Qena 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

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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 Qena'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 Qena Governorate and its stakeholders, beneficiaries and citizens prepare their GEAP.

I would also like to extend my thanks to General Adel Labib, Governor of Qena, 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 Qena Governorate and preserve the natural resources and contribute to sustainable development in Egypt.

Maged George

Eng. Maged George Elias

Minister of State for Environmental Affairs

FOREWORD BY THE GOVERNOR OF QENA

The last century has seen deterioration in the environmental conditions of different countries worldwide, in addition to an increase in pollution with its different types. Due to the threats posed by such events and the escalating need to face them, there came our concern with the environment to protect human's health and other living organisms' existence.

With this in mind, central government realized that only through partnership with different local departments can such challenges be met and in order to promote decentralization. This is mainly due to local departments' ability to engage community participation in developing environmental policies and plans and in translating them into practical actions in order to realize environmental targets.

I was pleased together with all the citizens of Qena that the Governorate's Building and development projects in Qena City were awarded the ISO 14001 in Environmental Management Systems. This award crowned our efforts which resulted in various achievements based on the directions of His Excellency President Housni Mubarak.

In the end I would like to thank all those- from the Executive, Popular and Political leadership including different stakeholders from the community and the private sector- who exerted hard efforts during the implementation phase; efforts which improved community livelihoods and made them proud of the achievements.

General Adel Labeb

Governor of Qena

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 Qena Governorate's Environmental Action Plan (GEAP).

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

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

GLOSSARY / ACRONYMS

AOYE	Arab Office for Youth and Environment
BEPO	Best Environmentally Practical Option
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
dB	decibel
EA	Environmental Audit
EC	Electrical Conductivity
EEAA	Egyptian Environmental Affairs Agency
EHDR	Egyptian Human Development Report
EIA	Environmental Impact Assessment
ELO	Environmental Liaison Officer
EMD	Environmental Management Department
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 the Environment.
K	One thousand
LE	Abbreviation for Egyptian pound
LGU	Local Government Unit
M	One million
Markaz	Administrative District
MCM	Million cubic metres
mmhos/cm	millimhos per centimetre
MSME	Micro Small 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
ppm	Parts per million
PM	Particulate Matter
PEA	Public Economic Authority
RPC	Regional Planning Centre
SEAM	Support for Environmental Assessment and Management
SS	Suspended Solids
STW	Sewage Treatment Works
SWM	Solid Waste Management
TOR	Terms of Reference
TSP	Total Suspended Particles
WHO	World Health Organisation
WTP	Water Treatment Plant
USAID	US Agency for International Development

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Boxes

Appendix

1 QENA AT A GLANCE

Location

- Upper Egypt north of Aswan Governorate and south of Sohag Governorate. This GEAP does not include Luxor, which was originally part of the Qena Governorate but in 1989 became a separate administration known as the 'Supreme Council of Luxor'.
- The Governorates Capital is Qena City.

Area

- 10,261 km^2 , approximately 15% of the land lies on the Nile Valley.

Climate

- Mean air temperature is 21.3° C ranging from a maximum of 40° C in August to a minimum of 8° C in January.
- Average annual rainfall is 4.7mm with precipitation greatest in winter.

Population

- Total population is 2.7 million expected to rise to 6 million in 2020.
- 79% rural, 21% urban.
- Population growth rate is 2.2%.
- Population density reaches up to 1,581 person/km^2 in some places.
- Age distribution: 42% < 14 years (19% 0-6 years), 51% 15-59 years, 7% > 60 years.

Settlements

- There are 11 Markazes, 12 Cities, 51 mother villages and 137 satellite villages.
- 15% of the Governorate is inhabited and cultivated, 5% is devoted to residential areas and dwellings.
- Population in top 5 Markazes: Qena (19.2%); Naga Hammady (16.3%); Qus (12.7%); Abu Tesht (12.4%); Isna (12.3%).

Economic base

- GDP per Capita LE 2692.0 in 2001-2 (Ranked 22 out of 26 Egyptian Governorates)
- Number of Ultra Poor living in the Governorate is 15.1%.
- Agriculture contributes 36.6% of GDP and is the major sector.
- Per capita share of cultivated land is 0.11 feddan (462m^2).

Agriculture

- Main crops include: sugarcane (49.8% of Egypt's total); wheat (24.6% of Egypt's total); tomatoes (28.8% of Egypt's total); sesame (15.4% of Egypt's total); and bananas (22.4% of Egypt's total).
- 15% of the total land area is agricultural.
- In 2000, production of Qena's main crops was valued at LE 588.5 million.
- 2001 total viable land reclamation amounted to 124 841 feddans.
- The majority of land holdings (86.4%) are less than 2 feddans.

Fisheries

- Fisheries and Aquaculture also contribute to Qena's economy. In 2000 the total fish catch was 1,531 tons. This equates to an annual revenue of between LE 7,655,000. Artisinal fishing brings in an annual revenue of between LE 7,655,000 and LE 30,620,000.

Industry

- Four of Qena's main sugar factories contribute close to 50% of Egypt's sugar production. The Governorate houses the only primary Aluminium industry in Egypt. The Governorate has two industrial zones one in Qeft and the other near Naga Hammady. Two further zones are currently being built in Armant and Isna. Of the remaining industries 98% consist of micro, small and medium sized industrial operations.

  28 % of MSMEs are engaged in the manufacturing of clothes.

Employment

- 40% of the workforce is employed in Agriculture, 6.4 % in Industrial activities and the remainder work in micro, small and medium size industries.
- 25% of Adults between 15-29 are unemployed.

Essential services

- Water Supply – 60% from the Nile, 40% ground water sources. Supply meets 80% of demand.
- Sanitation – 73% of the population are not connected to any type of sewerage system.
- Power – 94% of the population has access to electricity.

Education

- Adult literacy rate is 50%
- 2.15% of population are University Graduates and 11.5% have high school education.

2 SETTING THE SCENE

2.1 What is the Plan?

This document describes Qena Governorate's Environmental Action Plan (GEAP). The plan lays the foundations for actions that will enhance the quality of life of those living in Qena Governorate by providing a set of locally prioritized environmental strategies and actions that will result in real environmental and public health improvements. The plan will also protect the environment from adverse environmental impacts that might be associated with existing or new development, thus integrating social, economic and environmental elements of sustainable development. The GEAP approach delivers benefits to local people, and facilitates a particular focus on the needs of the poorest.

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 Governorate's future environmental vision. It adopts practical and affordable solutions to prioritise environmental problems that are of concern to the Governorate and through a set of objectives, strategic policies and improvement programmes 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 facilities for all urban centres.

Qena Governorate Building

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 during the GEAP's preparation include:

- Qena's Environmental Profile, which outlines the Governorates environmental conditions and priority issues, and;
- Supporting reports covering sustainable development themes, on issues related to water, sanitation, land, air quality, health, social development, and environmental economics.

Contributions to the GEAP are numerous. A list of some of the individuals and organisations involved are provided in Appendix 1.

A full list of the reports held in the Governorate's Environmental Management Unit (EMU) is provided in Appendix 2.

2.2 Why does Qena Governorate need an Environmental Action Plan?

Like other Governorates in Egypt, Qena is only in the early stages of developing an environmental action planning system. The GEAP process aims to support this development by providing Governorate departments involved in environmental management with a practical approach to environmental planning and management. It is based on extensive consultation and participation amongst the widest possible range of stakeholders, which ensures that the GEAP takes account of the needs of the poorest and most disadvantaged groups that are not routinely part of the planning and decision-making process.

If successfully implemented, the GEAP should help the Governorate better address:

- The equitable provision and efficient management of Governorate infrastructure and environmental services (solid waste; potable water; sanitation);
- The planning, management and sustainable management of the Governorate's natural resources and heritage (e.g. land,

water, air, fisheries, biodiversity and culture);

- The prevention and control of pollution impacts on the Governorate's natural resource base;

These improvements will be done in a way that demonstrably targets improvements in the wellbeing and livelihoods security of the poorest, most marginalised groups in Qena society, giving them the means to articulate their needs and priorities through participatory GEAP processes.

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. Feedback mechanisms built into GEAP processes allow actions and programs that are not achieving their objectives to be adjusted when the plan is updated and the next set of prioritised actions are agreed. This sets in place a sustainable environmental action planning process, with substantial benefits, including:

Qena Beautification Scheme

Economic /financial benefits - such as improved planning and resource allocation, optimising the efficiency of current utility services, avoiding excessive costs for treating increasingly polluted waters and contaminated areas, reduced medical and lost productivity costs due to environmentally related illness, 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, reduced pollution and training/awareness-raising, better living and working environments (especially for those living in the greatest poverty), increased civic pride, and 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 bad practices, and the benefits of improved habits;

Natural environmental benefits - such as improved and safer quantities/quality of irrigation and industrial water, improved land drainage and soil conservation, and reduced pressures on fisheries resources and biodiversity..

2.3 Principles of GEAP Preparation

Qena Governorates GEAP has been prepared according to the following set of widely-recognised guiding 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;
- *Focused on the prioritisation of environmental concerns* – by using participatory processes, the GEAP creates a list of prioritised actions and targets to address the needs of all stakeholder groups, especially those whose concerns are often overlooked (the poor and marginalized);
- *Targeted at 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 which 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 comprised of representatives from government, communities, NGOs and the private sector. Once formed, the groups prepared technical reports on the status of each of Qena's environmental sectors (the main issues and concerns). This process was supplemented by extensive consultation with a wide range of stakeholders across Qena's Markazes, which led to the preliminary identification of a number of environmental issues and priorities. Information from technical reports and stakeholder consultations was then drawn together to create Qena's Environmental Profile, which provides the GEAP's baseline. The consultation process, which provided a means for the poorest and most marginal groups to take part in the GEAP process, began in Nov. 2001, and over the following nine months produced the following outputs.

- *A GEAP Survey* (in 11 cities and 119 villages, with a total of 3000 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.
- *Village Profiles* (in 119 villages) to provide secondary statistics

and primary village level data related to environmental service delivery and related problems.

- *Focus Group Discussions* (in 22 villages in 11 Markazes) with local government unit (LGU) officials, farmers, students and male and female employees to substantiate findings from the above, and to provide data on the causes and effects of environmental problems.

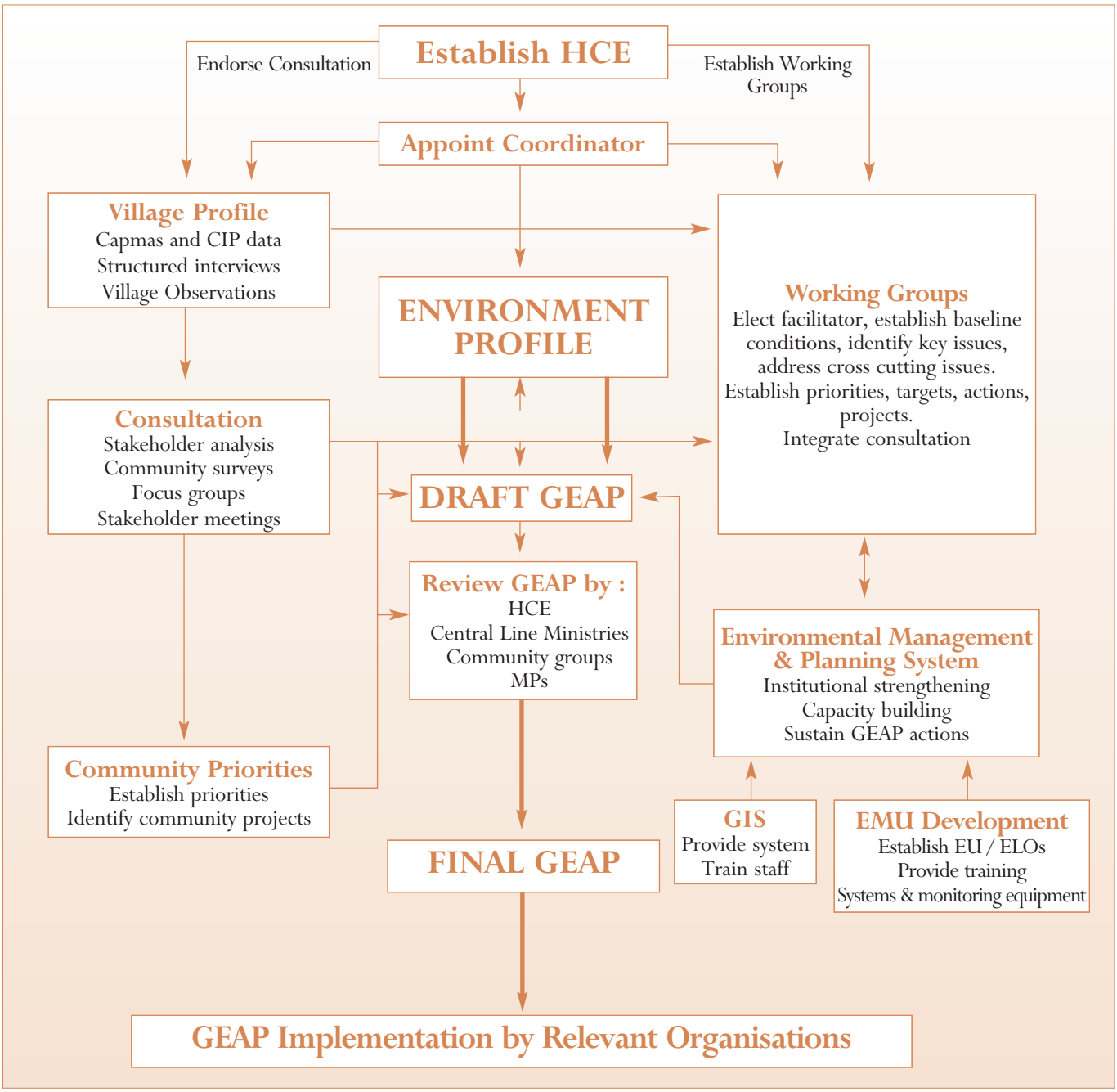
By using participatory and community-based methodologies to collect quantitative and qualitative information the above GEAP processes have proven invaluable. They have not only helped refine aspects of the environmental profile, but have also started to provide decision-makers with information they can use to improve their capability to address people's real needs. The consultation process also helped to raise environmental awareness in the community and has already stimulated action.

The GEAP methodology is illustrated in *Box 2.1*, and shows that consultation and participation are central to the GEAP preparation process. During the GEAP's periodic updating, participatory methodologies will ensure that it continues to reflect the interests and priorities of all stakeholder groups (see Section 11).

2.5 Whose Plan is it?

This GEAP belongs to Qena Governorate 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. It provides a vehicle through which all stakeholder groups in Qena can contribute to the improvement of their well-being and their environment according to the principles of sustainable development.

BOX 2.1: GEAP METHODOLOGY



3 THE 25 YEAR VISION

The overall aim of the GEAP is to improve the quality of the environment and the lives of all people living in the Governorate. Key sustainable development issues affecting people and their environment must be addressed in ways that bring about environmental improvement and enhance people's quality of life. In the short-term, these two objectives can be in conflict, and one of the key objectives of the GEAP process is to balance them out so that the needs of environmental protection and economic development can both be met. It provides a foundation for natural resources to be used wisely, ensuring that future generations are still able to reap the benefits of a well-managed environment.

In fulfilling this vision the GEAP recognises that people have a right to secure livelihoods: they 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.

Community Consultation

The GEAP Vision is that within the Governorate there will be:

A Healthy Environment:	*in which every Qena Citizen has access to a clean and healthy living environment including access to clean regular and adequate drinking water and adequate sanitation systems.*
Sustainable Development:	*where natural resources are managed and conserved in a manner that is compatible with continued economic development, without jeopardising the needs of Qena's future generations.*
Integrated Development:	*in which government departments and wider stakeholder groups involved in environmental management (e.g. farmers, industry, communities) communicate and coordinate their efforts in an effective and planned manner.*
Institutional Sustainability:	*in which all responsible organizations (Governorate departments, private sector, NGOs, communities) are provided with sufficient human and financial resources to carry out their environmental management duties effectively*
An Involved Community:	*in which Qena Citizens through effective participation are fully integrated into a decision making process which supports the establishment of a decentralised approach to environmental management.*

4 PRIORITY ISSUES

Extensive stakeholder consultation throughout the GEAP process identified seven top priority issues. These are listed below, in order of perceived importance. Of the top seven, five were regarded as critical areas where early interventions are needed.

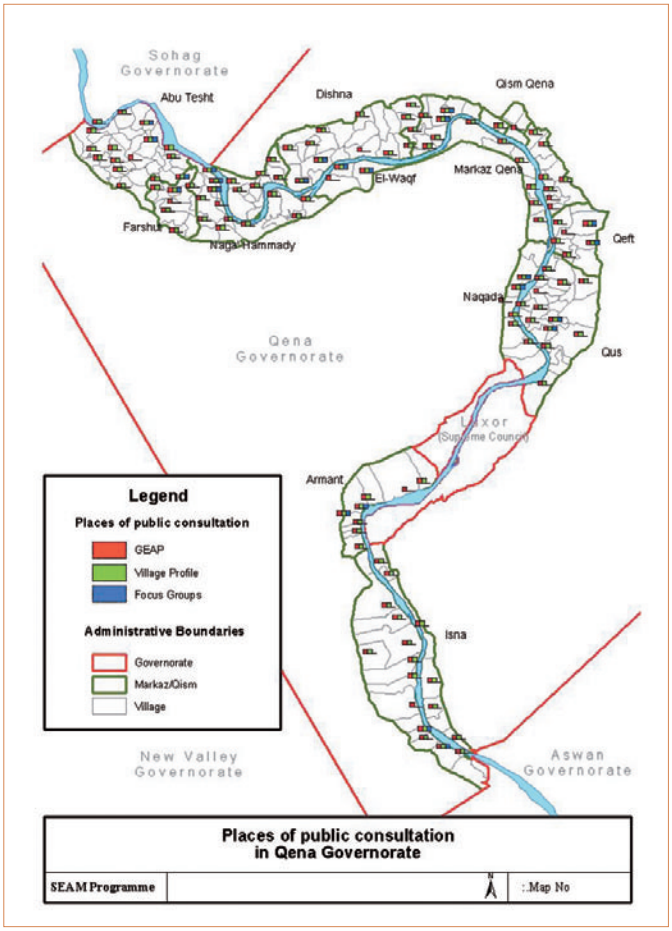
High Priority

Rank	Issue	Typical Concerns
1	**Sanitation**	The majority of Villages lack a sewage network, municipal evacuation systems are overstretched, evacuation fees and other services are too expensive, vacuum vehicles are poorly equipped and too large for narrow streets, sullage spills onto streets/ canals and fields, the number of dumpsites are inadequate and sanitation problems in some Markazes are further worsened by rising ground water.
2	**Solid Waste Management**	Most villages lack solid waste collection and disposal systems, the number of collection trucks, bins and workers are inadequate, waste is dumped and burnt indiscriminately, waste related disease spreads into communities, hygiene awareness among villagers is poor.
3/4	**Water Supply and Water Quality**	Low water pressure, poorly maintained and unclean pipes, polluted ground water, seepage into water pipes from poorly maintained sanitation systems, water leakages.
5	**Lack of environmental awareness**	Lack of environmental awareness among government staff and the general public, inadequate coordination among government departments responsible for service delivery, insufficient funding, poor provision of basic services, unhygienic behavioural practices.

Lower Priority

Rank	Issue	Typical Concerns
6	**Industrial Pollution**	Inadequate enforcement of pollution controls, spread of respiratory and liquid pollutant related disease.
7	**Canals and drain coverings**	Disposal of waste into canals and drains and the spread of related disease.

Locations of Community Consultation in Qena Governorate



More than three-quarters of Qena's population live in rural areas, and although the overall population density is not very high (248 inhabitants/km^2) it is heavily concentrated along the Nile's fertile floodplain where population densities reach 1,581 inhabitants/km^2. In these areas demands on water resources, sanitation and solid waste management systems are high and they are difficult to manage and maintain.

Many rural communities rely on compact units for drinking water; these are generally poorly maintained, which impacts on their immediate living environment and on their health. The situation regarding sanitation and refuse disposal is comparable, with only Qena City and its surrounding villages having access to proper waste disposal services and an integrated wastewater system. At present, most other cities and villages depend on poorly designed un-networked sanitation services (e.g. septic tanks and soakaways) and lack solid waste collection services which both lead to significant health problems.

The adverse health consequences from ongoing environmental degradation in both urban and rural areas can be substantial. The health impacts can affect all strata of society, but are particularly serious among the poor whose livelihoods are more vulnerable: they are generally less able to mitigate or prevent poor environmental conditions, and may be poorly nourished and more susceptible to disease.

Waste Water Collection, Taramsa Village

5 ANNUAL COST OF ENVIRONMENTAL DEGRADATION

An economic study to identify the costs of environmental degradation in Qena 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 cost the Governorate close to LE 260 million pa.

The monetary valuation of environmental degradation, and quantification 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. 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.

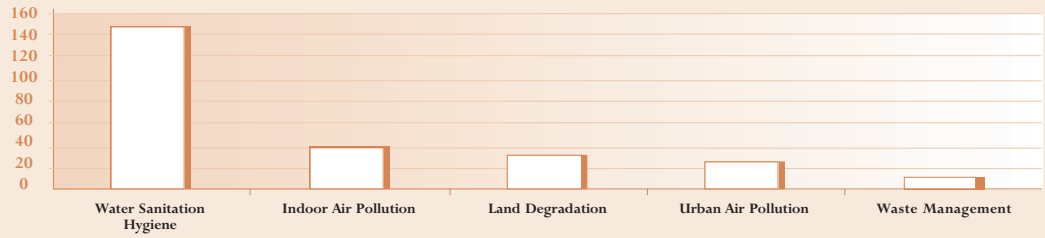
When estimating the cost of degradation a distinction is made between financial and economic costs. To the extent feasible, economic cost should be applied because it captures the cost and reduced welfare to society as a whole. For instance, the financial cost of health services that an individual pays may be substantially less than the cost of providing these services. It is therefore important to estimate the real cost to society of providing those services. Another example is time lost to illness or provision of care for ill family members. If the person being ill or providing care for an ill individual does not earn income, the financial cost of time losses is zero. However, the person is normally engaged in activities that are valuable for the family, and time losses impair these activities or reduce the amount of time available for leisure activities. Thus there is an economic cost of time loss to the family. In economics and welfare analysis, this is normally valued at the opportunity cost of time, i.e. the salary, or a fraction of the salary that the individual could earn if choosing to work for income.

When estimating the cost of environmental degradation in a Governorate a question may be raised about the extent to which the cost is internal to the Governorate or absorbed by 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 that help pay for services provided or subsidized by 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

Data limitations have prevented estimation of degradation costs for fresh water fisheries, and inappropriate solid waste disposal and inadequate industrial and hospital waste management. It is however very doubtful that aggregate costs of degradation and health risks arising from these issues are anywhere close to the costs associated with inadequate water, sanitation, and hygiene, land degradation, and indoor and urban air pollution.

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

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



The estimated cost of inadequate water supply, sanitation and hygiene represents 57% of total cost. The cost of indoor air pollution is estimated at 15 % the cost of land degradation at 12 %, the cost of urban air pollution at 11% and the cost of inadequate household waste management at 5%.

- More than 80 % of the estimated costs of environmental degradation are associated with health impacts, and less than 20% with natural resources.
- With regard to health impacts, the social and economic cost of mortality is estimated at close to LE 130 million.
- The estimated cost of morbidity is close to LE 90 million. The cost of morbidity mainly includes the cost of health services, medication, value of time lost to illness and care giving, and reduced well-being. More than 70 % of these costs are associated with inadequate water, sanitation and hygiene.

Water Supply, Sanitation and Hygiene

- The annual cost associated with health effects of water, sanitation and hygiene is estimated at LE 123-173 million, with a mean estimate of almost LE 150 million.
- The estimated total annual cost of diarrheoal illness is between LE114 – 161 million.
- The estimated total annual cost of bilharzia is between LE8 - 12 million. The cost of medication (mass administration and treatment of detected cases) is reported as being around LE 3 million.
- Diarrhoeal child mortality represents 57 % of this cost, diarrheoal morbidity 36 %, and bilharzia 7 %. Annual diarrheoal child deaths represent 18-21 % of child mortality.

Indoor Air Pollution

- The estimated total annual health impact and cost of indoor air pollution is between LE28 - 53 million with a mean estimate of LE 40 million.
- The vast majority of those affected by indoor air pollution are affected by Acute respiratory associated illnesses (ARI) with fewer suffering from Chronic obstructive pulmonary related diseases (COPD).

Land Degradation

(Information on the possible extent of land degradation and impact on agricultural productivity in Qena is very limited hence the wide range in estimated costs.)

- The estimated annual cost of land degradation is between LE 9 – 54 million.
- A 5-15 % yield loss on 45 thousand feddans of cropped land, corresponding to new lands and some old lands, would represent LE 9-27 million. A 5-15 % yield decline on 90 thousand feddans of cropped land, or close to 20 % of total cropped land, would represent LE 18-54 million.

Urban Air Pollution

- The total annual Health effects and costs of Urban Air Pollution are estimated to be in the range of LE 23-35 million, with a mean estimate of LE 29 million. The cost of mortality is based on the value of statistical life (VSL), and represents about 78 % of the total costs
- The air pollutant that has shown the strongest association with health implications is particulate matter (PM or Total Suspended Particulates TSP), and especially particulate matter of less than 10 microns (PM 10) and 2.5 microns (PM 2.5) in diameter.

Waste Management

- The annual cost of inadequate household waste management is estimated in the range of LE 11-15 million, with a mean estimate of LE 13 million. (This amount is associated with inadequate waste collection only)

A study in Qena, conducted by SEAM, found that rural and urban households were willing to pay LE 2-3 per month for improved waste collection services, with a rural average of LE 2.40 and an urban average of LE 2.85 per month. This represents the cost of not having adequate waste collection.

Other costs associated with waste management (i.e. dredging of canals due to inappropriate waste disposal, inadequate management of industrial, hazardous, and hospital waste, and inappropriate land fills and dumpsites with consequences to nearby residents and/or land and water resources, rodent control etc) have not been calculated due to lack of available data.

6 WHAT ACTIONS ARE NEEDED?

6.1 Objectives, Policies, Targets, Actions and Programmes

In order to achieve the Governorate's GEAP vision it is important to set in place a series of measures: objectives and ten year targets have been agreed to address priority issues and policies and programmes have been designed to enable practical and affordable actions to be taken to meet the established targets and objectives. In brief these are:

Objectives outline what should be achieved over the next 25 years. The objectives should therefore relate to improving the provision, 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 met, the framework in which actions are to be taken, and indicate how actions can be implemented.

Targets which aim to address the objective(s), are set over a 10-year time period. As far as possible they should be quantified and measurable, so that proposed actions can be assessed in terms of their contribution to meeting the targets.

Programmes are actions that will contribute towards meeting the targets. They vary widely in their scale, from Governorate-wide to very local, and can address not only generic, long-standing problems but also issues or topics where more immediate action is required.

This Action Plan framework has been established for each of Qena's main environmental issues, which include: *Water Resources; Water Supply and Sanitation; Agriculture; Solid Waste Management; Industrial Pollution; Natural Resources and Biodiversity, and Cultural Heritage.*

The Action Plan also includes a number of representative projects, many of which are at community level. They are outlined in Section 7, and are presented in more detail in the individual community CEP (Community Environmental Project) case study reports (see 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 Qena. 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 introducing incentives to encourage the adoption of environmentally friendly practices that comply with environmental standards or enforcing environmental regulations and imposing fines on those who 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 Qena. It is a living document, which at any moment in time reflects a synthesis of the Governorate's prioritised environmental issues identified by representatives from a wide range of different stakeholder groups throughout Qena. To operate effectively, the custodians of the Plan must bear the following in mind:

Environmental action planning is an iterative and 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.

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 SANITATION

Rationale

The provision of sewerage systems has for a long time lagged behind the development of Qena Governorates potable water supplies. Qena City is the only place in the Governorate with an integrated wastewater system. The system covers 100% of the city and the surrounding villages of Bayadiya, Naga Abu-Arab Dughaymat and Naga Alhamedat. It consists of a gravity sewer network, 6 large and 3 small pump stations and a "Trickling Filters" treatment plant with a rated capacity of 25,000m^3/day, although it is currently running well over this rate at 35,000m^3/day. Plans to extend the system which include a gravity sewer and a large (no7) and small capacity pumping station (at Salhiya) to serve the villages of Shiekh Rekab, Shiekh Hussen, Salhiya and Shuwain are currently underway. Plans to increase the treatment plants capacity are also being considered. The Governorates waste/wastewater department has set aside LE 2 million in its current fiscal year plan (2002-3) to improve condition of Qena city's gravity sewers.

NOPWASD plan to construct a wastewater treatment plant in every city in Qena. Seven wastewater systems are currently under construction and are expected to be completed before the end of the current five-year plan. The 2002 – 2007 five-year economic and social development plan has allocated LE 180 million for this purpose (LE45 million from the 2002-2003 fiscal year), however the total cost of the 7 plants according to 2004 prices is likely to be around LE 985 million.

Despite this progress NOPWASD still has no local plans to build wastewater systems to service the Markazes of Al Waqf, Qeft and Naqada. All other cities and villages depend on poorly designed and installed on-site facilities. Approximately 20 % of houses have septic tanks, whilst others either have vault, dry pit latrines or no sanitation facilities at all. Septic tanks and vaults are emptied by vacuum tankers and the resultant waste is supposed to be transported to the nearest sewage treatment works for treatment but often ends up being disposed of in agriculture drains or canals without treatment (e.g. the Al Waqf uses El Marashda canal). Almost all Markazes suffer from a shortage of vacuum emptying. Vacuum tanks are often either too small or infrequent, which can cause septic tanks to overflow resulting in localized pollution.

Sanitation Project Oxidation Pond, Kom El Dabei

In the longer-term the Governorate aims to connect as many rural villages to networked sanitation systems as possible however this is likely to take some time to deliver. During the interim period measures need to be taken to improve current village sanitation systems. This might include the introduction of larger/or more vacuum tankers in village areas and increasing the number of visits they make to sewage treatment works.

The discharge of a large portion of untreated domestic and/or industrial wastewater into agriculture drains/canals has significant health and environmental consequences, canals and drains become highly polluted, and seepage into shallow groundwater may pollute some drinking water supplies. Examples include; the El Shaikhiya agriculture drain which discharges waste 2 km upstream of Qeft Water Treatment Plant (WTP) intake and a paper factory in Qus, which discharges approximately 20,000m^3/day of industrial waste upstream of the city's WTP intake.

It was evident from the GEAP survey that sanitation is a much greater problem in Isna, Qena, Nakada, Qus and El Wakf Markazes than other parts of Qena. Other areas that experience particularly poor sanitation include villages around the Isna and Naga Hammady Barrages where high ground water levels pre-

Location and Capacity of Qena's Seven Wastewater Treatment Plants

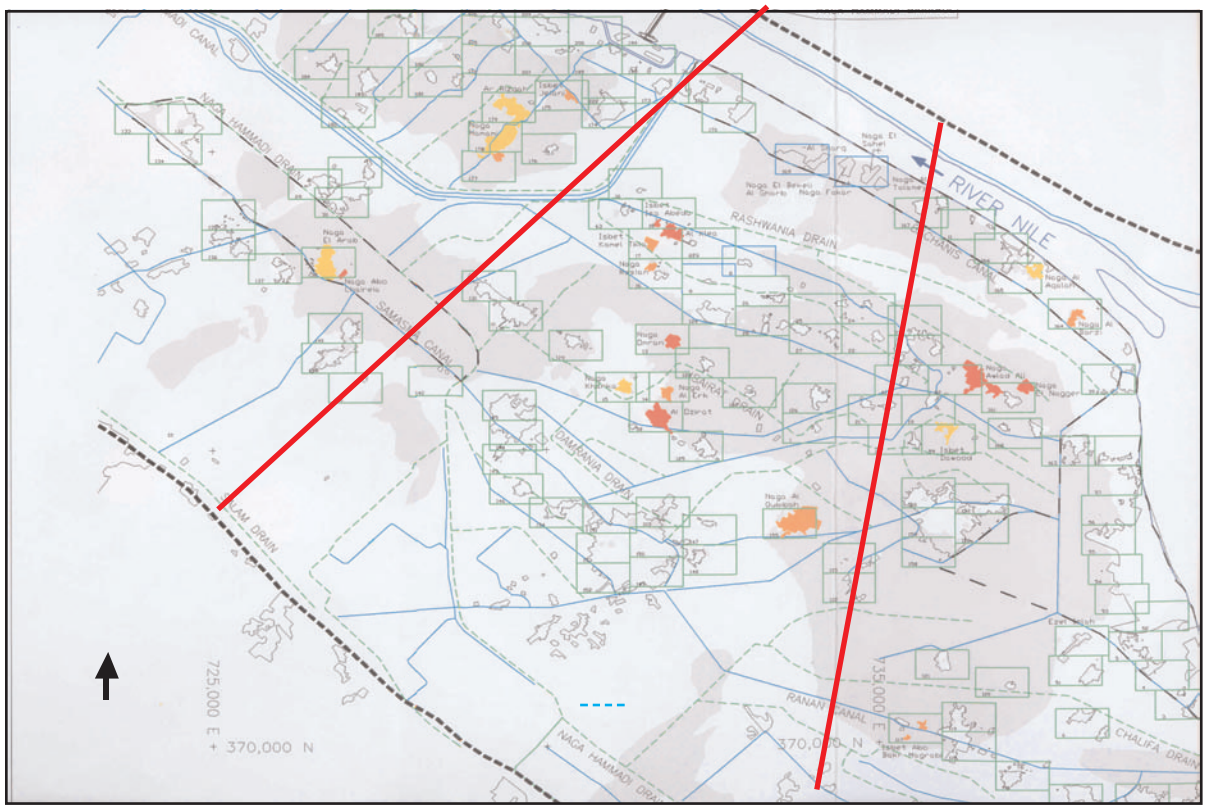
Location	Capacity m^3/day	%
Abu Tesht	30,000	11.3
Farshut	30,000	11.3
Naga Hammady	55,000	20.8
Dishna	55,000	20.8
Qus	30,000	11.3
Armant	30,000	11.3
Isna	35,000	13.2
Total	**265000**	**100**

dominate and seepage from septic tanks is common place. USAID is currently supporting a project to improve the sanitary conditions of 9 affected villages in Naga Hammady (see Map) whilst in Isna, Danida are supporting a similar initiative.

At the time of writing this GEAP, the newly established industrial zones within Qena and Naga Hammady Markazes did not have access to any wastewater collection, treatment or disposal facility, which is hazardous if industrial waste infiltrates into the ground water. Qena's El Salhiya industrial zone is 2 km away from the existing wastewater treatment plant. A gravity sewer and pump station is currently under construction in this area; however, a connection to the existing sewerage system cannot be made because there is pre-treatment facility for the industrial waste. Long construction periods brought about by funding shortages indicate that an enormous task is still ahead. Apart from the environmental issues, this situation affects potential investment and employment opportunities in these zones.

The Governorate's 2002-2007 development plan estimates that LE248 million is needed to provide urban and rural residential areas with wastewater collection and treatment facilities. A further LE28 million is also required to install new wastewater systems in the industrial zones at Kallahen and Hoo. The actual allocation for the five-year plan is only LE180 million representing a significant short fall in required investment.

Villages affected by high water levels around Naga Hammady



Key — **Irrigation Canals, Affected Settlements extent of Impact (I)** % I<25 25<I<50, 50<I<75 75<I<100, Depth to groundwater < 100m, ----Open Drain, — Irrigation Canal.

Objectives

- To extend integrated wastewater collection and treatment systems to Qena's other cities either through the public or private sector. Treated water and sludge use possibilities should be assessed.
- Develop a plan to ensure that all villages have access to adequate sanitation and link as many villages to networked sanitation where economically and technically feasible.
- Connect Industry to the sewer system in accordance with national discharge standards. Secondary treatment systems may need to be installed in the main urban centres.

Policies

- Improve coordination between the relevant stakeholders who currently work in this sector such as NOPWASD, Governorate, city and village local administration units and the housing department to optimise the utilisation of available funds, land, human resources and appropriate treatment technologies to successfully deliver sustainable wastewater projects.
- Optimise the use of treated wastewater and sewage sludge by optimizing the use of surrounding desert land as a potential disposal route.
- Strengthen the institutional capacity of the water and wastewater sector at Governorate level to effectively plan and manage the sewage systems including resources for

advanced training of employees so they are better able to deal with the newly constructed sewage system.

- Provide adequate collection and treatment facilities to small villages and remote settlements that are not connected to the sewer network.
- Apply Egyptian standards to domestic and industrial wastewater discharged into public sewer systems and provide adequate treatment facilities for industrial waste.
- Consider affordable wastewater charges in the process of restructuring the water tariff to ensure long-term sustainability, this should include industrial waste charges.
- Encourage and coordinate foreign donor assistance and private sector participation in investment and wastewater reuse.

10 Year Targets and Programmes

Extend Sanitation Services to all Urban and Rural Areas

- Complete 7 wastewater projects presently under construction before the end of 2007.
- Consider construction of wastewater systems in Al Waqf, Qeft and Naqada.
- Develop an action plan to deal with the sanitation needs of villages and rural areas where it is either not technically or economically feasible to connect them to a sewer network. This may include introducing larger or more vacuum tankers and increasing the frequency of visits they make to Sewage Treatment Works.
- Construct wastewater collection networks in villages surrounding urban centres and connect them to local treatment plants.
- Consider a feasibility study to investigate the cost of constructing pre-treatment facilities for industrial zones where appropriate, so that industrial effluent may be safely discharged into the main sewer network.
- Introduce measures to prevent seepage from septic tanks, particularly in areas experiencing high groundwater levels (i.e. Around Isna, Naga Hammady Barrage) or where groundwater provides the main source of drinking water.
- Raise public awareness of the environmental implications of poor sanitation to improve hygiene around septic tanks and prevent sanitary waste being dumped into agricultural canals/ drains.

Strengthen the Sector Institutional Capacity Building at Governorate Level.

- Strengthen sector-planning capabilities to facilitate network expansion into village areas.
- Introduce training and capacity building programmes aimed at building up the capacity of Local Government Units. Training programmes should include; training in short and long term planning techniques, budgeting, operation and maintenance etc.
- Attention should be given to sector reform by establishing a public economic authority or company at Governorate level. Consideration should be given towards establishing a central body, which would be responsible for managing water and wastewater. Private sector participation should be considered.
- Use appropriate treatment technologies and improve the design and installation of sewer networks to avoid wastewater backups, overflows and high Operation &Maintenance costs.
- Produce drawings of the sewer network to facilitate inspection, cleaning and maintenance of sewer pipes and manholes etc.
- Provide technical assistance to the Governorates wastewater management service including training, preparation of O&M manuals and identification of cost centres.

Maximize Reuse of Treated Wastewater and Sewage Sludge

- Assess possibilities of safely using treated wastewater and sludge in land reclamation and watering certain crops.
- Assess the feasibility of using modern technologies such as micro-organisms as effective additives to septic tanks and vaults to reduce the sludge size and increase the opportunity of its safe reuse.

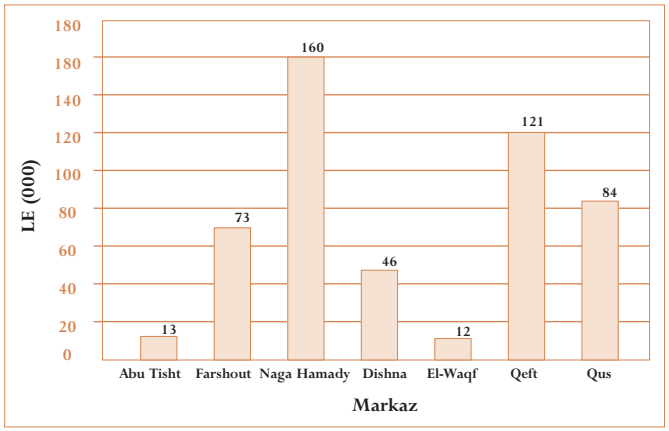
6.5. IMPROVING SOLID WASTE MANAGEMENT

Rationale

Qena City has initiated an ambitious waste collection and transfer system which has resulted in significant improvements in the coverage of street sweeping and waste collection. The Governor has restructured the cleansing section inside Qena City enabling direct supervision by the Deputy Secretary General. Approximately 700 sweepers are now employed to keep the streets of the Governorate capital clean.

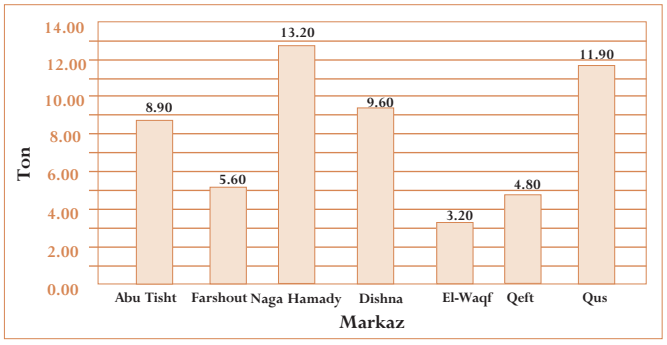
In addition to this Qena city has purchased 10 Suzuki trucks to facilitate waste collection from narrower streets. The existing dump truck fleet of 25 vehicles has been fully overhauled and maintained and 4 new dump trucks purchased. The majority of the City is covered by a daily collection round which has made the streets some of the cleanest in Egypt. Funds have been raised to implement this program through fee collection from residents, shop owners, and other sources. There is also a plan to replicate this system in Qena's second largest city, Naga Hammady.

Money collected by Cleansing fund by Markaz (2004)



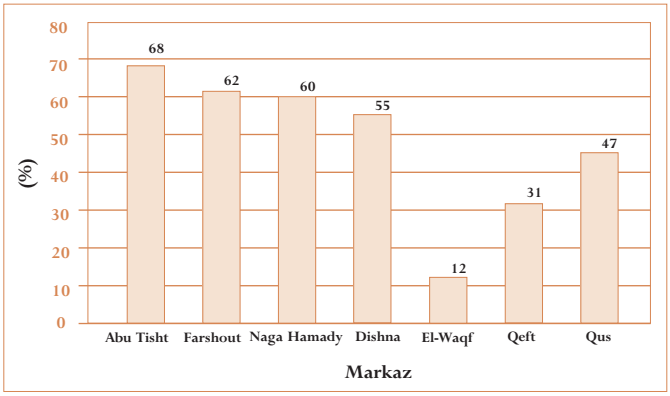
In spite of this achievement, waste collection in the Governorate more generally needs further attention. Quantities of waste being generated continue to rise, and only a small portion of this waste is currently being collected (as little as 20% in some cities) and waste that is collected is not properly managed or disposed of.

Waste Generated by Markaz (2004)



Rural and urban municipal solid waste generation is estimated to be in the region of 329,000 tonnes per year (annual urban generation rate 0.6kg/capita, annual rural generation rate 0.25kg/capita), with only approximately 88,000 tones (27%) of the generated waste actually collected. Poor management and disposal practices raise significant public health risks, which need to be addressed.

Collected Waste by Markaz (2004)



Present transfer sites are not formally designated and have few controls in place leading to unsightly and unhealthy accumulations of waste which is often left burning. The disposal of waste is both unregulated and opportunistic. Random dumping of waste in the streets is a common phenomenon. There is also an increasing trend for waste to be tipped into canals and drainage channels. Improved disposal facilities and specially located sites with onsite management and control, are a paramount need for the Governorate.

Two landfill sites have already been approved by EEAA, but are awaiting final EIA approval before they can be built. To make best use of these future landfills it is essential that a proper waste management strategy and dump management system be put in place before they become operational to ensure they comply with government regulations. Fortunately Qena is in a better position than most Governorates as it is surrounded by desert which means that there is a great deal of land available for possible land filling.

A 150 tonnes per day composting plant has recently been built in Qena city as part of a Governorate wide move towards greater waste recycling and another is currently being built in Naga Hammady. Both plants are funded by the Ministry of Local Development and are part of a wider national plan to construct another 12 composting plant across the country to process organic and animal waste.

The Governorate generates approximately 200 tonnes of clinical waste each year. Despite this very few major hospitals have incineration facilities for its safe disposal and those that do, have limited capacity or equipment in poor condition. As a result clinical waste is often sent to dump sites without being properly segregated from the normal municipal waste stream and therefore poses a significant health risk to municipal collectors, scavengers and local communities living close by (i.e. Isna).

Based on the initial baseline studies and consultation programme for Qena's new Solid Waste Management Strategy, which was

developed in close consultation with a number of different stakeholder groups including the community, solid waste management was ranked as the second highest priority after sanitation. Contributing factors to the status of SWM in Qena include lack of financing, shortage of labour (70 % of Markazes reported inefficient and lack of labour) and inappropriate use of equipment (More than 50 % of equipment is inoperable or operating beyond their economic life time). In addition, public attitude towards waste management and related public health issues are generally poor.

Waste Scavengers, Qena City Dumpsite

A number of priority issues were identified to increase the efficiency of SWM system in Qena Governorate and are reflected in the following table.

The main sources of finance for supporting Solid Waste Management services across Qena Governorate comes from the cleansing and service funds, whilst a beautification fund is used to improve infrastructure and public services. The management of solid waste is currently carried out by City Councils (LGUs) but in future a central and more strategic waste management department, at the Governorate level, will be needed to promote and assist in the co-ordination of improved waste management activities between Markazes and eventually to the villages.

Naga Hammady's solid waste improvement service has been supported by the SEAM programme, which helped design and implement a demonstration project involving strategically located transfer stations and small trucks, which can collect waste from the cities narrow streets. The project supports the implementation of the Qena Solid Waste strategy, particularly in upgrading waste collection and transfer in secondary cities.

Solid Waste Management CEP, El Dier Village

The Governor is now interested in replicating similar initiatives in other cities and villages in the Governorate where solid waste collection services are still largely inadequate. The Governorates existing prioritised solid waste action plan aims to improve solid waste management systems in the following cities; remaining parts of Qena City, Naga Hammady, Qus, Dishna and Isna. Plans to improve solid waste management in other cities like Abu Tesht, El Wakf, Armant, Qeft, Farshut and Naqada will soon follow once resources become available. A number of different Solid waste management techniques (i.e. street container loaders in Qus, door to door collection in Qena City, transfer stations in Naga Hammady) are likely to be introduced in each city depending on specific circumstances.

Identified Approaches to Improve the Efficiency of SWM systems in Qena Governorate

Priority Issues	Abu Tesht	Farchout	Naga Hammady	Dishna	Al Waqf	Qena	Qeft	Qus	Naqada	Armant	Isna	Av Score	Rank
New /Improved		1	1	1	1	1	1	2	1	1	1	1.1	1st
Waste elimination Techniques		3	3	3	2	2	5	1			2	2.6	3rd
Clinical Waste Incinerator	3	6	6	4	3	5		5	4		4	4.4	6th
Sanitary Landfill Site		4	5	7	4			4	2	3	3	4.0	4th
Better waste collection coverage	1	7	4	6	5		2		5			4.3	5th
Improved frequency of sweeping	2	5		5	6	4	3	6				4.4	7th
More Labourers		2	2	2		3	4	3	3	2		2.6	2nd

1 – high priority, 7 – low priority

Objectives

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

Policies

- Set up an efficient and affordable waste collection strategy.
- Introduce an appropriate waste transfer and transportation system.
- Ensure that waste is properly disposed of.
- Support the establishment of a selective waste recycling system.
- Improve the Governorates institutional capacity to manage waste in an environmentally sustainable manner.
- Improve public awareness of waste issues through greater stakeholder involvement.
- Improve the management of clinical and hazardous waste streams and introduce segregated collection services.

10 Year Targets and Programmes

Establish an Integrated Waste Management Strategy for Qena Governorate.

- Develop a plan for the implementation of an urban collection system, trial it in one city and based on that experience adapt it to all Qena Cities in order of priority.
- Agree standard urban collection systems to include methodologies for choosing appropriate vehicles for specific tasks.
- Design and test possible solutions for village solid waste management.
- Identify how responsibility for village solid waste collection can be shared between different government institutions and authorities.
- Assess the potential for private sector participation in solid waste management in the Government.

Improve the Operation and Management of Waste Services and Facilities

- Introduce clear monitoring and supervision strategies to guarantee the reliable and satisfactory operation of all waste management services.
- Set up standard dumpsite management and operation procedures, which reflect EEAA standards.
- Closely manage Qena's recently established compost plant and do the same with Naga Hammady's compost plant once it has been built.
- Develop transparent and effective budgeting procedures for all solid waste management related costs in the Local Governorate Units, Cities and the Governorate Administration.
- Introduce an appropriate preventative maintenance program for waste management vehicles in each city, to minimize the need for, and cost of new parts to limit vehicle downtime and extend vehicle lifetime.
- Encourage the privatized collection, treatment and disposal of waste once an enabling environment has been established and circumstances are favourable.
- Encourage a high level of appropriate community participation in new schemes i.e. starting with community based clean-up campaigns.

Maintainance Garage, Naga Hammady

Improve Existing Waste Collection, Transfer and Transportation Systems

- In each city in Qena, evaluate which kind of transfer system would be most appropriate (probably all except El Waqf).
- Implement a new transfer system in each city before any new collection equipment is fully operational.
- In villages, investigate need and appropriate options for waste transfer from village collection systems to the disposal sites.
- Replicate El Tarmsa and El Dier demonstration waste collection systems to other villages in Qena Governorate.
- Improve public awareness of waste management and public health issues.
- Manage scavenging activities on dumpsites.

Adopt Proper Waste Treatment and Disposal Systems

- Current disposal sites should continue to operate and serve the cities across the Governorate, but they should be upgraded to improve their standards of operation. Except in the case of Naga Hammady, where a new site is required.
- Naga Hammady's proposal for introducing composting requires greater economic appraisal before the dumpsite is moved to its new position.
- Undertake EIA's (to EEAA standards), for all new disposal sites to ensure proposed sites meet the required standards.
- Introduce controlled tipping practices at all disposal sites, use construction waste and sand as a top cover to limit the possibility of wind blowing litter away and use tractors to level off waste on the site.
- Phase out and rehabilitate problem disposal sites.
- Investigate opportunities for simply managed village dump-

sites to reduce the need for waste transfer and provide appropriate collection equipment in villages.

Receiving Solid Waste Equipment, Mahrousa Village

Ensure Safe and Sustainable Recycling of Waste

- Provide 'scavengers' with protective clothing and encourage constructive interaction with dumpsite managers.
- Investigate the economic potential for introducing recycling and composting schemes.
- Encourage reuse and recycling of waste in business's, factories and at home. NGOs or community groups running small waste recovery enterprises with assistance from the Social Fund for Development could fulfil this function.
- Initiate a pilot waste segregation project for different packing materials in schools, institutes and government buildings.

Introduce Appropriate Hazardous/ Clinical Waste Management Systems

- Ensure that clinical and hazardous wastes are collected separately and disposed of in controlled cells at dumpsites.
- Ensure that hazardous/clinical waste is collected separately and incinerated with resultant ash being transported and disposed of in controlled cells at the dumpsite.
- In the medium term, all clinics, hospitals, factories etc. should be required to introduce at source waste segregation together with in-house awareness raising and training.
- Collection systems for clinical waste require specific vehicles, appropriate training and protective clothing.
- Maximise the shared utilization of existing resources (i.e. incineration facilities, sanitary cells) to treat and dispose of these wastes and minimize the need for expenditure.
- Develop a detailed understanding of waste treatment and disposal practices in order to determine the need for extra resources, equipment, new dumpsites etc and lobby the department of Health for provision.
- Introduce appropriate charges for collecting and disposing of these wastes and establish an appropriate monitoring and 'fines' system to prevent illegal disposal.

Improve Institutional Organizational and Worker Capacity

Improve Institutional Organizational and Worker Capacity

- Ensure that the Central Waste Management Unit is in place, fully operational and has proper funding and the necessary expertise to fulfil its role.
- Build up the capacity of each Markaz to better plan and co-ordinate existing solid waste activities.
- Establish proper monitoring and supervision mechanisms to ensure reliable and satisfactory service delivery.
- Improve the working conditions of SWM labourers to increase productivity and staff retention.
- Prior to implementing new services ensure proper co-ordination between different government departments, the public, city administration and Governorate and city administration to avoid duplication.
- Develop monitoring and evaluation surveys during and after activities in order to continually improve the system and assess their impact on the population.
- Develop appropriate fines and monitoring and enforcement procedures to ensure greater resident participation, and improved behaviour towards paying necessary fees.
- Develop an appropriate communication system between Markaz Heads, the Deputy Secretary General, City and LGU solid waste management units and the Governorate Strategic Solid Waste Management Unit.
- Increase incentives for private sector and NGO participation in the collection, treatment and disposal of waste through e.g. sustainable revenue raising methods, tax exemption and the provision of low cost land.
- Suitable mechanisms should be put in place to take account of those who cannot afford to pay as much as others for Solid Waste Management services.
- Coordinate awareness raising programmes to ensure people change behaviour and where possible participate in new services.
- Coordinate awareness raising programmes to ensure people change behaviour and where possible participate in new services.

Transfer station, Nagaa Hamady

6.6. IMPROVING POTABLE WATER SUPPLIES

Rationale

Although potable water capacity, in Qena Governorate, has doubled over the last 7 years, a significant number of people still have limited or no access to a clean or reliable water supply either because of poverty, a shortage in water production or an inadequate water distribution system.

Out of the total capacity of 423,800m^3/day, (see Table) over 50% has been installed in the last 7 years. This capacity is generated from the following sources and will include two further water treatment plants which are currently under construction, one at Armant which is expected to be completed by 2004 (capacity of 34,600m^3/day) and the other in Abu Tesht City which is expected be completed in 2007. It is hoped that the added surface water capacity generated will reduce the number of people in rural areas currently dependent on un-networked water for their potable water. The following table illustrates Water Treatment Plants are currently responsible for supplying 45% (193,600m^3) of the governorates daily potable water supply whilst Compact Units supply 34% (144,700m^3).

Waste Water Treatment Plant, Saleheia

Water Supply Capacity in Qena Governorate (2004)

Source	Capacity m^3/day	%
Qena WTP (new & old)	63,900	15.1
Qeft WTP	17,300	4.1
Qus WTP	25,900	6.1
Dishna WTP	34,600	8.2
Naga Hammady WTP	34,600	8.2
Isna WTP	17,300	4.1
67 Compact Units	144,700	34.1
264 Groundwater Wells	85,500	20.1
Total	**423,800**	**100**

It is estimated that 85% of the Governorate has full access to water services and through this is able to meet 80% of the Governorates water demand.

Nature of Water Supply by Markaz (2004)

Markaz	Traditional WTP m^3/day	Compact Units m^3/day	Groundwater Wells m^3/day	Total m^3/day
Abu Tesht	Under construction	15,120	24,600	39,720
Farshut	Supplied from Naga Hammady	0	5,500	5,500
Naga Hammady	34,600	21,600	4,900	61,100
Dishna	34,600	2,160	7,800	44,560
El Waqf	No plan	6,480	4,900	11,380
Qena	63,900	38,860	14,600	117,360
Qeft	17,300	0	6,200	23,500
Qus	25,900	8,640	9,000	43,540
Naqada	No plan	10,800	3,500	14,300
Armant	Under construction	10,800	2,600	13,400
Isna	17,300	30,240	1,900	49,440
Total	**193,600**	**144,700**	**85,500**	**423,800**

The remaining 15% of the population are currently unconnected to the water network and mostly rely on ground water wells for their water, whilst a small minority still rely on hand-pumps. The average per capita consumption is 160 litres/capita/day ranging from 58 litres/capita/day in Abu Tesht to 254 litres/capita/day in Qus. The Governorate's current 2002 – 2003 fiscal year plan includes an approved allocation of LE 3.5 million for extending water networks in urban and rural areas, and LE 2 million to install water networks in the new industrial zones at Kallahen and Hoo. In addition, the 2002 – 2007 five-year plan includes the supply and installation of 10 new compact units by NOPWASD, each with a 100 lit/sec capacity (8,500m^3/day, 4 times the capacity of the existing units). The new units will be built in Qena (4), Qus (2), Naqada (2) and Abu Tesht (2). Increased improvements in drinking water supply are a direct response to growing demand, increased per capita consumption and a general policy commitment to replace groundwater wells with piped water supply (e.g. Abu Tesht).

Compact Unit under construction, Naqadah

Although these efforts will undoubtedly improve water supply in Qena a number of key issues still need further attention.

- In networked areas water supply problems relate to the fact that much of the network is old (30 to 50 years), dilapidated and poorly maintained.
- Leaking pipes are commonplace and household connections are often in a bad state of repair. Areas that are not currently networked, include rural areas and some urban areas which have expanded water distribution networks unofficially (i.e. through illegal expansion or connection)
- Water supply problems mostly relate to the condition of compact units and groundwater wells.

Groundwater, which ranges in depth from 1m in Isna to 6m in Qena, makes up 20% of the Governorates total potable water capacity and though an important water source its quality and quantity is beginning to deteriorate. The iron and manganese content of many wells is as high as the National limit (5%) and over 80% of groundwater wells can't be operated for more than 6hrs at a time. Furthermore, increased abstraction rates and pollution from agrochemicals and domestic sewage have caused deterioration in water quality.

In Farshut Markaz where the entire population presently relies on ground water wells for their water supply (see table) communities have complained of water discolouration and pollution, which has forced some to buy water from neighbouring Naga Hammady Markaz. However, the Governorate has recently installed a new water line from Naga Hammady and is now in the process of building a new water treatment plant (34000m^3/day). Both initiatives will not only improve the supply and quality of water reaching villages in and around Abu Tesht and Farshut etc but also reduce their dependence on groundwater wells. There are currently no plans by NOPWASD to address the issue of elevated iron and manganese concentrations in groundwater derived supplies.

The operation efficiency of compact units is impacted by poor maintenance and inadequate chlorine dosing. Qena's compact units now operate at 60% of their actual capacity.

From an institutional perspective, poor and fragmented service management has resulted in inadequate revenue collection, which has in turn resulted in reduced O&M budgets and low service standards. Furthermore, lack of an overall strategic maintenance plan means that maintenance tends to be reactive rather than proactive. This problem can be illustrated by the fact that most of Qena's Markazes lack water network maps; this in turn means that many O&M staff do not know the location or condition of booster stations and elevated tanks or where valves, bulk meters and

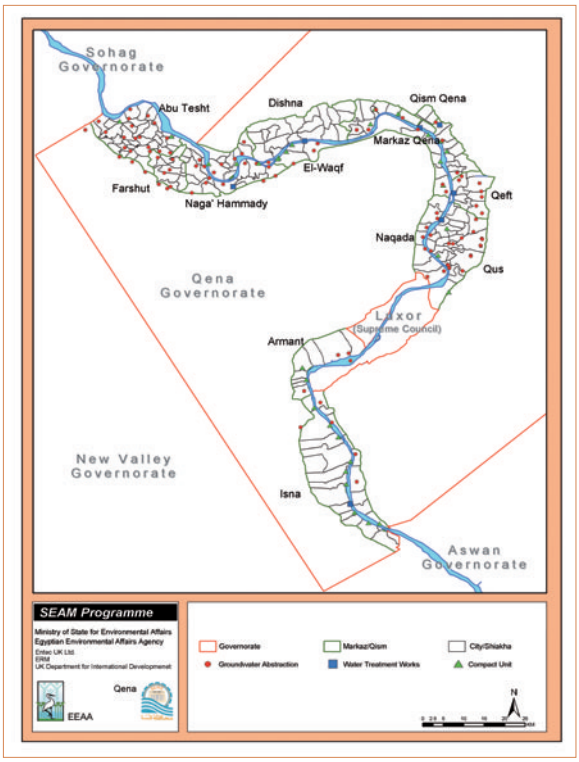
High Water Tank under construction, Qena City

Water Systems Management

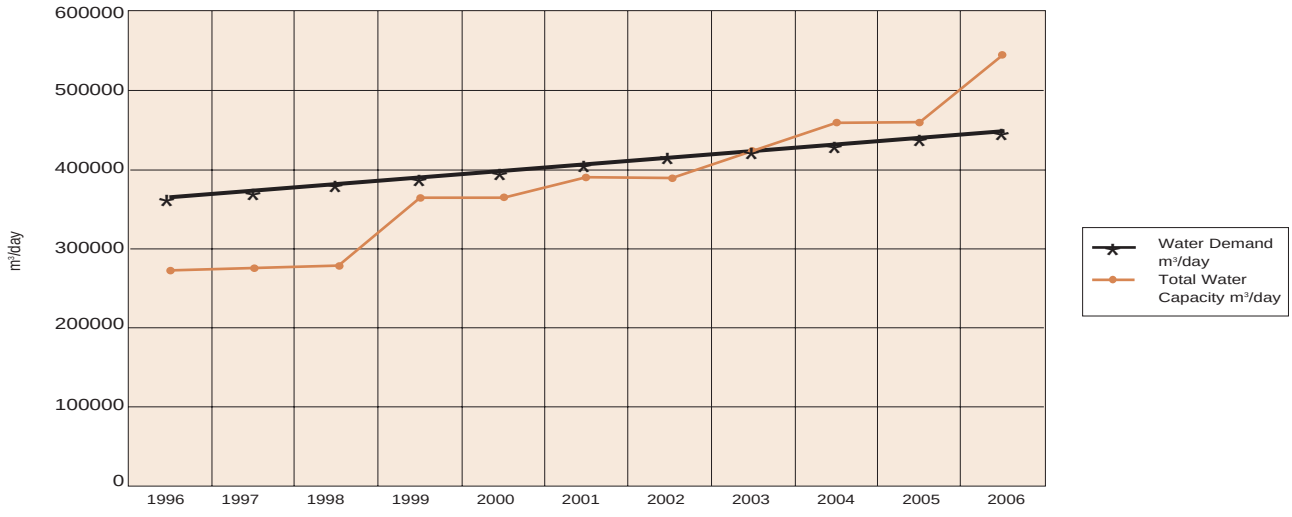
where old and newly constructed parts of the network are located. As a result they are unable to conduct adequate hydraulic analysis. Water losses from poorly maintained pipes are estimated to be in the range of 25 % whilst, un-metered and unpaid consumptions may also account for a further 35 % loss of potable water. Indeed figures for Qena City's unaccounted for water losses were as high as 71% during the 1999-2000 fiscal year. (This figure includes the difference between the applied flat rate and actual consumption, the unpaid water of the Governorate buildings and schools etc and physical losses from the networks).

At a Governorate level overall tariff collection efficiency is presently 29%. Approximately 25 % of household connections are not metered or have broken meters. As far as water network charges are concerned a flat consumption rate of 10m3/flat/month is applied (especially in Qena city) where in reality actual average consumption is almost three times this rate. This means that a significant amount of potential revenue is never collected. Given these and other problems cost recovery is presently ranging between 40% and 50%.

Water Supply Locations in Qena Governorate



Water Demand/ Water Capacity (1996-2006)



Objectives

- To expand the coverage of clean and reliable drinking water supply.
- To provide a cost efficient, sustainable and well managed water supply system.

Policies

- To provide necessary institutional support to strengthen and reform the Governorates water management framework so that it can effectively sustain a water service to Egyptian standards.
- To achieve a sustainable water supply system which meets community requirements. This should include the introduction of an effective water metering and bill collection system, restructuring the tariff and reducing water use that is not accounted.
- To extend network coverage to un-served residential areas and increase production of treated water so that supply meets demand.
- To stop using groundwater as a source of drinking water unless it receives effective treatment, and set in place a plan for replacing existing groundwater wells with treated surface water throughout the Governorate.
- To develop an overall strategic maintenance plan to remove inefficiencies in water treatment and distribution systems through improved maintenance and reduced losses from leaking and broken pipes and wastage.

10 Year Targets and Programmes

Achieve 100% Service Coverage and Increase Production to Meet Projected Demand

- Complete Abu Tesht and Armant water treatment plants.
- Consider building new surface water plants in El Waqf (capacity of 25,000 m^3/day) and Naqada (capacity of 34,000 m^3/day).
- Extend water mains and distribution networks to un-served urban and rural residential areas and build new booster stations to maintain pressure in remote areas.
- Assess the O&M plans of water treatment plants (especially compact units) and upgrade them to their rated capacity levels.
- Review the current utilization of existing compact units and wherever necessary relocate them to optimize the contribution that these units make to the overall water service.
- Provide public standpipes in remote communities.

Improve the Water Service Quality to Egyptian Standards by the Year 2007

- Develop measures for using groundwater through licensing the installation of wells and hand pumps, providing suitable treatment should also be considered.
- Improve the design and control of pollution discharge that may affect intake points.
- Analyse water distribution systems to ensure information is available on the entire networks infrastructure and assess to ensure continuity of supply;
- Consideration should be given to moving Qena WTP intake or constructing a barrier wall to avoid fungus accumulation. The same problem is observed at Qus WTP where the paper factory discharges approximately 20,000 m^3/day of untreated industrial waste upstream of the water intake.
- Hydraulically analyse water networks, establish GIS systems and provide network drawings, install valves and bulk meters, check against location sewage lines and septic tanks and rehabilitate to maintain pressure and avoid contamination.
- Consider analysing Qena city's water system to find reasons for pressure drops and unbalanced water distribution.
- Strengthen Local Governorate Unit capacity to maintain and operate compact units, particularly in chlorine dosing and use of chemicals, to ensure reliability of supply.
- Consideration should be given to coordinating the construction of networks with the availability of water production.

Improve Tariff Collection Efficiency from 65% to 85% and Physical Losses in the Network from 25% to 20%

- Implement a comprehensive leak detection and repair program for water mains and networks in major cities starting with Qena City.
- Rehabilitate old and deteriorated networks to reduce leakages, maintain water pressure and stop contamination.
- Increase metering to cover all households connected to supply and ensure all metres are in full working order; rationalize design to facilitate maintenance.
- Promote public awareness campaigns to improve water conservation and preserve water sources and prevent dumping of liquid or solid wastes into watercourses.
- Review the existing cost centres and tariff structure and increase charges to appropriate and affordable rates.

Strengthen Institutional Capacity

- Integrate water service activities under an authorised body such as the planned Qena Water Authority or a Public Economic Authority.
- Strengthen capacity to manage, operate and maintain the water supply systems.
- Develop a strategic maintenance plan to better coordinate improvements to the network.
- Establish a computerized billing system and improve metre reading and tariff collection.
- Develop a staff inventory, staffing plan and training needs assessment.
- Implement an assets inventory.

6.7. WATER RESOURCE MANAGEMENT (*Surface & Ground Water Resources*)

Rationale

Water resource management is a cross cutting issue which covers a number of different areas including agricultural, industrial and domestic environments. The importance of water resource management in these areas is dealt with in separate GEAP sections. This particular section focuses on issues related to importance of ground and surface water resources.

Qena's water resources mainly comprise of water diverted from the Nile for municipal and agricultural use and water extracted from groundwater. An additional potential water resource comes from occasional rainfall which falls as flash floods producing large volumes of surface runoff. Qena's surface water sources which account for roughly 80% of the total water use mainly comprise of Nile water diverted for direct use or to the irrigation canals upstream of the barrages.

The per capita water use in Qena is roughly 1224m^3 pa, which is considerably higher than that found in other Governorates due to the high demand for irrigation of the sugar cane crop. Resulting deep percolation, seepage loss and threat of water logging place great strain on tile drainage systems. The Ministry of Water Resources and Irrigation is planning to replace sugar cane with sugar beet to maximize the on farm efficiency of water use however such crop substitution will have to be done gradually to allow farmers and factory owner's time to adapt.

Nile Water Resources - Qena Governorate covers a large section of the Nile Valley extending for more than 350 km, from Isna in the south to Naga Hammady in the north. Along this stretch of the Nile there are two main canals that take water directly from the Nile upstream of Isna barrage: the Asfoun and El-Kalabaya canals. In addition, 9 pumping stations and three barrages (old Isna barrage, new Isna barrage and Naga Hammady barrage) are used to control the level of Nile water and abstract water directly from the Nile for irrigation purposes. The total annual abstraction for the Asfoun and El-Kalabaya canals and 9 pumping stations was 3.593 Billion m3 per year in 2002. A breakdown of these abstractions is provided below.

An assessment of surface water quality indicates that although the Nile receives high BOD loads from the 4 sugar factories the rivers dilution capacity is high which means the effect of this pollution is reduced. The Ministry of Water Resources and Public Works have recently commissioned the construction of a new barrage to take account of the deterioration of the old Naga Hammady Barrage. The new barrage will be able to produce 65 Megawatts of electricity. The water level between the old and new barrages will be increased to 65.9m above sea level, resulting in a net gain of roughly 100 hectares of agricultural land. However, the possible side effects of an increase in headpond water levels include:

- the loss of approximately 64 feddans of river island land and 230 feddans of river bank land currently used for perennial and seasonal cropping or grazing;
- new structural bank protection measures will need to be developed to protect infrastructure along certain reaches of the Nile;
- cultural sites, buildings and graveyards may be affected by poor drainage or water logging if adequate drainage systems are not put in place;
- settlements along the Nile with very shallow groundwater levels may experience flooding and surface ponding of groundwater through capillary rise; this may be exacerbated by flooding of septic tanks and the development of contamination and odour problems; some affected settlements will need to be permanently relocated.

Groundwater Resources - Based on the geological and hydrogeological conditions, Qena's groundwater aquifers may be divided into two main kinds; the Nile flood plain aquifer (Quaternary aquifer) and the pre- Nile (Nubian) sediments aquifer. The Nile aquifer system is mainly recharged from surrounding irrigation systems and has

Water Abstraction in Qena Governorate

Kalabaya Canal (irrigates 174,515 feddans)	1.306 BCM/year
Asfoun Canal (irrigates 68,879 feddans)	0.524 BCM/year
2 Pumping Stations (Upstream Isna Barrage)	0.718 BCM/year
7 Pumping Stations (on the Isna to Naga Hammady reach)	1.045 BCM/year
Total Surface Water Abstraction	**3.593 BCM/year**

high potential for groundwater development near the Nile, whilst the deep Nubian aquifer has limited or zero potential for groundwater development especially in the desert areas where land reclamation has occurred. Average groundwater heads decrease from 78m above sea level at Isna to 62m above sea level at Naga Hammady. The existing total annual groundwater abstraction in the Nile Valley Aquifer is about 1.5 BCM/year with a future additional increase of 1.7 BCM/year, 0.5 BCM/year of which will be extracted for new land reclamation and 1.2 BCM/year will be extracted for conjunctive use, tube well drainage and domestic use.

The quality of groundwater is affected by the hydrogeological environment and human activities. Nile valley groundwater salinity levels range from 500 to 1000ppm. The existence of microbiological contamination of both deep and shallow groundwater wells is an indicator of the vulnerability of the main aquifer to point source and diffuse contamination from untreated sewage.

Policies

- Reduce dumping of domestic and agricultural waste into canals and drains.
- Improve drainage of cultivated areas to improve crop yields.
- Extend wastewater collection and treatment systems to prevent groundwater pollution.
- Improve flood defences and drainage systems in order to conserve rainwater run-off.
- Reduce the use of chemical fertilizers to reduce surface water and groundwater pollution.
- Monitor the discharge of industrial effluents into the Nile and canals and rigorously enforce the standards of Law 48.

Unconventional Water Resources – These resources are recycled or reused from previously utilized resources and fall into two broad categories:

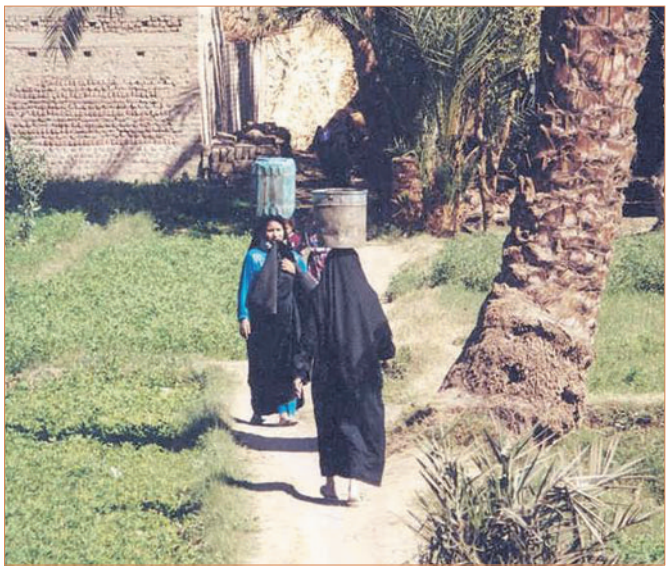
Reuse of Agricultural Drainage Water – The amount of water entering drainage channels is relatively high (about 25 to 30% of the total water supplied) and originates from three main sources; tail end and seepage losses from canals, surface runoff from irrigated fields; and deep percolation from irrigated fields (particularly where salt leaching is being carried out). Agricultural drainage from Egypt's southern regions returns directly to the Nile River where it mixes with the Nile fresh water and is utilised by downstream users. Isna-Naga Hammady's reaches return flows through the 16 main drainage channels, from an area of approximately 285,000 feddans was estimated to be about 0.72 BCM/year.

Reuse of Treated Waste Water – Increasing water demand for domestic use due to population growth and improvements in living standards and growing industrial demand for water is increasing the total amount of wastewater potentially available for reuse. This resource could be utilised for irrigating non-food crops such as trees, as is the case with effluent from Qena wastewater treatment plant, which is reused at the "Man-Made Forest" in El Salihia. The current amount of treated wastewater from wastewater treatment plants in Qena and Luxor is 38,000m^3/day and a further 12 new treatment facilities are planned which will increase the amount of treated water to 600,000m^3/day by the year 2017. However, particular attention needs to be focussed on issues associated with effluent reuse including potential public health and environmental hazards, and related technical, institutional, socio-cultural and sustainability aspects.

Estimates for Qena's water requirement in 2017 show that municipal, agricultural and industrial water use are respectively, 189.0 x 1MCM, 3771 x 1MCM and 268 x 1MCM/year which represents a 30% increase on current available water resources. Approximately 170000km^2 of land in Qena Governorate is potentially suitable for reclamation and these areas would require a further 700 x 1MCM m^3 of water each year.

Objectives

- To improve water resources management and conservation across Qena Governorate.
- To reduce contamination of surface and ground water resources.



10 Year Targets and Programmes

Improve the Management of Surface and Ground Water Resources

- Include Water User Associations in the operation, maintenance and management of irrigation systems.
- Introduce charges for the operation and maintenance of the irrigation water distribution system.
- Improve drainage of cultivated areas to secure and improve crop yield.
- Develop a flood hazard assessment and hydrological study to assess the potential for greater utilisation of rainwater run-off, particularly during flash flood events.
- Develop a detailed water resources assessment of the Nubian Aquifer to assess its potential for development as a water resource.
- Monitor groundwater levels between the old and new Naga Hammady barrages to assess potential rising ground water levels.

Improve the efficiency of Surface and Ground Water Resources

- Increase water efficiency by minimizing water losses in surface water use, including reducing water conveyance losses, especially in irrigation.
- Implement and manage measures to improve subsurface tile drainage to improve the physical and chemical characteristics of the soil.
- Develop a plan to improve on-farm water efficiency by crop replacement measures such as gradual replacement of cultivated sugar cane with cultivated sugar beet.
- Limit the current sugar cane cropping area to meet the productive capacity of existing factories without any future increase.
- Raise farmer awareness of irrigation and water conservation measures by developing the capacity of Water Users Associations.
- Manage land fragmentation to ensure better management of water resources.

Reduce Pollution of Surface Water and Ground Water Resources

- Introduce measures that oblige Nile Cruisers to discharge wastewater and solid refuse at authorised collection points.
- Ensure that industrial facilities comply with existing laws concerning quality of effluent discharge into surface water.
- Ensure that where appropriate new industrial areas install pre-treatment facilities prior to discharge into municipal sewers.
- Control and reduce the use of fertilizers, pesticides and the agrochemicals.

Naga Hammady Barrage

6.8. DEVELOPING AGRICULTURE & FISHERIES

Rationale

Agriculture is a major economic source of income in Qena Governorate, with just over 81% of the inhabited Nile valley area under cultivation, and 78.8% of the population in rural areas. In 1999 Qena's population was 2.7 million, with an average annual growth rate of 2.2%. Population intensity in inhabited areas averages 1581.1 persons per km^2, the per capita share of cultivated land is 0.11 feddan ($462m^2$) and $759m^3$ of water is used each year to cultivate this land. With this in mind Qena's main agricultural challenges include limited arable land, scarce water resources, water pollution and a relatively high population growth rate.

Qena's principal crops include sugarcane, wheat, clover, corn, sorghum, fava beans and vegetables. The majority of arable land holdings (86.4%) are less than 2 feddans and cropping intensities (1.5) and yields are high. Roughly 50% of the Governorates total cultivated land area is permanently cropped. This is only possible because the area benefits from a plentiful water supply, high fertilizer usage (over 300kg /fed. /year) and fertile soils. In addition much of Qena's arable land (particularly sugarcane land) profits from soil improvement programmes (sub soiling, adding gypsum) and an integrated pest management system (IPM), which have both helped improve crop productivity. In 1998 the Governorate banned the use of pesticides on sugarcane land. Since then farmers have used the T.evanesces parasite to control pest infestation. Each year the parasite is released onto about 75% of sugarcane land, which avoids the annual, use 400 tons of pesticides. The following table illustrates the use of pesticide, nitrogen based fertilizers and biological controls on sugar cane land. In all three cases the use of each has risen substantially in recent years.

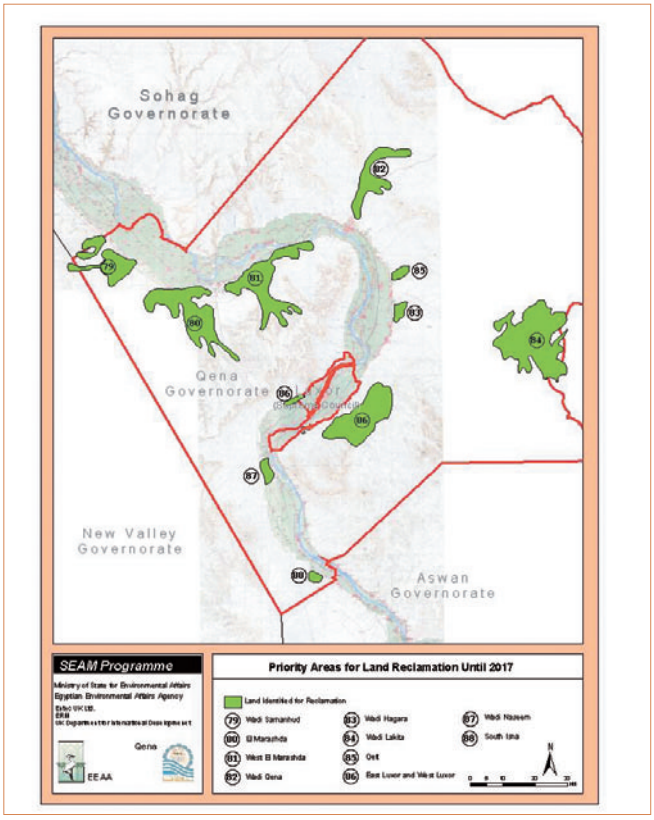
Animal and poultry production also play an important role in Qena's agricultural system. Livestock numbers total around 250 000 whilst numbers of poultry amount to around 1.3 million (or 80% of Egypt's total number). Whilst the sector is of great economic value poor disposal or use of animal waste often causes environmental problems.

Pressure on land from intensive agricultural and urban development has resulted in the degradation of soil and water quality. In the last thirty years around 56,257 feddans of cultivated land has been lost to urbanization however, in recent years the Governorate has had more success in halting urban encroachment on agricultural land through better use of existing laws and its land reclamation strategy. By 1988 42,600 feddans of land had been reclaimed, although 68% of this land is comprised of sandy soils whilst the remainder comprises of saline soils. In addition most land reclamation sites are higher than agricultural land and the Nile. This means that water lifting limits are high which in turn places stress on water pumping systems that have to supply irrigation water to this land. The 2017 national land reclamation strategy aims to reclaim an additional 218,500 feddans of land from desert areas and other marginal land in Qena (see Map). To reach this target 20,000 feddans of land would need to be reclaimed each year however in practise only around 5 to 7,000 feddans has actually been reclaimed per year thus far.

Use of Pesticides, Nitrogen Fertilizer and Biological Control on Sugar Cane land

Year	Pesticides (Tons)	N-Fertilizers (Tons)	Biological Control Sugar (Feddans)
1997	N.A	224701	36 000
1998	1.202	225346	51 458
1999	0.900	236659	92 648
2000	1.875	168154	85 095
2001	1.166	199856	123 348
2002	2.397	229079	130 536
2003	2.014	272507	194 540

Qena's Land Reclamation Programme



Qena's drainage system consists of 16 open main drain catchments that serve 316,410 feddans of land and annually drains 955 million m^3 of water into the Nile. Water from the remaining irrigated land drains directly into the Nile. The subsurface tile drainage system serves 186,000 feddans of the cultivated land, which lacks natural drainage capacity. Drainage reuse only occurs through the "Hamad "drain where a pump station mixes drain water with water from the El- kelabia canal.

Relatively low on-farm irrigation efficiencies, excessive water application by gravity and/or pumps, doubling cropping intensities and a sugarcane monoculture have all contributed to increased levels of soil salinity and sodicity (alkalinity). Roughly 20% (72,000 feddans) of Qena's cultivated land area is now affected by salinity. Areas that are particularly affected include land west of Abut Tesht district, Naga Hammady district and newly reclaimed lands, which use pressurized irrigation systems to save on irrigation water and minimize the pressure placed on drainage systems. Another problem facing cultivated lands is sodicity (water-logging), caused by bad drainage. At present 3% (11 000 feddans) of Qena's cultivated land area is affected by sodicity but the problem is particularly acute in areas like Isna district, Dishna Markaz and Naga-Hammady where sugarcane predominates.

The introduction of land levelling (using laser technology) and gated pipe technology to improve water use efficiency and surface irrigation systems has had some success at controlling sodicity in sugarcane fields. Gated pipe technology increases water delivery efficiency by 30 to 40% whilst water savings are in the range of 20 to 25%. The governments National Sugar Policy on Water Management aims to save Qena 0.5 a billion m^3 of water each year by extending gated pipe systems to 65% of Upper Egypt's sugarcane fields. Furthermore, the National Tile Drainage programme which covers roughly 58% of Qena's cultivated land area (186,000 feddans) has also been relatively successful in lowering Qena's water table particularly around the Isna and Naga Hammady barrages where high water levels are a significant problem. The use of tile drainage systems is said to increase soil fertility by 30%. The Ministry of Water Resources and Irrigation (MWRI) has also initiated an integrated water resource management programme, which it is piloting in a number of districts in Qena. The aim of the initiative is to decentralize the management of water resources to the district level to better control water allocation, improve irrigation efficiency and provide equitable water shares for all users.

The pollution of both agricultural and potable water is a serious issue affecting surface and sub-surface water. Main sources of pollution originate from sewage discharge, municipal and industrial effluents (into main waterways), irrigation canals, drainage ditches, the Nile and excessive use of fertilizers and misuse of pesticides. Actions to reduce pollution levels have been initiated with the construction of a number of wastewater plants throughout Qena Governorate and some treated wastewater is also used to grow trees for wood production on desert fringes. Groundwater, surface and subsurface water sources however, continue to suffer from nitrate contamination due to the excessive use of nitrogen-based fertilizers, which is now reaching alarming levels. The current rate of application to cultivated land is 714kg/ha, which is far higher than the world average 28kg/ha. As a result nitrate leaching has become a significant source of water pollution. With this in mind groundwater use may be endangered. Aquifers are at least partly replenished from drainage water and in such situations cycles of extraction and infiltration of the same water develop, and the main or only outlet of the system is evapotranspiration, which over the years induces an increase in salinity.

Bagass Storage

Qena produces six million tons of agricultural residue each year. Some direct uses of this residue include burning for energy (60%), feeding animals and composting (40%). Approximately 3 million tons of bagasse, the by-product of Qena's 4 sugar cane factories is burnt as a fuel at these factories, which causes significant air pollution. In addition, the Naga Hammady Fiberboard and Qena Newsprint paper company at Qus are another two factories that use bagass as a fuel are also responsible for producing large quantities of black liquor, which is a hazardous water pollutant. Although the use of bagass is important solutions to bagass airpollution need to be identified. There are currently no programmes to resolve the bagass air pollution or black liquor issue.

Other sectors that contribute to Qena's agricultural sector include fisheries, livestock and poultry production. In fisheries sector the Governorate Governorate has introduced mabrouk fish fingerlingesfingerlings into the Nile to control aquatic weeds and regularly restocks Qena's stretch of the Nile with Tilapia, aquaculture is also strongly encouraged. Livestock and poultry production also play an important role in Qena's agricultural sector. The Governorate Governorate produces 80% of the Egypt's poultry and has over 250 000 head of livestock. Although byproductsby-products from these sectors are economically valuable there is as yet no system to deal with the generated waste.

Bagass Storage Yard

Objectives

- To enhance agricultural production (with GAP) and promote environmentally sustainable agriculture.
- To prevent further contamination of agricultural land, water sources and fishing areas.
- To ensure that land reclamation is undertaken in a manner that is sensitive to the environment.
- To promote the long-term development and conservation of water resources (reuse/recycling of wastewater and flash floods) including use of groundwater for irrigation.
- To develop fisheries and ancillary services.
- To make safe and full use of agricultural and industrial residues.

Policies

- Protect land from degradation and urban expansion.
- Encourage long-term conservation of soil structure and fertility.
- Enhance cropping intensities and yields and reduce the use of inorganic fertilizers.
- Improve on-farm water efficiency to reduce soil salinity levels.
- Reduce pollution into waterways through better awareness and application of stricter penalties.
- Encourage participation and involvement of farmers in the operation and maintenance through water association boards and drainage user's association.
- Improve the Governorates ability to support sustainable agriculture (i.e. agriculture, livestock and fisheries)
- Develop fisheries and ancillary services by rehabilitating Naga Hammady fish hatchery and restocking the Nile with fish.
- Promote the use of organic land management techniques. (i.e. compost, biogas, silage, farm residue and animal waste and bio-pest integrated pest management)
- Ensure all major industries including sugar comply with environmental standards.

10 Year Targets and Programmes

Improve Soil and Irrigation Efficiency

- Update the Governorate's soil survey map (last conducted in 1972) to improve agricultural planning.
- Improve land drainage and on-farm water efficiency (to reduce soil sodicity) by promoting the extension of gated pipe technology on sugarcane fields. Focus areas should include Isna district, Deshna Markaz and Naga-Hammady where sugarcane predominates.
- Encourage the replacement of gravity irrigation systems with pump irrigation systems (in accordance with National Sugarcane Policy on water management) to save water.
- Continue to rehabilitate and renew drainage tiles and improve tile and open drain maintenance in areas, which experience poor drainage and high water tables.
- Modify cropping and irrigation practices to prevent soil degradation and excesses irrigation. (this may include replacing rotational with continuous flow irrigation systems).
- Encourage farmers to drill new wells and use underground water to irrigate Qena's desert fringes.
- Conserve flash flood water to recharge groundwater and irrigation systems.
- Encourage farmer participation in the operation and maintenance of the irrigation/ drainage system at the farm level through water- user's associations and boards.

- Prevent further loss of agricultural land through stricter law enforcement and appropriate land reclamation strategies.
- Increase crop productivity by extending the coverage of existing sub soil and gypsum addition programmes.

Optimise the use of Fertilizers and Pesticides

- Continue implementing the National Integrated Pest Management (IPM) Programme
- Provide ongoing training to farmers on the use and handling of pesticides.
- Encourage the suitable use of chemical fertilizers, especially nitrogen-based fertilizers, to avoid nitrate leaching.
- Where appropriate promote the use of organic and bio-fertilizers.
- Encourage bio-control of pests in sugarcane fields as well as other crops to lower the use of pesticides.
- Develop a regional Agricultural Extension Service that encourages farmers to adopt environmentally friendly farming practices and increases their awareness of existing and new technologies.
- Encourage the reuse of farm residues as well as animal waste in making compost, biogas and silage.

Enhance Fish Production

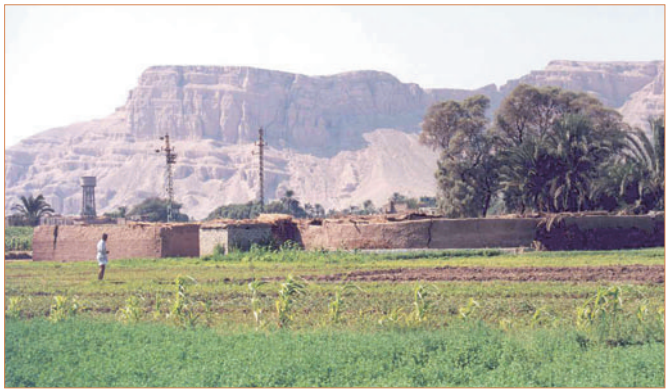
- Restock the Nile with Tilapia fish and rehabilitate the Naga Hammady fish hatchery.
- Ensure that there are adequate numbers of mabrouk fish fingerlings to control aquatic weeds along the shores of the Nile.
- Introduce carp fish in waterways to control the growth of aquatic weeds.
- Encourage the establishment of aquaculture ponds.
- Develop a fish extension service to train fishermen and fish producers on the use of new technologies for intensive fish production.
- Closely monitor domestic sewage discharge from treatment plants to reduce the amount of pollution flowing into waterways and the Nile.

Reduce Post Harvest Losses and Handling

- Encourage farming of grapevines and cantaloupes on drip irrigation using good agricultural practices (GAP).
- Reduce agricultural losses of crop yields through improvements in: post harvest handling, transport and storage, marketing of field crops, fruits and vegetables and refrigeration of milk and fish.

Upgrade Institutional Management

- Improve interdepartmental coordination among ministries and administrative departments concerned with environmental protection to strengthen their ability to apply and enforce environmental rules and regulations (EIA, legislation etc).
- Improve government's ability to plan, monitor, and manage agricultural resources.
- Where appropriate begin shifting the responsibility of managing certain government utilities (e.g. water) to the private sector.
- Improve Governorate Governorate capacity to operate and maintain its canal networks (e.g. irrigation, drainage and main canals).
- Develop a strategy for the safe reuse of treated municipal wastewater and sewage sludge.
- Introduce a soil and water management plan to avoid soil degradation and enforce stricter laws to control and stop the loss of agricultural land to urban encroachment.
- Promote landcare extension programmes to encourage sustainable land use and productivity and reduce detrimental impacts associated with prolonged intensive farming.



6.9. INDUSTRY

Rationale

Only 6.4% of Qena's workforce are employed in the industrial sector and out of that a third are employed at the Aluminium factory at Naga Hammady. Another 25% are employed at the 4 sugar factories located throughout Qena. The rest of the industrial workforce are employed in Qena's small medium and micro enterprises (MSME), of which 98% are made up of the micro sector. Common MSME sector industries include fabricated metals and non-metallic mineral production although furniture and clothing together make up 45% of the sector.

Sugar Factory, Naga Hammady

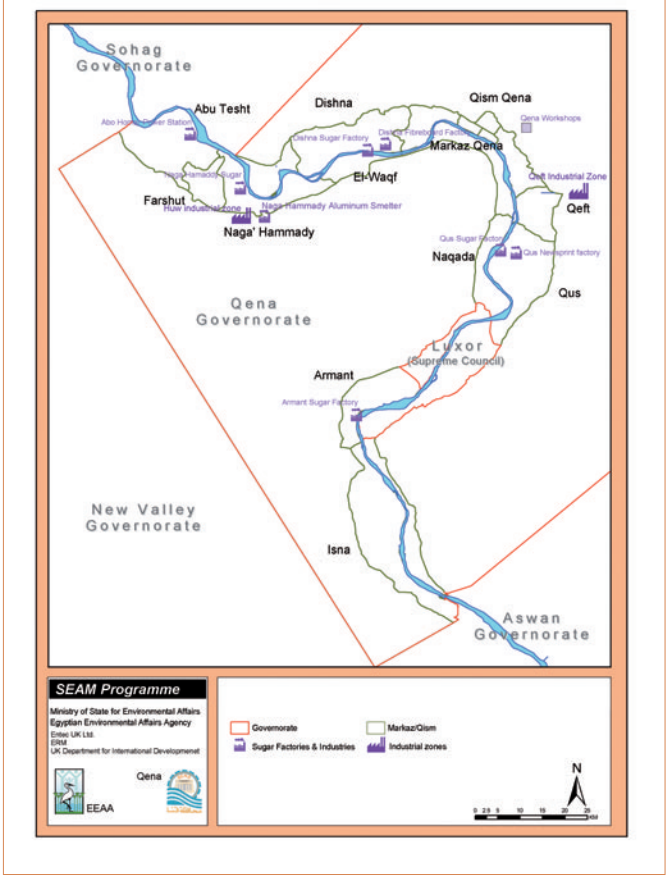
With the size of industrial development still limited in Qena the extent of industrial pollution is relatively small. However, pollution from Qena's larger industries needs stricter regulation and enforcement. The large sugar factories continue to burn bagasse, (to fuel the boilers) which causes emission of high concentrations of fine particulates, although the emission rates have been reduced in recent years by the installation of abatement technology on the boiler emission flues. In 2000 Dishna and Armant sugar factories were both emitting around 6000mg/m^3, which was well above the legal emission limit of 500 mg/m^3. Since then however all sugar factories have installed ash traps, which has drastically reduced their levels of ash pollution. Other effective pollution controls in the sugar include the use of wastewater treatment plants and cooling towers to treat wastewater, which is then used in irrigation.

Qeft Industrial Zone

In Qena's Aluminium Complex the main sources of pollution come from process related fumes such as Hydrogen Fluoride (HF) and Sulphur Dioxide (SO_2) these gaseous emissions are reduced using wet and dry treatment processes. The Aluminium plant uses dry processes, which are preferred as they can handle larger volumes of gas, do not use chemicals in the process and are capable of reducing HF concentrations from between 60-120 mg/m^3 to 10mg/m^3. Domestic wastewater from the factory is treated and used in irrigation whilst industrial wastewater is discharged as mud into a nearby lined mud lake. The only hazardous waste used is chlorine gas which is generally well stored.

As the table demonstrates besides dust emissions from flour milling and spinning which are not sufficiently controlled, pollution from other larger industries is generally limited and not considered as a significant environmental or health issue.

Industrial Locations in Qena Governorate



Waste and Emissions from Large-scale Industry in Qena

Facility	Gaseous/ Particular Emissions	Liquid Wastes	Solid Waste	Hazardous Material	Ground Contamination
Sugar factories: Armant, Deshna, Naga Hammady Qus.	- Fine ash generated from bagasse burning serious air pollutant. - Fuel gases from Mazut burning	- wastewater from process and flood washing contains high levels of BOD,COD, O&G	- The spent cane (bagasse) is used as a raw material for paper and fiberboard industries. - Filter Mud from juice treatment is sold to farmers as a fertilizer or animal feed.	- Some acids and alkalis used in the process.	- Not significant
Aluminum Complex	- Metal oxide fumes and dusts from production cells - Gaseous compounds i.e. HF, SO_2, CO_2, CO.	-Wastewater from the wet fumes treatment process.	- Particulate matter collected from electrostatic precipitators. - Sediments generated from thickeners of wet fume treatment effluent.	- Use Chlorine. - Waste gases i.e. H_2S, HF. - Iron cyanide formed in carbon portion of liners.	- Not significant
Flour Mills: Farshut, Ramis, Nasser Cylinder, El-Mahlag, Qena, Dandara, Ahmous, Nasser and Tiba Mills.	- Dust emissions from high % of local wheat used.	-Wastewater, only when high % of local wheat used. Water contains high levels of BOD, S.S and discharged without treatment.	- Dust collected from cyclones and other impurities such as seeds, stones.	- No hazardous material used or waste generated.	- Not significant
Spinning Factories	- Dust and cotton particulates from cleaning and opening operations - Fuel gases from fuel burning.	- No industrial waste water generated only domestic waste water	- Collected dust and particulates from cleaning. - Empty cotton bales, rejected yarn, and scrapes from factory workshops.	- No hazardous material used or waste generated.	- Not significant
Clay Brick Factories	- Exhaust gases from fuel burning in the furnace. - Particulate emissions from raw materials.	- No industrial waste water generated only domestic waste water	- Broken Bricks	- No hazardous material used or waste generated.	- Not significant
Qena Newsprint Paper	- Flue gases from burner - Gases from burning black liquor in chemical recycling boiler.	Waste water from bagasse and pulp washing and black liquor effluents.	- Calcareous clay sludge from treatment of black liquor with lime. - Sludge from WWTP	- Chemicals used in pulping and bleaching (Sodium hydroxide, sodium sulfide etc)	- Wet bagasse storage and its depletion of nutrients from the soil.
Naga Hammady Fiberboard factory	- Flue gases fromburner. Bag filters used to purify gases from solid particulates	- Wastewater from bagasse washing has high BOD levels and is acidic.	- Unsuitable fibers from dif ferent operations - Solid particulates from bag filters	- No hazardous material used or waste generated.	- Wet bagasse storage and its depletion of nutrients from the soil.
Mohamed Tawik for juices and beverages	- Exhaust gases from fuel burning in the furnace. - Steam leakage from heating operations.	- Industrial waste characterized by high levels of BOD and SS	- Rotten fruits, rejected fibers - Metal scraps	- Caustic soda used for equipment washing	- Not significant

*** Shaded areas represent the main environmental issues in different industries**

Only a few of Qena's MSME sector industries are considered significant polluters. The worst include; molasses, clay and brick kiln factories. In all cases the most common pollution problem stems from the fact that most MSME industries continue to rely on old or inadequate processing or burning technologies, which results in inefficient fuel combustion and air pollution. However, due to the diverse nature of industrial processes and technology present in this sector it is hard to assess their potential overall environmental impact. The following table indicates the relative impact of each MSME sector.

Environmental Impact of MSME Industry in Qena Governorate

High Environmental Impact		High Environmental Impact	
Sub-sector	No of establishments	Sub-sector	No of establishments
Other Various Metallic Products	509	Milling	799
Non Metalic Mineral products/ glass products	271	Other Food Products	461
Other Textile Industries/ Spinning weaving and finishing	74	Dairy Industry	78
Structural Products, Tanks and Steam Generators	43	Printing and services related to it	63
Basic Chemicals/ Other Chemical Products.	19	Production, preservation and preparation of meat and fish	11
Plastic Products/ Rubber and Plastic Products	12		

An issue that is of far broader environmental significance however is the issue of bagasse. Bagasse is now being used as a fuel and raw material by a large number of small and large industries. Indeed some industries like the Deshna and Qus sugar factories now share their respective sites with a Fiberboard and Newsprint paper factory, which has helped reduce the amount of bagasse waste, previously generated from both factories.

Factories Using Bagass in Qena Governorate

Company	Factory	Bagasse use per day (Tons)
Qena Co.	Fiberboard (on the same site as Deshna sugar factory)	500
Qena Co.	Newsprint paper (on the same site as Qus sugar factory)	500
Misr Edfo Co.	Newsprint paper	400
Naga Hammady Co.	Fiberboard	200
Kom Ombo Co.	Wood	150
Armant Co	Animal Fodder	150

However, despite these efforts the fact still remains that only 0.647 (22%) million tons of bagasse is utilized each year, which means the remaining 3.1 million tons of wet bagasse still has to be burnt off as waste.

Despite the limited size of Qena's current industrial sector the Governorate Governorate has taken steps to encourage industrial growth by establishing a number of industrial zones and offering free serviced land to investors. The government is also trying to control the growth of industrial development by only issuing new industrial licences to industries located in the new industrial zones. Furthermore, every new industrial zone has designated areas set aside for the relocation of all vocational industries from residential areas as many are reported to be violating environmental regulations. A large number of these industries have already been relocated from Madina Qena to Al Saleheya vocational city and expect to be relocated from Naga Hammady, FarshoutFarshut and Abou Tesht to Al Hew industrial zone when it becomes operational.

At present two zones have been constructed the in Qeft and Hew, (Naga Hammady) with a further two zones planned for Armant and Isna. Qeft industrial zone occupies 570 feddans and comprises of 31 factories, 4 of which are large-scale industrial establishments. However, the zone has often suffered from inadequate electricity, insufficient infrastructure and services, a weak transportation network and the absence of a marketing plan, which have all slowed its development considerably. Whilst the zone still lacks an overall solid waste management system, it has installed a uniform water supply and sewage system, paved roads, electricity and telephone cables, which has helped attract new industrial investment. Indeed in 2004 two new factories are planned, one producing insulin and the other antibiotics, 52% of the costs of the $170 million project are to be met by

American firms. Hew industrial zone (636 feddans) on the other hand has yet to be completed with only around 45% of its infrastructure needs having been put in place.

Neither of the existing industrial zones or those under construction have either prepared or submitted an Environmental Impact Assessment, therefore making it difficult to assess environmental issues associated with their development and operation.

Flue Boiler Tuning

Objectives

- To reduce industrial pollution by ensuring all large scale factories comply with Egyptian Standards.
- Ensure that industrial zones have adequate service infrastructure to deal with the solid and liquid waste streams.
- Introduce measures aimed at improving environmental conditions of MSME's.

Policies

- Ensure large and small-scale industry upgrade their process technologies to minimize air emissions.
- Mandate all large-scale industries to develop strategies for management and disposal of hazardous waste.
- Strengthen Governorate Governorate capacity to better regulate industrial activities.

10 Year Targets and Programmes

Increase Government Capacity to Manage Industrial Activities.

- Strengthen awareness of environmental laws and regulations among industries to create a culture of environmental compliance.
- Introduce measures to increase coordination between different regulatory authorities involved in inspection, regulation and enforcement of environmental compliance at industrial facilities.
- Strengthen, equip and provide training to EMU's so that they are better able to monitor industrial activity and enforce environmental law.
- Improve the industrial planning process to ensure that future industrial development is better financed and coordinated.
- Make sure that industry on industrial estates complylies with EIA requirements.
- Complete the remaining industrial zones ([i.e. Armant and Isna)] and put in place specific management systems for their ongoing operation and management.
- Ensure that the relocation of vocational industry away from residential areas not only benefits the environment but also their owners and workers.
- Establish an industrial advisory service to assist MSME's in the reduction of pollution.
- Prepare a database of industrial establishments to provide updated information on the environmental status of each establishment.

Reduce Gaseous and Particulate Emissions from Large Industries by 50%

- Ensure industrial zones have the full complement of infrastructure required to facilitate industrial relocation/development ([to include sewage and waste water treatment plants)].
- Require that all large-scale industry install and regularly service pollution abatement equipment to minimise their environmental impact and comply with all the requirements of Law 4 and Law 48.
- Ensure that large and small-scale industry keep an environmental register (as required by Law 4/1994) and ensure that it is regularly reviewed.
- Increase the number and use of ambient air pollution monitoring stations in Qena.
- Encourage factory owners to upgrade their processing technology to reduce their environmental impact.
- Introduce routine pollution monitoring of industrial plants placing particular focus on known industrial hot spots (i.e. Pottery Kilns in Al Towayrat village, Brick Kilns in Al Hanadi village, Molasses in Abou Tesht, FarshoutFarshut, Naga Hammady etc)
- Assess how pollution abatement technology utilized by the sugar industry can be improved to reduced atmospheric emissions of fine particulate matter.

Ensure Safe Storage of Hazardous Substances and Safe Disposal of Hazardous Waste

- Improve systems for the collection and disposal of hazardous wastes.
- Protect water resources from industrial pollution through introduction of incentives and the polluter pays principle.
- Require that industries provide EMU's with a list of hazardous material they produce so that a safe disposal system can be agreed between the industry and EMU.
- Require that industries have clear strategies in place to manage their solid and hazardous waste.
- Ensure that waste treatment facilities are regularly maintained and that potentially hazardous substances are safely disposed of.

6.10. PRESERVATION OF THE GOVERNORATES BIODIVERISTY

Rationale

Qena Governorate Governorate contains a number of important habitats that are of significant ecological importance though none are endemic to Qena. The three main habitats include wetlands, arable and urban landscape and Deserts each with there own unique seasonal flora and fauna. All three habitats are important migratory station stops for waterbird species (i.e. white stork, *Ciconia ciconia*) which fly between breeding grounds in Eurasia and winter quarters in Africa.

Wetland Habitats are by far the richest ecological habitats in Qena with the Nile islands exhibiting the richest biodiversity. They are particularly important as wintering stations for waterbird populations including two globally threatened species; the Greater Spotted Eagle (*Aquila clanga*) and the Ferruginous Duck (*Aythya nyroca*) (1% of the ducks world population winters on the Nile). The Northern stretch of the Nile with its large number of reed beds and marshes is more pristine and provides suitable habitats for water birds whilst the south particularly between Dandara and Isna has fewer reed habitats and more Nile cruise ship traffic. Large concentrations and increased diversity of birdlife occurs upstream of existing barrages where the water surface width is widest and current slowest. Canals and drains, though rich in vegetation are of lesser importance.

Arable and Urban Landscape Habitats provide good habitats/refuges for breeding birds and even larger mammals like Jackals. Agricultural land is dominated by sugarcane but some native plants i.e. Date Palms (*Phoenix Dactylifera*), Dom Palms (*Hyphaene thebaica*) and (*Tamarix aphylla*) are in fact cultivated which is a very positive aspect of agricultural practice both in terms of the maintenance of biodiversity and conservation.

No. of Counted Species in Qena Governorate

Indigenous Plants	126
Water Birds	56
Mammals	26
Amphibians Reptiles	31
Fish	56

Desert Habitats cover 80% of Qena Governorate and are largely unspoilt wildernesses. The western and eastern deserts provide the two main desert habitats. Although poor in terms of species richness, these habitats are important to a range of highly adaptive creatures and a number of these are potentially threatened. Open vegetated desert regions like Wadi Qena and El Laqita are vital habitats for the Dorcas Gazelle (*Gazella dorcas*) and Rueppell's Fox (*Vulpes rueppelli*). Vegetation is key to their survival and this is largely restricted to wadis and plains. Desert habitats are generally in good condition though increasing human activity ([i.e. quarrying)] poses a threat to the existence of these delicate environments.

Drastic ecological changes have occurred in the Nile valley over the last hundred years as a result of intensive human interventions. These interventions which include activities such as; land reclamation, bank protection work, uncontrolled building on agricultural land, manipulation of river hydrologieshydrology (i.e. Aswan Dam), industrial and domestic pollution, pesticide use, hunting, quarrying and population growth have all altered the structure and balance of existing habitats in some way or another. In response many animal and plant species have either changed in distribution or disappeared completely from their respective habitats.

In the deserts, land reclamation most commonly targets marginal land and vegitativevegetative desert. In these areas Nile valley species tend to colonise the newly created environments forcing a drastic reduction in many desert species like the Barbary Falcon (*Falcon pelegrinoides*), Stone Curlew (*Burhinus oedicnemus*) and Houbara Bazard (*Chlamydotis u. macqueenii*) which is endangered. The disapperancedisappearance of the Barbary Falcon might be due to falcon trapping whilst the disappearencedisappearance of the Stone Curlew is almost certainly due to land reclamation. On the other had populations of sandgrousesand grouse have increased with the advent of land reclamation.

Wadi Qena

Bank protection work is another significant factor contributing to a reduction in river biodiversity. It has a deterimentaldetrimental impact on fish breeding and the loss of shoreline vegetation not only reduces waterbird nesting grounds but also the river's ability to cope with increased pollution and nutrient loads. Erosion is evident in areas behind the Isna barrage but gradually decreases northward toward Naga Hammady barrage. Indeed after the construction of protection structures on the eastern bank of the Nile erosion affected the whole area in front of El Zawaida village. Untreated discharge from factories like the Armant Sugar factory and paper factory at Qus and solid waste dumping by cruise boats or communities living along the river also have a significant impact on the rivers biodiversity.

The incidence of bird populations is a good indicator of imminent or current environmental change. On arable land for instance species like the Yellow billed Kite (*Aegyptius*), and sand martin (*Riparia riparia*) have probably declined due to increased pesticide use whilst species like the Cattle Egret and the Kestrel (*Falco tinmunculus*) have increased. Around the Nile the impact of the Aswan High Dam has lead to a proliferation of reed beds (good nesting sites) and marshes which has resulted in the spread of species like the Squacco Heron (*Aredeola ralloides*) Purple

Kingfisher

Swamphen (*Porphyrio porphyrio*) and the resident Kingfisher (*Ceryle rudis*). However, the gradual erosion of sand banks has resulted in the virtual disappearance of the Egyptian Plover (*Puluvianus aegyptius*). The Dam has also had a significant effect on the variety of local fish. Of the 56 fish species found in Upper Egypt, 70% of them are now either locally extinct or very rare due to loss of habitat, over fishing and pollution. In the deserts threatened species include the following mammals; the Nubian Ibex (*Capra nubiana*), Striped Hyena (*Hyaena hyaena*), Dorcas Gazelle (*Gazelle dorcas*), Rueppell's fox (*Vulpes rueppelli*) and Barbary Sheepsheep (*Ammotragus lervia ornate*).

Hyacinth in Agricultural Canal

Like many Governorates in Egypt increased demand on limited resources means that Qena has fewer resources to spend on areas like nature conservation which are considered to be a low priority. With this in mind general awareness about biodiversity, landscape value and nature appreciation is low. (This said however, there is considerable interest and support for environmental activities that enhance the social-economic welfare of the Governorate. Indeed the Governor has taken a keen interest in improving Qena City's environment, 60% of the cities solid waste is now recycled and there are plans to establish a landfill site in the desert.)

Objectives

- To protect Qena's biodiversity and ensure conservation of priority habitats and species.

Policies

- Build up the Governorates capacity to monitor, manage and develop conservation programmes.
- Protect priority habitats and species by introducing a species and habitat protection programme.
- Improve monitoring and management of the above programmes by developing practical action plans.
- Promote awareness among decision makers, NGO's, schools and community of the importance of nature and biodiversity conservation through education programmes [(i.e. promotion of green cornercorners)].

10 Year Targets and Programmes

Establish a Biodiversity and Nature Conservation Programme [(NCP])

- Allocate a budget and personnel for this purpose.
- Strengthen staff to design, develop and manage the NCP.
- Establish a nature conservation programme and set up criteria to identify priority habitats/ species.
- Develop practical and effective management and monitoring systems.
- Strengthen the Governorates environmental management unit to help enforce and control environmental law and facilitate delivery of an effective NCP.

Manage Protected Areas

- Identify priority habitats/species that either have, or will need protection and develop action plans to manage and protect their biodiversity.
- Each habitat action plan should include; a status summary of the habitat and priority species, realistic objectives and targets, and a list of current and proposed actions.
- Raise awareness of the importance of having protected areas among key stakeholders.
- Declare Wadi Qena and the Nile Islands protected areas.
- EIA's should be strictly adhered to.

Control Environmental Threats

- Introduce measures to protect the habitat of marginal lands from excessive land reclamation.
- Introduce and enforce a ban on hunters entering prioritised habitats and hunting endangered species and fine violators.
- Identify main sources of pollution and enforce relevant laws to limit the disposal of untreated waste in priority habitats.
- Introduce measures that control the level of human activity ([quarrying, building etc)] in sensitive habitats. Control dumping in desert areas, particularly along the Qeft-Quseir road and establish sanitary landfills to deal with waste.
- Establish solid waste management programs for cruise ships on the Nile.
- Introduce an erosion protection programme to reduce the effects of increased levels of erosion on some affected stretches of the Nile.

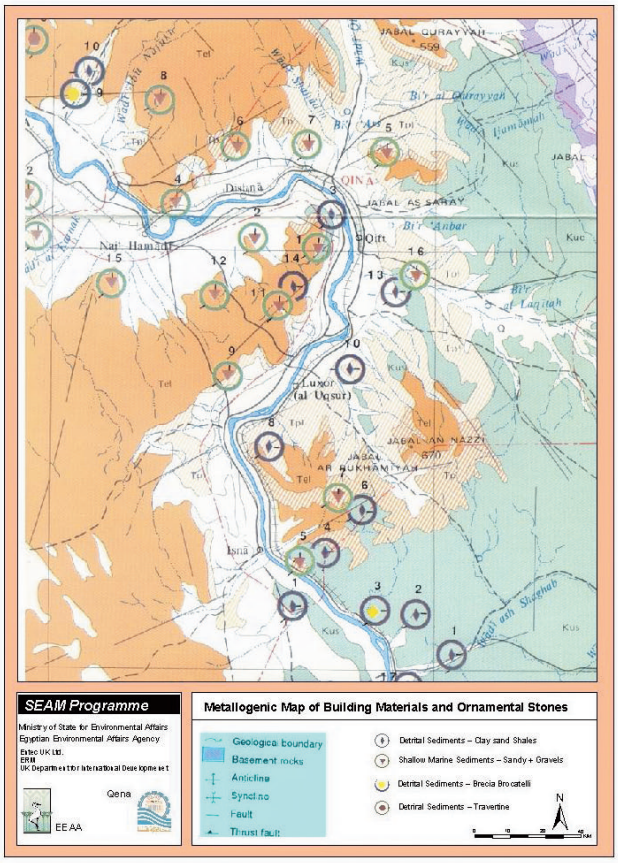
White Stork

6.11 PRESERVATION OF NATURAL RESOURCES & CULTURAL HERITAGE

Natural Resources

Qena's main mineral deposits include,include limestone, shale, sandstone, sand, granite and clay, which are for the most part used in construction. These minerals are mined in a number of locations along the Safaga-Qena and Qeft-Quseir roads where they are then transported to areas like the Red Sea coasts to be used in construction. Phosphate another relatively important economic mineral is mined from Idfu to north Qena and is used domestically in El Mohamed and El Sibaiyah. Other less frequent mineral deposits include talc found in Wadi Um Sulaymat and gold found in Fawakhir and Atalla. Quarrying and mining is widespread in desert areas but is limited south of the Sheikh Fadl-Ras Ghareb road.

Metallogenic Map of Building Material and Ornamental Stones in Qena Governorate

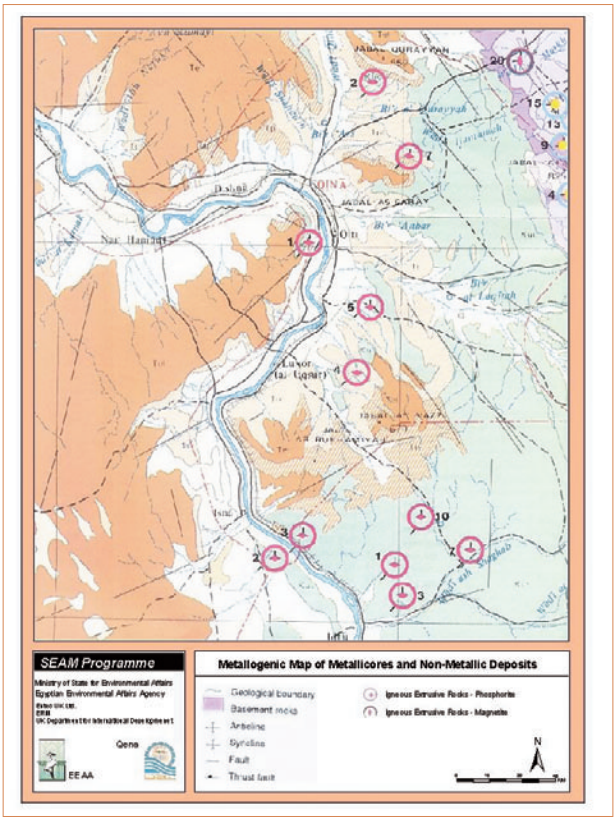


At present the industry lacks adequate planning and regulation, which means that many quarrying and mining activities, often occurring in sensitive environments or culturally rich areas are not sufficiently controlled. For instance, Nubian sandstone quarrying along the Qeft-Quseir road occurs in an area rich in prehistoric rock drawings and Roman and Islamic forts. Similarly general quarrying and soil mining as well as dumping of waste by products by the newly established cement factory north of the Quseir-Qeft road is having a negative impact on a large tract of the Eastern Desert.

Sandstone Quarry

The government has however taken steps to limit quarrying in some areas ([e.g. south of the Sheikh Fadl-Ras Ghareb road in the extreme north and south of Wadi Qena)] by issuing a decree. It has also banned the exploitation of aggregates along the main desert roads. In general terms, quarrying activity in Qena often involve the separation of valuable minerals from the surrounding rock leaving significant amounts of waste rock (i.e. the phosphate mines in South Isna and Wadi Zeidon near the Quseir road) this leaves behind scars that spoil the natural landscape which has a damaging effect on the local environment and tourism.

Metallogenic Map of Metallic Ores and Non-Metallic Deposits in Qena Governorate

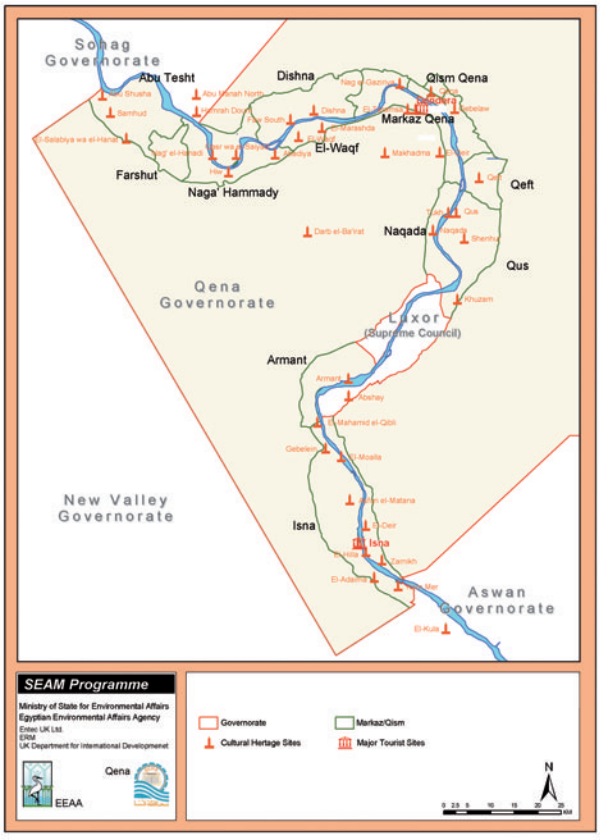


Natural Resources	
Main Environmental Targets	**Recommended actions**
Strengthen the planning, operation and regulation of quarries and mining operations	- Identify and map quarry and mining areas using GIS and train existing staff in the use of GIS so that they are better able to manage and monitor these sites. - Using GIS and land use planning techniques train relevant staff to plan the location of future mining and quarrying sites that do not threaten cultural and natural heritage sites. - Enforce the use of waste saving technology like wire saws, large diameter circular blades and thermal lancing in mining and quarrying operations through regulation.
Strengthen the Capacity of Quarrying and Mining Management	- Train EMU staff to use and enforce existing planning and regulatory systems so that Mining and quarrying activities meet Egyptian Standards. - Develop guidelines for the EMU to help them manage and monitor mining and quarrying operations so that they are better able to prevent and mitigate environmental impacts. - Introduce an action plan to enforce the recent decree limiting quarrying in some areas, priorities Wadi Qena and Qeft –Quseir road.
Improve Environmental Impact Assessments (EIAs)	- Strengthen the capacity of EMU offices to better understand and manage the EIA's application process. - With the above training in mind introduce measures that better enforce EIA requirements on mining and quarrying operators before they are allowed develop their sites. - Impose strict penalties on mining and quarrying operations that do not comply with environmental regulations. - Encourage community consultation and public participation in the EIA process to improve the quality of environmental decision-making.
Mitigate the Impact of Quarrying and Mining Activity	- Reduce waste and dust emissions from mining and quarrying sites by making it a legal requirement that operators install adequate waste management and air filtration systems. - As a condition for granting land use planning consent introduce measures that require mining and quarrying operators to restore old open pits to an acceptable environmental standard agreed between the EMU and company. - In the abandoned mining areas, re-contour the disturbed area and obliterate all earthworks by removing embankments, backfilling excavations, and grading to re-establish the approximate original contours of the land in the area of operation.

Cultural Heritage

Qena Governorate Governorate has two key tourist attractions, the Isna and Dendara Temples these together with Qena's Eastern and Western Desert contain numerous archaeological sites from Prehistoric, Pharaonic, Greek, Roman, Islamic and Coptic periods (see Map). The Eastern Desert has a wealth of archaeological sites that are little known and seldom visited like the numerous fortified watering-stations or "hydreuma". The Qeft-Quseir road was an important trade and pilgrimage route between the Nile Valley and the Red Sea. Along this road prehistoric rock drawings, Greek graffiti and the remains of Roman and Islamic forts and settlements can be found. However, for the most part tourists come to this part of Egypt to visit the Luxor and Karnak temples and the Valley of the Kings, which are situated in the Supreme Council of Luxor (a separate administration). With this in mind the economic contribution that tourism makes to Luxor as opposed to Qena's economy is significant. Regardless of this, development of infrastructure that is closely associated with opening up areas of cultural and historical importance to tourists needs to be closely managed so that it does not destroy the very environment people have come to visit.

Cultural Heritage Sites in Qena Governorate



There is evidence that valuable cultural heritage sites and areas of environmental importance are being destroyed by human activity. Particularly under threat, are antiquities in remote desert areas like Wad Hammamat and Wadi Abu Kue along the Qeft-Quseir road, which have poor site protection and management. Other sites have been destroyed in the process of road construction whilst prehistoric rock drawings have been damaged by graffiti. In addition land reclamation in the desert behind Dendara Temple could also exacerbate the rise in the water table threatening the temple. Some limited reclamation efforts are underway in the downstream part of Wadi Qena.

Given its strategic location and natural and cultural heritage resources, the Governorate Governorate has moderate to high potential for tourist development. Tourism currently plays a significant role in generating jobs and reducing poverty in the Governorate. However this role could well be substantially increased if Qena is able to improve upon the current management and operation of its cultural and natural heritage sites.

Dandara Temple

Cultural Heritage	
Main Environmental Targets	**Recommended actions**
Strengthen Management of Cultural Sites and areas of Environmental importance	- Strengthen the capacity of the Department of Antiquities to better manage and monitor sites of cultural importance. - Introduce greater coordination between government departments responsible for protecting cultural sites and those protecting areas of environmental importance. - Identify and map areas of cultural heritage using GIS and integrate them into land use planning for the Governorate. - Investigate the potential of using a proportion of the revenues earned from more popular sites to fund the upkeep of less well known but equally important cultural heritage sites. - Regulate development in desert areas and require that Artifacts and cultural heritage conservation issues be considered in the scope of the Environmental Impact Assessments (EIAs).
Strengthen Capacity Building	- Build capacity in cultural heritage conservation and natural resource management to meet the urgent manpower requirements of Governorate in this emerging field. - Supreme Council of Antiquities should assign the responsibility of following up on cultural heritage conservation issues at Governorate level to the appropriate department
Enhance Conservation of Cultural Heritage	- Regulate land reclamation, quarrying and solid waste dumping in desert areas of the Governorate to insure such activities do not take place in areas of cultural heritage. - Control development in and adjacent to cultural heritage sites. - Enforce immediate control on land reclamation behind Dandara Temple. - Site protection efforts (i.e. use of guards, sign posting, regular monitoring and enforced fines) are needed to stop vandalism and gradual deterioration of cultural heritage sites. This is especially important along the Qeft-Quseir road and Dandara Temple. - Improve the extent and range of publications on cultural heritage sites and areas of environmental importance to increase local awareness and expand tourism to these sites. - Implement conservation work (i.e. site stabilization, restoration, or reconstruction on sites when necessary - Develop and initiate programs to preserve traditional architecture in the Governorate.
Enhance the area around Isna Temple	- Address solid and liquid waste problem around the Isna Temple. - Restore surrounding Islamic buildings using as appropriate adaptive reuse (i.e. transform the Wakaf into a visitor centre e.g. El Ferka El Sodany).

7 WHAT ACTIONS CAN WE TAKE NOW?

7.1 Developing Partnerships

One of the GEAP's main objectives is to generate action and a sense of ownership. Through consultation during its preparation ensuring that the fullest possible range of views on issues and priorities has been captured, a start has been made towards implementing a GEAP in which all parts of society in the Governorate feel some ownership. There has been a genuine attempt to empower potential beneficiaries to have a say in what is implemented, and special care has been taken to give a voice to poor and marginalised groups that are frequently overlooked. The aim has been to enable a wide range of people to understand how their contribution to the GEAP process can improve their own environments and livelihoods by identifying actions and proposed projects that reflect their views on how best to improve their environment. As a result, it is hoped that those participating in the GEAP process will feel greater responsibility for making the ideas work in practice. This is essential for the many environmental issues that cannot be resolved without the direct participation of individuals and communities to improve environmental conditions for themselves and others.

Stakeholders' views may not necessarily represent the Governorate's key environmental issues in every case, but they have been accommodated within the GEAP through an objective, transparent prioritisation process. This prioritisation has recognised the need for rapid, often short-term responses to acute, immediate problems, partly to foster growing support for longer-term, more costly actions to address broader longer-term environmental issues that will ultimately deliver sustainable development in Qena. Experience gained from other environmental action planning processes suggests that public attitudes are likely to change positively through this involvement in preparing and implementing the GEAP.

The GEAP has tried to incorporate the priority concerns and requirements of all stakeholder groups in the governorate, and it has identified many opportunities for different groups to work collaboratively towards sustainable development in Qena. Some of the actions discussed in Section 6 have been planned, or are now being implemented, by coalitions of public and private sector organisations, whilst in other cases communities are implementing actions in collaboration with support from different types of organisation. 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 realize what an Action Plan can achieve, thus increasing support and advocacy for the GEAP. These projects are also seen as the initial way of promoting greater partnership 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 been fully involved in the GEAP working groups, which has been instrumental in developing Qena's Environmental Profile and GEAP priorities. To support GEAP activities at a strategic level, the Governorate has established a High Council for Environment (HCE), which is responsible for facilitating the GEAP process and reviewing existing GEAP commitments on a regular basis.

Qena Governorate has also recently undertaken a number of large-scale solid waste initiatives: these include the development of a municipal waste collection and transfer station in Naga Hammady, and an innovative waste collection and disposal system in Qus City. Both of these initiatives have the potential to be replicated elsewhere in Qena and other Governorates. Governorate staff have also shown keen interest in actively

encouraging community and private sector initiatives that aim to improve the environment.

The Governorate has recently been awarded an ISO 14001 certification for its management of environmental systems within the Governorate's main office, clearly demonstrating its leadership credentials in environmental management.

7.3 An Important Role for the Private Sector

The private sector has an important part to play in helping Qena Governorate achieve its GEAP. Development of this role jointly with other stakeholders, particularly the Governorate administration, is essential. The Governorate should identify the various ways in which the private sector could become involved, and how this could be encouraged. This could, for instance, involve: expanding the role of the private sector in environmental service delivery (e.g. upgrading waste collection and disposal, water supply, or sewage treatment); building more constructive partnerships between the Governorate EMU and industries and developers to address EIA compliance and factory inspection issues; and promoting and supporting corporate responsibility in the private sector, for example through introduction of better self monitoring systems or adopting sound environmental management practices.

As part of the GEAP process a significant number of industries were visited to help identify opportunities for improving industrial processes, in order to protect the environment, safeguard the health of workers and local residents, promote low cost technology and increase the quality and efficiency of production.

An example that clearly demonstrates what the private sector can do to support the GEAP comes from a car painting workshop on the Salhia industrial estate which has started to improve their industrial operations. The workshop is in the process of introducing four high volume low-pressure (HVLP) paint guns into its painting booth. The guns will reduce paint consumption and the emission of volatile organic compounds, thus reducing costs and protecting human health and the environment. Four further car-painting workshops on the same industrial estate are now interested in using the same technology.

As the interest of further workshops on the industrial estate demonstrates, private sector firms are themselves often the best advocate for change in support of the GEAP. It is therefore important that representatives from the private sector are part of the Governorate's Environmental Management and Planning System (EMPS: see Section 8,) to ensure that full private sector participation and involvement in environmental improvement is developed.

7.4 Community-Based Actions

In order to ensure full and effective participation of all stakeholder groups in the GEAP process considerable efforts were made to support dialogue with communities and the NGOs and

Car Painting Workshop, El Salhia Industrial Estate

CDAs that support them. Part of this process involved convincing community groups that their active involvement could bring tangible benefits to their communities. To demonstrate this a workshop was held to identify a number of Community Environmental Projects (CEPs) that would be supported as part of the GEAPs implementation process. Subsequent dialogue led to the identification of 168 CEPs proposals, which covered the following issues:

Solid Waste Management CEP, El Dier Village

- Water connections (44 proposals) –- to increase the number of water connections in Qena Markazes and initiate related awareness-raising activities.
- Improve sanitation & provide septic tanks (41 proposals) – increasing treatment capacity, constructing septic tanks and establishing septic tank emptying services.
- Solid waste management and waste collection (30 proposals) - focusing on street cleaning programmes, involving recycling and in some cases waste processing to generate fodder or organic fertilisers.
- Environmental Awareness (14 proposals) – involving general awareness raising and education programmes on the environment.
- Tree Planting (12 proposals) – to beautify barren areas and protect open areas from gathering waste.
- Recycling of Agricultural Waste (3 proposals) – teaching farmers to recycle agricultural waste and use it as an organic fertilizer or animal fodder.

- Other Categories (19 proposals) – covering a variety of smaller initiatives such as community gardens and local drainage projects.

The concentration of proposed projects focusing on water provision, sanitation and solid waste management reflect the high priority that many communities in Qena place on the provision of basic environmental infrastructure. Most continue to rely on treatment plants, compact units and ground water wells for water supply and on basic, on-site sanitation systems. Solid waste disposal also tends to be basic.

The following table illustrates the range of community-based actions other agencies are supporting in Qena, under working agreements with the Ministry of Social Affairs.

The Governorate and various aid agencies are funding a number of community water supply and sanitation initiatives. With this in mind SEAM programme selected and funded the following six CEP proposals which addressed other priority areas identified by communities in some of the poorest and most environmentally degraded villages:

- Dier (Essna Markaz) - A low cost solid waste collection and transfer system to reduce the indiscriminate dumping of waste in open spaces;
- Taramsa (Qena Markaz) - A solid waste and wastewater collection system to deal with the problem of animal waste and wastewater, which is causing a serious health risk.
- Mahrousa (Qena Markaz) - A solid waste collection system to resolve the problem of animal and agricultural waste.
- Hanady (Essna Markaz) and Khouzam (Qus Markaz) - Tree planting and beautification projects to increase shaded areas and improve the general living environments of both villages and increase environmental awareness among village residents and,
- Negm Bahgoura (Naga Hammady Markaz) - An environmental awareness and education programme in support of a women's association health project. The programme aims to raise environmental awareness through the use of promotional material and organised campaigns. The same association also went on to implement a solid waste collection programme.

All four solid waste initiatives included a community clean up and health and hygiene awareness campaign, and all six included an environmental awareness component.

The CEPs serve to demonstrate to communities the range of low cost environmental actions that can be taken to resolve many of the problems they face in their daily lives. The projects are managed by local NGOs and CDAs, which helps develop a sense of ownership among local people. This is strengthened through NGO and CDA involvement in measuring the environmental impact of these projects, and demonstrating their success to other villages in order to aid their replication elsewhere in the Governorate. As the GEAP moves forward, it will be important to mobilise resources to promote ownership and facilitate dissemination and replication in other villages where the local community is willing to contribute. It is important that communities are prepared to meet up to nearly 50% of the estimated cost of the project, mostly through in-kind contributions such as land, voluntary labour and materials.

In summary, some very simple actions that can be taken at the

Some NGO activities in Qena Governorate

NGO	Scope of Work
CARE	Water and sanitation, education, credit and revolving loan fund. Implementing environmental projects according to need assessments.
UNICEF	Health care, revolving loan fund, water connections in cooperation with government and local units.
EURO- Group	Water and sanitation, family planning etc
SFD	Sanitation, waste collection, village beautification, evacuation projects, covered drainage systems, pitching canal sides, small enterprises
CARITAS	Hygiene awareness, revolving loan fund, constructing sanitary latrines
Fredreich Ebert	Organizing training events for CDAs and associations
CEDPA	Health care projects and midwives training project.
Jon Snow	Mother and child health care.

community level include:

- Participating in the design and implementation of development projects
- Spreading awareness raising messages into homes and among the wider community.
- Instilling civic pride by organising clean-up campaigns, which reduce indiscriminate dumping of waste and littering and discourage persistent offenders.
- Supporting and encouraging NGOs and CDAs to work with the Governorate and businesses to bring about environmental improvements.
- Sustaining the operation of services that have been provided.
- Encouraging employers to be more environmentally responsive and assisting them by not leaving taps running, minimising wastage and so on.
- Informing the local environmental unit or liaison officer of pollution incidents.

The CDAs involved in implementing the above CEPs have received training in: conducting social surveys; project and financial management; and environmental awareness. As a result of this training a number of Qena's CDAs are now better able to partly or wholly fund a number of their own environmental initiatives, for example;

Tree Planting CEP, El Hanady Village

- In Taramsa and Mahrousa – Solid waste brochures were produced to promote a community driven solid waste initiative, describing the steps communities could take themselves to reduce and manage solid waste and improve hygiene. During their preparation, household visits were conducted to encourage community participation and increase public awareness of the main issues.
- In El Dier – Banners were produced to promote a community-driven solid waste management project. This was followed by a public awareness programme on citizen responsibility and hygiene-related issues.
- In El Handy and Khouzam – Tree planting projects were implemented and related public awareness materials produced.
- In Negm Bahgoura – A village environmental awareness programme was initiated to identify and discuss solutions to the village's main environmental issues. This was followed by a village street clean-up campaign and an environmental awareness competition in local schools.

Tree Planting CEP, Khousam Village

Whilst preparing their proposals, NGOs and CDAs identified problems in identifying and designing projects that could be funded by the various funding sources available for community development. With this in mind more needs to be done to improve the proposal writing capacity of NGOs and CDAs. Furthermore, CDAs and NGOs need to ensure that proposals demonstrate that they effectively target a real need, and match the funding priorities and administrative requirements of potential funding agencies.

Waste Water Collection, Taramsa Village

Estimated Cost of Qena's CEPs

Project Name	CDA Name	Total Cost LE
Taramsa Village Solid and Sanitation Waste Collection	*Taramsa CDA*	149,100
Mahrousa Village Solid Waste Collection	*Mahrousa CDA*	165,900
Deir Village Solid Waste Collection.	*Deir CDA*	136,000
Hanady Village Tree Planting and Beautification	*Hanady CDA*	24,600
Awlad Negm bahgoura Environmental Awareness and Education Programmes,	*Awlad Negm Bahgoura* Women's Association – Naga Hammady Markaz	20,750
Tree Planting and Beautification	*Khouzam CDA* – Qus Markaz	25,650
Solid waste collection in Awlad Negm Bahgoura Village, (building on previous awareness CEP).	*Awlad Negm Bahgoura* Women's Association in cooperation with Awlad Negm Local Government Unit, Naga Hammady Makaz, Qena	130,200
Building the capacity of Environmental network federation of the CDA	16 CDAs covering different parts of Qena	137,690

8 INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING

Successful implementation of actions outlined in Qena's GEAP should result in a more efficient use of current resources. New investment will also be required, particularly for proposed infrastructure developments. In both cases, a significant effort will be needed to develop the organisational structures, processes and incentive systems required to support implementation.

In Qena most of the basic institutional building blocks are already in place, and some of the key actions to strengthen existing institutions and promote more effective coordination are described in this section. The Governorate has recently established a High Council for Environment (HCE), which is responsible for facilitating the GEAP process. It also has an Environmental Management Unit (EMU) at Governorate level and Environmental Units were recently established in each Markaz. Line ministries, such as the Ministry of Housing, Ministry of Irrigation, and the Ministry of Health and others have environmental responsibilities under various Laws and important roles to fulfil: their capacity to deliver on these responsibilities will need strengthening, as will the structures and processes to facilitate an effective contribution from the private sector, NGOs, CDAs, and the community at large

8.1 Environmental Planning and Management System

To implement and sustain the environmental actions outlined in the GEAP an effective decentralised Environmental Planning and Management System (EMPS) should be established. This should set in place a structure for managing, assessing and continuously improving the effectiveness and efficiency of decentralized environmental management at Governorate level. The EMPS should emphasize a planned and systematic approach to environmental management, which will be regularly reviewed and updated to ensure its continued relevance, under the supervision of the HCE. The EMPS will have the following broad functions:

- Strategic and operational planning to ensure sustainable and environmentally friendly development.
- Application of environmentally sensitive land-use planning through stricter enforcement of EIA requirements.
- Co-ordination of all stakeholder group activities to improve environmental services, resource conservation, protection, and remediation.
- Increased 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 and its regular update.

The principal institutional strengthening requirements stem from the need to:

- Develop the EMPS, so that it is capable of effectively *addressing the priority issues* described in Section 4 of this GEAP.
- 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* of stakeholder groups with an interest in improving environmental services and natural resource conservation.
- Establish a *coordinated network* of stakeholders to facilitate the GEAP's sustainability.

DECENTRALISED 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 ASWAN

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.

QENA 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 and they are heavily involved in the EIA process. 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.

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

* The recently established High Council for Environment (HCE) is responsible for coordinating and streamlining environmental planning and management activities at a Governorate level. Qena is now in the process of defining its structure and roles and responsibilities, which are likely to include:
  - The establishment of 3 sub committee's representing the GEAP's three most important priority areas (i.e. Solid Waste Management, Water & Sanitation and Agriculture). These sub committee's will be responsible for monitoring progress against agreed actions in the 3 main priority areas.
  - Establishing mechanisms aimed at integrating the GEAP's strategic priorities into the Governorate's more general planning, programming, budgeting and resource allocation processes.
  - Promoting greater coordination and information sharing between central government ministries and their agencies at Governorate level.
  - Increasing cooperation and coordination between sectoral agencies at Governorate level.
  - Providing feedback to central agencies (e.g. EEAA) and maximising local inputs on national environmental policies and plans (i.e. the NEAP)
  - Following up on the implementation and updating of GEAP priorities and ensuring that environmental factors are integrated into development plans.
  - Playing an advisory role to the Governor on strategic environmental issues.

  One of the HCE's first priorities will be to ensure that environmental plans and priorities set out in the GEAP are implemented.

* Continuing to strengthen Qena's EMU through targeted training programmes. The EMU currently has 12 staff and is divided into the following departments:
  - An EIA department aimed at ensuring that factories and industry accurately complete their EIA reports before they are submitted to EEAA for consideration.
  - A Complaints department tasked with dealing with Environmental problems submitted by the general public.
  - An Inspection department responsible for inspecting industries/factories to ensure they comply with environmental standards
  - A Training department and Communications department responsible for raising awareness of environmental issues

* Environmental Management Units have been established in Industrial Estates.
* Establishing Environmental Units in each Line Ministry that are more directly related to environmental activities such as the Ministries of Housing, Health, Agriculture, Industry, Irrigation and Tourism.
* Appointing Environmental Liaison Officers in other Line Ministries.
* Strengthening the capacity of each of the 51 Environmental Liaison Officers that exist at Mother Village level.
* Strengthening the capability of the Environmental Units that have been established in each of the Governorates 11 Markazes.
* Once the president has issued a decree allowing Qena to establish a Public Economic Authority for water supply management, strengthening measures, particularly in the areas of planning, maintenance and tariff collection should be taken to build awareness and environmental management capacity.
* Appointing an Environmental Co-ordination and Development Officer within the Directorate of Social Affairs, so that the roles of NGOs and CDAs in environmental management can be supported more effectively.
* Strengthening the capacity and resources of representatives from the education directorate at Markaz level who are responsible for supporting environmental activities in all schools.
* Establishing a central Solid Waste Management Unit (initially with 2-3 staff) to plan, promote and coordinate solid waste management activities as well as support moves towards privatised services, including the monitoring of contractor performance and compliance. The staff would need to be trained in general waste management and strategic and financial planning. Qena Governorate has already developed a solid waste management strategy, which recommended the establishment of a central solid waste management unit.
* In due course, establishing an extension service to assist the many small to medium sized businesses to adopt environmentally safe technologies and management practices.
* Strengthening Agricultural extension workers on environmentally related issues
* Building the Ministry of Health's capacity 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 the EMUs in each Governorate into a general office for environment. This will give increased status and profile to environmental matters, and will 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 the trial is complete, Qena Governorate should quickly build up the capacity of this new department so that it is able to provide full support to GEAP implementation.

  Amongst its main duties the general office for environment 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, focused at a central level, aims to develop an overall strategy for decentralised environmental management whilst the second task force, focused at a Governorate level, is in the process of developing mechanisms to implement the strategy (i.e. establishing horizontal and vertical 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 Governorates present decentralised environmental management system it should also help coordinate and strengthen the effectiveness of other key directorates with in Qena to fulfil their environmental responsibilities. The following table illustrates responsibilities and coordination of key environmental directorates.

KEY ENVIRONMENTAL DIRECTORATES (Responsibilities and Coordination)

Directorate	Areas of Environmental Responsibility	Coordination with others
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 through joint inspection with 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.* - *Violation of laws other than Law 48 are referred to the EMU or other relevant authority.* - *Refers problems related to the quality of irrigation water to the central WRI Ministry.*
MINISTRY OF HOUSING, UTILITIES AND URBAN COMMUNITIES **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 sewerage 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 Surface Water Police.*
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.*	- *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 Markaze.*
MINISTRY OF HEALTH AND POPULATION **Health Directorate**	- *Takes samples from potable water supplies, water treatment plants sewage treatment plant effluents, wastewaters in local sewerage networks, and canal waters.* - *Analyses these samples (or arrange for their analysis by the central Health Ministry)* - *Takes and analyses 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.*

8.3 Institutional Strengthening of Other Organisations

Capacity building should not be confined to Government organisations. A significant effort should also be directed towards NGOs, communities, educational establishments and the private sector, to strengthen their capability to plan and manage environmental programmes and projects. Initiatives should 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.

Most of the new EMPS structure (see Box 8.2) 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 the stakeholder discussions, it is clear that raising environmental awareness within the community is a high priority.

Awareness campaigns should be planned to target all sections of the community. New approaches and concepts to support achievement of the GEAP's objectives and targets will take time instill, and significant resources will be needed to be generated to support this process. In the early stages (i.e. the first two or three years), campaigns should be built around the GEAPs priority issues with some programmes targeting:

Primary stakeholders on:

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

Secondary stakeholders on:

- The importance of, and need for, provision of improved waste management, water supply and sanitation services.
- The need for industry to self-monitor the impacts of incorrect industrial discharges on the surrounding community.
- Employers to improve working conditions.
- Preservation of natural resources.

The campaigns should be run throughout the Governorate and focus on settlements as and when utility services are provided and/or improved.

Public awareness operates on many fronts; the media, educational establishments, NGOs, CDAs and industry representatives playing pivotal roles. To support GEAP implementation in Qena, it is intended that special promotional and interpretative materials should be produced, including posters, general and thematic videos, TV and radio programmes, and special messages to be conveyed by Imams and other religious leaders. The GEAP promotion materials will coordinate with ongoing, public awareness campaigns, including annual Environmental Events and Competitions under the patronage of HE the Governor, and special clean-up and "greening" programmes which might be sponsored by donor organisations or the private sector.

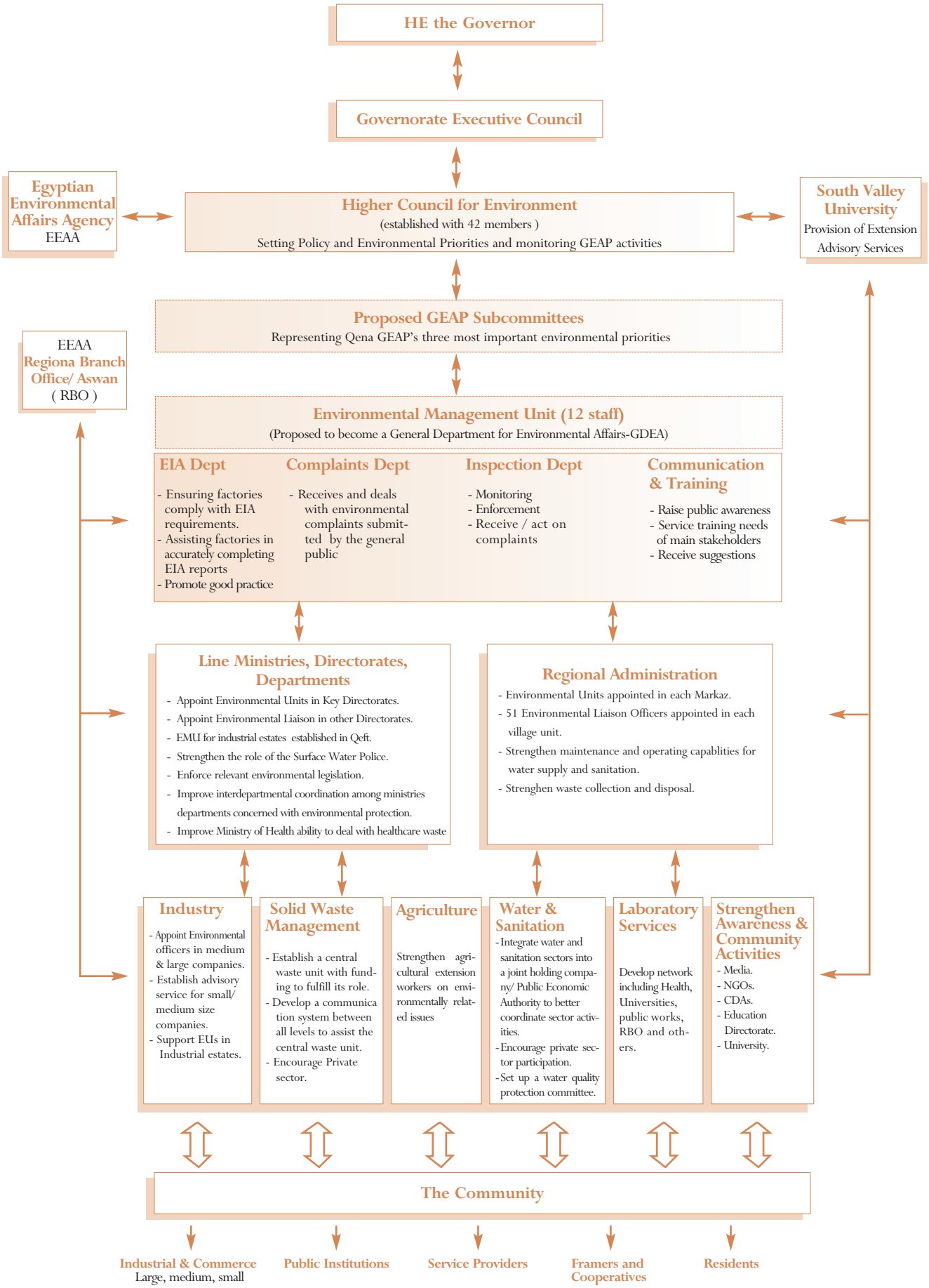
Environmental Awareness CEP, Qena Governorate Schools

Universities and schools should be targeted to raise awareness among students, who can often influence parents' habits and behaviour. As a first step, effort therefore should focus on fostering a high level of environmental awareness in university lecturers and schoolteachers, and on building their commitment and support for the GEAP's objectives.

These activities should be coordinated with EEAA, which has a public information office that has 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.

BOX 8.1 ENVIRONMENTAL MANAGEMENT SYSTEM



8.5 Training

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

High priority should be given to the training of staff assigned to those newly established or strengthened 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. For training support and assistance the unit could build links to facilitate support being provided by EEAA, South Valley University, and local colleges, NGOs, the private sector and the donor community.

The following tables indicate the kind of training primary and secondary stakeholder groups have already received and areas that that they want to receive further training in.

Solid Waste Management Introductory Workshop, El Dier Village

Solid Waste Management Introductory Workshop, Taramsa Village

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

Target Group	Training/Awareness
EMU/EUs	- Use of monitoring equipment - Environmental Impact Assessment - Laws and regulations - Inspection procedures and complaints - Field Inspection - Hazardous waste management
ELOs	- ELO training on the 'Environmental Officers Manual'
CDA	- Conducting social surveys - Project management - Environmental awareness - Financial management
Molasses Factory Owners	- Cleaner Production opportunities
Head of Industrial Estates, Heads of relevant Governorate departments (i.e. water, sanitation, electricity and industrial safety)	- Environmental management for Industry

Environmental Training needs identified by Qena's key environmental Directorates

Directorate	Training needs
Agriculture	- *The use of chemical fertilizers and organic alternatives.* - *How to increase the quality of garden crops for export, especially in newly reclaimed areas.* - *Developing and improving fisheries.*
Water Resources	Irrigation - *Water management particularly on conveyance and distribution.* - *The consumptive use of different crops.* - *The benefits of different irrigation systems and water savings techniques.* Drainage - *The rehabilitation and renewal of old drainage systems.* - *How best to irrigate, drain and crop newly reclaimed areas.* - *The environmental impact of the Isna and Naga Hammady Barrages and how to lessen their effect on agriculture (water table, irrigation, drainage, crops)*
Water & Sanitation	- *Operation and maintenance of water and sanitation networks and systems in treatment plants.* - *Techniques for measuring the leakage and loss of water in water networks.* - *Techniques for reducing water loss.* - *Training chemists involved in testing water quality.*
Solid Waste Management	- *General capacity building on management of waste for employees and managers involved in SWM (City to Markaz level)* - *How to improve public awareness and responsibility of waste issues.* - *Safe recycling of waste.* - *How to increase incentives for private sector involvement in SWM.*
Industry and EMU/EUs	- *Hazardous waste management* - *Environmental Inspection* - *Environmental Impact Assessment EIA* - *Environmental laws* - *Environmental development*

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 and the five priority key issues that have already been identified need to receive urgent action:

1. Improving sanitation.
2. Improving solid waste management.
3. Improving water supply and water quality
4. Improving environmental awareness among government staff and Qena residents
5. Reducing industrial pollution.

Actions relating to the first three priorities will be primarily the responsibility of the Governorate to provide environmental utility services (although, in time, opportunities for private sector participation should be investigated). Actions to address the fourth priority will be the responsibility of both the private and public sector companies. Lead responsibility for the last priority will rest with Qena Governorate's Department of Public Awareness.

Solid Waste Management Training Workshop, Taramsa Village

To address these issues, in the first three years priority will need to be given to the following:

a) Establish and strengthen the EMPS

Sustainable results depend on putting in place the appropriate organisational structures, and resource requirements to achieve them. The structure proposed in Section 8 should be implemented within the first year of the GEAPs launch. In order to do this effectively the Governorate should establish a General Office for the Environment, which will have a pivotal role in implementing the Plan within the Governorate, under the supervision and guidance of the recently-established High Council for Environment (HCE). Resources should be secured to provide the necessary training to all GOE and HCE appointees within the first two years.

Broader awareness of the role of constituent parts of the EMPS in delivering on the GEAP's objectives and targets should be promoted. An environmental awareness campaign strategy should be developed to ensure that the successes of environmental projects are disseminated throughout the Governorate, supported by appropriate messages to promote wider GEAP objectives. The strategy should include Governorate administrative units, EEAA, NGOs, CDAs, schools, universities, mosques, trade associations, businessmen's groups and the media.

b) Establish a 5 year Implementation Plan and Budget

After the launch of the Plan the Governorate should contact the relevant Directorates/ organisations responsible for addressing the priority issues listed above. They should be assisted in incorporating the relevant parts of the GEAP into their operational plans, and in providing more detailed costings for implementation. The detailed implementation plans should optimise existing budgets, and identify and quantify where additional resources are necessary to deliver on GEAP objectives and targets. Another important aspect of implementing the plan will be to prioritise each target area programme of activities and deliverables.

c) Strengthen Monitoring Capabilities

From the outset the Governorate should agree on a number of easily measurable indicators from which progress on GEAP activities may 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, targeting application of scarce resources so that they have the maximum beneficial effect, and improved

environmental performance.

d) Disseminate and Promote the GEAP to attract Additional Resources

The GEAP provides the Governorate with a clear framework for planned and prioritised environmental action. In order to implement the plan resources will need to be mobilised from the Governorate, individual communities, CDAs and NGOs and the private sector. Additional funds should also be sought from Central Line Ministries, donor agencies and national organisations where additional monies may be available to fund GEAP implementation.

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. With this in mind the Governorate should establish a monitoring and enforcement department to help track progress against GEAP activities.

By establishing an effective economic framework for economic service delivery (e.g. by raising tariffs for utility services so that operational costs are covered) an efficient collection system could be financed. The use of economic instruments to change consumer behaviours could then be considered, along with mechanisms to generate funds for measures targeted at securing the livelihoods and improving the health and environmental conditions of the poor and marginalised.

f) Attract the Private Sector into Utility Services

The Governorate should put in place a legal and economic framework that will promote private sector participation and investment in provision and delivery of environmental utility services. This should reduce the Governorate's financial and administrative burden, and have the objective of improving the quality and coverage and extent of environmental service delivery.

9.2 Responsibilities

Each environmental target will have lead organisations and key players responsible for implementing various sections of the GEAP, as outlined in Box 9.1:

- 'Lead organisations' will also be responsible for coordinating policy development, monitoring outcomes, reporting on progress and advising on how the performance may be improved.
- 'Key players' will assist the lead organisations in reaching their objectives, and provide monitoring information and consultation feedback that will facilitate agreed actions to be achieved as effectively as possible.

BOX 9.1: GEAP IMPLEMENTATION RESPONSIBILITIES

ISSUES AND TARGETS	LEAD ORGANISATIONS	KEY PLAYERS
SANITATION		
- Extend sanitation services to all urban and rural areas.	*- PEA, NOPWASD*	*- DoH*
- Strengthen the sectors institutional capacity building at Governorate level.	*- City Markaz, Village Units, PEA, NOPWASD*	*- GoQ, EMU*
- Maximise reuse of treated wastewater and sewage sludge.	*- DoA, PEA*	*- EMU, Farmers' cooperatives, agricultural extension workers*
SOLID WASTE MANAGEMENT		
- Establish an appropriate integrated waste management Strategy for Qena Governorate.	*- EMU*	*- City Markaz, Village Units, CDA's*
- Improve the operation and management of waste services and facilities	*- City Markaz, Village Units*	*- EMU*
- Improve existing waste collection, transfer and transportation systems.	*- City Markaz, Village Units*	*- EMU*
- Adopt appropriate and good quality waste treatment and disposal systems	*- City Markaz, Village Units, Hospitals, factories etc*	*- EMU, DoH*
- Ensure safe and sustainable recycling of waste materials	*- City Markaz, Village Units, Hospitals, factories etc*	*- EMU,DoH*
- Introduce appropriate hazardous/clinical waste management systems	*- City Markaz, Village Units, Hospitals, factories etc*	*- EMU,DoH*
- Improve institutional organisation and worker capacity.	*- City Markaz, Village Units*	*- GoQ*
WATER SUPPLY AND WATER QUALITY		
- Achieve 100% service coverage and increase production to meet projected demand.	*- PEA*	*- NOPWASD, GoQ, DoWS*
- Improve water service quality to Egyptian standards by 2007.	*- PEA*	*- NOPWASD, DoH*
- Improve tariff collection efficiency from 65% to 85% and Physical losses in the network from 25% to 20%.	*- City Markaz, Village Units, Factories, communities, CDAs, NGOs*	*- PEA,CDAs, NGOs*
- Build up institutional capacity to better manage the water supply and service network	*- GLPC, City Markaz, Village Units*	*- PEA*
WATER RESOURCES		
- Improve the management of surface and ground water resources.	*- WRID*	*- EMU*

BOX 9.1: GEAP IMPLEMENTATION RESPONSIBILITIES - Continued

ISSUES AND TARGETS	LEAD ORGANISATIONS	KEY PLAYERS
- Improve the efficiency of surface and ground water resources.	- WRID, DoA, DLC	- EMU
- Reduce pollution of surface water and ground water resources.	- Factories, EMU, DoA, DoPWWR, DoH	- EEAA, Water Police
AGRICULTURE		
- Improve soil and irrigation efficiency.	- DoA	- WRID
- Optimise the use of fertilizers and pesticides.	- DoA	- MALR
- Enhance fish production.	- DoA	- MALR, GAFFRD
- Reduce post harvest losses and handling.	- DoA	- MALR
- Upgrade institutional management.	- DoA	- GoQ
INDUSTRIAL POLLUTION		
- Ensure safe storage of hazardous substances and safe disposal of hazardous waste.	- Factories, EEAA, EMU	- DoH. DoM
- Reduce gaseous and particulate emissions from large Industry by 50%.	- Factories	- EMU, DoH, EEAA
- Increase government capacity to manage Industrial activities.	- PEA, DoPWWR, City Markaz, Village Units	- EMU, GoQ, EMU's
LACK OF ENVIRONMENTAL AWARENESS		
- Raise environmental awareness among government workers and Qena residents.	- GoQ, DPA, EEAA, DoE	- City Markaz, Village Units, DoH
- Improve service provision so that residents are better able to adopt hygienic practises.	- PEA	- NOPWASD, DoH
NATURAL RESOURCES		
- Strengthen the planning, operation and regulation of quarries and mining operations.	- DMQ	- GoQ
- Strengthen the capacity of quarrying and mining management.	- DMQ, EMU	- EEAA
- Improve Environmental Impact Assessments (EIAs).	- EMU, EU	- EEAA
- Mitigate the impact of quarrying and mining activity.	- EMU, EU	- EEAA
CULTURAL HERITAGE		
- Strengthen management of cultural sites and areas of Environmental importance.	- DA	- GoQ, SCA
- Strengthen capacity building.	- DA	- GoQ, SCA
- Enhance conservation of cultural heritage.	- GoQ	- SCA
- Enhance the area around Isna Temple.	- DA	- GoQ
PROTECTING BIODIVERSITY		
- Establish a biodiversity and nature conservation programme [NCP].	- GoQ, DoA, EEAA, DoE	- EMU, City Markaz, Village Units
- Manage Protected Areas.	- GoQ, DoA, EEAA	- EMU, Village Units
- Control environmental threats.	- GoQ, DoA, EEAA	- EMU, Village Units

MWRI	Ministry of Water Resources and Irrigation	**CDAs**	Community Development Association
GoQ	Governorate of Qena	**GLPC**	Governorate Local Public Council
EEAA	Egyptian Environmental Affairs Agency	**DoE**	Directorate of Education
SCA	Supreme Council of Antiquities	**DoH**	Directorate of Health
DA	Department of Antiquities	**DoA**	Directorate of Agriculture
MALR	Ministry of Agriculture and Land Reclamation	**DoM**	Directorate of Manpower
NOPWASD	National Organisation of Potable Water and Sanitary Drainage	**DoE**	Directorate of Education
		DoPWWR	Directorate of Public Works and Water Resources
DoWS	Department of Water and Sanitation	**DMQ**	Department of Mining and Quarrying
EMU	Environmental Management Unit (Qena Governorate)	**PEA**	Public Economic Authority
		EU	Environmental Units
GAFFRD	General Authority for Fish Resources Development		

10 FINANCING THE PLAN

10.1 The Risk of Doing Nothing

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

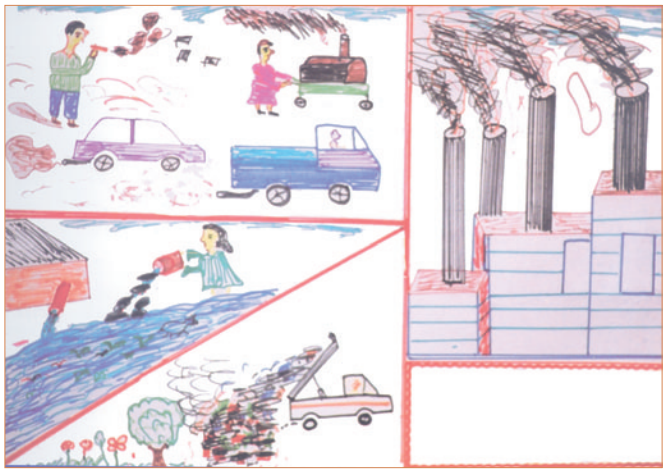
The total annual costs of environmental degradation in Qena Governorate including inadequate water supply sanitation and hygiene; indoor air pollution; land degradation; Urban Air Pollution and waste are estimated at more than LE 260 million. This is equivalent to 2.45% of GDP in 2001. The estimated cost of inadequate water supply, sanitation and hygiene represents 57 percent of total cost. The cost of indoor air pollution is estimated at 15% of total cost. Estimated cost of land degradation represents 12%, while the cost of urban air pollution and inadequate household waste management is estimated at 11% and close to 5% of total cost, respectively.

Potential risks to Qena citizens amongst others are likely to include:

a) 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. Child mortality and diarrhoeal prevalence rates are substantially higher in rural areas (Child mortality under 5 [urban 44%, rural 58%] and diarrhoeal prevalence in children under 5 [urban 8.9%, rural 14.5%), strongly suggesting that the poor bear a disproportionately high burden of diarrhoeal environmental risk and illness. In Qena inadequate water and sanitation coverage has been found to be associated with 18 to 21% of deaths in children under 5 years old whilst the estimated annual cost of diarrhoeal related deaths is estimated to be in the region of LE 36-70 million. The estimated annual costs of other diseases related to poor water, sanitation and hygiene conditions have been more difficult to estimate due to lack of available data but rough costs are as follows; Bilharzia LE 12 million, Hepatitis A, Typhoid and Paratyphoid (LE 1.6 million)

Indoor air pollution high in fine particulates is another issue of concern, caused by burning traditional fuels such as agricultural residue and animal dung it can often result in lower respiratory tract infections such as chronic obstructive pulmonary disease, acute respiratory illness and cancer. It is also likely that indoor air pollution can cause an increased prevalence of tuberculosis and asthma. In Qena the total annual cost of these kinds of diseases has been estimated at being anything between LE27 to 50 million with a mean of LE 40 million. Acute respiratory illness in children and adult females represents 45% of the cost and respiratory child mortality 30% whilst chronic obstructive pulmonary disease represents less than 2%.



b) Depletion of Natural Resources

Protecting the quality and quantity of agricultural land and irrigation water is of utmost importance for household income and livelihoods in rural Qena. However, pressure on land from intensive agricultural and urban development has resulted in the degradation of soil and water quality. With a limited amount of fertile land the Governorate has had to reclaim new land of lesser quality from the desert and other marginal lands with an average a 5 to 15 % yield loss. With this in mind the potential annual cost of this degradation has been estimated to be up to a value of LE 54 million.

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 Qena'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.

Other risks of continued environmental degradation include: 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; and indiscriminate waste dumping; loss of inward investment if inadequate supporting services aren't 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

The capital costs of implementing the 10 year target programmes of the GEAP in Qena, were projected based on investment figures from the Governorate 5 year plan 2002 – 2007, as well as from first hand experience of the cost of implementing SEAM demonstration projects. Projected costs are reflected in the following table.

10 Year GEAP Implementation Costs (LE)

Sectors	(LE)
Improving Sanitation	
Extend sanitation services to all urban and rural areas	
complete 7 wastewater projects	*985 000 000*
consider construction of wastewater systems	*50 000 000*
Sub-Total	*1 035 000 000*
Improving SWM	
Improve existing waste collection, transfer and transportation systems	
Collection system : appropriate collection system in 51 major cities	*38 250 000*
Transfer system in 9 markazes out of 11	*18 000 000*
Adopt proper waste treatment and disposal systems	*8 000 000*
Introduce appropriate hazardous/clinical waste management systems	*13 200 000*
Improve institutional organizational and worker capacity	
Central Waste Unit CWU	*500 000*
Sub-Total	*77 950 000*
Improving Potable Water Supply	
Achieve 100% service coverage and increase production to meet projected demand	*146 000 000*
Improve the water service quality to the Egyptian standards by the year 2007	*3 800 000*
Improve tariff collection efficiency from 65% to 85% and physical losses in the network from 25% to 20%	*3 750 000*
Sub-Total	*153 550 000*
Agriculture	
Improve soil and irrigation efficiency	*124 700 000*
Optimize the use of fertilizers and pesticides	*5 050 000*
Enhance fish production	*18 880 000*
Reduce post harvest losses and handling	*30 000 000*
Upgrade institutional management	*5 000 000*
Sub-Total	*183 630 000*
Institutional	
Institutional strengthening	*15 000 000*
Training programmes	*35 000 000*
Public awareness programmes	*15 000 000*
Sub Total	*65 000 000*
Total Costs	*1 515 130 000*
Contingencies 10 %	*151 513 000*
Total	*1 666 643 000*

Sanitation coverage in Qena is still insufficient, apart from Qena City no other city in Qena currently has sewage infrastructure. Some 79% of the population live in rural areas, most (45%) rely on on-site sanitation whilst some 35% have no sanitation facilities at all. To meet this need Qena Governorate is currently making a number of significant investments in the sector. A major part of this investment centres around the construction of 7 wastewater plants covering the following Markazes; Abu Tesht, Farashut, Naga Hammady, Dishna, Qus, Armant and Isna with a total capital cost of LE 985 million. In addition to these plants the Governorate should also consider covering the remaining unserved Markazes of Al Waqf, Qeft and Naqada. The cost of this investment would be in the range of LE 50 million.

The cost of upgrading the solid waste management systems in Qena Governorate will require an approximate investment of around LE 85.7 million. Based on SEAMs demonstration project experience in upper Egypt, the cost of improving existing collection and transfer systems in Qenas' major cities is likely to cost around LE 56.2 million, whilst upgrading the Governorates existing disposal and treatment facilities will require an additional LE 8 million. Hazardous waste is also an issue that needs urgent attention, and it is estimated that developing a system of hazardous waste management in Qena would require an investment of roughly LE 13.2 million.

Approximately 85% of the Governorate has full access to water services whilst roughly 15% remain unconnected to the water network. The average daily water consumption in Qena is currently around 159 litres/day. Traditional large surface water treatment plants are responsible for producing 45% of the Governorates daily requirements whilst compact units and ground water wells respectively supply 34% and 20% of the remaining demand. Over the next ten years the Governorate aims to reach 100% service coverage. To complement this, the Governorates 5 year plan also aims at improving water services quality and tariff collection efficiency. To achieve this goal 2 new water treatment plants in Abu Tesht and Armant Markazes are currently under construction

The Governorate's current 2002 – 2003 fiscal year plan includes an approved allocation of LE 3.5 million for extending water networks in urban and rural areas, and LE 2 million to install water networks in the new industrial zones at Kallahen and Hoo.

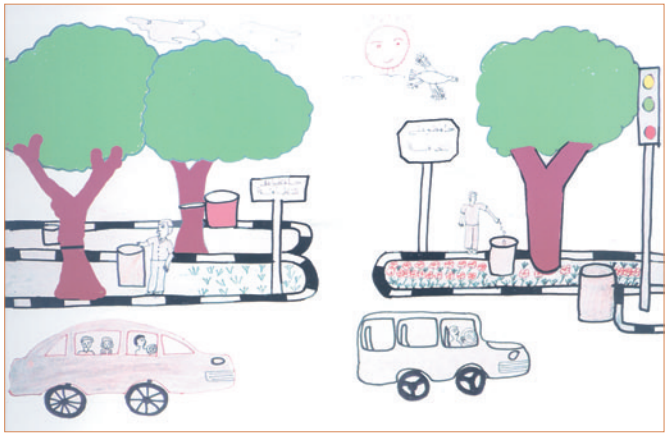
In addition, the 2002 – 2007 five-year plan includes the supply and installation of 10 new compact units by NOPWASD, each with a 100 lit/sec capacity (8,500 m^3/day, 4 times the capacity of the existing units). The new units will be built in Qena (4), Qus (2), Naqada (2) and Abu Tesht (2) and another (2) in El Waqf and Naqada Markazes. In addition to this water mains and distribution networks are to be extended to un-served urban and rural residents. Cost of implementation for improving potable water supply will add to LE 153.5 million.

Agriculture continues to make a significant contribution to Qena's economy. However, pressure on existing soils is increasing which means that the Governorte will need to spend in the region of LE130 million on its land reclamation, soil improvement, and irrigation programmes if it is to keep pace on growing demand. The cost of introducing measures to reduce post harvest losses, upgrade institutional management and increase fisheries production is likely to be in the region of LE53 million. Introduction of technology and better targeted management systems can do much to assist this process.

The outlay on institutionally related environmental management improvements is estimated to be in the region of LE65 million with the main focus being on institutional strengthening and training and public awareness campaigns.

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. Resources likely to be of greatest relevance in Qena 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 ENVIRONMENTAL 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 (cf 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)*
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; 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.

Environmental actions have been identified to address priority issues and targets have been set by which success of these general actions can be measured. Accordingly, it is important that a simple and effective monitoring system be established to help measure more specific progress against smaller particular actions. For example, if you are trying to measure improvements to;

a) a solid waste management system, simple and measurable indicators should be agreed from the start i.e. the amount of waste collected by each employee per day, the number of burning dumpsites, or

b) in the case of water supply the number of metres repaired per day, the amount of water tariffs collected.

Progress against the above targets could for instance be regarded as either being a personal or departmental responsibility. In order to increase the chances of reaching any of the above kind of targets incentives should be considered.

'Lead organisations' which have a key role in achieving these targets (Box 9.1) are expected to be responsible for monitoring the outcomes of their actions and to providing feedback to the HCE. In addition 'Key Players' are also identified as having a role in both assisting and monitoring the outcomes of the 'Lead organisation'. However, the HCE is ultimately responsible for carrying 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 submitted to the HCE each year summarising:

- Progress achieved against agreed actions (implementation)
- Improvements made to the environment as a direct result of implementing GEAP actions.
- Areas that need further attention due to non-performance or difficulties.
- Recommended changes to on-going actions that are necessary as a result of changing environmental priorities/ or circumstances.

Preparation of the report should be coordinated by a Governorate appointed GEAP co-ordinator working closely with the EMU or GEDA if it is established. The GEAP Unit will be expected to provide support during this process. 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

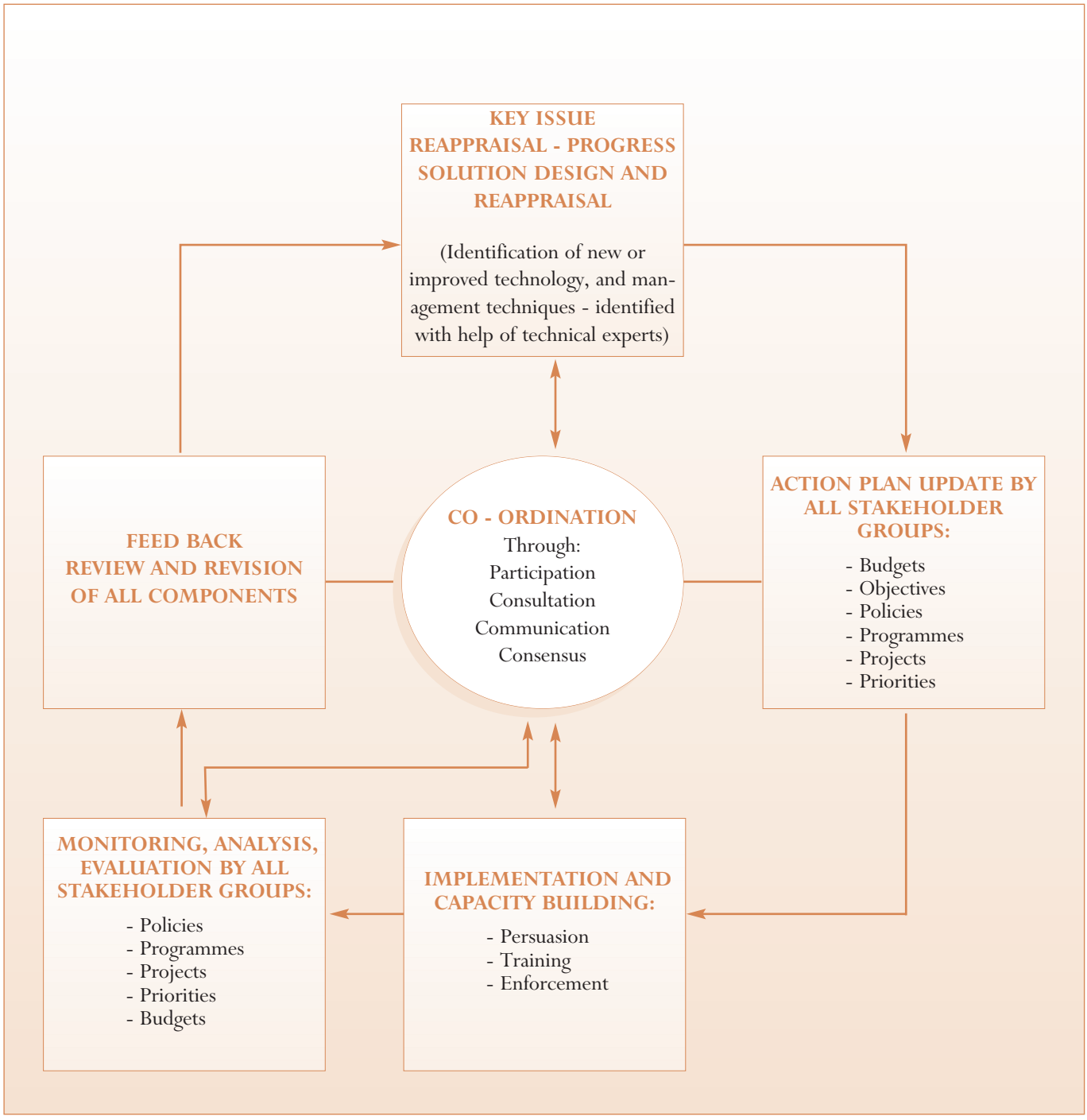
To be sustainable the GEAP process needs to be dynamic and flexible. The policies, targets and actions that combine with consultation to form the GEAP process must be updated to reflect changing conditions and local circumstances. In addition, the progress reports should document the lessons learnt during 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. The box summarises all the stages of the GEAP cycle and shows the extent of participation required in delivering the GEAP.

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 agreed improvements.
- The monitoring and on-going environmental planning that is 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.

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 environ-mental hazards and disasters*						
- *Improved access to environ-mental 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

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* Ragab Abou sereea (Head of Nagada Markaz)
* Mohamed sabry Abd EL Megeed (Head of Qena Markaz)
* Abd EL Salam Abou EL Hagag (Head of EL Wakf Markaz)
* Ossama Mohamed Hasanien (Head of Farshut Markaz)
* Tarek Hassan Mohamed Hassan (Head of Qus Markaz)
* Refaat Mohamed Omrran (Head of Abou Teshet Markaz)
* Hassan Abdu EL Rahawan (Head of Armant Markaz)
* Zienab Mohamed Mohamed (Head of Governorate EMU)
* Refaat Basely (Head of water utilities of Abu Teshet Markaz)
* Rezek Mahmoud (Head of cleansing department of Deshna city)
* Lotfy Mohamed Dieab Head of utilities (cleansing & evacuation)
* Shokry Habeb (Mechanical Engineer)
* Ra'uf Mohamed (Head of Planning department – Qus Markaz)
* Abd Allah Kamel (Head of cleansing utilities)
* Mostafa Hamed (Head of ORDEV – Qena Governorate)
* Youssef Amin saleem (Head of legality affairs department – Qena Gov.)
* Salwa Farouk Fouad (Head of Gov. planning department)
* Alion Atta Allah Boles (Head of planning and utilities – Farshut)
* Saleem Abd EL All saleem (Head of EU – Armant Markaz)
* Abd EL Razek Mohamed EL Akaby (Head of Engineering department – Armant)
* Mostafa gad Hussien (Responsible for cleansing in Essna city)
* Abd EL Moetty Abd EL Kader (Head of the Governor office for monitoring)
* Mohamed Rabiea Omar (Head of Armant housing maintenance)

Qena Social Surveyors

* Lamia'a Kamal Sayed (Public service / Qena social affairs)
* Doa'a Ahmed Nageb (Public service / Qena social affairs)
* Maha Fathey Seleem Mustafa (Public service / Qena social affairs)
* Lobna Helmy Hassan (Public service / Qena social affairs)
* Ghadah Montaser EL Tokhey (Social worker in Sedi Abd EL Raheem prep school / Qena)
* Ramadan Khamess Mohamed (Qena social department)
* Amal Maher Shaker (Qena social department)
* Hanaa Zaher Kamel (Qena social department)
* Hadeia Abd EL Gelel Amin (Public service / Qena social affairs)
* Asma'a Mansour Mohamed (Public service / Qena social affairs)
* Nahed Sayed Tolehey (Public service / Qena social affairs)
* Montaser Mahmoud Ahmed (Gov. Public Relation department)
* Hassan Salah EL Din Ahmed (Head of Adaima Social unit / Essna Markaz)

Qena Governorate Directorates and Departments

* Health Directorate
* Veterinary directorate
* Agriculture Directorate
* Social Affairs Directorate MSA
* General Department for Water Supply & Sanitation
* General Department of Irrigation
* General department for water Resources and Irrigation / Qena
* Education Directorate
* General Authority for Literacy & Adult Education (GALAE)
* Youth and Sport
* Planning Directorate
* Cooperation Department
* Manpower and Migration Directorate
* Information Center
* Cleansing Department
* Fisheries
* Roads & Bridges and Transportation
* Social Insurance Directorate
* Food Supplies
* Investment Department
* Telephone Directorate
* Security Department
* Upper Egypt Antiquities dep.
* Islamic and Coptic antiquities dep./ Nage Hamady
* National Council for Women
* Organizational for Rebuilding and Development Egyptian villages ORDEV (Shrouk)
* Housing Directorate
* Executive department for Qeft Industrial Zone
* Mining and Quarries dep.
* Community service dep.
* NOPWASD
* Endowment Directorate
* Bilharzias Dep.
* Electric directorate
* Egyptian Company For Communication – Qena office
* Industrial Security
* Nile Protection dep.
* Environmental & Water Surface Police
* General dep. for Essna Barrage
* Organizational and Administration directorate
* CAPMAS

* Central dep. for Statistics
* Budget dep.
* Financial directorate
* Physical Planning dep.
* Survey dep.
* Research & agricultural experimental station in Qena & Essna
* Qena General Hospital

Isna City Council and Local unit
* Information Centre
* Agriculture Department
* Social Dep.
* Public Relation
* Environmental Unit
* Health department
* SHROUK
* Cleansing department

Armant City Council and Local unit
* Information Centre
* Agriculture Department
* Social Dep.
* Public Relation
* Environmental Unit
* Health department
* SHROUK
* Cleansing department

Armant City Council and Local unit
* Information Centre
* Agriculture Department
* Social Dep.
* SHROUK
* Environmental Unit
* Health department
* Local & popular council
* Cleansing department
* Security department

Naqada City Council and Local unit
* Information Centre
* Agriculture Department
* Social Dep.
* SHROUK
* Environmental Unit
* Planning department
* Cleansing department

Qus City Council and Local unit
* Information Centre
* Agriculture Department
* Social Dep.
* Public Relation
* Environmental management Unit
* Qena Markaz EU
* Security dep.
* Cooperation dep.
* Investment dep.
ß Food Supply dep.
* Social Insurance
* Irrigation dep.
* Health dep.
* Cleansing department

EL Wakf City Council and Local unit
* Information Centre
* Social Dep.
* Environmental Unit
* Health department
* Food supplies and provision department
* Cleansing department

Dishna City Council and Local unit
* Information Centre
* Environmental Unit
* Deshna Beautification department
* Social Dep.
* Cleansing department

Naga Hammady City Council and Local unit
* Information Centre
* Agriculture Department
* Social Dep.
* Environmental Unit
* Health department
* SHROUK
* Cleansing department

Farshut City Council and Local unit
* Information Centre
* Environmental Unit
* SHROUK
* Social Dep.
* Endowments department.
* Cleansing department

Abu Teshet City Council and Local unit
* Information Centre
* Environmental Unit
* Social Dep.
* Health department
* SHROUK
* Cleansing department

University Of South Valley
* Faculty of Science
* Faculty of social sciences
* Center for Environmental Research & Applied Sciences (CERAS)
* Deputy of head of University for Environmental affaires & community development
* Central laboratory of South Valley University.

Industrial Companies and Cooperatives
* Misr Aluminum complex company / Nage Hamady
* Armant Sugar Factory
* Qus Sugar Factory
* Nage Hamady Sugar Factory
* Dishna Sugar Factory
* Qena for spinning
* Qena Clay Bricks

* Newsprint Paper / Qus
* Fiberboard factory / Dishna
* Investment Association
* Hathour company for beverages

Local Communities

Heads of the following LGUs

Isna Markaz
* Essna City
* Essna Markaz Villages:
- Asfon
- Tomass 3
- Hella
- Kalabia
- Deir
- Hanady
- EL Shaghab
- EL Malaa
- Deiabia
- EL Negoa'a
- EL Negoa'a Qebly
- EL Namasa
- Adaima
- Mesawia
- Gezeret Rageh
- Keman Mataana'a
- Tafness
- Tomass Wa Afia
- Tomass 1
- Tomass 2

Armant Markaz

* Armant City
* Armant Markaz villages:
- Rozikat Bahary
- Rozikat Qebly
- Rainia
- EL Maress
- Mahameed Bahary
- Demokrat
- Mahameed Qeblia

Naqada Markaz

* Naqada City
* Naqada Markaz Villages:
- EL Bahary Kamoula
- Danfek
- Tokh
- Khatara

Qeft Markaz

* Qeft City
* Qeft Markaz Villages:
- EL Shaikhia
- EL Oidat
- EL Kalla'a
- EL Zaferia
- EL Barahma
- Wadi EL Laketa

Qus Markaz

* Qus City
* Qus Markazes Villages:
- EL Heragia
- EL Homr Wa EL Gaafra
- EL Mekarabia
- EL Kalalesa
- EL Massed
- Shanhour
- Garagous
- EL Shaarany
- EL Kharaneka
- Gezeret Matera
- Hagaza Qebly
- EL Olikat
- Khouzam
- EL Mefragia
- EL Karateia

Qena Markaz

* Qena City
* Qena Markaz Villages:
- Abnoud
- Karm Omran
- EL Ashraf EL Gharbia
- EL Asalia
- EL Gabalaw
- EL Salehia
- EL Qenawia
- EL Ashraf EL Baharia
- EL Mahrousa
- EL Deir EL Sharky
- EL Toirat
- EL Deir EL Gharby
- Awlad Amro
- EL Hogirat
- EL Toabia
- EL Ghoasa
- Dandara
- Taramsa

EL Wakf Markaz

* EL Wakf City
* EL Wakf Markaz Villages:
- EL Marashda
- EL Kalmena

Dishna Markaz

* Dishna City
* Dishna Markaz Villages:
- Abu Deiab Gharb
- Abu Deiab Shark
- Abu Mana'a Bahary
- Abu Mana'a Shark
- Nage Azouz
- Nage EL Shiekh Ali Shark
- EL Samata Qebly
- Faw Qebly

- Faw Bahary

Naga Hammady Markaz

* Naga Hammady City
* Naga Hammady Villages:
- EL Helfaia Bahary
- EL Helfaia Qebly
- EL Shaweria
- EL Rahmania Qebly
- EL Qenaweia EL Bahariea
- EL Kassr
- EL Salamia
- EL Hesha
- Hamra Dom
- Nage EL Sheikh ahmed Nour EL Din
- EL EL Gharby Bahgoura
- EL Kemana
- Awlad Ngm EL Qeblia
- EL Sharqy Bahgura
- EL Hefnawia
- Hew
- EL Darb
- Bahgoura

Farshut Markaz

* Farshut City
* Farshut Markaz Villages:
- EL Arky
- EL Dahasa
- EL Osirat
- EL Qubeiba
- Kom EL Bega
- EL Kom EL Ahmr
- Refa'a
- Nage EL Haj Salam

Abu Teshet Markaz

* Abu Teshet City
* Abu Teshet Markaz Villages:
- EL Qara
- Kom Yakob
- EL Rafasha
- Bakhaness
- Gezeret EL Dom
- Samhoud
- Belad EL Mal Bahary
- EL Qebli Samhoud
- Kom Gaber
- Koseir Bakhaness
- EL Mahareza
- Abu Shousha
- EL Awamer wa Bany Berza
- EL Khawaled

Media

* Nile Centre for Information
* General Authority for the Information
* TV-CH 8

NGOs (National and Local) and CDAs

* EU (European Union)
* CARE
* Egyptian – Italian Cooperation
* SFD
* Family & Environmental Development Association (FEDA)
* Regional Enterprises Development Center (REDEC)
* Mother and Child Health care (JSI)
* Makhadama CDA
* EL Wakf CDA
* EL Karateia CDA
* Hew CDA
* Awlad Negm EL Qebliea CDA
* Women development association in Awlad Negm EL Qebleia
* Misr 2000 CDA-Essna
* Taramsa CDA
* Mahroursa CDA
* Deir CDA
* Hanady CDA
* Dandara CDA
* EL Sheikh Essa CDA
* EL Qenawia CDA
* Kom EL Dabei CDA
* Hella CDA
* Abu Manaa Bahary CDA
* Abu Diab Gharb CDA
* Terre des homes Agency
* Regional federation for NGOs.
* Community capacity Development and Environmental Protection association
* Rural and Urban Women Development Association.
* British Programme / GALAE
* UNICEF
* Qena Regional Federation
* Qena Investment Association

APPENDIX 2 - LIST OF GEAP PUBLICATIONS

LIST OF REPORTS PREPARED AS PART OF THE GEAP PROCESS

1.	*Baseline Study on Water supply and Sanitation Services in Qena Governorate*	*Chemonics Egypt – Dr. Ahmed Gaber and Associates*	*October 2001*
2.	*Baseline Study on Land Use Agriculture and Fisheries in Qena Governorate*	*Nile Consultants – Dr. Abd EL Wahab Allam*	*July 2001*
3.	*Qena Environmental Baseline Geology, Geomorphology and landscape*	*Prof. Dr. Abas M. Mansour* *Dr. Gamal M. kamal EL Din*	*November 2000*
4.	*Report On Cultural Heritage sites in Qena Governorate*	*Dr. Said Gohary* *Dr. Jocelyn Gohary – Faculty of Archaeology, Cairo University*	*June 2001*
5.	*Biodiversity Component of the Qena Governorate Environmental Profile*	*Dr. Sherif Baha EL Din* *Dr. Mindy Baha EL Din*	*December 2001*
6.	*Baseline Study on Water Resources Hydrology and Hydrogeology in Qena Governorate*	*Dr. Bayoymy Attia*	*December 2002*
7.	*Assessment of SMEs in Qena Governorate – Draft Final Report*	*Environics – Management of Environmental Systems*	*November 2000*
8.	*Baseline Study on Large Industries in Qena Governorate – Draft Final Report*	*Environics – Management of Environmental Systems*	*January 2001*
9.	*Baseline Study on the Cost of Environmental Degradation in Qena Governorate*	*Bjorn Larsen*	*April 2004*
10.	*Qena Industrial Working Group – Final Report*	*Environics – Management of Environmental Systems*	*November 2002*
11.	*Health and environment baseline study*	*Health working group members*	*October 2002*
12.	*Qena Solid Waste Management Strategy*	*SEAM*	*July 2004*
13.	*Community Consultation Findings*	*SEAM*	*December 2002*

Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency

Entec UK Ltd., ERM

UK Department for International Development

SEAM Programme

Qena Governorate