

Changes in biodiversity are good indicators of the state of environmental health. There has been a marked decline in the number of water bird species wintering at the lake. During surveys in winter 2002 (SEAM survey) some 1,856 birds from 21 species were counted in western Manzala as compared to 233,901 birds from 60 species during comprehensive surveys of the lake in the winter of 1990. Water Hyacinth, an invasive plant has spread throughout the lake, and is becoming a major threat to the lake's ecosystem.

Excessive exploitation of natural resources is prevalent in Damietta Governorate. It is likely that the pace of fishing in both the marine environment and Lake Manzala cannot continue at its current rate if it is to be sustainable. Large numbers of birds are hunted on a seasonal basis for food, sport and commercial sale. Absence of hunting regulations means that even birds protected under Egyptian law and international conventions are hunted.

Egypt has global obligations to conserve and sustainably utilize habitats and species, which have yet to filter down to the local level. In Damietta as in other Governorates there is insufficient management and law enforcement to conserve biodiversity and maintain the natural resource base. This largely results from the absence of clear structures and systems for biodiversity management, as well as low awareness and capacity in the Governorate.

Objectives

- Enhance the conservation of biodiversity and the sustainable development of natural resources in Damietta Governorate in compliance with international conservation and national legislation.

Policies

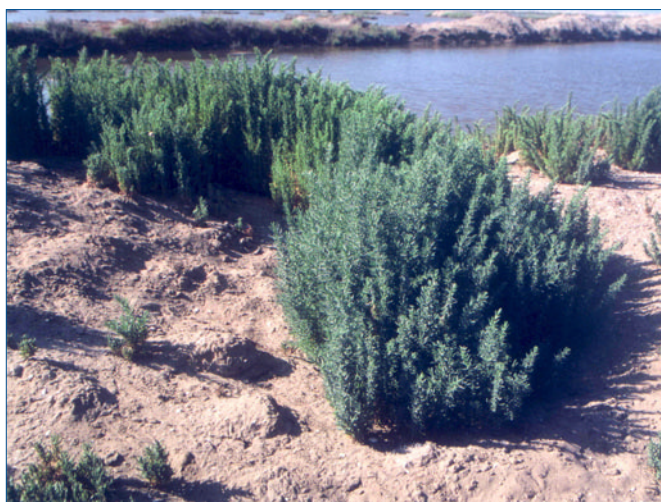
- Build the Governorate's capacity to address biodiversity related issues.

- Undertake actions to conserve and rehabilitate Lake Manzala.
- Enhance fisheries output while ensuring the sustainable use of fish resources.
- Regulate the hunting of birds and other wildlife so that it occurs in a sustainable and environmentally sound manner.
- Control invasive species detrimentally impacting critical habitats and species.

10 Year Targets and Programmes

Develop Governorate Capacity to Conserve and manage its Biodiversity and Natural Resources.

- Strengthen the institutional capacities of the authorities, universities and NGOs to enhance conservation and management of biodiversity.
- Adopt an integrated approach incorporating biodiversity conservation into environmental management, such as EIA's.
- Devise educational programmes to raise the level of conservation awareness;
- Develop qualified manpower to satisfy the Governorate's requirements in the field of biodiversity and natural resource management.
- Initiate programmes of research and monitoring of key habitats and species, particularly those of economic importance.
- Develop pilot programmes to address key biodiversity issues.



Salt Marsh Vegetation, Northern Manzala

Improve the Environmental Conditions of Lake Manzala

- Strengthen Lake Manzala Management Authority to improve coordination and cooperation between key authorities and stakeholders.
- Produce a Lake Manzala Action Plan that identifies priorities to address critical environmental problems and enhance wetland management.

- As a decision making tool, conduct a study of Lake Manzala to assesses existing conditions and scenarios if various factors are changed.
- Develop projects to enhance environmental conditions at the lake.

Regulate Bird Hunting.

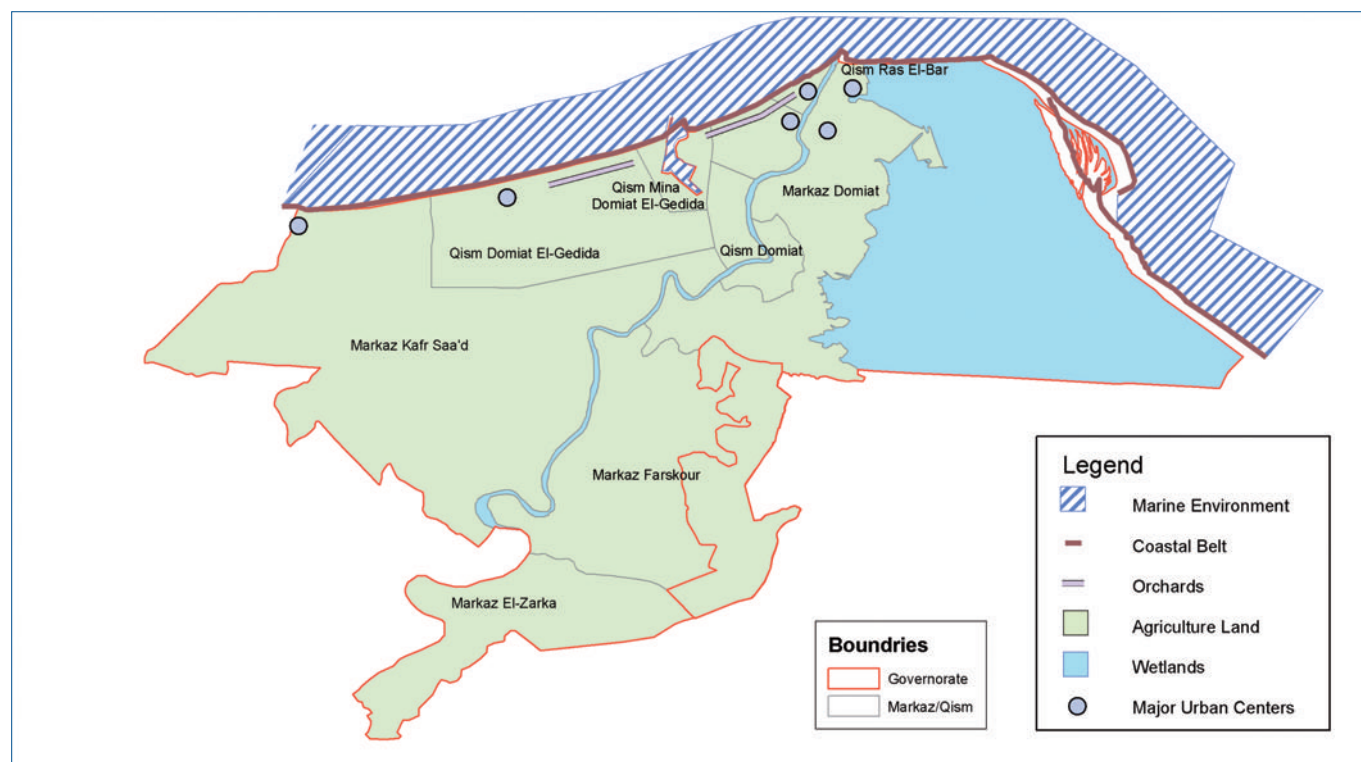
- Produce a hunting management plan for Damietta Governorate in cooperation with key stakeholders
- Set-up and implement a sustainable system of hunting management, including law enforcement, monitoring, public awareness and economic instruments.
- Generate public awareness and train qualified manpower to maintain the system.

Reduce and mitigate the Harmful Impacts of Invasive Species, in particular Water Hyacinth

- Conduct a study to assess the status and magnitude of the problems associated with invasive species identifying potential measures to prevent and mitigate environmental impacts.
- Develop an Invasive Species Action Plan for the Governorate.
- Develop pilot projects to control Water Hyacinth, especially at Lake Manzala.



Habitats in Damietta Governorate



6.11 IMPROVING COASTAL ZONE MANAGEMENT

Rationale

Much of Damietta's coastal zone remains largely undeveloped because of threats to shoreline erosion and poor connections with the rest of Egypt. However, this situation is steadily changing since the construction of the new international coastal road from El Saloum to Rafah which has done much to improve the areas connectivity. Significant developments in the past two decades include the construction of Damietta Port, the establishment of New Damietta, offshore exploratory oil and gas activities, tourism and fishing activities. Most of the governorate's fishing catch is caught from the Mediterranean Sea (20.1%) and to a lesser extent Lake Manzala (4.39%).



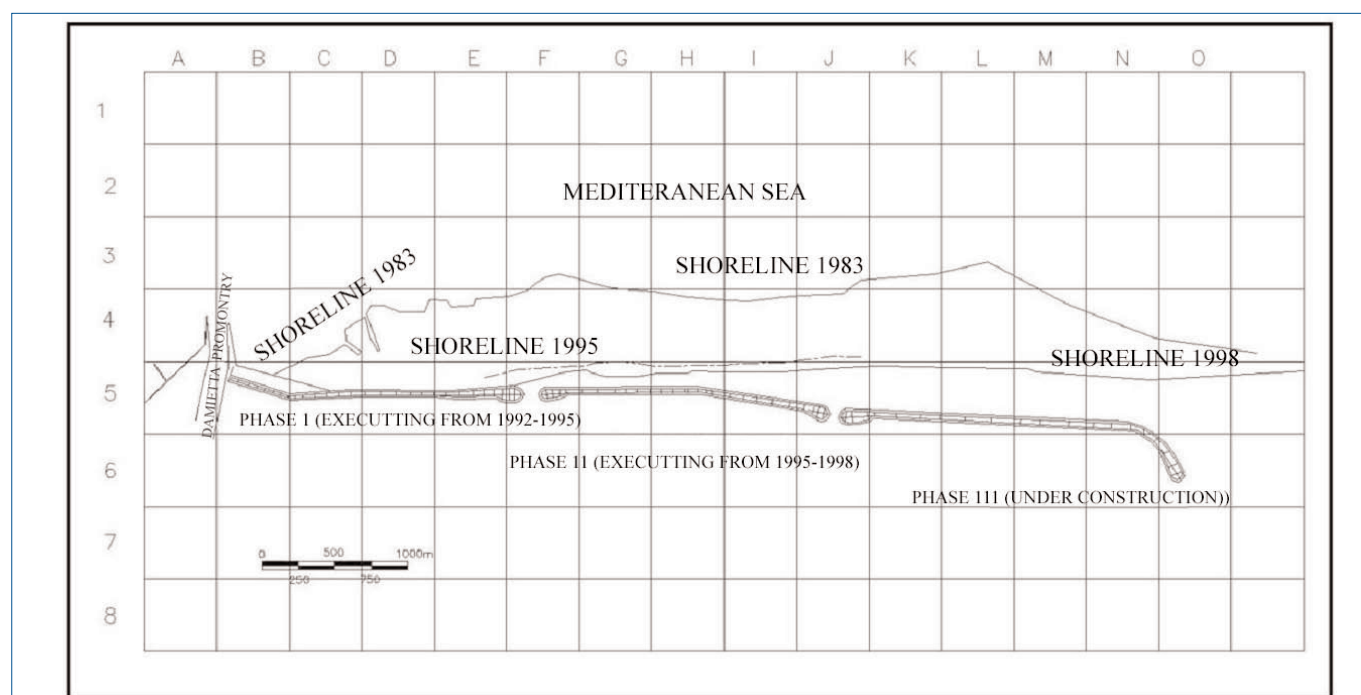
Damietta Port

The task of planning, managing and protecting the coastal zone is distributed among various ministries and bodies and governed by a number of national regulations. As a consequence there is often insufficient cooperation and dialogue, which results in regulatory inconsistencies regarding planning, management and development of coastal zones. Furthermore, lack of environmental controls and standards, and environmental awareness amongst building licensing authorities, as well as absence of a National Land Use Plan have led to unplanned urban growth which has in turn placed a burden on coastal zone environments, contributing to traffic congestion and increased population densities. Continued and steadily intensified human activity along Damietta's coastline has also affected the shoreline profiles significantly. Erosion is now a significant environmental problem affecting Damietta's coastal zone. Indeed the shoreline east of Damietta Promontory has retreated more than 500m in a little over 10 years (1983 to 1995).

In response coastal defences have been built west of the promontory. Two other successful shoreline protection measures also worth mentioning include pilot groin defences in Ras El Bar and a sea wall defence system in Ezbet El Borg. Both these initiatives were built by the governorate's Shoreline Protection Authority.

Increasing levels of development and persistent sources of pollution (from various drains and factories into the Nile, commercial activities around Damietta Port, sewage and agricultural drainage sources and oil and gas related industries) have all had an effect on the coastal zone ecosystems and levels of biodiversity. Along the coast, levels of pollution have led to an increase in the number of grey mullet fish and Cardium snails and a decrease in the number of Anguilla eels, crabs and sparidack fish etc. A similar trend is also being experienced in Lake Manzala where levels of polluted drain water etc being dumped

Shoreline erosion east of Dameitta promontory and protection works



Source: Shoreline Protection Agency

into the lake have threatened the number of some species and increased the numbers of others.

A solution to improving the quality of water in the coastal zone and lake Manzala may not be far away however, as a 100 hectares of engineered wetland facility designed to treat 25,000 m³ of polluted drain water per day gets underway in Port Said. Another issue of some concern facing the livelihoods of fishing communities on Lake Manzala is that land reclamation and siltation processes have shrunk the size of the lake by an average of 5.2 km² pa. Efforts to halt the reclamation process need to be taken soon to protect the future livelihoods of the lakes fishing communities.

Attempts to establish a system of integrated coastal zone management (ICZM) in Damietta governorate began in 1996. A 10 year draft framework focusing on shoreline erosion, flooding, irrational land use, water pollution and deteriorating natural resources was drawn up under the coordination of a National Committee for ICZM. Unfortunately little has happened since, which has left the governorate without a plan to manage its environment and development needs.



Ras El Bar Seafront

Objective

- To ensure that coastal zone development is both economically and environmentally sustainable.

Policies

- Strengthen the institutional capacity of governorate bodies responsible for managing development along the coastal zone and improve coordination.
- Ensure development complies with environmental regulation and standards.

10 Year Targets and Programmes

Strengthen the planning and management of Damietta's Coastal Zone

- Provide management support to the Shoreline Protection Authority.

- Revive the National Committee for Integrated Coastal Zone Management (ICZM) and re-launch the ICZM plan.
- Strengthen compliance with existing environmental controls and standards.
- Introduce stricter land use planning and management to mitigate against the potential negative effects of development.
- Encourage greater coordination between governorate bodies responsible for enforcing environmental regulations, building control and urban and developmental planning to improve the quality of coastal protection measures and overall development.
- Ensure that developers comply with EIA regulations



Sea Defences

Introduce measures to reduce coastal zone erosion

- Increase environmental awareness amongst governorate staff and private developers.
- Develop an action plan to prevent erosion, managed by the Shoreline Protection Authority.
- Continue to support measures to protect Damietta's coastline from further erosion.

Introduce measures to reduce levels of pollution currently affecting Damietta's coastal zone

- Increase environmental awareness amongst governorate staff, port staff, fishermen and private developers.
- Introduce measures to reduce hazardous effects of sewage discharge from Damietta's Main Drains, sewage treatment plants and the Port etc.

7 WHAT ACTIONS CAN WE TAKE NOW?

7.1 Developing Partnerships

The role of the GEAP is to generate action and a sense of ownership. Through consultation a start has been made towards achieving a GEAP that everyone in the Governorate, public and private sectors; rural and urban communities and men and women believe they own. There has been a genuine attempt to enable potential beneficiaries to have a say in what happens. The aim has been to enable a wide range of people to understand how their contribution to the GEAP process can improve their own living environments. With this in mind, it is hoped that those consulted will feel greater responsibility for making the ideas work in practice. This is essential, as many environmental issues cannot be resolved without the direct participation of individuals or indeed communities. A key aspect of the GEAP process has been to explore issues of partnership and ownership. All the main stakeholder groups were involved in the process of identifying environmental issues and priorities (discussed in Section 2) either through working group discussions, the GEAP survey, Village Profiles or focus group discussions. Stakeholders have been encouraged to identify actions and propose projects, which reflect their views on how best to improve their environments. These views may not necessarily represent the Governorate's key environmental issues in every case but they are nonetheless important. The universal request and interest of most of those consulted has been to search for solutions to immediate problems. However, it is expected that once these needs are met, there will be growing support to address broader longer-term environmental issues that affect their communities or businesses. Experience gained from other environmental action plans suggests that attitudes are likely to change from the time the GEAP is prepared to the time it is being implemented; likewise, rather than depending on the Governorate, communities will become more self-reliant and take more action themselves.

The GEAP has tried to incorporate the priority concerns and requirements of all stakeholder groups in the Governorate: business, academic and the village communities. Some of the actions discussed in Section 6 are in progress or at least planned by public and private sectors, equally several projects have been proposed by communities. While these projects alone are not

expected to resolve the major issues, they will contribute towards achieving the end goal. Promoting these small-scale actions is seen as an "entry point" towards helping all stakeholder groups realise what an Action Plan can achieve. Success is expected to win support and advocacy for the GEAP. These projects are also seen as the initial way of promoting greater partnerships between different stakeholders.



7.2 Government's Role

Government's active participation in the GEAP process is critical in securing real ownership of the process. To this end government representatives have amongst other things been fully involved in the working group process, which has been instrumental in developing Damietta's environmental profile and GEAP priorities. At a strategic level the Governorate has recently established a High Council for Environment (HCE), which will soon be responsible for facilitating the GEAP process and reviewing GEAP commitments on a regular basis. The Governorate has also shown keen interest in actively encouraging community and private sector initiatives that aim to improve the environment. Indeed the Governorate currently plans to privatize solid waste management in larger cities. Damietta City is the first to hire a private firm, Helio-Care to manage its solid waste. A Governorate wide Municipal Solid Waste Strategy is currently being developed to support this process.

7.3 An Important Role for the Private Sector

The private sector has an important part to play in helping the Governorate realize its GEAP. Development of this role jointly with other stakeholders, particularly the Governorate, is essential. To fully integrate private sector firms into the GEAP, the Governorate will need to encourage private sector firms to play an active role. This might for instance involve upgrading waste treatment facilities, working closely with the governments EMU on EIA compliance issues and or factory inspections, helping private sector firms introduce better self monitoring systems to improve their corporate responsibility and adopt sound environmental management.

The private sectors main role will be to:

- Embrace the principles of the GEAP in running their businesses at all levels - especially sustainable use of resources, improved worker conditions, and pollution prevention.
- Show to others the benefits of environmental action on industrial business - in this respect trade organisations, business associations and Chambers of Commerce have an important role to play.
- Develop a dialogue with the Governorate on industrial issues and develop beneficial partnerships.
- Seek ways to provide private sector services (e.g. waste collection and disposal, water supply, and sewage treatment) to assist the Governorate in its tasks.



New Equipment, Shabana Dairy

- Implement self-monitoring and become environmentally responsible 'corporate citizens' working with the community.

Other examples of private sector initiatives include two in the dairy sector one in Eissa (Kafr El Manzala) and the other in Shabana (Kafr Soliman). In support of 'cleaner production' both dairies have undergone radical modernization from predominately manual based systems of production. With new automatic equipment in place both firms are now able to improve the quality/ quantity of their products and the range of products they are able to manufacture. The new technolo-

gy has also enabled the firms to extract more by-products from whey and at the same time reduce their BOD water loads.

The furniture sector workshops in Shoara village have also benefited from improved technology, a number have introduced high volume low pressure spray guns which has helped them reduce paint loss and improve health conditions for workshop employees particularly paint sprayers. Another initiative soon to be developed involves the introduction of pyrolysis equipment which will be used to convert wood scap into coal.

It is hoped that the experience of initiatives like these will trickle down to Damietta's wider business community and ultimate-



High Pressure Low Volume Spray Gun Training

ly help to increase general understanding of the benefits of introducing low cost technology; improving the financial situation; and environmental performance. Representatives from the private sector will be part of the EMPS to ensure that their participation and involvement in environmental improvements will be developed and encouraged.

7.4 Community Based Actions

Considerable dialogue took place with the communities, and NGOs and CDAs that support them. However the CDAs and NGOs in Damietta were generally found to be somewhat weaker than in other GEAP Governorates, hence whilst working closely with CDA structures and local communities all Community Environment Projects (CEPs) would be managed by local government units (LGUs). In order to address some CDA weaknesses, an environmental awareness raising workshop was arranged to strengthen capacity to plan and implement community based projects. Since Damietta CDAs and NGOs are quite weak their capacity to prepare community project proposals and attract donor funding will need strengthening. A total of 8 workshops have already been conducted around this issue.

Five CEP proposals were chosen, they include;

- Solid waste projects in Rahamna and Nasseria villages, Faraskour Markaz.



Extension of Sewer Network, Khayata Village

- Sewer network extension projects in Westany village; Kafr Saad Markaz, Shoara village; Damietta Markaz and Western Khayata village, Damietta Markaz.

Two further proposals were submitted to the Social Fund for Development for their consideration:

- An Agricultural extension service project on integrated crop and pest control management in Kafr Saad and EL-Zarka Markazes and;
- An on farm water resource management project in Faraskour and Kafr Saad Markazes.



Beautification, Nasseria Village

Whilst some of the above projects reflect the critical concerns of specific village communities, all have wider environmental significance. In all of the initiatives communities are prepared to meet up to an average of 50% of the estimated costs of the project, notably through in-kind contributions such as land, voluntary labour and materials. This support needs to be cap-

tured and fully developed not only in these settlements but also in other villages where the local community are willing to help.

These projects serve to demonstrate the range of environmental actions that can be introduced by communities as part of the GEAP process. The projects are being managed by local government units who will be responsible for ensuring that lessons learnt from these projects are replicated elsewhere in the Governorate. In summary, some very simple actions that can be taken at the community level include:



Solid Waste Collection Nasseria Village

- Building up the capacity of NGOs and CDAs to run environmental awareness programmes and implement small-scale environmental projects.
- Supporting and encouraging NGOs and CDAs to work with the Governorate and businesses to bring about environmental improvements.
- Instilling civic pride in the local communities by not littering, by organising clean-up campaigns and by discouraging persistent offenders.
- Taking messages from awareness campaigns into individual homes and passing them on to others.
- Sustaining the operation of services that have been provided.
- Encouraging employers to be more environmentally responsible and obtaining support from employees by not leaving taps running, minimising wastage and so on.
- Informing the local environmental unit or liaison officer of pollution incidents.

Estimated cost of Damietta CEPs

Project Name	CDA Name	Total Cost L.E.
Extension of the sewer network in Shoara village, Damietta Markaz	Shoara CDA	126,280
Extension of sewer network in Kafr El-Westany village, Kafr Saad Markaz	Kafr El-Westany CDA	230,922
Extension of Sewer Network, Western Khayata Village, Damietta Markaz	Khayata CDA	170,391
Solid Waste Collection, Nasseria Village, Faraskour Markaz	Nasseria CDA	210,650
Solid Waste Collection , Rahamna Village, Faraskour Markaz	Rahamna CDA	312,215



8 INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING

Successful implementation of actions outlined in this GEAP will result in a more efficient use of current resources, but will also require new investment particularly in the proposed infrastructure developments. However, for these actions to be sustainable, much greater attention must be given to the organisational structures, processes and incentive systems needed to achieve them.

Whilst many of the basic building blocks of environmental management are in place in Damietta, environmental management is still in its early stages of development. The Governorate has recently established a High Council for Environment (HCE) responsible amongst other things for facilitating the GEAP process. The Governorate has an Environmental Management Unit (EMU) at Governorate level and environmental units were recently established in each Markaz and City. An environmental liaison officer (ELO) position has also been established in each village. A Regional Branch office of EEAA is located in Mansoura, and Line Ministries, such as the Ministry of Housing, Ministry of Irrigation, Ministry of Health and others, have environmental responsibilities under various Laws and therefore have important roles to fulfil. However, there are gaps to be filled. Strengthening and coordination of the existing authorities in environmental matters is essential and, of course, the private sector and the community have a significant role to play in improving the environment in which they live.

8.1 Environmental Management and Planning System

To implement and sustain the environmental actions outlined in this GEAP document an effective Environmental Planning and Management System will need to be established. This system should set in place a structure for continuously improving the effectiveness and efficiency of decentralized environmental management. The HCE will have a key role to play in delivering and supporting this process. Such a system should enable the following broad functions to be achieved.

- Strategic environment planning to facilitate sustainable development.

- Application of environmentally sensitive land-use planning through stricter enforcement of EIA requirements.
- Environmentally sensitive land-use planning through stricter enforcement of EIA requirements.
- Co-ordination of stakeholder group activities to improve environmental services, resource conservation, protection, and remediation.
- Increasing public awareness and public consultation on environmental issues.
- Capacity building through training, recruitment and the operation of effective extension services.
- Procurement of the budget and manpower resources required to implement the GEAP programmes and projects.
- Operation of effective monitoring and enforcement of environmental laws and the development of environmental performance measures and incentives.
- Promotion and sustainability of the GEAP.

The principal institutional strengthening requirements, illustrated in Box 8.1, are seen as stemming from the need to:

- Develop an Environmental Planning and Management System that is capable of effectively *addressing the priority issues* referred to in Section 4 of this GEAP within Government, private sector and the community.
- Ensure that, at the highest levels within the Governorate, *commitment to* the adoption and successful implementation of the GEAP is both achieved and widely recognised.
- Encourage and facilitate *increased participation* by all stakeholder groups with an interest in improving environmental services and natural resource conservation.
- Establish a *coordinated network* of stakeholders to facilitate the GEAP sustainability.

The EMPS does not impose any new bureaucracy but simply builds on the Governorate's present decentralised system of local environmental management which is comprised by the following:

Decentralized Environmental Management

EGYPTIAN ENVIRONMENTAL AFFAIRS AGENCY (EEAA)

Based at a *central level* its main responsibility lies in formulating a policy framework, setting up the required action plans to protect the environment and following-up their execution in coordination with the Competent Administrative Authority (CAAs).

REGIONAL BRANCH OFFICE (RBO) OF EEAA IN DAKAHLEYA

The RBO represents EEAA at a *governorate level*, and is responsible for implementing EEAA policy at the regional level. The RBO's mandate includes inspection activities, EIA reviews and the implementation of EEAA directives.

DAMIETTA ENVIRONMENTAL MANAGEMENT UNIT (EMU)

The EMUs protect the environment from pollution within the *boarders of the governorate*. They report directly to the Governor and are responsible for the implementation of Law 4 (1994) and other environmental laws at a local level, they have limited involvement. The head of the EMU has judicial impoundment for Law 4.

MARKAZ ENVIRONMENTAL UNITS (EUS)

EUs exist at *Markaz and town level* to assist the EMUs in their activities. Accordingly, the units undertake activities delegated to them by the EMUs. The head of the Markaz or district is granted judicial impoundment for Law 4.

An EU is also situated in the executive agency for development of New Damietta City and Port and is responsible for monitoring all environmental activities in New Damietta City and its industrial zone. Damietta's industrial free zone does not have an EU but instead free zone employees are responsible for collecting EIA's from companies situated in the free zone, before sending them on to EEAA office in Cairo.

VILLAGE ENVIRONMENTAL LIAISON OFFICERS (ELOS)

ELOs are found at *village level*, they receive and process EIAs, follow-up on solid waste management activities and investigate simple complaints.

- **The High Council for Environment (HCE)** is responsible for coordinating and streamlining environmental planning and management activities at a Governorate level. The council is headed by HE the Governor and comprises of 21 senior members drawn from local administration, Line Ministries, industry, utilities, Damietta University the community and women's council. The council will shortly meet to define its role, which is likely to;
 - Bring greater coordination and information sharing between central ministries and their agencies at governorate level.
 - Play an advisory role to the governor on strategic environmental issues.
 - Provide feedback to central agencies (i.e. EEAA) and maximising local inputs on national environmental policies and plans (i.e. NEAP)
 - Integrate the GEAPs strategic priorities into the Governorates more general planning, programming, budgeting and resource allocation processes.
 - Follow up on the implementation and updating of GEAP priorities and ensuring that environmental factors are integrated into development plans.
- **The Environmental Management Unit (EMU)** will require continued strengthening through targeted programmes. The EMU currently has 14 staff and is divided into the following sections; a) **Environmental Inspection**, responsible for inspecting industry to ensure that they comply with environmental standards b) **EIA**, responsible for ensuring that industries successfully complete their EIA forms before they are submitted to EEAA for consideration, and c) **Complaints**, responsible for dealing with environmental issues that are raised by the general public.
- An **Environmental Unit** has also been established in the Executive Agency for the Development of Damietta Port and New Damietta City. It is responsible for monitoring environmental activities in New Damietta City and its industrial zone. There is no EU in Damietta's Industrial free zone, instead employees of the free zone are responsible for collecting EIA's from companies situated in the free zone and sending them to EEAA offices in Cairo.
- Establishing **Environmental Units** in each **Line Ministry** that is directly related to environmental activities such as the Ministries of Housing, Health, Agriculture, Industry, Irrigation and Tourism.
- Appointing **Environmental Liaison Officers** in each of the other **Line Ministries**.
- Strengthening the capacity of each of the 44 **Environmental Liaison Officers** that exist at **mother village level**.

- Strengthening the capability of the 10 **Markaz Environmental Units** including another EMU in New Damietta City (11 in total).
- Strengthening the institutional capacity of **Damietta Water Company** in water supply and management particularly in the areas of planning, maintenance and tariff collection.
- Strengthen the management and planning capacity of **Damietta's Sanitation Sector** and consider merging it with Damietta Water Company to form a joint holding company to bring better alignment to both the water and sanitation sectors.
- A **Central Solid Waste Unit** has already been established, it has 5 full time staff and 1 who is part time, as part of the Governorates recently designed Solid Waste Strategy. The unit will promote and coordinate solid waste management activities as well as support the privatisation of services, including the monitoring of contractor performance and compliance. Staff will be trained in general waste management and strategic and financial planning.
- Appointing an **Environmental Co-ordination and Development Officer** within the Directorate of Social Affairs so that the environmental roles of NGOs and CDAs are improved.
- Establishing an **extension service** in due course to assist the many small to medium sized businesses to adopt environmentally safe technologies and management practices.
- Appoint Industrial Officers in medium and large companies.
- Strengthening Agricultural extension workers on environmentally related issues.
- Building up the capacity of the Ministry of Health so that they are better able to deal with health care waste issues.
- Other ongoing initiatives that have been initiated at a central level to support the process of decentralised environmental management include;
- The issuing of a draft EMU decree to transform EMUs into

a general department for environmental affairs (GDEA) at Governorate level to support the process of decentralised environmental management. The USAID funded Egyptian Environmental Policy Program (EEPP) in conjunction with the Egyptian Environmental Affairs Agency have submitted the draft decree to HE the Prime Minister for approval. The draft decree is currently being trialed in a number of governorates. Once agreed all effort should be made to build up the capacity of this new department so that it is able to perform its new duties.

- Amongst its main duties the GDEA is likely to be responsible for the overall coordination of environmental activities across relevant governorate departments/Markazes and Line Ministries including the preparation of strategic environmental plans and programmes. The department is also likely to act as a public information and complaints office on environmental matters, this will help in environmental monitoring, provide environmental training and raise public awareness of the environment.
- The establishment of two Decentralised Environmental Management (DEM) task forces within the Egyptian Environmental Affairs Agency (EEAA). The first task force focuses at a central level on developing an overall strategy for decentralised environmental management. The second focuses at governorate level on how to implement the strategy establishing horizontal and vertical working linkages between EMUs and Directorates, EUs and Departments and ELOs with other relevant offices at governorate level.

8.2 Key Environmental Directorates

Just as the EMPS must build upon the Governorate's present decentralised environmental management system (see below) it should also help coordinate and strengthen the effectiveness of Damietta's key environmental directorates in fulfilling their environmental responsibilities. The following table illustrates responsibilities and coordination of the key environmental directorates and identifies issues that need attention.

Key Environmental Directorates

Directorate	Areas of Environmental Responsibility	Coordination with others	Issues that need Addressing
MINISTRY OF WATER RESOURCES AND IRRIGATION Water Resource and Irrigation Directorate (Mainly concerned with distributing water and cleaning canals of waste).	- Administers Law 12/1984 concerning irrigation and drainage and relevant decrees - Develops estimates of demand for irrigation water for central ministry. - Manages, operate and distribute infrastructure for supply and drainage of irrigation water in accordance with Ministry allocations. - Ensures that agricultural fields are adequately irrigated and drained to increase potential yields. - Increases the efficiency of water conveyance to irrigated fields. - Rehabilitates and renew old drainage systems. - Enforces Law 48 /82 concerning Nile river and water course protection from pollution through joint inspection with Environmental Surface Water Police.	- Health Directorate takes water samples to measure water quality for public health purposes. - Any problems related to the quality of irrigation water are referred to the Central Ministry. - Refers problems with irrigation water quality to the central WRI Ministry.	- no testing exists to look at the broader acceptability of canal water for irrigation purposes. [Agricultural Directorate does not undertake water quality sampling.] - The extent of current pollution in irrigated water is not known. - The operation of fish farms is licensed by the Fisheries Department but it needs approval from the WRI Directorate. - The Environmental Surface Water Police find it difficult to take legal action against unauthorized fishing operators. - There are no standards under Law 48 for the discharge from irrigation water drains to canals but there are ambient standards for water in canals.

Key Environmental Directorates - continued

Directorate	Areas of Environmental Responsibility	Coordination with others	Issues that need Addressing
MINISTRY OF HOUSING General Authority for Sanitation	- Administers Law 93/1962 concerning sewage disposal and relevant decrees - Ensures that wastewater collection and treatment services comply with Egyptian Standards. - Encourages the reuse of treated wastewater and sewage sludge. - Provides adequate collection and treatment facilities to small villages and rural areas. - Ensures adequate treatment facilities for industrial waste. - Ensures that domestic and industrial wastewater discharged into public sewage system meets Egyptian Standards. - Develops small sanitation projects (pipelines, systems, pumps) Large projects delivered by central ministries managed by governorate. - Oversees the monitoring by Markaz staff of projects being implemented by contractors. - Markaz staff are responsible for investigating cases of leakage or broken pipe, odors from treatment plants and pollution from untreated sewage.	- The Health Directorate has a routine programme to monitor industrial effluents intended for discharge into the sewer system. - The Health Directorate will on request test effluents on behalf of the EMU or Sanitation department. - Violations associated with water pollution are referred to the Environmental Surface Water Police.	- The governorate's long-term objective is to operate the entire treatment plant system but they do not currently have the capacity to do so. - New establishments must comply with industrial discharge standards [Law 93] before being licensed but so far no action has been taken.
MINISTRY OF AGRICULTURE AND LAND RECLAMATION Agricultural Directorate	- Administers Law 53/1966 and relevant decrees. - Provides marketing and financial services and seed stock through the Agriculture Cooperative. - Assists the farming industry to control pests and disease. - Assists in the conservation of soil quality (e.g. by conducting research into salinity) - Promotes land reclamation and leveling projects. - Manages and cleans up irrigation water and drainage canals (WR&I manage the main canals, Agriculture the smaller ones) - Provides information, training and extension services in agricultural practice (e.g. pest control, fertilizer use, animal husbandry) - Licences intensive animal industries. - Assists in the clean up of animal and agricultural waste.	- The quality of agricultural produce is monitored by the Health Ministry and Export Development Agency. - The Directorate reports environmental offenses to the Environmental Units [EU's] in each Markaz.	- Where drainage water is used for irrigation purposes, productivity is reduced. - There is no agricultural water quality monitoring in the governorate. - There are no standards for routine monitoring of pesticide contamination on agricultural land.
AGRICULTURAL DIRECTORATE, MINISTRY OF AGRICULTURE. Fisheries Department	- Mainly concerned with developing fish industry and collecting licensing revenue. Not concerned with water quality except where it may cause fish contamination. - To license fishing activities in canals. Lakes and the Mediterranean. - To enforce law 124/1983 through joint inspection with environmental surface water police. - To inspect existing fishing operations (annually) at license renewal. - To check the quality of fish catch. - To control weeds in fishing areas. - The department is sufficiently staffed.	- Health Directorate take routine fish samples for testing. - The Fisheries department carries out limited testing of water samples etc but refers detailed testing to Health Directorate - The department has a complaints office, which deals with complaints within its own mandate. It refers other complaints to agencies on the governorate inspectorate committee.	- Testing of market samples does not allow the source of contamination to be identified. - Coordination with environmental surface water police needs strengthening.

Key Environmental Directorates - continued

Directorate	Areas of Environmental Responsibility	Coordination with others	Issues that need Addressing
MINISTRY OF HEALTH AND POPULATION Health Directorate	- Takes samples from potable water supplies, water treatment plants sewage treatment plant effluents, industrial wastewaters in local sewerage networks, and canal waters. - Analyses these samples (or arrange for their analysis by the central Health Ministry) - Takes and analyse samples from industrial and other pollution sources at the request of other agencies - Monitors ambient air quality (with two permanent facilities and portable equipment) - Implements programmes for vaccination, prevention and management of communicable disease. - The Health Directorate is not directly involved in enforcement.	- If there is a problem of potable water quality a committee is formed with the EMU and the Water Company to verify and investigate the problem. - Spot samples taken from the Nile are sent to the Central Ministry, which then notifies the governorate if there is a problem.	- The Directorate does not have the portable technical equipment that it needs to do its water quality or workplace monitoring.

8.3 Institutional Strengthening of Other Organisations

Capacity building should not be confined to Government organisations. NGOs, communities, educational establishments and private sector businesses also need to strengthen their ability to plan and manage environmental programmes and projects. Such initiatives include encouraging the appointment of *Environmental Officers in Trade Associations* and *Chambers of Commerce* to promote self-monitoring and the benefits of improved environmental performance to their corporate members.

It is considered that most of the new EMPS structure (see Box 8.1) could be established through the re-deployment of existing human resources, although key positions may require outside recruitment. Additional financial resources will be required to achieve an effective and comprehensive EMPS.

8.4 Public Awareness and Education

From stakeholder discussions it is clear that raising environmental awareness within the community is a high priority.

Awareness campaigns will need to be planned to target all sections of the community. Deeply ingrained attitudes and practices that lead to environmental degradation will take time to eradicate and significant resources to do so. In the first few years campaigns should be built around the priority issues with programmes targeting:

Primary stakeholders on:

- Littering and its impact.
- Sanitation and personal hygiene.
- Water Conservation methods.

Secondary stakeholders on:

- The need to provide improved waste management, water supplies and sanitation services.
- The need for industry to self monitor the impacts of incorrect industrial discharges on the surrounding community.
- Employers need to improve working conditions.

- Preservation of natural resources.

The campaigns should be run Governorate-wide and focus on settlements as utility services are provided and/or improved.

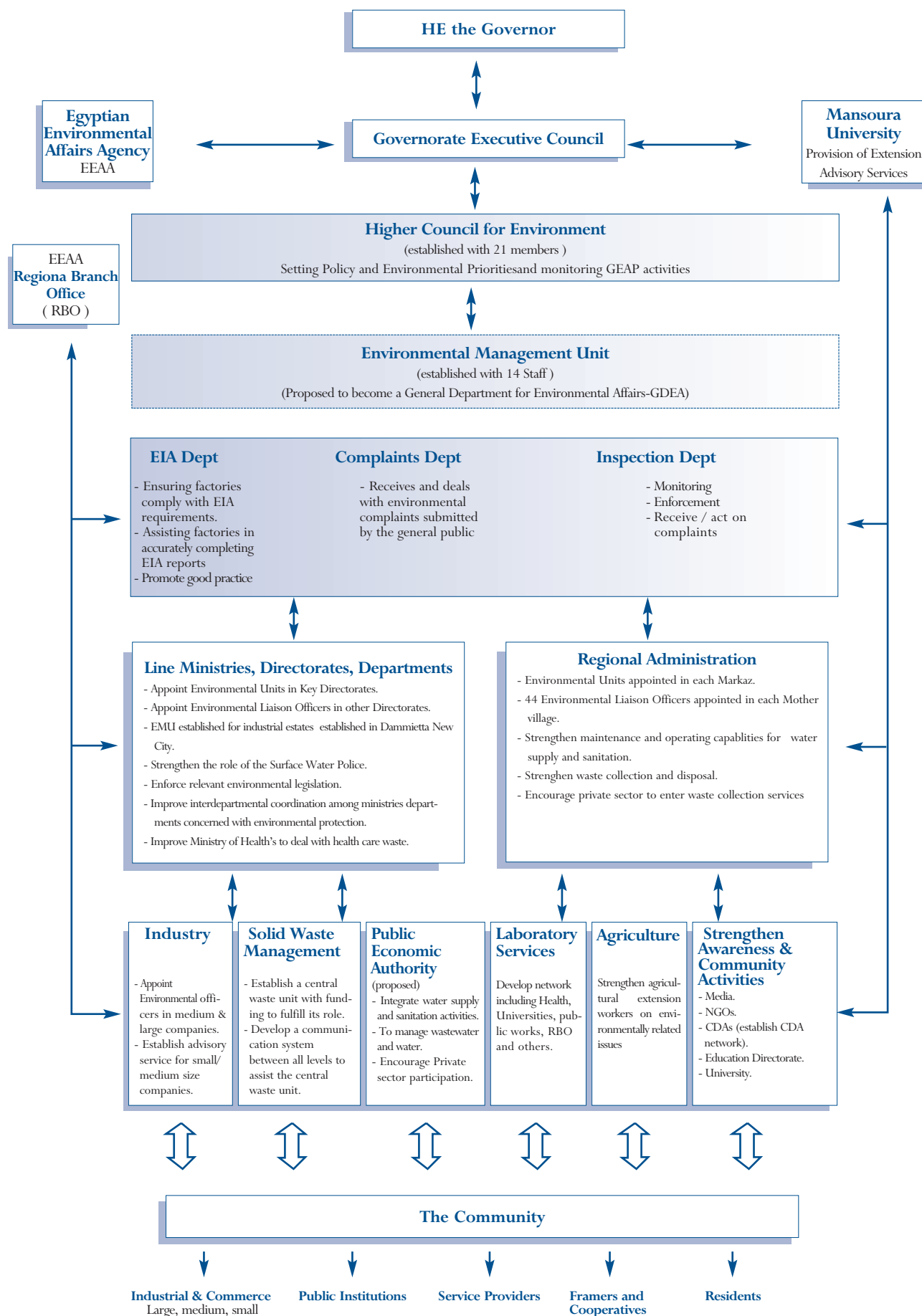
Public awareness operates on many fronts with the media, education centres, NGOs, CDAs and industry representatives playing pivotal roles. It is proposed that special promotional and interpretative materials should be produced in support of the GEAP. These should include posters, general and thematic videos, TV and radio programmes, and special messages conveyed by the Imams and other religious leaders. They should be conceived as part of on-going, carefully financed (and, where appropriate, sponsored) public awareness campaigns. Such campaigns should include annual Environmental Events and Competitions under the patronage of HE the Governor, and special clean-up and “greening” programmes.

Universities and schools should be targeted to raise awareness among students who will ultimately be responsible for shaping Damietta’s future environment. Children are often useful in carrying educational messages that they learn at school to other family members. Activities could be coordinated with EEAA who have a public information office and have produced a range of public awareness booklets, leaflets and posters.

It is important that the impacts of such campaigns should be closely monitored over time. This should involve research into producer/consumer attitudes and behaviour. The results of such research are essential to achieving both successfully designed/managed campaigns and follow-up action programmes.

A more aware public will help the Governorate apply pressure to persistent offenders to change their habits.

BOX 8.1 ENVIRONMENT MANAGEMENT AND PLANNING SYSTEM



8.5 Training

A top priority in the first 1-2 years after the launch of the GEAP will be the preparation and execution of a comprehensive training programme. This is to be designed to assist institutional strengthening of all stakeholder groups according to their specific needs.

High priority should be given to the training of the nominated staff assigned to those components of the EMPS. This group of people will have an important role in successfully establishing an effective EMPS.

A Governorate Environmental Training Unit should also be established,, consisting initially of two staff members, covering environmental services, resource conservation and general communications skills. The unit could draw on EEAA, the Mansoura University and local Colleges, NGOs, the private sector and the donor community for training support and assistance.

The following tables indicate the kind of training primary and secondary stakeholder groups have identified as necessary and that they have already received during GEAP consultations.

Environmental Training Needs Identified by Damietta's key Environmental Directorates

Directorate	Training needs
Agriculture	- General environmental aspects related to agricultural practices. - For agricultural extension staff on the use of chemical fertilizers and organic alternatives, pesticides, bio-control pests and irrigation systems, animal husbandry etc. - For farmers on the operation and maintenance of irrigation and drainage systems to promote farmer 'ownership'.
Fisheries	- General environmental aspects related to fisheries. - The supervision and construction of fish farms. - Water quality sampling methodologies. - The preparation of feasibility studies for fish farms, cages etc. - Data management. - Methods of fishing that comply with regulations.
Sanitation	- Wastewater treatment methodologies. - Use of treated wastewater in agriculture. - Public, private partnerships in wastewater management. - Operation and Maintenance of sanitation networks and systems in treatment plants. - Techniques for measuring the leakage and loss of water in water networks.
Water	- Training aimed at Damietta Drinking Water Company on. - The control and monitoring of drinking water quality. - Techniques for reducing water loss. - Operation and Maintenance of water networks and water treatment plants. - Techniques of measuring the leakage and loss of water in water networks - Running public awareness programmes on water consumption etc.
Health	- Training chemists involved in testing water quality. - Improving Health Directorates monitoring capabilities.
Solid Waste Management	- General capacity building on management of waste for employees and managers involved in SWM (City to Markaz level). - How to run Public awareness programmes on SWM. - How to conduct a logical needs assessment. - Safe disposal and recycling of waste. - How to increase incentives for private sector involvement in SWM.
Industry and EMU/EUs	- General rules and procedures involved in their day-to-day work. - How to prepare an environmental feasibility study.
Integrated Training	- How to develop an integrated approach to natural resource management. Aimed at senior managers involved in managing land, water, sanitation and fisheries. - How to apply environmental laws involving representatives from EMU, EU, Health inspectors, industrial safety inspectors and relevant local unit employees.

A List of Primary and Secondary Stakeholder Training Programmes already conducted in Damietta

Training/Awareness	Target Group
Training on the use of monitoring equipment	EMU/EUs
Environmental Impact Assessment (EIA)	EMU/EUs
Laws and Regulations	EMU/EUs
Inspection Procedures and Complaints	EMU/EUs
Field Inspection	EMU/EUs
Hazard waste management	EMU/EUs
Environmental Officers Manual	ELOs
Project Management,	CDAs
Financial Management sustainability	CDAs
Monitoring and Evaluation	CDAs
Environmental Awareness	CDAs
Proposals Writing	CDAs
How to work with Donors	CDAs
Networks and Networking	CDAs
Introduction to Advocacy	CDAs
Introduction to Governance	CDAs
GIS Training	IDSC Staff
Cleaner Production	The Dairy Factory and Furniture Workshop owners
Environmental Management for Industry	Head of Industrial Estates, Heads of relevant Governorate departments (i.e. water, sanitation, electricity and industrial safety)

*Awareness Raising Workshop, Khayata Village**NGO Training*



9 IMPLEMENTING THE PLAN

9.1 Implementation Priorities

In developing the actions of this GEAP, attention has been given to providing practical and affordable solutions. Nonetheless there are only limited resources to achieve improvements. The five priority key issues that must receive urgent action are:

- Improving sanitation.
- Improving solid waste management.
- Improving water supply and water quality.
- Reducing industrial pollution.
- Improving environmental awareness among government staff and Damietta residents.

Actions to the first three involve the provision by the Governorate of utility services. Solutions to the fourth will be the prime responsibility of both the private and public sector companies. The last is the responsibility of Damietta Governorate. To address these issues, priority will need to be given in the first 3 years to the following:

a) Establish and Strengthen the EMPS

Sustainable results depend upon putting in place the appropriate organisational structures, and resource requirements being in place to achieve them. The structure proposed in Section 8 should be implemented within the first 6 months of the launch. Essential will be the establishment of the General Department for Environmental Affairs (GDEA) within the Governorate, which will have a pivotal role in implementing the Plan. Resources should be secured to provide the necessary training to all appointees within the first two years.

An awareness campaign should be prepared involving the Governorate, EEAA, NGOs, CDAs, schools, the University, trade associations, businessmen's groups and the media. These organisations will be the main medium for passing on appropriate messages and ensuring that local successes are promoted Governorate-wide. At the same time they may be able to mobilise resources for implementation.

b) Establish a 3 to 5 year implementation plan and budget

After the launch of this Plan the Governorate will contact the relevant Directorates/ organisations responsible for addressing the above five priority issues. They will be assisted in incorporating the relevant parts of this Plan into their operational plans and in providing more detailed costings for their implementation. This applies to both government and non government organisations.

The detailed implementation plans will seek both to optimise existing budgets and to assess what additional resources will be necessary.

Prioritising within each component may also be necessary. For example, providing services to the more needy groups and supporting actions that will attract environmentally clean inward investment such as Industrial Estates.

c) Strengthen monitoring capabilities

Targets and standards should be established from the outset against which improvements can be measured. Directorates and companies should be encouraged to set departmental and individual targets, (as discussed in Section 11). This will assist achievement of increased efficiency and improved environmental performance.

d) Disseminate and promote the GEAP to attract additional resources

The GEAP should be widely disseminated throughout the Governorate to raise awareness and to attract the support of primary and secondary stakeholders. It will be important to garner support and mobilise resources at community level at an early stage.

The GEAP should be immediately promoted by the Governorate to Central Line Ministries, donor agencies and national organisations. Having a clear plan of what environmental improvements the Governorate is committed to achieving may encourage these organisations to support the Governorate in meeting its objectives. Promotion, and continued lobbying at the highest levels, will be important in unlocking additional funds.

e) Establish an effective legal and economic framework

An effective legal framework will revolve around the enforcement of current environmental laws. Additional levies or control procedures should also be considered. The Governorate monitoring and enforcement department should therefore be immediately established. Enforcement of laws will reduce pollution levels through proper disposal procedures. This group should become self-funding through the collection of fines for offenders.

Establishing an effective economic framework would not only look at raising tariffs for all utility services so that operational costs are covered but at enabling an efficient collection system to be financed. Additional mechanisms, including the imposition of realistic fines that would enable the Governorate to raise funds, are discussed in Section 10.

f) Attract the Private Sector into utility services

This will be important over the next few years so that the Governorate is not burdened with the task of raising all the nec-

essary capital. However, an effective legal and economic framework will need to be in place if the private sector is to be encouraged to invest in the provision of utility services. The Governorate should establish this framework.

9.2 Responsibilities

The Plan will be implemented by the actions of all relevant stakeholders as outlined in Box 9.1. A number of the stakeholders are already implementing some of the proposed actions under current programmes and funding.

Lead Organisations are those stakeholders who will have a main role in implementing the actions, coordinating policy development, monitoring outcomes, reporting on progress and advising on how the performance may be improved. Key Players will be stakeholders that have a role in assisting the Lead Organisation in reaching the objectives and in providing monitoring information and consultation feedback to the Lead Organisation. All stakeholder activities will be coordinated within the framework of the EMPS.

BOX 9.1: GEAP IMPLEMENTATION RESPONSIBILITIES.

ISSUES AND TARGETS	LEAD ORGANISATIONS	KEY PLAYERS
SOLID WASTE MANAGEMENT		
- Adopt an Integrated Waste Management Planning Approach to Optimise Existing Systems and Develop Improved Services	EMU	City, Markaz, Village Units, CDAs
- Strengthen Financial, Institutional and Legal Frameworks for Solid Waste Management	CSWM Unit, GoD	GoD
- Improve Collection and Transfer Efficiency and Extend Services to Low-Income Urban and Rural Areas	City, Markaz, Village Units	EMU, CDAs
- Provide Properly Controlled Disposal Sites to Reduce Impacts and Clean-up Illegal Dump Sites	City, Markaz, Village Units	EMU, DoH
- Strengthen Recycling and Composting Activities.	City, Markaz, Village Units	EMU, CDAs
- Segregate and Dispose Safely all Hazardous Healthcare Wastes.	Hospitals, factories etc	CSWM Unit, DoH
- Increase Efficiencies in Services through Private Sector Participation.	City, Private Sector Firms	Private Sector Firms, GoD
- Increase Awareness of Residents and other Stakeholders on Solid Waste Management	DoE, NGOs, CDAs, Private sector SWM firms	GoD –DPA
SANITATION		
- Strengthen the capacity of the sanitation sector	GoD, NOPWASD	GoD
- Expand Sanitation Services to All areas in the Governorate	GoD, NOPWASD.	GoD
- Maximise reuse of Treated Wastewater and Sewage Sludge.	GoD	Factories, treatment plants
- Improve Management of the Sanitation Sector	GoD, NOPWASD.	GoD
WATER SUPPLY AND WATER QUALITY		
- Increase production of drinking water by 30% to meet projected demand and extend water supply to 100% of the population	GoD	NOPWASD, GoD, DDWC
- Reduce the gap between cost and revenues for water supply by the year 2006	GoD	DDWC
- Improve Quality and pressure of supplied water through the network	GoD, NOPWASD.	DDWC
- Build up Institutional Capacity to better manage the water supply and service network	DDWC, City Markaz, Village Units	DDWC.
- Raise awareness levels related to water conservation	GoD, DPA	DDWC, City Markaz, Village Units.

BOX 9.1: GEAP IMPLEMENTATION RESPONSIBILITIES. - CONTINUED

ISSUES AND TARGETS	LEAD ORGANISATIONS	KEY PLAYERS
WATER RESOURCE MANAGEMENT		
- Safeguarding Damietta Branch water quality	MWRI, MHUNC, MOHP, MALR	MOHP, MWRI
- Improve drain water quality (to keep its ambient water quality within acceptable limits for drainage water reuse according to law 48)	MWRI, MHUNC, MOHP, MALR, EEAA, MOI, GoD	MOHP, MWRI
- Improve Safeguarding canal water quality	MWRI, MHUNC	MOHP, MWRI
- Securing acceptable water for fisheries/aquaculture	MWRI, MALR	MALR
- Minimize utilization of water resources (demand management) Optimise management of water resources.	MWRI, MHUNC, MALR	MWRI
AGRICULTURE & FISHERIES		
- Increase Fisheries Production in Lake Manzala	EMU, MALR, MWRI, GoD.	MALR
- Improve land Conservation	MALR	MALR
- Improve Water-use Efficiency by 20%.	MWRI, MALR	MWRI
- Improve Agricultural Chemicals and Residues Use	MALR	MALR
- Enhance livestock and Poultry Production	MALR	MALR
- Strengthen governments Institutional Capacity to manage sustainable agriculture and fisheries.	EEAA, GoD, MALR	GoD, MALR
BIODIVERSITY		
- Develop Governorate Capacity to Conserve and manage its Biodiversity and Natural Resources.	GoD, DPA, EEAA, DoE.	City Markaz, Village Units, DoH.
- Improve the Environmental Conditions of Lake Manzala	GoD, DPA, EEAA, DoE.	City Markaz, Village Units, DoH.
- Regulate Bird Hunting.	GoD, DPA, EEAA, DoE.	City Markaz, Village Units, DoH.
- Reduce and mitigate the Harmful Impacts of Invasive Species, in particular Water Hyacinth	GoD, DPA, EEAA, DoE.	City Markaz, Village Units, DoH.
INDUSTRY		
- Ensure safe management and disposal of industrial and hazardous waste	Factories, EEAA, EMU	DoH, DoM
- Reduce the level of industrial pollution in residential areas	Factories	EMU, DoH, EMU
- Reduce pollution loads from wastewater treatment plants and large industry	Factories	EMU, DoH
- Raise environmental awareness in industry	Factories	EMU, GoD

MWRI Ministry of Water Resources and Irrigation

MHUNC Ministry of Housing, Utilities and New Communities

GoD Governorate of Damietta

EEAA Egyptian Environmental Affairs Agency

MOHP Ministry of Health and Population

MALR Ministry of Agriculture and Land Reclamation

MOI Ministry of Interior

DDWC Damietta Drinking Water Company

DPA Damietta Public Awareness Department

DoE Directorate of Education

DoH Directorate of Health

EMU Environmental Management Unit

DoM Directorate of Man Power

NOPWASD National Organisation of Potable Water and Sanitation



10 FINANCING THE PLAN

10.1 Risk of Doing Nothing

As Damietta Governorate increases its agricultural and industrial production to meet the needs of an expanding population, pressures on its environment will inevitably increase. Without action the consequences of continued environmental degradation are likely to be substantial.

Costs associated with environmental degradation including land degradation; urban and indoor air pollution; inadequate water, sanitation and hygiene; and inadequate solid waste management have been estimated at between LE 110 and 170 million. These costs do not take into account reduced fishery catch due to pollution and overexploitation in Lake Manzala or coastal regions, nor losses in tourism revenues as a result of coastal pollution. The costs of coastal erosion have not been included or the costs of impacts of inappropriate solid waste landfills and dumpsites. The total annual cost of environmental degradation is likely to be far in excess of LE110 million.

In Damietta the five largest quantifiable contributors to environmental degradation in the Governorate are in order of priority;

- a) Land degradation
- b) Urban Air pollution
- c) inadequate water, sanitation and hygiene
- d) Inadequate solid waste management and
- e) Indoor Air Pollution.

It is however worth noting that costs associated with the degradation of Lake Manzala are also likely to be significant.

Potential effects on Damietta citizens are likely to include (amongst others):

a) Depletion of Natural Resource

Protecting the quality and quantity of agricultural land and irrigation water is of utmost importance for household income and livelihoods in rural Damietta. Even modest yield reductions, as a consequence of soil degradation, can have significant impacts on net farm income and overall household living standards. Lack of tile drainage systems for about 60% of cultivated land in Damietta compounds the problem of soil salinity and sodicity. Some 45% of cropped area is devoted to relatively saline sensitive crops, even so it is estimated that estimated crop losses associated with soil salinity are in the order of LE 47 to 63

million. With this in mind the total cost of land degradation has been estimated to be around LE 100 million.

In relation to average annual labour income in Damietta the yield losses per farm are around 15 to 50 % of the annual income. Total annual yield losses are equivalent to the income from 10 to 20 thousand jobs.

b) Adverse Health Impacts

Lack of plentiful and safe water, sanitation facilities and hygienic conditions are generally found to influence the incidence of diarrhoeal disease and child mortality. In 2002 Diarrhoeal disease was estimated to be responsible for around 24% of deaths in children under 5. Currently Damietta's public health facilities spend around LE2 440,000 pa on the treating diarrhoea. Taking all the costs associated with treating diarrhoea into consideration the estimated total annual cost to Damietta is around LE18,000,000. The incidence of Bilharzia is also quite high in Damietta, according to the Health Directorate around 4000 cases of Bilharzia were detected and treated between 2001 and 2002. The total cost of combating the disease has been estimated to be around LE3,500,000 pa. Adding up all the costs associated with Bilharzia and similar endemic diseases costs to Damietta amount to LE2,806,000 pa. The estimated annual cost of other diseases related to poor water, sanitation and hygiene conditions like Typhoid, Paratyphoid and Hepatitis is around LE40,000.

Urban Air pollution has significant negative impacts on public health and results in premature death, bronchitis, respiratory disorders and cancer. The air pollutant that has shown strongest association with these health endpoints is particulate matter (PM) especially fine particulates of less than 10 micros in diameter (PM10). Acute lower respiratory illness (ARI) is the leading cause of mortality for children under 5 in Damietta (50 deaths pa). According to Damietta's Primary health care department over 116,500 children accessed health facilities for ARI in 2002. The total cost associated with ARI in children under 5 in Damietta is estimated to be between LE500 to 900 million pa. Chronic Obstructive Pulmonary Diseases (COPD) include chronic bronchitis and emphysema. It is interesting to note that the incidence of COPD related diseases are particularly prevalent in areas like Shora and Basarta in Damietta City where furniture industries predominate. The incidence rate in these areas is twice that of other urban areas outside Damietta

City suggesting a strong correlation between furniture industries and the incidence of COPD related illness.

c) Increased cost of essential services

Increasing pollution of surface and groundwater resources from industrial and municipal sources will lead to higher costs for treating the water to achieve drinking water standards.

d) Loss of market share

If Damietta's industry and manufacturing enterprises are to compete effectively in the international market it is essential that they have sound environmental practices. This will have greatest impact on industry as global markets continue to place increasing emphasis on sourcing their materials from suppliers who comply with internationally recognised environmental standards. Typical examples where markets have been recently jeopardised are the use of toxic dyes in textiles and the presence of pesticides in food.

Other risks of continued environmental degradation include: social unrest due to deteriorating living conditions; reduced agricultural output due to increased salinisation or sodicity and impacts of using polluted irrigation water; increased building maintenance arising from air pollution and rising ground water levels and increased industrial inefficiency due to in-plant wastage and pollution; loss of tourism due to polluted waters

indiscriminate waste dumping; and loss of inward investment if inadequate supporting services are not in place.

It should be noted that experience in other countries indicates that the cost of remediation is 10-100 times the cost of pollution prevention.

10.2 Cost of Implementation

This section sheds light on the estimated total capital requirement for implementing the 10 year target programmes of the Damietta GEAP. Emphasis is made on four main areas of great importance to the environment in Damietta namely, potable water, sanitation, solid waste management and agriculture. Projection of costs was mainly based on figures of GOE five year plans (for some areas, plans were reviewed until the year 2017), as well as on first hand experience of cost of implementation of either SEAM demonstration projects and or estimates of Government/ consultants experience of similar projects previously implemented. Based on this, the total capital required to implement the 10 year programmes for the four areas is estimated at 2,301,115,000 LE. Table below provides a break down of the cost by action. It is important to note here that figures calculated below reflect costs at 2004.

10 Year GEAP Implementation Costs (LE)

Sector	(LE)
Improving Potable Water Supply	
Increase production of drinking water by 30%	208,000,000
Reduce the gap between cost and revenues for water supply by the year 2006	1,360,000
Improve quality and pressure of supplied water through the network	144,050,000
Sub-Total	353,410,000
Improving Sanitation	
Extend sanitation services to all urban and rural areas	
(I) Complete all partially completed sanitation projects to increase the level of sanitation coverage in Damietta	548,800,000
(ii) New Projects	173,000,000
Complete end-of-pipe treatment for existing factories	689,820,000
Identify opportunities for safely irrigating crops using treated wastewater	50,000
Encourage the reuse of treated effluent from wastewater treatment plants	1,745,000
Improve management of the Sanitation Sector	60,000
Sub-Total	1,413,475,000
Improving Solid Waste Management	
Collection	12,000,000
Transfer systems	14,500,000
Adopt proper waste treatment and disposal systems	4,500,000
Sub-Total	31,000,000
Agriculture	
Improve land conservation	178,000,000
Improve Water-use Efficiency by 20%.	45,000,000
Improve agricultural chemicals and residues use.	29,230,000
Enhance livestock and Poultry production	251,000,000
Enhance fisheries production and improve lake Manzala wetlands area	To be negotiated among stakeholders
Sub- Total	503,230,000
Total	2,301,155,000

At present, 97% of Damietta Governorate has access to potable water supply. One of the main targets of the water programme is to achieve 100 % coverage in both residential and industrial areas and to meet the projected water demand over the coming ten years by increasing water production by 30%. To meet this target, water treatment plants in El- Adleya, El- Bostan and in Kafr Soleiman will be completed/ renovated by 2017. Capital cost for implementing this is estimated at LE208,000,000 in accordance with Damietta Regional Development Plan for the Water Sector 1997- 2017. Another important target is to reduce the gap between costs and revenues of water supply including revisiting the pricing structure and improving efficiency of water bill collection. The cost of implementing this activity will amount to LE1,360,000. Finally, a capital cost of LE144,050,000 will be required to meet the third major objective of the water programme which is to improve the quality of water supplied through the networks. This will bring the total estimated capital cost for the ten year water programme to LE353,410,000.

Sanitation coverage in Damietta Governorate is on the other hand only 80%. Currently the Governorate is investing heavily in the sanitation sector in an attempt to extend sanitation coverage to all villages and Markazes. As part of the Governorate Development Plan, partially completed projects will be finished at an estimated capital cost of LE548,800,000. In addition to this, a number of new projects are planned until the year 2017 to provide sanitation to villages and reduce their dependence on septic tanks. New projects will be funded by the National Organization for Potable Water and Sanitary Drainage (NOP-WASD), at an estimated cost of LE173,000,000. Another main objective of the sanitation programme is to ensure proper treatment of industrial wastewater. This mainly focuses on completing end of pipe treatment for existing factories in Damietta Governorate at an estimated cost of LE689,820,000. In total, capital required to implement the sanitation program will amount to LE1,413,475,000.

The cost of upgrading the SWM system in Damietta Governorate will require a capital investment amounting to LE31,000,000 over a span of 10 years. In Damietta Governorate, the long distances between some Markazes and the main disposal site in Shata has put more emphasis on developing transfer systems as a main pillar of Governorate integrated SWM strategy. The development of transfer stations will enable the existing collection equipment to be more effectively used for waste collection, as the long time spent hauling waste to the disposal site will be eliminated. It is projected that constructing 8 transfer station (3 in Faraskour, 1 El- Zarka, 2 in Kafr Saad, 1 in Ezbet El- Borg and 1 in Ras El-Bar) will necessitate a total capital cost LE14,500,000. However much of the waste collection equipment has already passed its economic working life resulting in significant downtime and costly repairs and hence should be either phased out or refurbished. The capital cost pertaining to this activity is estimated at LE12,000,000. Finally, in order to improve final disposal, the main disposal site in Shata will be developed into a sanitary landfill costing LE4,500,000, while other dumpsites in Damietta governorate

will be phased out and eventually closed.

Agriculture is considered an important economic activity in Damietta Governorate. However, many of Damietta's soils are affected by increasing levels of salinity/alkalinity and high water tables. This in effect stresses the need for a program targeting land conservation in Damietta. The main components of this program will focus on updating the soil classification map to facilitate better agricultural planning and monitoring, promoting soil improvement techniques and improving land drainage techniques. It is projected that implementation of this program will need an estimated capital cost of LE178,000,000. Another important target of the agricultural program is to improve the water use efficiency at farm level by using improved surface irrigation systems, modifying cropping and irrigation practices and improving irrigation and drainage from main canals. A capital cost of LE45,000,000 will be required to carry out this program. A third essential action which complements the first two aims at encouraging optimum use of agricultural chemicals and the reuse of farm residues, at an estimated capital cost of LE29,230,000.

The agriculture program also includes activities aiming at enhancing livestock, poultry and fisheries production in Damietta Governorate. While it is possible to put an estimate on enhancing livestock and poultry production- in the region of LE251,000,000, however it was very difficult to project the cost of enhancing fisheries production, as a result of lack of data on pollution levels and the fact that Manzala Lake is shared between a number of Governorates. This will hence require an action plan to be developed among all stakeholders, where roles and tasks are well defined and costs are shared accordingly.

10.3 Mechanisms for Raising Resources

It is intended that this plan will be implemented by Government, the private sector and non-government organisations to the maximum practical extent. Although provision of utility services has traditionally been delivered by government, where appropriate private sector involvement should be encouraged to maximise improved service coverage. The cost of reducing industrial pollution should be largely shouldered by both the private and public sector.

There are however, a number of options available for raising funds and mobilising the resources required to implement the GEAP. These are summarised in Box 10.1. The sources likely to be of greatest relevance in Damietta include: direct funds such as full cost recovery tariffs, fees, charges, Licences, levies, fines and taxes; indirect funds arising from increased revenues and cost savings, associated with both management and operational improvements and external funds from i.e. Government or Donor agencies.

BOX 10.1: MECHANISMS FOR RAISING FUNDS

1.	FINANCING IMPROVED WATER SUPPLY AND SANITATION SERVICES
	1.1 Increase Water Supply Tariffs (full cost recovery) 1.2 Sewage Charges (full cost recovery) 1.3 Licence Fees for Ground Water Abstraction (full cost recovery) 1.4 Consent Fees for Discharges to drains and waterways (of sewers) (full cost recovery) 1.5 Collection of renewables 1.6 Establishment of "Environmental Fund" 1.7 Savings from privatisation 1.8 Revenues from waste water re-use and sewage sludge sales
2.	FINANCING IMPROVED SOLID WASTE SERVICES
	2.1 Annual Fee for Collection/Use of Landfill Site (full cost recovery) 2.2 Gate fee for Composting Facilities (full cost recovery) 2.3 Gate fee for Landfill Site (full cost recovery) 2.4 Savings from Waste Exchange Schemes 2.5 Revenues from Compost Sales 2.6 Revenues from Recycling 2.7 Levies for hazardous waste disposal from institutions: hospitals, University, schools, companies etc (full cost recovery) 2.8 Waste minimisation plans/projects 2.9 Savings from privatisation 2.10 Charges for Domestic and Institutional Collection Services (full cost recovery) are these duplications 2.11 The Governorates 'Beautification Fund'
3.	FINANCING IMPROVED INDUSTRIAL POLLUTION PREVENTION/CONTROL SERVICES
	3.1 Pollution fines ("polluter pays principle") 3.2 Pollution permit fees (full cost recovery) 3.3 Tax on Mazot to encourage switch to natural gas 3.4 Vehicle Licence Fees 3.5 Charges for Vehicle Testing
4.	FINANCING OTHER/GENERAL ENVIRONMENTAL SERVICES
	4.1 Removal of all inappropriate subsidies; replace with income support grants 4.2 Establishment of Utility Chest 4.3 Establishment of Environmental Bonds/Environmental Trust Funds 4.4 Levy on Top Soil sales 4.5 Fees for EIA Evaluation 4.6 Lobbying Donors 4.7 Lobbying Commercial Sponsors 4.8 Lobbying Central Government Funds/Grants 4.9 Introducing Performance Related Pay Schemes, linked to efficiency improvements 4.10 Savings through improved management (monitoring and accountability) 4.11 Savings and service efficiency improvements from improved maintenance 4.12 Improved financial planning to achieve more effective use of available funds 4.13 Investment in improved technology and lower operating costs 4.14 Improved management (via training) leading to technical efficiency gains 4.15 Harness customer "willingness to pay" 4.16 Adoption of energy saving/efficiency programmes 4.17 Investment in Sustainable Development projects to generate increased Government revenues/taxes 4.18 Laboratory charges and fees; 4.19 Advisory fees charged to other organisations



11 THE GEAP CYCLE

11.1 Monitoring the Actions

The GEAP is designed to be an iterative process through which progress against agreed and prioritised environmental actions can be measured and monitored on a regular basis. Whilst the responsibility of delivering each environmental action lies with different government or private sector agencies the governorate will have to delegate responsibility to a specific body e.g. the HCE to carry out necessary monitoring and updating of GEAP priorities which may change over time.

11.2 Annual Evaluation

A 'State of the Environment' report should be prepared and presented to the HCE each year summarising:

- Progress achieved in implementing the agreed actions.
- Resulting improvements made to the environment.
- Areas that need to be addressed due to non-performance or difficulties.
- Recommended changes to on-going actions that are necessary as a result of changing circumstances.

Preparation of the report should be coordinated through the EMU (or GDEA if it is established). Further support in preparing the report should be provided by EEAA's GEAP Unit. Contributions, however, should come from all the environmental units and environmental liaison officers that will be established throughout the Governorate as part of the EMPS. NGOs, the private sector and community leaders should also be closely involved in the evaluation process.

11.3 GEAP as an Ongoing Process

To be sustainable the GEAP process needs to be dynamic and flexible. The policies, targets and actions that combine with consultation to form the GEAP process must be updated to reflect changing conditions and local circumstances. In addition progress reports should document the lessons learnt during the process so that improvements can be incorporated into future actions.

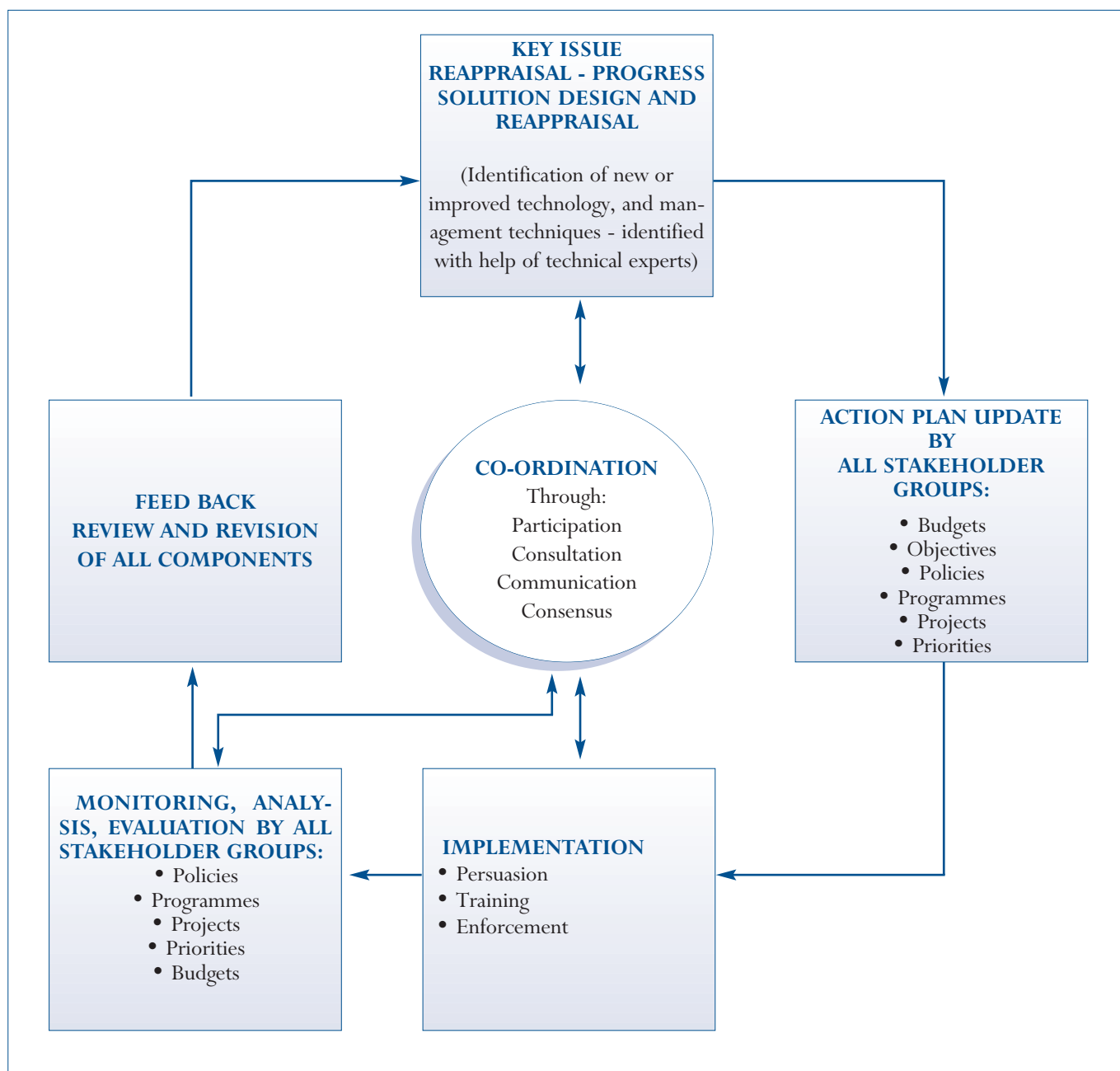
The GEAP targets and actions should be updated on an ongoing

basis. Progress reports should be produced annually and the GEAP itself updated every 2 to 3 years. In the GEAP cycle it will be necessary to:

- Annually prepare and update forward (3 to 5 years) detailed implementation plans and budgets for the priority actions.
- Carry out monitoring and evaluate progress and implementation performance;
- Assess difficulties encountered and identify alternative ways of achieving objectives.
- Continue consultation with primary and secondary stakeholders and incorporate their views and support for forward environmental plans.
- Identify new actions that become necessary due to changing circumstances (e.g. new laws and/or standards).
- Revise and set new targets and actions as appropriate.
- Accelerate investment in certain areas as a result of outside changes (e.g. changes in National Policy).
- Lobby continually for external investment from Central Government, private sector and the donor agencies.
- Keep abreast of technological improvements that may provide more cost effective solutions to environmental problems.
- Respond to changing requirements for institutional strengthening and capacity building.

A schematic illustration is given in Box 11.1.

BOX 11.1: THE GEAP CYCLE - SUSTAINING THE PROCESS





12 CONCLUSIONS

Preparation of the GEAP has involved all the main stakeholder groups in agreeing:

- The priority issues to be addressed.
- The main actions to be taken at Governorate and Markaz levels by Government, industrial and private sectors, as well as a sample of local communities.
- The chief institutional strengthening requirements of all the principal interests.
- The public awareness and training initiatives required.
- The responsibilities of the Lead Organisations and Key Players.
- The need for accurate costing of the agreed improvements.
- The monitoring and on-going environmental planning required.

Implementation of both the Actions and the Process is expected to involve all of the same stakeholder groups. The benefits which are expected to result from implementation of the GEAP are displayed in Box 12.1. This indicates the range of qualitative benefits which are sought by a sample of primary and secondary stakeholders. The targets presented in Section 5 indicate the scale of quantitative benefits expected to be achieved on behalf of all stakeholders.

Success demands continuing participation and collective responsibility. Box 11.1 summarises all the stages of the GEAP cycle and shows the extent of participation.

BOX 12.1: GEAP BENEFITS TO BE EXPECTED BY STAKEHOLDER GROUPS

BENEFITS	PRIMARY STAKEHOLDERS			SECONDARY STAKEHOLDERS		
	Communities	NGOs	Industries	EMU Central	EU Markaz	Line Departments
- Improved health/reduced mortality						
- Better trained/ experienced environmental and extension staff						
- Increased civic pride and cleaner streets						
- Reduced risks of environmental hazards and disasters						
- Improved access to environmental training facilities						
- Increased scope for community participation						
- Opportunities for higher revenue generation						
- Better job openings						
- Increased access to donor funds						
- More cost-effective infra-structures and environmental services						
- Greater scope for technology transfer						
- Improved and safer irrigation water						
- Fisheries stocks conserved and restored						
- Cleaner and weed-free canals						
- Improved land drainage and soil conservation						

APPENDIX 1- ACKNOWLEDGEMENTS

Contributors

Damietta Governorate

His Excellency the Governor
Dr Mohamed Fathi El-Baradie

Secretary General
General Ahmed El Sersy

Deputy Secretary General
General Saad Abd El Hady

With Thanks To

Former Governor
Dr Abdel Azeem Wazeer

Former Secretary General
Eng Reda Ragab

Former Deputy Secretary General
Eng Aly Azzaz

Damietta Environmental Management Unit

Hamed Farrag (Manager)
El Tantawy Kashkoush (Previous Manager)

SEAM Damietta GEAP Team

Dr. Atwa Hussein	EEAA
Philip Jago	SEAM PM
Adam Read	SEAM
Dr. Ahmed Aziz	SEAM
Ahmed Fawzy	SEAM
Ahmed Shouman	SEAM
Bill Farrell	SEAM
Bjorn Larsen	SEAM
Dina Ahmed	SEAM
Haitham Abd El Monem	SEAM
Dr. Hanna EL Gohary	SEAM
Heba Behery	SEAM
Hossam Aziz	SEAM
Ismail Hamdy	SEAM
Kholoud Mohsen	SEAM
Magdalena Banasiak	SEAM
Maha Bassiouny	SEAM
Maher Fares	SEAM
Mahmoud Reda	SEAM

Manus Coffy	SEAM
Mark Povey	SEAM
Mary Shenouda	SEAM
Mohamed Shafeek	SEAM
Nahla Sabet	SEAM
Paul Fletcher	SEAM
Samah Zaghloul	SEAM
Shahenaz Fouad	SEAM
Walaa Badawy	SEAM

Technical Reports

Dr. Abd EL Wahab Allam
Dr Ahmed Gaber – Chemonics
Dr Sawsan Bakr
Dr Said Gohary
Dr Jocelyn Gohary
Dr Sherif Baha ELDin
Dr Mindy Baha El Din
Dr Bjorn Larsen
Dr Yasser Sherif - Environics
Dr Maged Hamed – Chemonics
Dr Ahmed Maged –Chemonics
Dr Ashraf Ghanem – Chemonics

SEAM Surveyors

Public service, Damietta Social Affairs
Sonia Ahmed El Tahan
Shaimaa Ismail El Hosiny
Ferial Mohamed El Sherbiny
Yara El Saeed El Demerdash
Mona Abdel Hamid Farah
Hanan Saad Abu El Ghet
Abeer Ibrahim El Halawany
Shaimaa Abo Zead Hassan
Eman Saad El Alfy
Kamilia Kahal Abo El Farh
Naziha Ramadan Gameel
Soha Ibrahim Abdel Gawad

Damietta Markaz

* Damietta City Council
* Ras El Barr City Council
* Ezbet El Borg City Council

Damietta Markaz Local Units

Basarta, El Sheikh Dorgham. Enania, Senania, Shoara, Sayala Bostan (-Bostan, -El Adlya,) Ezab El Nahda (Ezab El Nahda -El Khalefeia, -Awlad Hamam) Khayata (Khayata, -Shat Geriba -Ezbet El Lahm) Gheit El Nosara (-Shata)

Faraskour Markaz

- * Faraskour City Council
- * Rouda City Council

Faraskour Markaz Local Units

Al Atawi, Al berasheia, Al Ghoniemeia, Nasseria, Sharabas Al Ebedia (-El Ebedeia, -El Tarha) Al Ghawabeen (-Al Ghawabeen, -Awlad Khalaf) Dahra (Dahra, -El Naggareen, -El Salmeia) Horany (Horany, -Meit El Sheyokh) Kafr El Arab - (Kafr El Arab, -Kafr El Shennawy) Karam wa Razouk - (Haggaga, Al Arbaeen) Rahamna (Abou Girda, Azazma)

Kafr Saad Markaz

- * Kafr Saad City Council
- * Kafr El Batiekh City Council
- * Meit Abo Ghaleb City Council

Kafr Saad Markaz Local Units

Al Abbaseia, Al Basateen, Kafr Meit Abo Ghaleb (Al Zahraa) Kafr Solieman Al Bahary, Kafr El Manazla, Kafr Saad El Balad El Sawalem, Om El Rizk, Om El Reda, Al Rekabeia (Al Rekabeia, Gamasa) Kafr El Westany (Kafr El Westany, El Badrawy) Kafr Shehata (Kafr Shehata, Dar El Salam) Al Reyad- (Kaheil) Al Mohamadia,- (Al Mohamadia, El Ibrahimeia Al bahreia,- El Ibrahimeia Al Kebleia) Kofour El Ghab (Kafr El Ghab, Kafr El Merabeen Al Sharkia)

Zarka Markaz

- * Zarka City Council
- * Serw City Council

Zarka Markaz Local Units

El Kashef El Gedit, Dakahla, Kafr El Mayasra, Meit El Khoully Abdella, Seif El Dein (Seif El Deen, Al Salam) Sheremsah, (Sheremsah, El Zaatra, Kafr Takie)

Damietta City

New Damietta City Development Agency

Damietta Governorate Departments

- * Governor's office affairs
 - Security Dept.
 - Monitoring office
 - Planning and monitoring Dept.

- Communication affairs Dept.
- Citizens service office
- Public relations Dept.
- * Dept. of Legal affairs
 - Investors service office
 - Central accounting Agency Reports analysis Unit
 - Information and Decision Support Centre
- * Computer Dept.
- * Documentation and Library Dept.
- * Publication Dept.
- * Statistics Dept.
 - Central Statistics Department
 - General Department of Sanitation
 - General Department of Production and
 - Economic Affairs
- * Agriculture development Dept.
- * Economic Researches Dept.
- * Affairs of companies and Authorities Dept.
 - Administrative Training centre.
 - State properties Protection Dept.
 - Dept. of Gardens and Parks
 - Dept. of Village development
 - Dept. of Local Councils, Committees and Conferences
 - Dept. of Tourism
 - Dept. of Port Affairs
 - Dept. of Governorate Building Affairs
 - Dept. of Cooperation
 - General Department of Financial and Administrative Affairs
- * Dept. Of Administrative Affairs
- * Dept. of Financial Affairs
- * Dept. of Personnel

Damietta Governorate Directorates and Authorities

- * Health Directorate
- * Veterinary Directorate
- * Agriculture Directorate
- * Social Affairs Directorate
- * Manpower and Migration Directorate (Including Industrial safety)
- * Roads Directorate
- * Housing and Utilities Directorate
- * Bridges and Transportation Authority
- * General Authority of Fisheries Development
- * General Department of Damietta Irrigation
- * Central Department of Water Resources and Irrigation
- * General Department of North Dakahleya Irrigation
- * General Department of Damietta Irrigation
- * General Department of Nile Protection North of Damietta branch
- * Shrouk Programme
- * NOPWASD
- * Damietta Electricity Holding Co.
- * Damietta Water Co.
- * Coastal Zone Protection Authority
- * Environmental & Water Surface Police

- * CAPMAS
- * Faculty of Science, Mansoura university, Damietta Branch

Community Development Associations (CDAs)

- * Al Atawi
- * Al Mohammadia
- * Al Rekabeia
- * Awlad Hamam
- * Awlad Khalaf
- * Bostan
- * Ezb El Nahda
- * Kafr El Arab
- * Kafr Seliman Al Bahary
- * Meit Abo Ghaleb
- * Meit El Khouly
- * Meit El Sheyoukh
- * Nasseria
- * Senaneaia
- * Seif El Deen
- * Shoara and Ezbet El Seady

Damietta Working Groups

Drinking Water Working Groups

Eng Ahmed Kadri (Chairman) Damietta Drinking Water Company
 Eng Fouad Mikhaeel (Deputy Chairman & Executive Manager) Damietta Drinking Water Company
 Eng Mohamed Dessouki (Head of Department) NOPWASD
 Dr Mohamed Ali Zeiyada (Environmental Science) Damietta University
 Dr Salah Abu El-Atta (Head of Public Health) Health Directorate
 Mr Samer Ragab (Head of Planning) Governorate

Sanitation Working Group

Eng Mohamed El-Shehaby (Head of Sanitation Department) Damietta Governorate
 Eng Mohamed Dessouky (Head of Department) NOPWASD
 Eng Hassan Ezzat (Head of Sanitation) Markaz Faraskour
 Eng El Sayed El-Naggar (Head of Sanitation) Markaz El-Zarka & El-Serwa
 Eng Abbas Helal (Head of Sanitation) Markaz Kafr Saad
 Eng Yehia Fayed (Head of Sanitation) Damietta Markaz
 Eng Mohamed Barakat (Sanitation Dept) Damietta Governorate
 Eng Samir Abo Gharbia (General Dept of Sanitation)
 Dr Mohamed Ali Zeiyada (Environmental Science) Mansoura University; Damietta Branch.

Water Resources, Irrigation & Drainage Working Group

Eng Attia Hashesh (Under Secretary) Central Department MWRI, Damietta
 Eng Refky El Bendari (Under Secretary) Central Department

MWRI, Damietta
 Eng Saad Mousa (Head of Planning) Central Department MWRI, Damietta
 Eng Mohamed El-Namouri (Head of Irrigation Department) Central Department MWRI, Damietta
 Eng Mohamed Romiah (Head of Nile Sector) Irrigation Directorate
 Eng Mohamed Neamaat Allah (Agriculture drainage) Kafr Saad Markaz
 Eng Ibrahim Farag (General Manager) North Dakhaleya Drainage.

Fisheries Working Group

Dr Saneel Sadek (Chairman) General Authority of Fisheries
 Dr Hussein El-Shafei (Head, Research Centre) General Authority of Fisheries
 Dr Ahmed El-Mazayen (General Authority of Fisheries)
 Eng Mustafa Abu El-Kheir (Head of Department) General Authority of Fisheries
 Eng Ibrahim Hamad (General Manager, Production & Operations) Central Department
 Eng Mohamed Romia (Head of Nile Sector) Irrigation Directorate.
 Dr Salah Abu El-Atta (Head of Public Health) Directorate of Health
 Mr Abdelfattah Ragab (President) Fisherman Association, Ezbet El-Borg
 Ragaa Ghanem (Private Sector Fisherman)
 Dr Mahmoud Salem (Head of Environmental Sciences) Damietta University
 Dr Mohamed Ali Zeiyada (Environmental Science) Damietta University
 Eng Abdelfatah El-Shebly (Manager, Lake Manzala) General Authority of Fisheries
 Mr Akram Abu Hussein (Head, Technical Office) General Authority of Fisheries

Agriculture Working Group

Eng Ali Attwa Rizk (Under Secretary) Agricultural Directorate
 Eng Adel El-Khadargi (Head) Agricultural Affairs Extension Programme and Agricultural Waste
 Eng Muharam Khalilz (Head) Livestock & Poultry Farming and Non traditional Fodder
 Eng Ahmed Hindawi (Head) Land Resources, Water and the Environmental Department
 Eng Mohamed Rabee (Head) Laboratory and Soil Analysis, Agriculture Directorate
 Eng Yousri Subh (Head) Agricultural Research Centre
 Eng Wagdi El-Sewedy (Head) Plant Protection and Pesticide Use Department
 Dr Ezzet El-Katami (General Director) Vet Department
 Dr Mahmoud Mostafa (Slaughterhouses Dept) Vet Directorate.
 Eng Mahmoud Arieda (Agricultural Research Centre) Damietta Governorate

Mr Fawzi Abd El Maksood (Technical Office)
 Mr Mohamed Nageed Eesa (Technical Office)
 Mr Ahmed Taha Farah (Agricultural Affairs)

Marine & Coastal Zone Management

Eng Taha El Eryan (General Manager) Shoreline Protection Agency (SPA)
 Mr El Araby Gomaa, (SPA)
 Dr Mohamed Abdelrahman (Head) Alexandria Research Institute
 Eng Aliaa Al Abd (City Council) Ras El Bar
 Mr Abu Bakr El Shehamwy (Manager of Environmental Quality Dept) Mansoura RBO.
 Mr Mohammed Mazeen (City Council) Ezbet El Borg
 Mr Mohamed El Kashawy (Chairman) Fisheries Association.
 Dr Mahmoud Salem (Environmental Science) Mansoura University: Damietta Branch.
 Dr Mohamed Zeiyada (Environmental Science) Mansoura University: Damietta Branch
 Eng Saad El-din Ahmed (Chief Engineer) Coastal Research Station, Ras El Bar
 Eng Ahmed Ezet Ahmed (Geologist) Coastal Research Station, Ras El Bar
 Dr Mahmoud El Bana (Geologist) Coastal Research Station, Ras El Bar
 Captain/Fekri Abu El-Ezz (Coastal Zone Protection) Port Authority

Geology Working Group

Dr Magdy Khalil (Scientist) Environmental Science, Damietta University
 Eng Mohamed El-Askandarani (Undersecretary) Housing Department
 Eng Mohamed Zaghloul (General Manager, Economic Affairs) Governorate
 Eng Taher El-Ghabari (Geologist) Housing Directorate
 Eng Mohamed Taha Hassan (Geologist) Housing Directorate

Health Working and Air Quality Group (Cost of Environmental Degradation report)

Dr Mohamed Abu El Atta (Under Secretary) Health Directorate
 Dr Salah Abu El Atta (Head of Public Health) Health Directorate
 Dr Ahmed Saleem Neiazy (Head, Environmental Health) Mansoura University
 Dr Mai Ibrahim El-Gamal (Environmental Science) Damietta University
 Dr Magda Saleh (Monitoring Unit) Health Directorate
 Dr Mohamed Adb Allah (Respiratory Disease Specialist)
 Dr Hasan Eweda (Endemic Disease Dept) Health Directorate.
 Dr Mohamed El Badry (Infectious Disease Dept) Health Directorate.
 Chem Zenhom Abdoh Mahmoud (General Manager of

Industrial Safety)
 Miss Sonia El Tahan (Surveyor) SEAM Damietta.

Industry Working Group

Mr Mustafa Kamal (President) Chamber of Commerce
 Mr Ahmed Wali (General Manager) Chamber of Commerce
 Eng Abd El Hameed Shoman (Chairman) Investors Association.
 Mr Raafat Sarhan (Free Zone) Damietta Port
 Eng Mohamed Beshta (President, New Damietta City) Ministry of Housing.
 Eng Mohamed El- Barashi (Head of Environmental Affairs) Industrial Zone, New Damietta City
 Eng Yasser Sherif (Director) Environics
 Dr Abdel Hafez Hasanin Environics

Planning & Investment Working Group

Mr Samer Ragab (Head of Planning) Governorate
 Mr Mohamed Zaghloul (General Manager of Economic Affairs) Governorate
 Mr Kamal Abu El –Atta (General Manager, Investors Industrial Zones & Youth Employment Affairs) Governorate
 Mr Hussein Khafaga (General Manager, Finance & Management) Governorate
 Mr Mohamed Helba (Sharouk Programme) Governorate
 Mr Khaled Zohery (Finance & Management Dept) Governorate.

Urban Development Working Group

Eng. Mohamed El Askandarani (General Manager) Housing Directorate
 Eng. Mohamed El Shehaby (General Manager) Sanitation Dept.
 Mr. Mahmoud Hamed (Zarka City Head)
 Mr. El Sayeed Sharaf El Deen (Kafr El Bateikh)
 Eng. Atef Abo Yousef (General Manager) Roads Directorate
 Eng. Abd El Salam Makharia (Manager) Urban Planning
 Eng. Mahmoud Shalaby (Development Manager) New Damietta City
 Dr. Hamdy El Saka (Planning Manager) Health Directorate
 Eng. Saad Eessa (Electricity Co.) Damietta
 Eng. Ismaia El Halawani (S.G.) Meit Abo Ghaleb City
 Mr. Rabeaa Ateia (S.G.) Serw City
 Mr. Abd Allah El Masry (S.G.) Ezbet el Borg City
 Eng. Shehata Abd El Hafez (Deputy City Head) Faraskour City
 Eng. Ali Abdoh (Head of Rouda Garage)
 Eng. Mohamed Osman (Cleaning Dept.) Rouda
 Eng. El Araby Ibrahim (Development Dept.) Kafr Saad Markaz
 Mr. Zaid Nawar (EMU Manager) Meit Abo Ghaleb
 Mr. Ahmed Salama (Property Manager) Housing Directorate

Solid Waste management Working Group

Gen. Helmy Abdel Alim El Said (Markaz Head) Faraskour

Markaz

Mr. Shehata El Naggar (Deputy City Head) Faraskour

Markaz

Mr. Sedeek Shaban (Manager) Cleaning Dept.; Faraskour

Markaz

Mr. Mohamd El Dewail (EU Manager) Faraskour

Mr. Ali Abdel Fatah Srbeah (Rouda City Head) Faraskour

Markaz

Eng. Sabry Mohamed Ata (Head of Garage) Faraskour

Markaz

Mr. Ali Abdoh (Head of Rouda Garage) Faraskour Markaz

Heads of Faraskour Markaz LUs

Gen. Mohamed Shehab (Markaz Head) Kafr Saad Markaz

Mr. Gad El Said Mosa (Deputy City Head) Kafr Saad

Markaz

Mr. Al Sayed Sharf El Deen (Kafr El Bateikh City Head) Kafr Saad Markaz

Gen. Fawzy El Shamy (Meit Abo Ghaleb City Head) Kafr Saad Markaz

Mr. Hamdy El Aobity (Manager) Cleaning Dept.; Kafr Saad Markaz

Mr. Mohamed Rashed (EU Manager) Kafr Saad

Mr. Hasan Abdel Ghafar (EU Manager) Kafr El Bateikh City

Mr. Zaid Nouara (Cleaning Dept.) Meit Abo Ghaleb City

Mr. Ismail El Kaseem (Head of Kafr El Bateikh Garage)

Kafr Saad Markaz

Heads of Kafr Saad Markaz LUs

Mr. Mahmoud Hamid (Markaz Head) Zarka Markaz

Mr. Ahmed El Helw (Deputy City Head) Zarka Markaz

Mr. Mohamed El Sherbiny (Serw City Head) Zarka Markaz

Mr. Osama El Morshedy (Manager) Cleaning Dept.; Zarka Markaz

Mr. Nabil Kamil Emasha (Head of Garage) Zarka Markaz

Mr. Mohamed El Geyoshy (Head of Serw Garage) Zarka

Markaz

Heads of Zarka Markaz LUs

Mr. Khalil Gazy (Markaz Head) Damietta Markaz

Mr. Mahmoud Abd El Khalik (Deputy City Head) Damietta Markaz

Mr. Mokhtar Noh (Ezebt El Borg City Head) Damietta Markaz

Mr. El Sayed Abd El Mawla (Head of Garage) Damietta Markaz

Mr. Asaad El Zahed (Cleaning Dept.) Ezebt El Borg City

Mr. Mohamed Sadek (Head of Garage) Ezebt El Borg City

Essam El Deen Tawfek (Cleaning& Environment) Ezebt El Borg City

Heads of Damietta Markaz LUs

Mr. Mohamed Ezzat Salamo (Manager) Composting Plant ; Ras El Barr

Mr. Attia El Sayes (Manager) Composting Plant ; Shata

Social Development Working Group

Mr. El Saeed El Gendi (General Manager) Social Affairs Administration

Mr. Ali Mohamed Atia (Manager) CDAs Dept. Social Affairs Administration

Mr. Mohamed El Ezaby (Chairman) Qism Awal CDA, Damietta Markaz

Mrs. Soaad Shoman (Manager) Development Dept. Social Affairs Administration

Mr. Mahmoud Abd El khalik (Chairman) Regional CDAs& NGOs Federation

Mr. Ibraheam Sameah (Chairman) Ismailia CDA, Kafr Saad Markaz

Mr. Mahmoud Abo El Enein (Manager) Kafr El Mayasra CDA, Zarka Markaz

Mr. El Saeed Dawod (Manager) Planning Dept. Social Affairs Administration

APPENDIX 2 - LIST OF GEAP PUBLICATIONS

LIST OF REPORTS PREPARED AS PART OF THE GEAP PROCESS

1.	Baseline Study on Water supply in Damietta Governorate	Water supply working Group Facilitated by: Chemonics Egypt – Dr. Ahmed Gaber and Associates	February 2002
2.	Baseline Study on Sanitation Services in Damietta Governorate	Sanitation working Group Facilitated by: Chemonics Egypt – Dr. Ahmed Gaber and Associates	March 2002
3.	Water Resource GEAP section	Water, Agricultural and Sanitation working Group Facilitated by: Chemonics Egypt – Dr Ashraf Ghanem	March 2002
4.	Baseline Study on Agriculture in Damietta Governorate	Agriculture working Group Facilitated by: Dr. Abd EL Wahab Allam	March 2002
5.	Damietta Governorate Environmental Baseline Geology	Geomorphology and landscape Geology working Group Facilitated by:	October 2002
6.	Baseline Study on Water Resources and Irrigation in Damietta Governorate	Water Resources working group Facilitated by: Chemonics Egypt – Dr. Ahmed Gaber and Associates	October 2002
7.	Baseline Study on Health And Air Pollution in Damietta Governorate	Health working group	September 2003
8.	Baseline Study on Fisheries in Damietta Governorate	Fisheries working group Facilitated by: Dr. Abd EL Wahab Allam	February 2002
9.	Baseline Study on Coastal Zone protection in Damietta Governorate	Coastal Zone working group	February 2003
10.	Baseline Study on Planning and Investment in Damietta Governorate	Planning and Investment working group	June 2004
11.	Baseline Study on Social development in Damietta Governorate	Social development working group	October 2002
12.	Baseline Study on Solid waste management in Damietta Governorate	Solid waste working group	August 2004
13.	Industrial Section for Damietta's Environmental Profile	Environics – Management of Environmental Systems	January 2004
14.	Baseline Study on Urban Development in Damietta Governorate	Dr. Sawsan Bakr	July 2004
15.	Report On Cultural Heritage in Damietta Governorate	Dr. Said Gohary Dr. Jocelyn Gohary - Faculty of Archaeology, Cairo University	February 2004
16.	Biodiversity Component of the Damietta Governorate	Dr. Sherif Baha EL Din Dr. Mindy Baha EL Din	March 2004
17.	Baseline study on the Cost of Environmental Degradation, Damietta Governorate	Bjorn Larsen	November 2003
18.	Study of the Burden of Environmental Diseases in Damietta Governorate	Ministry of Health, Bjorn Larsen, Mary Shenouda	June 2004
19.	Damietta Solid Waste Management Strategy	SEAM Programme	October 2005



Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency
Entec UK Ltd., ERM
UK Department for International Development

SEAM Programme



Damietta Governorate