

Task Order No. 832

USAID Contract No. PCE-I-00-96-00002-00

**Egyptian Environmental Policy Program
Program Support Unit**

Tranche 1, Objective 11

***The National Strategy for Integrated Municipal
Solid Waste Management: A Framework for Action***

June 2000

PSU-07

for
**U.S. Agency For International Development
Cairo**

by
**Environmental Policy & Institutional Strengthening
Indefinite Quantity Contract (EPIQ)**

A USAID-funded project consortium led by International Resources Group, Ltd.

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Fact Sheet

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Contract Purpose: Provide core management and analytical technical services to the Egyptian Environmental Policy Program (EEPP) through a Program Support Unit (PSU)

USAID/Egypt's Cognizant Technical Officer: Holly Ferrette

Contractor Name: International Resources Group, Ltd.

Primary Beneficiary: Egyptian Environmental Affairs Agency (EEAA)

EEAA Counterpart: Eng. Dahlia Lotayef

Preface

Through competitive bidding, the U.S. Agency for International Development (USAID) awarded a multi-year contract to a team managed by International Resources Group, Ltd. (IRG) to support the development and implementation of environmentally sound strategic planning, and strengthening of environmental policies and institutions, in countries where USAID is active. Under this contract, termed the Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ), IRG is assisting USAID/Egypt with implementing a large part of the Egyptian Environmental Policy Program (EEPP).

This program was agreed-to following negotiations between the Government of the United States, acting through USAID, and the Arab Republic of Egypt, acting through the Egyptian Environmental Affairs Agency (EEAA) of the Ministry of State for Environmental Affairs, the Ministry of Petroleum’s Organization for Energy Planning, and the Ministry of Tourism’s Tourism Development Authority. These negotiations culminated with the signing of a Memorandum of Understanding in 1999, whereby the Government of Egypt would seek to implement a set of environmental policy measures, using technical support and other assistance provided by USAID. The Egyptian Environmental Policy Program is a multi-year activity to support policy, institutional, and regulatory reforms in the environmental sector, focusing on economic and institutional constraints, cleaner and more efficient energy use, reduced air pollution, improved solid waste management, and natural resources managed for environmental sustainability.

USAID has engaged the EPIQ contractor to provide Program Support Unit (PSU) services to EEPP. The PSU has key responsibilities of providing overall coordination of EEPP technical assistance, limited crosscutting expertise and technical assistance to the three Egyptian agencies, and most of the technical assistance that EEAA may seek when achieving its policy measures.

The EPIQ team includes the following organizations:

- Prime Contractor: International Resources Group
- Partner Organization:
 - Winrock International
- Core Group:
 - Management Systems International, Inc.
 - PADCO
 - Development Alternatives, Inc.
- Collaborating Organizations:
 - The Tellus Institute
 - KBN Engineering & Applied Sciences, Inc.
 - Keller-Bliesner Engineering
 - Conservation International
 - Resource Management International, Inc.
 - World Resources Institute’s Center For International Development Management
 - The Urban Institute
 - The CNA Corporation.

For additional information regarding EPIQ and the EEPP-PSU, contact the following:

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Vice President		Chief of Party	

Abbreviations, Acronyms, and Glossary

ATF	Agency Task Force
CEO	Chief Executive Officer
EC	Executive Committee
EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program (a USAID-funded program aimed at achieving a series of environmental policy reform performance objectives)
EEPP-PSU	Egyptian Environmental Policy Program, Program Support Unit
EIA	Environmental Impact Assessment
EMU	Environmental Management Unit (of a governorate)
EPF	Environmental Protection Fund
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract. This is a contract issued by USAID's Global Bureau that enables environmental policy services to be provided to USAID missions worldwide.
GIS	Geographic Information System
GOE	Government of Egypt
IEMS	Integrated Environmental Management System
IP3	Institute for Public-Private Partnerships
MOEA	(Egyptian) Ministry of Environmental Affairs
MSWM	Municipal Solid Waste Management
NEAP	National Environmental Action Plan (for Egypt)
OEP	Organization of Energy Planning, attached to the Ministry of Petroleum
RBO	Regional Branch Office (of EEAA)
TDA	Tourism Development Authority, attached to the Ministry of Tourism
USAID	U.S. Agency for International Development
USEPA	U.S. Environmental Protection Agency
WG	Work Groups

EXECUTIVE SUMMARY

This Executive Summary provides a brief overview of the key findings and decisions that are a part of the proposed National Strategy for Integrated Municipal Solid Waste Management. It is provided to enable policy and decision makers, industry and the public to understand, with a minimum of reading, the plans of the Central Government for correcting the current deficiencies of municipal solid waste management in Egypt. The strategy addresses municipal solid waste [MSW] only. Municipal solid waste is combination of solid wastes from residential, commercial, institutional and industrial non-process/non-hazardous wastes. Definitions are included in Section I of the strategy.

Studies and surveys have clearly indicated that the problems associated with municipal solid waste management are among the most serious environmental problems in Egypt. The current management method of choice for MSW in Egypt is the uncontrolled open [and frequently burning] dumps and uncontrolled accumulations of solid waste.

The Purpose of the National Strategy is to Build an Infrastructure to Support a National Integrated Municipal Solid Waste Management System.

The Strategic Goal Of The National Integrated Municipal Solid Waste Strategy Is To Establish An Integrated Municipal Solid Waste Management System Based On National Legislation, Regulations, Standards, And Guidelines And An Infrastructure To Provide An Effective And Sustainable System For Managing Municipal Solid Waste In A Manner To Protect Public Health And Environmental Quality.

The Objectives Of The Strategy Are To:

- 1. Eliminate The Uncontrolled Accumulations Of Solid Waste That Have Accumulated Over Time.**
- 2. Provide Safe And Efficient Storage, Collection, Transfer, And Management [Waste Reduction, Composting, Recycling Of Materials, Combustion/Waste-To-Energy, And Sanitary Landfilling] For All Urban And Rural Areas, In A Manner To Conserve Natural Resources And Protect Public Health And Environmental Quality.**

The Strategy will be implemented by a partnership of the Central Government, the Governorates, Local Governments, Industry and the Public. National legislation, regulations, standards and guidelines will be established to guide the implementation of the Strategy. The Central Government will provide oversight of the implementation of the Strategy, provide technical and financial assistance,

and conduct research and development. The Governorates are looked to as the principal level of government to implement the Strategy. This will be accomplished by the adoption of the National regulations, standards and guidelines by the Governorates and the development of Governorate strategies, objectives and work plans to implement the National/Governorate strategies. The Governorates will be responsible to plan for and implement the delivery of integrated municipal solid waste management services for all urban and rural areas within their jurisdictions.

Implementation of the Strategy will take time. Legislation may need to be passed. Certainly regulations, standards and guidelines must be developed and approved. A lack of data necessitates the development of databases to assist in the development of work plans of implementation. Financing mechanisms for the implementation of the work plans will need to be established. The planned partnership between the Governorates, Local Governments, Industry and the Public will have to be built.

The implementation schedule is expected to be:

Reviewers Note: a schedule for implementation of the Strategy will need to be developed by EEAA.

The annualized national cost for the implementation of the strategy over the first 10 years is expected to be:

Reviewers Note: someone needs to estimate what implementation is going to cost.

I. INTRODUCTION and BACKGROUND

A. Introduction/Need & Purpose of the Strategy

The municipal solid waste management [MSWM] problem in Egypt is massive. The problem represents a measurable threat to the public health an environmental quality in the nation and requires national attention of the highest priority and urgency. The problem requires a fresh look, massive and aggressive endeavors of human and financial resources at all levels of government, industry and the population. Solutions for the problem must be guided by approved policies and strategies. There is a need for action, and to logically take action, a new national strategy is needed. This strategy must rationally and optimally lead a national effort to seriously and professionally attack and solve this national problem. The strategy must deal with both the urban and rural needs for integrated municipal solid waste management [IMSWM]. Further, the strategy must set priorities for dealing with the problem, identify the costs to implement the strategy and set a timetable for implementation.

The strategy addresses the issue of municipal solid waste management in Egypt, its associated problems, and proposes a process for the implementation of an integrated municipal solid waste management system for the country. The

strategy anticipates a partnership of the Central Government, The Governorates, Local Governments, Industry and the Public. The strategy depends heavily on the regional approach with the Governorates being the principal participant for the implementation of the strategy.

B. Scope Of The Strategy

The strategy addresses municipal solid waste. Municipal solid waste is a combination of residential, commercial, institutional, and industrial non-process and non-hazardous solid wastes. Definitions pertinent to the strategy are provided in the next section of the strategy. The strategy does not address other solid wastes such as industrial process/hazardous solid wastes, health care wastes, hazardous wastes, construction and demolition wastes [C&D] or waste water bio-solids [sewage sludge]. It should be recognized that these solid waste streams also represent potentially serious threats to public health and environmental quality. Further, it is quite possible that these materials can show up at municipal solid waste management facilities. Consequently, part of the strategy will include actions to ensure that they are not accepted at municipal solid waste management facilities. **[Note: Needs to be added by EEAA]**

C. Definitions

A number of terms will be used in the strategy. To ensure understanding and consistency in implementing this strategy, definitions have been developed.

Municipal solid waste – a combination of solid wastes from the following sources:

- e) households [residential solid waste] – multi-family and single-family dwellings,
- f) commercial enterprises [commercial solid waste] – shops, stores, retail outlets, office buildings, service organizations, tourist services, hotels,
- g) industrial enterprises [industrial solid waste] – small industrial activities such as assembly shops, fabrication operations, etc.; and offices, shipping, and non-process activities of larger industrial activities,
- h) administrative and governmental bodies,
- i) educational facilities,
- j) seaports/airports – dunnage, shipping materials, office activities, food services,
- k) street markets,
- l) camping/sporting activities – campgrounds, athletic fields and gymnasiums,
- m) street, square and park cleanings
- n) green wastes from upkeep of public parks and grounds, and
- o) dust and sand blowing into urban areas from the surrounding hills and desert areas.

Garbage – discarded food wastes including waste accumulations of animal, fruit or vegetable matter used or intended for food, or that attend the preparation, use, cooking, dealing in or storing of meat, fish, fowl, fruit or vegetables.

Municipal Solid Waste Management – the systematic organization and administration of activities that provide for the planning, financing and operational processes for managing municipal solid waste. Operational processes include such elements as storage, separation, collection, transport, treatment, separation, recycling of materials, composting, combustion/waste-to-energy and landfill of municipal solid waste.

Integrated Municipal Solid Waste Management – municipal solid waste management plus the reduction of solid waste generation [source reduction] at the source of generation.

Storage of Solid Waste – the containment after generation and prior to collection of solid waste in a manner to protect human health and environmental quality.

Collection of Solid Waste – the act of removing accumulated containerized and/or non-containerized solid waste from generating sources; in addition, collection may occur at centralized points where generators deliver their solid waste for collection.

Solid Waste Reduction/Source Reduction – any action that reduces the amount of solid waste to be collected and managed. It includes

- reducing the amount of solid waste generated at the source,
- redesigning of products or packaging so that less material is used, resulting in fewer discarded materials,
- voluntary or imposed behavioral changes in the use of materials which results in the selection of products and materials which last longer, or reduce the amount of material discarded, or
- increasing the durability and reusability of materials which result in longer lasting products.

Transfer – supplemental transportation systems employed to reduce hauling costs by normally using large truck-trailers [or rail cars or barges], to haul solid waste from a central point [**transfer station**] to one or more distant management facilities.

Recycling [of materials] – recycling is the diversion, or removal of materials, from a solid waste stream and the use of those materials in one of the following ways:

- for the same purpose as it was originally designed, or
- for use in its original form, but for another purpose, or
- the return of production line process wastes into main stream production line feedstock, or
- the treatment and reconstitution of the materials from one product to produce secondary raw material for other products, and/or
- other productive uses.

Composting – the biological decomposition and stabilization of organic feed stocks [organic fractions of solid wastes, green wastes and bio-solids] under

conditions that allow the development of thermophilic temperatures as a result of biologically produced heat to produce a final humus-like product that is stable, free of pathogens and plant seeds, and can be beneficially applied to the land.

Combustion – a process by which organic material is burned in the presence, or near absence of air. **Waste-to-energy** is the recovery of the waste heat from the combustion of solid waste for useful purposes; usually as process steam or for the generation of electric power.

Dump – a non-engineered, unmonitored, unprepared land area where unrestricted unloading of solid waste is done. Often resulting in open fires, feeding of animals, surface and groundwater pollution, vectors and sometime loss of human life.

Sanitary Landfill – a land area where solid waste is disposed in a manner that protects human health and the environmental. The sanitary landfill is an engineering method of disposing of solid waste on land in a manner which protects human health and environmental quality by spreading solid waste in layers, compacting those layers into the smallest practical volume and covering the compacted solid waste with soil, at least on a daily basis, or more frequently.

D. The Present Status Of Integrated Municipal Solid Waste System in Egypt

The major outcome from the implementation of the strategy will be the establishment of an integrated municipal solid waste management system [MSWM] in Egypt. MSWM is a philosophy of management that addresses solid wastes as a natural resource and consequently it should be managed accordingly. It is necessary, as part of developing Egypt's integrated municipal solid waste management system [MSWMS] to address and assess current practices, their adequacies and inadequacies, and their potential for change and usefulness in the future. Implementation of the strategy will address the current management practices, will accept those practices that are acceptable and meet the goals of the strategy, reject those practices that do not, and install practices to meet the goals. The present status of municipal solid waste management in Egypt is described below.

1. Overview of Current Management Practices

In Egypt integrated solid waste management problems and practices vary by geographical location and by population centers. Practices in urban areas are considerably different than those in rural areas. Further, management practices vary from Governorate to Governorate. Tables 1 & 2 summarize the current distribution of services for collection, composting, dumping and landfilling on a Governorate-by-Governorate comparison. An analysis of these data provide further reasons for the need for a new strategy and increased investment in human and financial resources to improve municipal solid waste management practices in Egypt.

**TABLE 1 – CURRENT MANAGEMENT PRACTICES, URBAN AREAS
GOVERNORATE BY GOVERNORATE**

GOVERNORATE	% COLLECTED	% COMPOSTED	% DUMPED	% SANITARY LANDFILLED

**TABLE 2 – CURRENT MANAGEMENT PRACTICES, RURAL AREAS,
GOVERNORATE BY GOVERNORATE**

GOVERNORATE	% COLLECTED	% COMPOSTED	% DUMPED	% SANITARY LANDFILLED

The following sections describe current solid waste management practices in the urban and rural areas.

a. Urban Area Practices

Organizational/Administrative Arrangements

- e) the system is run by different agencies at the national and regional levels and management differs in the urban areas and rural areas.
- f) regional governmental bodies and cleaning organizations collect and transport street cleanings, clean streets and storage containers, supervise dumping grounds as well as operate composting plants either directly or indirectly through the private sector.
- g) the role of those that collect solid wastes “garbage collectors”] differs from Governorate to Governorate. However, these collectors primarily provide service to private housing units for an agreed upon service fee ; Governorates oversee this service and collect a service fee from
- e) private companies within areas allocated by the collect residential, commercial and street solid wastes under the oversight of
- e) non-governmental organizations (NGOS) play only a small role in IMSWM,;

Management Approaches Practices

- e) aerobic composting plants process a total of 2000 tons of municipal solid waste per day [about 7% of the MSW generated in Egypt]. To date, anaerobic composting has not been utilized.
- e) open dumps owned by regional authorities in areas specially designated the Governorates are numerous and are the principal method of managing MSW ,

sanitary landfills are beginning to be sited, but advances such as protection of groundwater and control of landfill gas are not included in the designs.

- f) in direct violation of Law 4/1994, open burning is common at the open dumps, at accumulations of solid waste and by generators in any open space

b. Rural Area Practices

There is no organized management system for solid waste generated in the rural areas. The solid waste problems in the rural areas of Egypt can be described as:

- e) inadequate collection of solid waste due to inadequate collection equipment and a lack of an organizational and administrative system [infrastructure] to provide services,
- f) solid wastes is used for fuel and animal feed because there is no organized system, and
- g) a lack of organized disposal sites, which leads to open dumping, accumulations of solid waste and actions by individuals to discard and dispose of their solid waste any way the can.

2. Municipal Solid Waste Sources and Generation Rates

Table 3 summarizes the composition of MSW and Table 4 summarizes the generation rates of the various solid waste streams that constitute MSW. This data is important as it helps in the planning for an integrated municipal solid waste management system. The composition data provides insights into the opportunities for materials recycling and composting, energy values and the potential characteristics of landfill gas and leachate. The generator source data provides insights into the major contributors to MSW and suggests possible approaches for modifying generation patterns and management approaches.

TABLE 3 - MUNICIPAL SOLID WASTE COMPOSITION BY COMPONENT

COMPONENT	% BY WEIGHT
Organics	50-60
Paper	10-20
Glass	1-5
Plastic	3-7
Metals	2-7
Other	Varies

Source: ???

TABLE 4 - MUNICIPAL SOLID WASTE COMPOSITION BY SOURCE

SOURCE	% BY WEIGHT
Households ¹	?
Commercial ²	?
Light Industrial ²	?
Institutional ²	?
Street Markets & Camping Locations ³	?
Green Wastes from Streets, Squares and Public Gardens ⁴	?
Dust, Sand ⁵	?

Source: ???

1. Both single and multi-family dwellings. 2. See Definitions

5. Blown into the cities from surrounding hills and deserts.

The management of municipal solid waste is an inter-related enterprise. While the classic definition of integrated municipal solid waste management addresses only management methods [solid waste reduction, recycling, composting, combustion/waste-to-energy, and always a land] the “system” is far more complex. It is this complexity that makes the system interdependent. An IMSWM system contains a number of elements including strategies, policies, planning, financing and finally implementation. Implementation includes a number of elements such as storage, collection, transfer [where needed], and then a combination of one or more management methods [solid waste reduction, recycling, composting, combustion/waste-to-energy, and always a landfill]. The management methods affect the collection process. The collection process affects storage. The types of solid wastes generated dictates the entire system. This interdependency has to be considered in the development of this strategy and in addressing the current MSWM problems of Egypt.

3. Causes and Reasons Behind the Limitations of the Current Municipal Solid Waste Management System

The reasons and causes behind the limitations of the current MSWM system are technical, administrative, legal and financial. Some of the more important of these are listed below [this list is not inclusive]:

- a. The absence of an infrastructure at all levels of government to plan, organize and implement an IMSWM system.
- b. The lack of policies, strategies, goals, objectives and work plans that address all phases of IMSWM at all levels of government and industry.

- c. A lack of clearly defined roles and responsibilities for the different bodies currently working in the field of municipal solid waste management, e.g. all levels of government, associations, non-governmental organizations, private companies, public bodies, etc.
- d. A lack of adequate storage and very low coverage of collection and transportation services that reach only 15% in small cities, about 70% in large cities, and practically non-existent services in random-housing areas and rural areas
- e. A lack of sufficient disposal capacity with proper environmental standards and the absence of sanitary landfill space.
- f. A lack of qualified and trained personnel to manage and operate the system and a lack of adequate and properly maintained equipment for the system.
- g. A lack of sufficient environmentally safe materials recovery and composting plants and the low productivity of composting plants.
- h. The lack of infrastructures to manage other solid wastes [construction and demolition wastes, street markets waste, butcher houses waste, workshop waste, health care wastes, hazardous wastes] resulting in a mixing of high risk and low risk solid waste and resultant increased threats to public health and environmental quality.
- i. A lack of an adequate national database on MSWM practices and changes in generation patterns and quantities, resulting in an inability to plan adequately for these changing practices, trends and patterns.
- j. Insufficient funding at all levels of government and industry to support a MSWM infrastructure, much less an IMSWMS.
- k. A lack of adequate legislative, regulatory and enforcement authorities to adequately enforce acceptable integrated municipal solid waste management and a lack of enforcement of existing rules and regulations.
- l. Lack of public support and public participation in the current MSWM system.

II. THE NATIONAL INTEGRATED MUNICIPAL SOLID WASTE MANAGEMENT STRATEGY

The Purpose Of The National Strategy Is To Build And Infrastructure To Support A National Integrated Municipal Solid Waste Management System.

The Goal Of The National Strategy Is To Establish A National Integrated Municipal Solid Waste Management System Based On National Legislation, Regulations, Standards, And Guidelines And An Infrastructure To Provide An Effective And Sustainable System For Managing Municipal Solid Waste In A Manner To Protect Human Health And Environmental Quality.

The objectives of the national integrated municipal solid waste management strategies are:

- 1. To eliminate the uncontrolled accumulations of solid waste that have accumulated over time.***
- 2. To provide same and efficient storage, collection, transfer and management [through solid waste reduction/source reduction,***

composting, recycling of materials, combustion/waste-to-energy and sanitary landfilling] for all urban and rural areas in a manner to conserve natural resources and protect public health and environmental quality.

A. Policies of the National Strategy

The following policies shall serve as the foundation for the development and implementation of the strategy:

1. The Central Government shall be the facilitator for the establishment and implementation of the National Strategy.
2. Implementation of the National Strategy shall be in the responsibility of the Governorates. .
3. Operations of the national integrated municipal solid waste management system shall primarily be in the hands of Governorates/Local Governments either by direct ownership and operation, or through the contracting of services to capable private companies, or a combination of these two organizational approaches, but always under government control.
4. The existing operating systems shall be included in the new integrated municipal solid waste management system to the maximum extent possible.
5. Central Government and Governorate planning shall be integrated and shall foster a “Government -Public-Private Partnership”. ***Reviewers Note: This item was not addressed in the draft strategy received for review.***
6. The integrated municipal solid waste management system will accept only those solid waste streams included in the strategy.
7. Storage, collection and disposal capacity[sanitary landfills] are the essential elements for IMSWS and are the first priorities for the strategy. Where these three elements are in place, steps should be taken to add other management methods such as composting, materials recovery and waste-to-energy. All IMSWMS work plans should examine the degree of composting, materials recovery and waste-to-energy that can be successfully and economically achieved and should set schedules for adding these elements to the IMSWMS.
8. Solid waste reduction is dependent on a national materials use policy. Such a policy shall be established and implemented after implementation of the other aspects of integrated municipal solid waste management is underway.
9. The IMSWM system shall protect public health and the environment, shall be efficient and cost effective.
10. The public shall be full partners in all steps of the planning, development and implementation of the strategy.

B. Roles and Responsibilities of the Central Government

The responsibility for the development and implementation of the national municipal solid waste management strategy is assigned to the EEAA.

To successfully meet the goal and objectives of the National Strategy the following actions, roles and responsibilities are assigned by the Central Government to:

1. The Central Government, to enact appropriate national legislation that will enable the planning, development and implementation of the strategy.
2. The EEAA to develop and enforce national integrated municipal solid waste management regulations, standards and guidelines.
3. The EEAA, the principal role and responsibility for research, training and education and technical assistance.
4. The EEAA to provide financial assistance to the Governorates/Local Governments and industry, in the planning, financing and implementation of integrated municipal solid waste management,.
5. The Governorates the principal planning, financing and implementation responsibilities for the National Strategy,
6. The Governorates, or companies under the auspices of the Governorates/Local Governments, the principal responsibilities for ownership and operation of integrated municipal solid waste management systems.
7. The Governorates Governments the responsibilities to ensure that all integrated municipal solid waste management systems ensure universal storage, collection and disposal [sanitary landfilling] of generated municipal solid wastes and the utilization, where appropriate, of composting, recycling [materials recovery] and combustion [preferably with energy recovery] as additional management methods in a manner to protect public health and the environment and are to be economical and effective.

Roles and Responsibilities of the Governorates

As the Governorates implement their responsibilities under the strategy the following objectives shall serve as guidance:

1. Development of a strategy and work plan that meets the purpose, goal and objectives of the national strategy, meets the Governorate objectives in the national strategy, and defines the roles and responsibilities for the Governorate and local governments.
2. Establishment of appropriate Governorate legislation, regulations, standards to comply with the nationally established legislation, regulations, standards and guidelines,
3. Assignment of responsibilities within the Governorate to the Governorate and/or local governments for the planning, financing, and implementation [operation] of integrated municipal solid waste management systems with full geographical coverage for all cities, main villages, secondary villages and all rural areas,
4. Development of a work plan[s] for the implementation of the Governorate strategy which delineates the work of the Governorate and local governments,

5. Implementation of work plans within the Governorate in a manner consistent with the legislation, regulation, standards and guidelines authorized by the Central Government and established by the EEAA.

III. FINANCING THE NATIONAL STRATEGY

Reviewers Note: The EEAA needs to develop a financing plan which projects costs for the first 10 years of implementation that estimates costs and prioritizes where the funds will be spent annually.

IV. IMPLEMENTATION OF THE NATIONAL STRATEGY

Reviewers Note: The EEAA needs to develop a plan for implementation that describes the first 10 years of implementation, that prioritizes where efforts will be directed annually and the expected outputs annually.

ANNEXES

ANNEX A - Previous Experience in the Area of Managing Municipal Solid Waste in Egypt

Some of the past efforts in this domain include:

- a) Field studies performed by the Environmental Affairs Agency as well as by other governmental agencies of some Egyptian Governorates and cities with the purpose of defining and quantifying the problem of solid waste disposal, the proposed management methods, as well as possible solutions (studies were made for Cairo, Giza, Banha, Tanta, Luxor, Suhag, Beheira, Sharm El-Sheikh).
- b) Projects executed by the Environmental Affairs Agency in coordination with other executive bodies and research centers (e.g. projects for the transformation of garbage into organic fertilizer through the use of aerobic and anaerobic composting).
- c) A study addressing the problem of solid waste in Egypt with a proposal for a total resolution plan covering all kinds and sources of solid waste, both of high and of low risk, in urban and rural areas. The study also covers a

series of proposed programs for the management of this waste to be used at a regional level to achieve a full coverage by 2007 of the entire cycle including collection, transportation, treatment, and complete disposal of solid waste.

- d) A general strategy for the management of solid waste in Egypt was developed within the framework of the National Environment Action Plan prepared by the Environmental Affairs Agency in conjunction with the Ministry of Scientific Research in 1992. This strategy included the following:
- Upgrading collection and transportation services to reach a level of 90% in major cities, 80% in capitals of Governorates, 70% in smaller cities and 60% in larger villages
 - Using sanitary landfill disposal (where the necessary space is available) to dispose of this waste. An estimated 50% achievement rate could be reached with the use of this technique.
 - Using regulated disposal (where the space for sanitary burial is not available, or where technical or environmental reasons prevent its use). An estimated 30 - 40% achievement rate could be reached with this method.
 - Using incineration techniques to dispose of hazardous solid waste.

The action plan proposed by the above strategy helped achieve several objectives of technical, administrative and legislative aspects:

- Improving the collection and transportation methods, both quantitatively and qualitatively, including attributing a larger role to public participation.
- Designing and creating a sanitary landfill system as well as regulated disposal and incineration units.
- Establishing a sound management system for solid waste in rural areas.

Actual use of sanitary landfills for the disposal of garbage through surface sanitary burial has already started. Also, the first unit of aerobic composting of garbage to transform it into fertilizer material after recovering the recyclable components, has been designed and built through the joint efforts of the Environmental Affairs Agency, and the Ministries of Scientific Research and Military Production. This was followed by the replication and production of dozens of these units in Egyptian cities. At a later stage the technology used in this aerobic composting unit has been upgraded and fifteen new models are currently under production for installation during one year. It is planned to produce fifteen units annually with the objective of covering all the cities of Egypt. In addition the first incinerator was locally designed and produced to handle the dangerous solid waste produced by hospitals, through the joint efforts of the Environmental Affairs Agency, and the Ministries of Scientific Research and Military Production. These units are also undergoing improvements to produce regionally adapted units.

Annex B - Strategic Alternatives

Due to the big differences among the various Governorates circumstances in the subject of municipal solid waste management, which is directly related to the geographic, demographic, developmental, social, cultural and economic situation of the population, same strategic choices facing the Governorates could be exhibited as follows (for example):

A) Services Financing Strategies:

- Full government financing for new projects.
- Private sector financing with long term monopoly contracts like BOT for certain kinds of projects according to specific standards.
- The public bears the full cost for collecting and transporting garbage.
- Establish extra fees - service charges - at a fixed rate (added to the electricity bill, for example) with earnings directed to financing the treatment projects and final disposal, supply and maintenance of collection equipment and transportation.
- The Governorates supply the necessary support for the treatment, final disposal and maintenance of equipment activities from the funds contributed by business men, the private contributions, community participation and other sources.
- Collection of fees for the disposal of garbage in suitable sites.
- Supply facilities for investors in the activities of solid waste management like:
 - Land at nominal prices.
 - Customs duties forgiveness on machinery and equipment.
 - 5 Tax exemptions up to years
 - Help in obtaining permits.

B) Private Sector Participation Strategy in Operations and Maintenance:

- Sign contracts for the complete management system (collection, transportation, treatment and disposal).
- Limit private sector contribution to a part of the system and implement the remaining functions by local authorities.
- Sign service contracts - lease contracts - concessionary contracts for the system or part of it.

C) Strategies Related to System Size:

- Specify the system limits in terms of administrative limits of cities, centers or neighborhood.
- Focus on growing neighboring cities and villages together.

- Other.

D) Strategies Related to the Role of NGOs:

- Limit the role of NGOs to awareness.
- Encourage NGOs to assume responsibility for some parts of the system.
- Encourage and motivate the NGOs to assume responsibility of recycling, as a whole or in coordination with the private sector.

E) Strategies Related to Organizing:

- Establish a cleanliness organization at the Governorate level that would be authorized to monitor the performance of the private sector according to specific performance indicators linked to the service price.
- Establish an independent regulating body responsible for enforcement of the targeted performance indicators to all parties involved in this field (government or private) and monitoring the compliance.
- Add the responsibility of enforcement and compliance monitoring to the environmental management responsibilities in the Governorate.

F) Strategies Related to Technical Specifications:

- Assign establishment of specifications, codes and technical terms of all technical elements to one body.
- Every Governorate assumes the function of establishing technical terms within the Governorate to facilitate the functions of monitoring and maintenance.

G) Regarding Dealing with Violators (Enforcement and Compliance):

1. Apply legal penalties.
2. Motivate and encourage compliance.
3. Create awareness and change behavior (environmental evaluation and education) while seeking assistance from the different media outlets and parties.

Annex C - Technical Alternatives

Following is a group of technical alternatives that Governorates could study when developing plans and programs related to the solid waste management and choice of the suitable scenarios:

1. Regarding Disposal of Existing Accumulations:

- a) Compress the current location and prepare it as a green area (suitable for public dumps, which are fully depreciated).

- b) Complete or partial transfer followed by preparing and rehabilitating the location to make use of it. The transfer could be to:
- A suitable location chosen by the Governorate in coordination with the Ministry of Housing and Developmental Planning and EEAA, and prepared as a sanitary landfill location (suitable for recent accumulations).
 - Locations that need filling or smoothing like the low areas, the drainage canals or otherwise, on condition that technical expertise is used in this concern (suitable for public dumps and historical accumulations).
- c) Utilizing the old accumulations as material for soil enrichment after conducting the necessary tests and ensuring the technical adequacy. Agricultural research centers could be used in this concern.

2. Regarding Collection of Garbage:

- a. Collection from residential units or sources by traditional garbage collectors / cleaning companies / local authorities.
- b. Collection from the bottom of the building by special companies / cleaning organizations / traditional collectors.
- c. Collection from public boxes outside the building (source).
- d. Use of garbage transport pipes in buildings and new towers.
- e. Provide suitable bins and containers for the collection of waste distributed in the cities and roads. They must be easy to empty in the garbage trucks.
- f. Garbage collection inside the houses, separating the components that are recyclable (glass, paper and plastic) from the biological components and establish a collection system for each of them.

3. Regarding Temporary Storage in Transfer Stations:

- a) Combine the separation and compressing functions at the transfer station before transferring to the treatment location or final disposal.
- b) Use the compressing function, with the separation at the treatment location or final disposal site.

4. Regarding Garbage Treatment:

- a) Produce fertilizers using atmospheric heating (biological treatment) in the case where the biological matter is not less than 50% and 150 tons per day.
- b) Produce fertilizers using composting in rural areas and small cities.
- c) Incineration with or without energy retrieval (in the case economic feasibility is proven and in coordination with the Ministry of Electricity).

5. Regarding Final Disposal:

- a) Build sanitary landfill locations suitable for solid waste in chosen and prepared locations according to the technical and environmental basis and standards.
- b) Build public dumps for dumping and covering the garbage with a neutral material (dust, sand, clay, construction and demolition waste) and compressing with special equipment. Location will be chosen according to environmental criteria.
- c) Management of the sanitary land fills or public dumps on wholistic basis by:
 1. Private sector through BOT.
 2. Private sector through other methods.
 3. NGOs.
 4. Local entities.

6. Regarding Protection of Water Surfaces (Canals and Drains...) From Dumping Solid Waste in Them:

- a) Covering the water surfaces using technical methods and in coordination with special entities.
- b) Filling the water surfaces and widening the roads while ensuring recent garbage is not used. Construction and demolition waste could be used.
- c) Place containers in suitable locations to throw waste in them instead of throwing it in waterways.
- d) Enforcing punishments on whoever dumps solid waste on the banks of waterways.
- e) Build a fence around the waterways, especially those in villages and cities.

7. Regarding Dealing with the Garbage of Rural Egypt:

- a) Separate the garbage inside the houses and utilize the valuable components.
- b) Build secondary receiving centers on the outskirts of cities.
- c) Encourage established small industries to recycle the separated material.
- d) Encourage aerobic composting to produce fertilizers from biological waste.
- e) Provide garbage collection equipment to collect organic and other waste after regular separation on a consecutive basis. It is then transported to waste manufacturing establishments or recycling plants outside rural areas.
- f) Transport waste (garbage) regularly (twice or thrice a week) by a special collection equipment to the final disposal location outside the villages.

8. Regarding Public Awareness:

- a) Prepare and execute public awareness campaigns through the media, focusing on television as a fast awareness spreading method.

- b) Establish and execute awareness programs and campaigns in schools, clubs, youth centers and other areas of the society.
- c) Prepare and execute awareness programs to the private and investment sectors on the packaging material and its re-use.
- d) Actual participation in public cleanliness campaigns and activities.

7- Preparing an Action Plan at the Governorate Level:

Based on the available strategic alternatives, each Governorate can establish an action plan to include the following objectives:

- a) Upgrade the level of services of collecting and transferring the daily-generated garbage with X% in urban areas and Y% rural areas annually.
- b) Upgrade the level of services of garbage treatment with X% in the urban areas and Y% in rural areas annually.
- c) Upgrade the level of services of final disposal of garbage using the sanitary landfill method at X% in urban areas and Y% in rural areas annually.
- d) Reduce the volume of waste directed to the treatment and final disposal units at X% rate annually in urban areas and Y% in rural areas.
- e) Increase garbage separated items recycling rates at an X% in urban areas and Y% in rural areas annually.
- f) Cover all of Egypt with an administrative network on the local, regional and central levels that will be responsible for planning and executing the solid waste management programs and strategies.
- g) Increase private sector participation rate in the integrated management services in the urban areas at X% and at Y% in rural areas annually.
- h) Increase private NGOs participation rate in the integrated management services in urban areas at X% and rural areas at Y% annually.
- i) Get rid of the accumulated quantities in various urban area and Y% in rural areas annually.

* * *

Annex D – Suggested Programs

[I] Regarding Daily Generated Waste

Technical programs:

- 1- Establish a database at all geographical and sectional levels based on monitoring networks. Previous and current studies could be used in addition to conducting field studies in case of need but which should include the previous efforts in the field of integrated solid waste management in Egypt.
- 2- Build and operate garbage receiving centers, transfer stations, sanitary landfills and public dumps, while simultaneously choosing the adequate management systems. There is also the need to conduct the necessary studies for the evaluation of environmental impacts of these activities.
- 3- Separate the garbage at source and reduce the generation of waste (this is done by people at homes) with the objective of separating the garbage into a dry component (paper, plastic, metals, textile and glass) and a wet component (food remains, vegetables and fruits). These programs could be conducted in the areas where garbage receiving centers are available in order to use the available technical resources.
- 4- Separate and collect the household hazardous waste and build environmental storage to receive some of this waste like medicines packages, pesticides, household chemicals, etc.
- 5- Support the small industries built on recycling separated garbage. They could be managed through NGOs that give loans and technical assistance to young people to implement these programs.
- 6- Develop composting industry using the suitable technology for every community and according to the prevailing law and condition within an integrated system that allows the supply of safe location for disposal of the rejections.
- 7- Study and specify the feasibility of using small ovens that cook the bio-waste remaining from the food cooking process in houses and change it to bio-fertilizer usable in small home gardens. Thus, this technology could be spread in new cities and remote residential areas away from the valley

where the process of collection, transportation and disposal of waste is expensive.

- 8- Support the institutional structure of the NGOs and CDAs through providing technical support and facilitating networking and experience spreading among them, in addition to supporting the public awareness activities through NGOs.
- 9- Develop the packaging industry using recyclable material like multi-layer paper as an alternative to using multi-element material.
- 10- Develop the garages and workshops of the Governorates in urban and rural areas and upgrade the maintenance and implement preventive maintenance programs.
- 11- Increase the number of garbage containers and collection vehicles, choosing the types of vehicles suitable to the various service area.
- 12- Develop the street garbage container system and provide the suitable number of bins in different location.
- 13- Support the separating/recycling equipment industry.
- 14- Re-use of the construction and demolition waste.
- 15- Implement some leading projects like:
 - Accumulation disposal project.
 - Source separation project.
 - Safe sanitary landfill project.
 - Transfer station project.

Management and Institutional Programs:

- 1- Support the environmental management units and branch offices of EEAA in Governorates to assume their roles in the management of solid waste in planning, supervising, monitoring and evaluating municipal solid waste programs on the local and regional levels.
- 2- Include the municipal solid waste plans and programs within the national local and regional plans. Also, define the local sources, the possible entrances, the equipment available for the implementation and the necessary systems to evaluate these programs.
- 3- Upgrade services of caring for the workers in the field of collecting and recycling the separated solid waste and establishing control unions for them from the owners of factories and workshops.
- 4- Study the obstacles to the private sector's entrance to conduct these services and specify the ways and means of increasing the effectiveness and supply the resources for supporting and activating its role.
- 5- Supply the necessary expertise to deal with all elements of the system and provide the necessary support to increase their capacities and efficiency while supplying the suitable motivation system.
- 6- Establish the ECO-labeling system on the packaging products.

- 7- Establish a sound and effective system to supervise the monitoring of private companies and NGOs working within all phases of the integrated system.

Financial and Economic Programs:

- 1- Study the various alternatives to finance the services of collecting, transporting, treating and disposing of garbage while choosing the suitable economic and social system.
- 2- Study and specify the mechanics of collecting a service charge.
- 3- Study and define methods to encourage and support the services companies with suitable qualities. This could be done through assigning land to establish final disposal sites, customs removal, tax exemptions or others.
- 4- Develop a system to motivate the retrieval and recycling.
- 5- Financial support of some of the already existing activities.

III Regarding Accumulations

These programs aim at the complete disposal of all forms of existing accumulations in urban and rural areas and preventing their future occurrence. They include:

- 1- Locate the accumulations existing in every Governorate regarding its volume, kinds and locations.
- 2- Define the suitable method to dispose of these accumulations according to the circumstances of every Governorate, so that the disposal takes place within a specific, clear time frame through the administrative system of the government and according to each Governorates circumstances and the available resources of equipment and tools. The assistance of the private sector and using the capabilities of the NGOs and non-governmental institutions and community participation is encouraged.
- 3- Study the use of such accumulation either in recycling or in producing fertilizers that upgrade the soil.
- 4- Rehabilitation of some of the accumulation's locations and making use of them.
- 5- Provide financial, technical and institutional support for every Governorate according to the volume of accumulations and the capabilities of the Governorate in disposing and making use of them.
- 6- Provide the suitable location to dispose of some of these accumulations in coordination with the Ministry of Housing and Works and the General Secretariat of the Local Government.
- 7- Provide bins and suitable equipment to face any future problem.
- 8- Develop the workshops and garages to assume the roles of maintenance and continuous campaigns.

- 9- Establish a suitable program to deal with the vacant plots of land in order to prevent their turning into garbage collection sites complete.
- 10- Provide / awareness programs aiming at preventing the re-occurrence of this problem.

**Annex E. Guidelines To Assist The Governorates In
The Implementation Of The National Strategy**

Each Governorate will develop its action plan reflecting its objectives and strategy. These objectives should be translated into implementation mechanisms, including the setting of roles and time schedules as well as financial resources needed for each project.

The following elements should be taken into consideration by the Governorates as they set their action plans:

- a) Decentralized planning and execution; each Governorate should be responsible to prepare plans and implement the proposed programs and activities.
 - b) Ensuring the continuation of the implemented processes through an established financial system and an administrative and organizational structure suited for each Governorate that would encourage participation of all potentially interested parties;
 - c) Implementing the approach of a complete cycle for the management of municipal solid waste with its two components: accumulated garbage and daily-generated garbage in the urban and rural areas with its social, economic and technical aspects and its various stages, starting from the originating phase to the collection, the transportation, the treatment and the final disposal.
 - d) Making use of the available national experiences, and the efforts and the previous research on the national and local levels. Also, utilizing all available resources. This includes the coordination and cooperation with the scientific, research and executive bodies, while making use of the established successful systems and integrating them into complete cycle approach (like collection systems through traditional garbage collections in same areas).
 - e) Working on raising the degree of awareness at the various levels regarding the solid waste problem and the role of the individuals in dealing with it, allowing the increase of public contribution in the complete management system.
 - F) Focusing on developing the current industry to convert the garbage into fertilizers that upgrade the soil attributes with or without producing energy and according to circumstances and population activities for each Governorate with the possibility of reverting to other alternatives to treat and use the garbage.
 - g) Consider the possibility of integrating sanitary landfill disposal systems in the areas that have suitable locations. Simultaneously, work on locating a place suiting the needs of every Governorate and the developmental planning there in.
6. Improve the working conditions of those working in the public cleanliness field i.e., those who collect, recycle and reuse solid waste.

Annex F – Composting Plants 1999

Annex G – Public Dumps in Egypt

**Annex H – Legal and Organizational Guidelines and Criteria for Selecting
Some Activities**