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**USAID ENVIRONMENTAL STRATEGY**

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## **I. EXECUTIVE SUMMARY**

Serious environmental degradation constrains not only Egypt's economic development, but the health and livelihood of its citizens. Available evidence suggests that environmental damage is most serious for fresh-water sector, followed by air, coastal and marine, and land.

Agricultural chemicals, industrial waste, raw sewage and silt from runoff have seriously contaminated water intended for human consumption, irrigation and other uses. Since the country's water resource is limited, any water pollution reduces the quantity of this scarce resource for productive use.

Automobile and industrial emissions have severely degraded air quality, primarily in urban areas. Common contaminants include heavy metals, ozone, carbon monoxide, oxides of nitrogen and sulfur, and particulates. This has given rise to extremely high incidence of chronic and acute respiratory illness.

Environmental problems are largely a consequence of inappropriate economic policies. Heavy subsidies on all forms of energy, water, fertilizer, and pesticides have encouraged overuse of these inputs leading to serious deterioration of air and water quality. At the persistent urging of the IMF, World Bank and USAID, the Government of Egypt (GOE) has made some progress in reducing these subsidies.

Unfortunately, there currently is very limited public pressure for the GOE to formulate and implement policies to protect the environment. Administration of numerous, overlapping and generally unenforceable environmental laws have been assigned to scores of agencies in over a dozen different ministries. These agencies are reluctant to cooperate or even share data on the state of the environment. The Egyptian Environmental Affairs Agency (EEAA), the entity charged with protecting the environment, lacks the authority, budget, staff, and technical resources to fulfill its mandate.

The public sector, which accounts for most industrial production, is characterized by outdated and wasteful technology, whose byproducts seriously pollute the environment. Upgrading this technology will be a long and expensive process.

Given the absence of a strong central GOE environmental protection program, the Mission will pursue its environmental objective, "Enhanced Protection of Egypt's Fresh-water and Air Resources," in sectors and accompanying line ministries in which

it has significant experience and influence. Ongoing Mission activities in water and wastewater, irrigation, and energy provide effective "platforms" from which to expand Mission environmental activities. USAID will work with counterparts to augment environmental aspects of ongoing projects in the ministries of housing, public works and water resources, agriculture, electricity and industry.

The majority of the Mission's policy reform objectives will have positive environmental consequences. Reduced subsidies and increased cost recovery on energy, water and sewerage, fertilizer, pesticides and irrigation will reduce wasteful use of inputs and provide revenues for system operation and maintenance. Compared to their public sector counterparts, private enterprises generally employ newer and cleaner technologies and are more responsive to GOE efforts to enforce environmental regulations; thus the environment could benefit from USAID policy efforts to promote new private investment and privatization.

The Mission will work with selected GOE agencies to upgrade their environmental management skills. System sustainability and enhanced water quality are major themes of USAID assistance to water and wastewater, and irrigation agencies. Other efforts will focus on energy efficiency and industrial waste reduction. USAID will give specific attention to systematic data analyses, such as the environmental risk assessment, and the wide distribution of environmental data.

The Democratic Initiatives Program and PVO projects will support public awareness activities, environmental advocacy groups, and specific environmental protection sub-projects. Private sector energy conservation and environmental services companies will become active participants in the Mission's energy conservation program.

Continuation of the multi-billion dollar water and wastewater infrastructure program is the backbone of USAID's efforts to enhance protection of fresh-water resources. The program will gradually shift emphasis from sewage collection to environmentally sound treatment and sustainability. The Mission's large irrigation management project will be partially realigned to address water quality, which is becoming a major constraint to sustainable agriculture in Egypt.

Major air pollution control investments will reduce electricity losses and thus enable the utility to deliver more kilowatt-hours of power per unit fuel burned or unit air pollution produced. USAID investments in industrial energy conservation, also will significantly reduce urban air pollution. Finally, the

environmental quality of Egypt's air, water and land resources should benefit from the Mission's pilot industrial pollution prevention activity, which will focus on waste recycling.

## **II. SECTOR OVERVIEW**

### **A. STATE OF ENVIRONMENT IN EGYPT**

Egypt's development is being constrained by serious unaddressed environmental degradation. Solid wastes litter the landscape and clog the waterways; clouds of industrial, vehicle, and dust pollution fill the air; and rivers, canals, lakes and marine waters are discolored, in some cases fetid, clogged with vegetation, and silting. Adverse health effects are manifested in unnecessarily high lead levels, recurrent gastro-intestinal disorders, and high incidence of respiratory disease.

Agricultural chemicals, industrial waste, raw sewage, and silt from runoff seriously contaminate water intended for irrigation, potable use, fish production, recreation, and manufacturing. Since the country is facing a growing water shortage, any water pollution not only damages water quality, but effectively reduces the amount of water available for productive use. Agriculture, which accounts for over 80 percent of Egypt's water consumption, is most severely affected. For example, discharge of domestic, industrial and agricultural wastes into the agricultural drains seriously reduces opportunities for reuse. Contamination of drainage water could cut cultivated acreage by 10 to 12 percent by the next century. The resultant loss of agricultural output could be about two per cent of GDP, or roughly \$700 million based on 1989 prices. This translates into an estimated loss of 400,000 jobs in agriculture and supporting industries.

Human health and livelihood already are being affected by water pollution. The main stem and branches of the Nile River have suffered, over the past ten years, a 50 percent relative decline of water quality. The lack of effective environmental protection programs are seen most dramatically in lakes Manzala and Maryut. Cairo's untreated municipal and industrial wastewater is conveyed via agricultural drainage canals to Lake Manzala, a key Mediterranean coastal lake. Fish take in Lake Manzala has declined by 90 percent during the past ten years and life expectancy of lake side residents is 40 years compared to 60 years for the nation. Lake Maryut, another important fresh-water body on the Mediterranean coast,

is even more severely impacted. Due to a wide variety of heavily contaminated discharges from Alexandria, this once highly productive lake essentially has become a giant wastewater oxidation pond.

Urban air quality, especially in Cairo and Alexandria, is severely degraded due to completely uncontrolled emissions from industrial and vehicular sources. Fuel price subsidies seriously exacerbate the air pollution problem, which contributes to the extremely high incidence of respiratory disease. The location of heavy industries in residential areas places large numbers of people at high cancer risk from exposure to a wide variety of highly toxic air pollutants.

Though no definitive environmental risk assessment has been undertaken, the available evidence analyzed by a team of environmental experts suggests that environmental damage is most serious in the water sector, followed by air, coastal and marine, and land sectors.

- \* Water. Agricultural chemicals, industrial waste, raw sewage, and silt from runoff have seriously damaged water intended for irrigation, household drinking water, and manufacturing. Since the country is facing a growing water shortage, any water-borne pollution not only damages the water, but effectively reduces the supply of water.
- \* Air. Urban residents breathe a 24 hour per day "pollution cocktail" comprised of virtually every air contaminant including lead, ozone, carbon monoxide, oxides of sulphur and nitrogen, and suspended particulates.
- \* Coastal and Marine Resources. Petroleum waste from ocean oil tankers is damaging Red Sea coral reefs, Egypt's greatest source of biodiversity. Untreated urban, industrial and agricultural wastewater is damaging ocean fisheries and coastal bird habitats. The combined effects of all forms of coastal and marine pollution jeopardize the continued rapid growth of tourism linked to unspoiled coastal and marine resources.
- \* Land. Land pollution is a growing environmental problem. Each year an estimated 30,000 to 40,000 feddans of prime agricultural land is lost to urban encroachment or other uses. About 30% of agricultural land is degraded by waterlogging and salinization. Land dumping of domestic solid waste, sewage treatment sludge, and toxic industrial wastes are a source of pest-related disease and other environmental problems.

## **B. THE GOE AND THE ENVIRONMENT**

### **1. Policies**

In past decades, GOE policies have hindered more than helped the environment. Much of Egypt's environmental problems are the direct result of inappropriate economic policies. Specifically, heavy subsidies on all forms of energy, water, fertilizer, and pesticides have encouraged overuse of these inputs leading to serious deterioration of air and water quality. Furthermore, the tariff structure does not encourage the importation of environmental protection technologies, such as equipment for energy conservation, air pollution control, and waste reduction programs.

The GOE has made some progress in reforming its policies, primarily as a result of compliance with IMF, World Bank and USAID conditionality. Reduction of air pollution is very closely linked to the efficient and complete burning of fuels, which is a direct function of fuel prices. After recent price increases, the GOE currently provides an average subsidy of roughly 50 percent on fuels, which are virtually all hydrocarbon based. However, energy subsidies for the biggest users and polluters are still near 85 percent. The GOE has agreed to increase energy prices to border levels by 1995. Accomplishment of this target will make a significant contribution to improved urban air quality.

For fertilizers, the GOE has eliminated most explicit subsidies and decontrolled imports and local marketing. But still, much needs to be done to protect the environment from overuse of fertilizers. Potassium fertilizer is still subsidized. The implicit energy subsidy of fertilizer, 35 percent of input cost, should be reduced or eliminated. In addition, more needs to be done to liberalize fertilizer production and distribution. Prices for pesticides, primarily used for cotton, are increasing in real terms along with cotton prices, but still carry a large subsidy.

Despite persistent urging from USAID and other donors, the GOE has made only limited efforts to increase the price of domestic and irrigation water. As a condition to continued USAID assistance to water and wastewater project, the GOE must at least increase water prices enough to cover the operation and maintenance (O&M) costs of system infra-structure. More efficient water use, resulting from price

increases and improved O&M, will make a significant contribution toward protection of fresh-water resources.

The GOE does not have a concise statement of its environmental policy objectives. While there is agreement that the country is suffering from widespread pollution, particularly in the water sector, there is no GOE consensus regarding a guiding framework for environmental policy and pollution prevention. To date, the GOE has not addressed the economic costs and benefits of environmental protection. Environmental impacts are not explicitly considered in investment decisions.

Egypt's fragmented, highly political and crisis-oriented decision-making process is missing opportunities for early low-cost environmental solutions. The policy process focuses on economic growth and political stability; little if any attention is given to the environmental consequences of policy decisions. This process both perpetuates current price policies that ignore environmental costs, and hinders coordination among environmental management institutions. Furthermore, the policy process severely limits the participation of private sector groups interested in improving GOE environmental policy.

The GOE has passed numerous laws and decrees to protect the environment, but these are disjointed and ineffective. In the environmental area, 17 ministries have responsibility for 81 laws, 34 presidential decrees, and 17 prime ministerial decrees. The GOE has passed laws establishing several environmental protectorates, but does little to "protect" these protectorates. Aside from passing laws and decrees and cooperating with donors on the construction of sewage systems, the GOE has done relatively little to protect the environment.

Administration of overlapping and generally unenforceable laws has been assigned to several different agencies. Uncoordinated implementing regulations have been issued by numerous ministries including Health, Cabinet Affairs, Agriculture, Industry, Housing and Public Utilities, Public Works and Water Resources, Petroleum, Reconstruction, Electricity, Supply, Social Security, Culture, Tourism, Transport, Commerce and Trade, and Manpower. These ministries lack the commitment and/or resources to implement their regulations effectively.

While the Egyptian Environmental Affairs Agency (EEAA) has nominal responsibility over most aspects of the environment, it has neither the authority, budget, staff, or technical resources to fulfill its responsibility. Lack of a strong central environmental organization is a major constraint to improved environmental protection in Egypt.

## **2. Information**

The GOE environmental management institutions lack systematic and uniform monitoring systems for major environmental problems in all areas, but especially for air pollution. Time series data collected from an established monitoring network are crucial to the identification of critical environmental problems and the monitoring of their abatement.

The little environmental data that are collected, are rarely systematically analyzed. The few analyses that are performed tend to be narrowly focused. Egyptian institutions generally lack the capability of undertaking comprehensive environmental analyses, such as risk assessment.

Government agencies routinely fail to disseminate environmental management information, and thus also fail to foster better public understanding of environmental issues. In general, scientifically documented evidence of environmental damage is suppressed by government agencies. Furthermore, neither formal nor informal education systems adequately address environmental issues. In general, there is a low level of awareness and understanding of environmental trade-offs at all levels of society including technical experts, decision-makers, directly affected groups, and the general public. The lack of access to information concerning environmental quality is a major constraint to effective environmental protection programs.

## **3. Limitations on Private Sector Involvement**

As a result of GOE pricing, information, and other policies, the private sector (including NGOs) is relatively uninvolved with environmental issues. Relatively lax enforcement of existing pollution regulations have provided little incentive for private companies to invest in pollution prevention or hire private environmental service firms. Private sector technical consulting firms, which compete with subsidized GOE consulting firms, have relatively limited capability in the environmental field.

Non-governmental organizations (NGOs) in Egypt have had relatively limited influence on environmental concerns for several reasons. In addition to low public awareness of environmental issues, the NGOs lack hard data on environmental conditions in Egypt. NGOs are either registered with the GOE or non-registered. The activities of both are carefully controlled by the GOE. Registered NGOs are constrained by the presence of GOE representatives on their boards coupled with the fact that GOE parastatals are the largest polluters. Non-registered NGOs often try to be activist, but face potentially serious sanctions from the GOE as a result of their non-registered status.

## **C. TECHNOLOGICAL CONSTRAINTS**

### **1. Imbalance Between Population and Physical Resources**

Environmental problems result when the byproducts of human activity exceed the carrying capacity of the physical environment. In Egypt's case, the root cause of environmental problems is the extreme imbalance between Egypt's growing population and its very limited arable land and water resources. The geographic concentration of Egypt's arable land and water resource essentially forces the population into a very limited land area resulting in urban and rural population densities among the highest in the world. Such densities severely aggravate all environmental pollution problems. Egypt's severe imbalance between population and physical resources necessitates the adoption of environmentally sound technologies. Unfortunately, in the past Egypt consistently adopted environmentally unsound technologies.

### **2. Legacy of Inefficient and Wasteful Technology**

Egypt's current technology, represented by sunk capital and current operational practices, is a legacy from an era that had little appreciation for economic efficiency and virtually no concern for environmental protection or environmental constraints.

The public sector accounts for most industrial production and sunk industrial capital. Much of the technology, which is inherent in the capital, was imported from Eastern Europe. This technology is very inefficient; production is relatively low per unit inputs of energy, raw materials, water, and labor. In other words, waste abounds. Much of the waste has negative environmental consequences. The

inefficient combustion of fuels in Egyptian industry (not unlike that in untuned Egyptian vehicles) means that far more fuel is used and emissions of pollutants are much greater than need be. The same is true for industrial uses of water. Industrial inefficiencies also result in higher levels of material and toxic wastes. Given the overall size and severe inefficiency of Egypt's public sector industries, upgrading its technology with modern, clean technology will be a long and expensive process. Compounding the problem is the general attitude among many public sector industrialists that environmental protection is a low or nonexistent priority.

The agricultural sector also inherited some environmentally unsound technologies. For example, subsidized prices have encouraged widespread wasteful use of chemical inputs which can result in serious water and land pollution problems. Furthermore, the efficiency of the irrigation system and on-farm water management practices could be improved.

Egypt has sophisticated scientific and technological expertise in a wide range of areas, but environmental protection is not one of them. Given the legacy of inefficient and wasteful technology and the lack of economic incentives for protecting the environment, Egyptian industrial enterprises and technical consulting firms have not had an opportunity to develop expertise and experience with pollution prevention and control technologies.

#### **D. DONOR INVOLVEMENT**

##### **1. USAID and the Environment**

While the USAID Mission previously did not have a formal environmental strategy, many of its activities have had major impact on environmental protection. USAID's policy reform efforts and about one-quarter of its current projects have significant positive environmental impact.

USAID has been most active in the water and wastewater sector. Since 1977 it has invested more the \$2 billion to improve access to potable water and to remove sewage from urban streets. With the completion of Mission projects currently underway, 17 million people in eight recipient cities will be receiving improved water and wastewater services. For example, the USAID-assisted Cairo wastewater collection and treatment program will capture the wastes

from six areas of Greater Cairo and make them suitable for either discharge to the Nile River or for transport in agricultural drains without severely degrading those waters for downstream reuse. In addition to the urban program, thousands of villages and millions of residents have benefitted from USAID rural water and wastewater activities.

The Mission policy reform efforts have been instrumental in reducing subsidies and thus promoting more rational use of electricity, fertilizers, pesticides, and water. For example, as a condition to USAID assistance to the power sector, the GOE has more than doubled real electricity prices. The price increases are beginning to have an impact on improved efficiency, decreased demand, and reduced need to expand capacity. Wasteful use of fertilizer has declined significantly as a result of reduced subsidies and decontrol of fertilizer marketing, two conditions of USAID support to the agricultural sector.

USAID's \$421 million investment in irrigation has reduced waste of water, one of Egypt's most critical natural resources. Irrigation water is being delivered more efficiently as a result of USAID support for canal construction and maintenance. Drainage activities have reduced waterlogging and salinity build-up. With USAID assistance, the GOE is beginning to develop a comprehensive water planning and management capability.

The Mission's \$1.6 billion investment in energy has had a significant impact on reduced air pollution. For example, the Talkha Combined Cycle Power Plant is producing an additional 110 megawatts of electricity with no additional fuel consumption and thus no additional air pollution emissions.

Clean renewable energy activities include major modern-ization of the Aswan High Dam Hydroelectric Power Plant as well as pilot wind and solar power projects. The USAID Energy Conservation Project is having significant impact on air pollution. For example, by tuning combustion in 38 industrial boilers, the Project reduced emissions of SO<sub>x</sub> by 31% (550 tons/month) and NO<sub>x</sub> by 18% (4 tons/month), while cutting fuel consumption by 8% (\$8 million/year). An annotated list of current USAID projects with significant environmental protection is provided in Appendix B.

## 2. Other Donors

Given the wide range of activities that can be classified as environmental, virtually all bilateral donors are participating in the sector in one way or another. For example, Germany is providing about \$500M over a multi-year period for: reduction of dust emissions from Helwan cement factory, rehabilitation of Misr chemical factory, integrated pest management, improved irrigation drainage, substitutes for chlorofluorocarbons (CFCs) in foam and refrigerator industry; private sector incentives for environmental investments, and several small water and wastewater projects. France is providing about \$60M, primarily for water treatment plants. UK, Italy, Japan, Canada, the Netherlands, and Finland are all supporting wastewater programs. Canada also is assisting with irrigation drainage. Denmark is assisting with wind energy technology. UNICEF is helping with environmental curriculum in primary schools. Even the Chinese are participating; their assistance plan for 1991 included about one hundred person weeks of collaboration on a wide variety of environmental science activities. Donor environmental activities are coordinated through the Environmental Subcommittee of the Donors' Working Group.

The World Bank and IMF have made major efforts to reduce Egyptian energy subsidies, and thus promote more rational and cleaner burning of fuels. In addition, the power sector has received major financial assistance from the World Bank (\$842M) and the African Development Bank (\$1.1B). Gulf donors also have made large investments in the power sector.

The World Bank recently funded a tourism development project with a significant environmental protection component. It also is developing two new loans, Red Sea Coastal Marine Resource Management Plan [\$242M loan and \$5M from the Global Environmental Facility (GEF)], and Helwan Industrial Restructuring, Pollution Control and Energy Conservation.

The World Bank also is requiring the GOE to develop an "Environmental Master Plan" as a prerequisite for IDA loans. The Egyptian Environmental Affairs Agency (EEAA) is preparing the Plan with inputs from numerous GOE ministries and assistance from the Bank and Denmark. The GOE will present the Plan to donors at a conference in May 1992.

The recently established "Center for Environment and Development for the Arab Region and Europe" (CEDARE) is located in Cairo and is planning a number of research, monitoring and data bank activities. CEDARE has received roughly \$15-\$20M in pledges from UNDP, IFAD, the GOE, and AFESD (Arab Fund for Economic and Social Development).

### III. USAID ENVIRONMENTAL STRATEGY

#### A. STRATEGY OBJECTIVE

Given that the GOE currently lacks a strong central environmental protection program, the Mission will pursue its environmental activities in sectors and accompanying line ministries in which we have significant experience and, more importantly, leverage. These sectors include water pollution control (Ministry of Housing and Public Utilities), irrigation and agriculture (Ministry of Public Works and Water Resources, Ministry of Agriculture), energy efficiency and conservation (Ministry of Electricity and Energy, Ministry of Industry). Within sectors, the Mission will work with GOE counterparts to augment the environmental aspects of on-going and new activities by promoting sector policy reforms, upgrading institutional capacity to manage the environment, and supporting infrastructure and technologies that protect the environment.

The Mission's strategic objective for the environment is:

#### Enhanced Protection of Egypt's Fresh-water and Air Resources.

Given the cross-cutting nature of environmental issues, the environmental strategic objective is interrelated to several of the Mission's other sectoral strategic objectives involving market pricing, private investment and trade, agricultural productivity, family planning, and efficient and reliability urban public utilities.

#### B. ACTIVITIES

The Mission's environmental efforts are largely subsumed within activities that are primarily focused on other strategic objectives. Thus many aspects of the three explicitly environmental Program Outcomes will be achieved by program activities nominally placed in other sectoral programs.

## **1. Program Outcome 7.1: Policy Reform**

The majority of the Mission's policy reform objectives have environmental dimensions. Improved market pricing and cost recovery efforts (Program Outcome No. 1.2) seek to reduce environmentally detrimental subsidies on water supply and sewerage systems, irrigation water, electricity generation and distribution, fertilizers and pesticides. These reforms will reduce waste by promoting more rational and efficient use of these inputs. Furthermore, the reforms will raise revenues to cover costs of system operation and maintenance (O&M).

In pursuing these reforms, the Mission will rely on the strong relationships it has developed with its key counterparts in the ministries of cabinet affairs, housing, finance, electricity, public works and water resources, agriculture, industry, and health. We will support data collection and analysis efforts that show the environmental costs of continued subsidies and other policies. USAID also will provide selective technical assistance and training in environmental policy analysis.

Improved environmental protection could result indirectly from new private investment and privatization (Program Outcome Nos. 1.2, & 2.1). Though limited in all cases, GOE efforts to enforce pollution regulations have been significantly more successful with private enterprises than with parastatals. Compared to parastatals, private enterprises are more aware of GOE environmental regulations, perhaps because they know that the GOE could start to enforce them more rigorously in the near future. As a result of the perceived threat of future enforcement, private enterprises are reluctant to invest in pollution prone technologies. In contrast, public enterprises generally feel that they have enough political clout to counter any enforcement efforts. Thus they pay less attention to environmental regulations. However, as public sector firms move toward privatization, they tend to show greater interest in environmental concerns because they know that private entrepreneurs will not invest in companies that have serious pollution problems.

When the GOE eventually does start to enforce environmental regulations, private sector compliance is expected to be far more rapid than public sector. This in turn will open new markets for private sector environmental service companies. Private enterprises also are more cost conscious

than parastatals and thus work more diligently at waste reduction and recycling. Furthermore, private companies more readily adopt new technologies from the west which tend to be cleaner than the old technologies used by their public sector counterparts.

The Mission will strengthen its relationship with the Egyptian Environmental Affairs Agency (EEAA) and other central agencies involved with broad, cross sectoral environmental policy. USAID also will explore possibilities to assist the GOE in strengthening its environmental legislative and regulatory process by drawing on the US's rich experience in this field. These efforts will contribute to the GOE environmental policy debate and will help the GOE build a foundation for future environmental policy development and implementation.

## **2. Program Outcome 7.2: Institutional Changes**

The environmental awareness and technical/management capability of public and private sector institutions is weak. The Mission will enhance this capability through a range of activities including expanding the environmental aspects of ongoing and new technical assistance efforts, promoting private sector participation in environmental management, and encouraging the free flow of environmental information.

### **a. Institutional Development**

USAID will assist the GOE in strengthening its environmental analysis capability in a variety of areas. To improve GOE ability to formulate and implement policies for sustainable protection of water resources, the Mission will use its large water/wastewater and irrigation projects to assist the National Organization for Potable Water and Sewage Disposal (NOPWASD) and Ministry of Public Works and Water Resources (MPWWR). Where appropriate, the analysis will include "Environmental Risk Assessment", which has become accepted in recent years as the most effective approach to establishing priorities in the environmental area. Even in situations like Egypt, where data are limited, a preliminary risk assessment systematically organizes the available data in a well structured framework on which to base the most reasonable ranking of problems and proposed interventions. The MPWWR's Water Research Center (WRC) has shown considerable interest in risk

assessment as a complement to its water monitoring program and as a tool for developing its strategic plan for water resources.

In addition to helping NOPWASD and MPWWR at the central level, assistance will focus on improving local water associations, particularly with accounting, cost recovery, and operation and maintenance. The effective development of these local institutions will result in more efficient and responsive management, better operation of physical systems, less water waste (both during delivery and on site), more effective disposal of wastewater, and reduced water pollution.

The Mission will also assist the GOE with selected portions of its agricultural strategy for the 1990s which focuses on the environmental sustainability of agricultural development. Within the USAID agricultural research program, attention will be given to water quality and reuse for agricultural, new lands development, integrated pest management, use of stabilized sludge, and environmentally sustainable agriculture.

To improve energy efficiency and reduce air pollution, the Mission will continue its dialogue with the Ministry of Electricity and Energy (MEE) on price reform and work with MEE to modernize its internal management and improve the efficiency of its transmission and distribution systems. Continued management training for the MEE will improve sector efficiency, increase kilowatts delivered per unit fuel burned, and thus have a positive impact on air pollution emissions from power plants.

The Mission will expand the scope of its current Energy Conservation Project to address wastes from both energy and raw material inputs. Through USAID assistance, the Ministry of Industry's extension arm, the Tabbin Institute for Metallurgical Studies (TIMS), will expand its capability to analyze and mitigate industrial waste and pollution problems. TIMS's current energy conservation outreach program will be expanded to include a wider range of pollution problems.

USAID training activities also will support the environmental strategy. The Mission is reserving places for the study of environmental subjects under its Non-Project Training and Peace Fellowships programs.

**b. Democratic Initiatives**

The Mission's Democratic Initiatives Program will strive to broaden participation in decision making and thus will enable environmentally concerned citizens and advocacy groups to have greater input into decisions that affect the environment. The pressure from such advocacy groups has been the driving force behind the environmental movement in the U.S. and Europe.

The PVO Development Project assessment of Egyptian PVOs will identify PVOs with particular interest or strength in environmental activities. The Project will encourage proposals for pollution prevention and environmental protection activities, as well as environmental awareness programs and environmental advocacy activities. Furthermore, USAID is allocating funds within its new Technical Services and Feasibility Studies II Project for grants to PVO's and will give special consideration to PVO proposals for environmental subprojects.

**c. Private Sector Initiatives**

The Mission will support pollution prevention by private companies and promote the development of private sector environmental services firms.

In expanding its Energy Conservation Project to include industrial waste, USAID will continue its strong outreach to private sector firms. Project experience indicates that private companies have been eager to reduce energy waste (and thus air pollution emissions) because doing so increases profits. Though the Project has provided energy saving equipment on a grant basis, after discussions with project engineers, several private firms bought equipment on their own because they did not want to wait for AID's relatively long procurement process. The point here is that profit-motivated firms will readily adopt new, environmentally sound technologies when it improves their profit picture. Within the Energy Conservation Project, USAID will exploit this propensity by providing technical and commodity assistance to private companies interested in adopting environmentally sound, energy/waste saving technologies.

In assisting these companies, the Mission will use private sector consulting firms for the required engineering tasks. While there are several well qualified private industrial/ energy engineering firms in Egypt; they have limited experience with energy and waste reduction technologies.

To overcome this limitation, the USAID project contractor will work closely with these firms over an extended period of time. The Mission also will encourage GOE agencies to contract out environmental services by emphasizing the advantages in terms of budget flexibility, cost reduction, and access to technological innovation.

The Mission will also explore the possibility of establishing a pollution prevention - energy conservation fund. The fund might possibly become a self-sustainable revolving fund or a special window within the Mission's private sector Commodity Import Program.

d. Free Flow of Information

Data collected to characterize the Egyptian environment are restricted to limited distribution within the governing institution, and are suppressed when the data might prove embarrassing. This is not a new situation. Absence of notable progress over the past decade portends that the situation will not be easily rectified. Nevertheless, change is necessary for meaningful overall assessment of the environmental situation and precise identification of priorities.

The Mission will seek to improve the free flow of information in several ways. USAID will actively share the environmental information it obtains with Egyptian and international agencies, including NGO's and private firms. The Mission also will expand distribution of environmentally related reports generated by its projects.

Within the Irrigation Management Systems Project and the Energy Conservation Project, the Mission will support efforts to establish permanent repositories of environmental data on water and air pollution. For example, the Energy Conservation Project will collect, analyze and distribute stack emission data from about

one hundred industrial firms participating in its portable gas analyzer program. In addition, USAID will assist the Water Research Center with its water resource planning and water quality monitoring activities supported by the Irrigation Management Systems Project.

We will strive to ensure that the data are assembled in a coherent form for critical analysis and review by a wide spectrum of investigators. To the extent possible, the Mission efforts will work through existing information systems such as the Egyptian National Science and Technological Information Network (ENSTINET).

### **3. Program Outcome 7.3: Technology and Infrastructure**

Virtually all USAID development assistance to Egypt involves technology change, much of which has important environmental consequences. USAID's largest and most direct environmental achievements will come from construction of infrastructure which enhances protection of fresh-water and air resources.

#### **a. Major Water Protection Activities**

Continuation of USAID's multibillion dollar water and wastewater program is the backbone of USAID's efforts to enhance protection of Egypt's fresh-water resources. The program uses the appropriate technology for Egypt's environmental, institutional, and financial situation to directly protect Egypt's fresh-water resources. For example, the ongoing Cairo Sewerage II (\$816M) and Alexandria Wastewater (\$390M) projects focus on collection of sewage (to eliminate street flooding) and primary treatment. The proposed new phases of these projects will focus on long term sustainability and environmentally sound disposal of sludge.

The Canal Cities Project (\$380M) is improving sewerage systems for Suez, Ismailia, and Port Suez. Given the environmental situation, USAID is financing secondary treatment using aerated lagoons and sludge composting.

USAID support for sewerage in the secondary cities will be shifted from the current Upper Egypt focus of Fayoum, El Minia, and Beni Suef to cities in the Delta which

have severe industrial pollution problems. The proposed new project will assist five to ten Delta cities which demonstrate initiative and commitment to solving their sewerage problems.

Another extremely important component of the Mission's effort to protect water resources is the Irrigation Management System Project. While irrigation construction and maintenance activities will continue, the Project will be realigned to focus explicitly on water quality and increased efficiency of water use. Support to the Water Research Center (WRC) will emphasize water use efficiency and environmental considerations. The WRC will increase its water quality monitoring program and initiate use of risk assessment for the water sector.

b. Major Air Protection Activities

USAID's energy assistance activities will improve efficiency and have important positive impacts on air quality. The Mission's large power sector program will focus on improved performance of existing electricity generation and distribution facilities (Program Outcome 6.2). In short, the program will help the Ministry of Electricity and Energy (MEE) deliver more kilowatt-hours of power per unit fuel burned or unit air pollution emitted. The specific activities will include reducing losses in transmission and distribution (which are 65 to 70 percent higher than they should be); rehabilitating existing gas turbines and adding steam cycles (so plants can produce 50 percent more electricity with no increase in fuel or air pollution); and financing regional control centers (to increase system efficiency). Also contributing to enhanced protection of air resources is the Mission's industrial energy/waste reduction program, which is described more fully below.

c. Pollution Prevention and Environmental Analysis Technologies

Pollution prevention programs are attractive, reductions of 30 percent are commonly achieved, along with substantial increases in plant operations and energy efficiency.

Within its expanded Energy Conservation Project, the Mission will support transfer of U.S. pollution prevention technologies. For example, USAID will train staff at several private engineering firms and about 100 industrial firms to tune the combustion of their boilers using portable stack gas analyzers. Through the program private engineering firms will gain experience and expertise with conducting energy/waste audits of industrial facilities, identifying and designing needed pollution prevention activities, developing required procurement specifications for pollution prevention equipment (including metering), monitoring results, and servicing equipment. Once this is accomplished, these firms will be able to sustain the industrial energy/waste reduction program after USAID assistance is completed in 1996.

The Mission will expand the pollution prevention and other environmental aspects of its Science and Technology Cooperation Project, which contracts with Egyptian R&D and engineering agencies to solve development problems of industrial firms and other "end-users". After realignment, more than half of contracts will focus on environmental topics. For example, the contracts will analyze selected industrial wastes in an attempt to either recover or find productive uses for chromium, urea, cellulose fibers, slag, iron oxide pellets, cement dust, tire waste, and regeneration of edible oils. Other contracts will focus on improved local sewage treatment, sludge recycling, aquaculture, treatment of hazardous wastes, and alternatives to use of scarce agricultural soil in brick making. USAID will adjust the project to increase the involvement of U.S. technological expertise (Program Outcome 2.2), either through the World Environmental Council (WEC), the International Executive Service Corps (IESC), or some other mechanism.

## **APPENDIX A. NEXT STEPS FOR THE MISSION**

The Mission will undertake four near term activities to initiate implementation of its environmental strategy.

### **1. Initial Environmental Studies**

The Mission will undertake two studies to establish a sound basis for subsequent program activities. As a first step, the Mission will conduct a systematic review of all projects to identify potential sub-activities that can be augmented to improve environmental consequences. The outputs will be a clear exposition of Mission environmental activities for program review and planning purposes, and a quantification of environmental benefits already being achieved through USAID projects.

The Mission also will conduct an initial risk assessment using available data to clarify its understanding of appropriate priorities and to identify those areas on which to concentrate USAID environmental efforts. The initial risk assessment will confirm that emphases are properly placed, identify priorities being given either too little or too much attention, and provide a framework for systematic subsequent evaluations. The results will provide a framework against which to assess on-going projects and to design future activities.

### **2. Strengthen Environmental Review Component of New Projects**

The Mission will place greater weight on environmental considerations in the selection of new projects. Projects providing positive environmental benefits will be given preference over projects judged otherwise equivalent. Environmental considerations will be taken into consideration at each stage of project design and implementation.

### **3. Expand Outreach Activities in Environmental Area**

In order to be effective in the environmental area, the Mission will expand its outreach efforts toward key Egyptian environmental actors (governmental and non-governmental) and other foreign participants and donors. Relationships with this (relatively small) community provide an insightful basis on which to formulate USAID priorities in the environmental area. In addition, the Mission will build into Project Agreements the intention to publicize the environmental data generated by the project.

#### 4. Program Development

The Mission is establishing an Environment Office, which will be responsible for developing the Mission's environmental program as well as managing implementation of selected environmental projects. The Environment Office will insure that important cross-cutting issues are properly addressed and that all Mission environmental actions receive needed management attention. The Office will develop and periodically update an implementation plan for the Mission's environmental activities. These activities will include undertaking some of the initial studies discussed above; strengthening the environmental aspects of ongoing projects; increasing USAID linkages with Egyptian, US and other donor environmental groups; and monitoring changes in GOE environmental policy, legislation, and programs.

## APPENDIX B. USAID PROJECTS PROTECTING THE ENVIRONMENT

### 1. Projects Protecting Fresh-Water Resources

#### a. Alexandria Wastewater System Expansion (263-0100)

Duration: 1977-1993

LOP Funding: \$390.0M

This project finances design, construction and start-up of a sewage development program which will alleviate sewage flooding in residential areas and disposal of raw sewage in recreational beaches.

#### b. Provincial Cities Development (263-0127 and 161.03)

Duration: 1984-1994

LOP Funding: \$110.0M

Project helps three provincial city governments (Fayoum, El Minia and Beni Suef) effectively plan, budget, build and maintain urban infrastructure and to improve water and wastewater systems.

#### c. Cairo Sewerage II (263-0173)

Duration: 1984-1994

LOP Funding: \$816.0M

Project expands the Cairo sewage collection system into the largely unsewered areas on the west bank of the Nile and increase the capacity of the associated treatment plants.

#### d. Canal Cities Water and Wastewater II (263-0174)

Duration: 1987-1997

LOP Funding: \$380.0M

Project further improves the delivery of water and wastewater services in the Canal Cities of Port Said, Ismailia and Suez.

#### e. Water and Wastewater Institutional Support (263-0176)

Duration: 1985-1994

LOP Funding: \$15.0M

Project enhances the capability of the Ministry of Housing and Public Utilities (MHPU) and its executive agency, the National Organization for Potable Water and Sanitary Drainage (NOPWASD), in meeting municipal water and wastewater needs throughout Egypt.

f. Cairo Water Supply II (263-0193)

Duration: 1988-1995

LOP Funding: \$145.0M

Project rehabilitates and expands the Cairo central city water transmission and distribution system.

g. Local Development (LDID) (263-0182)

Duration: 1985-1992

LOP Funding: \$481.0M

Project improves the quality of life of low-income residents in rural and urban Egypt by providing improved basic services, which include substantial water and wastewater activities.

h. Irrigation Management Systems (263-0132)

Duration: 1981-1995

LOP Funding: \$340.0M

Project helps Egypt improve the operating efficiency of its irrigation system and strengthens the Ministry of Public Works and Water Resources (MPWWR) operational, maintenance and water resource planning capabilities. Project is giving increased attention to water quality issues.

i. National Agricultural Research (263-0152)

Duration: 1985-1994

LOP Funding: \$300.0M

Project improves Egypt's capability to provide farmers with productivity-increasing technologies in a supportive policy environment. Project is addressing water quality and reuse for agriculture, new lands development, integrated pest management and environmentally sustainable agriculture.

j. Agricultural Production and Credit (263-0202)

Duration: 1986-1995

LOP Funding: \$283.0M

Project assists the Government of Egypt (GOE) in deregulating the agricultural sector and provides farmers with improved financial services and expanded access to inputs, such as new technologies, in a deregulated agricultural sector. The capital component of \$250 million is to be transferred by installments to the GOE in support

of agreed agricultural policy changes such as reduction of subsidies on fertilizers and pesticides and liberalization of their marketing.

## **2. Projects Protecting Air Resources**

- a. Rehabilitation and Modernization of the Aswan High Dam Hydroelectric Power Station (263-0160)

Duration: 1982-1995

LOP Funding: \$140.0M

This project finances the rehabilitation and modernization of the 12 hydro-turbine generators of the Aswan High Dam, hydraulic gates and related controls.

- b. Alexandria Electrical Network Modernization (263-0194)

Duration: 1989-1997

LOP Funding: \$50.0M

Project improves selected areas of the electrical distribution network serving Alexandria and modernizes the control of Alexandria's sub-transmission and distribution systems.

- c. Power Sector Support (263-0215)

Duration: 1989-1999

LOP Funding: \$391.0M

The project supports past and promotes future continued Government of Egypt progress in reducing electricity sector subsidies and in making other energy sector policy changes by providing capital infrastructure incentives.

- d. Energy Conservation and Efficiency (263-0140.3)

Duration: 1988-1996

LOP Funding: \$49.5M

Project promotes and accelerates the adoption of improved commercial technologies, processes and practices for saving energy, increasing energy efficiency, and reducing air pollution emissions. Project is being redesigned to include other types of industrial waste in addition to energy waste.

### **3. Projects Supporting Environment in General**

a. **University Linkages (263-0118 and 0211)**

Duration: 1980-1997

LOP Funding: \$47.5M

Project supports the applied research activities of Egyptian university professors to solve priority development problems. Project is giving added attention to environmental problems.

b. **Science and Technology Cooperation (263-0140.01)**

Duration: 1987-1995

LOP Funding: \$36.0M

Project contracts with Egyptian applied scientists and research engineers to solve priority development problems that have the greatest effect on end-users. About half of the subprojects are focusing on environmental issues: lake ecosystems, sewage disposal, industrial waste recycling, etc.

c. **Population (263-0144 and 0227)**

Duration: 1983-1997

LOP Funding: \$179.6M

Project strengthens and expands Egypt's population/family planning activities so as to increase family planning practice among married couples of reproductive age.

d. **Development Training (263-0125)**

Duration: 1985-1995

LOP Funding: \$109.0M

Project will provide cost effective education and training opportunities for key individuals in development sectors. Environmental training activities are being expanded.

e. **PVO Development (263-0220)**

Duration: 1991-1994

LOP Funding: \$90.0M

Project provides grants for PVO sub-projects including environmental subprojects.

f. Technical Cooperation and Feasibility Studies (263-0102, 0225)

Duration: 1983-2000

LOP Funding: \$100M

Among other things, the project funds environmental studies and grants to PVOs for environmental sub-projects.