EHP

ENVIRONMENTAL HEALTH PROJECT

ACTIVITY REPORT

No. 10

Findings and Institutional Options for Future Management of Water Supply and Wastewater in the Governorates of Fayoum, Beni Suef, and Menya

Provincial Cities Development Project, Egypt

August 1995

Prepared for
ENVIRONMENTAL HEALTH DIVISION
OFFICE OF HEALTH AND NUTRITION

Center for Population, Health and Nutrition
Bureau for Global Programs, Field Support and Research
U.S. Agency for International Development

USAID

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APPENDIXES

ACRONYMS

BWC	Beheira Water Company
DWC	Daimetta Water Company
EHP	Environmental Health Project
FINIDA	Finnish overseas development organization
GOAW	General Organization for Alexandria Water
GOGCWS	General Organization for Greater Cairo Water Supply
HCCU	High Consultive Committee on Utilities
markez	political jurisdiction, subdivision of a governorate (plural: *marakez*)
MHPU	Ministry of Housing and Public Utilities
MLA	Ministry of Local Administration
MOF	Ministry of Finance
NOPWASD	National Organization for Potable Water and Sanitary Drainage
O&M	Operations and maintenance
PCD	Provincial Cities Development Project (USAID-sponsored)
USAID	United States Agency for International Development
WASH	Water and Sanitation for Health Project (USAID-sponsored)

EXECUTIVE SUMMARY

In March 1995, USAID/Cairo requested the Environmental Health Project (EHP) to conduct an institutional study of the water and wastewater systems in three provincial cities: Fayoum, Beni Suef, and Menya. USAID began funding the construction of water and wastewater facilities in these three cities in 1982; the plants have been completed and are now operational. Currently, these systems are run by governorate water departments. However, the Project Steering Committee expressed interest in moving the water and wastewater utilities in each of the three governorates towards managerial and financial autonomy, as well as in examining different institutional options for ensuring sustainable services.

This activity was divided into two main tasks. The first was an assessment of the systems existing in the three governorates, including their regulatory and legal frameworks, financial systems and costing, management and organizational structures, and level and type of community involvement. After completing the assessment, the EHP team presented its findings and discussed potential institutional options with the governorates, which lead to the second task: the preparation of action plans based on the option chosen in each governorate. It was decided that the actions plans would contain the policies, organizational structures, training needs, and specific steps required to achieve autonomy and cost recovery. This report discusses the findings of the first task, the assessment.

The assessment was conducted from April to July 1995 by a team of U.S. and Egyptian consultants. The three core U.S. consultants included a team leader, an institutional specialist, and a financial specialist. The Egyptian consultants included an engineer, a financial specialist, an institutional analyst, and a social scientist.

Assessment activities included the following:

- Initial visits to each governorate
- Data gathering visits consisting of interviews, inspection of records, physical inspections, and collection of written materials
- Analysis of findings
- Workshops in each governorate to review findings
- Meetings with leadership to discuss institutional options

Conclusions

Because the team believes that the three governorates wish to move ahead with new delivery organizations for water and wastewater services, the team recommends that each governorate develop a new institutional arrangement that would create a unified water utility. The Fayoum governorate had already reached this conclusion and was moving ahead with a presidential decree to create a general economic authority.

The options analysis (see Chapter 3) indicates that the general economic authority is the most appropriate organizational form. The team looked at three other options in addition to the economic authority: the existing institutional arrangements, a public water company, and contract management. There is precedence for creating an economic authority in Egypt (in Alexandria and Cairo), it is consistent with national policy for water and wastewater, and it can be established through presidential decree. An economic authority would provide an institutional form in which to structure a modern water and wastewater utility, would move the systems one step

further toward local control and responsibility, and would be a great improvement over the current situation. Also, an economic authority meets the essential criteria that USAID has said it wants: autonomy for staffing, ability to retain revenues, and capacity for setting tariffs that meet national guidelines and win popular council approval.

Summary of Findings, Constraints, and Issues

Chapters 4, 5, and 6 summarize the findings in each of the three provincial cities. Issues arising from the findings are discussed in detail in Chapter 7. Below is a summary of the main issues which need to be addressed.

Organizational Constraints

The local administration service delivery model is not suitable for modern utility management.

The team found that current institutional arrangements for water and wastewater utilities are characterized by overlapping responsibilities; an overly bureaucratic, procedure-laden administrative regimen; and a lack of organizational identity in the eyes of employees and managers. Water and wastewater officials consider themselves employees of the national government. Governorate and city-level departments respond to central ministries rather than to local demands or to consumers. Understandably, reward systems and organizational structures are designed to respond to this reality. Article 2 of Local Administration Law no. 145/1988 places these institutions under the jurisdiction of the localities, but government centralization of the budget, policy on tariffs, personnel, and the general purpose government delivery model all undermine local authority and responsibility.

The consequence of the general purpose delivery model is a lack of managerial accountability and absence of monitoring mechanisms in key areas.

Institutional Constraints

Central government rules and lack of autonomy hinder utility effectiveness.

The current structure of utilities under a local service delivery model, following rules set by and designed for central government bureaucracies and with ministry decision making for key resources, creates insurmountable institutional constraints. Unless a locally controlled utility model is put in place, these constraints will prevent improvements in management performance. It is impossible for local providers to maintain a service delivery orientation within the current structure.

Financial and Budgetary Constraints

Current budgetary process and priorities are ill-suited for utility management.

In the same way that institutional and organizational constraints limit the utilities' operating performance, constraints in the financial subsystem hamper financial performance. Most of the troublesome issues are related to budgeting and the allocation of funds. The consequences of the current system are financial assets that are not managed and an absence of forecasting tools.

Current performance demonstrates a serious imbalance between revenues and expenditures.

A number of factors contribute to the failure to collect sufficient revenues to meet operations and maintenance costs. These

factors, combined with unnecessarily high expenditures for personnel, operational costs, and unaccounted-for water, present a bleak financial picture for the utilities. Measures need to be taken immediately to address these problems.

Tariffs are inadequate to meet the goal of self-sufficiency The existing tariff will need to be raised unless unrealistically large increases in subsidies are provided under all imaginable scenarios.

The detailed financial analysis in Appendix E projects tariff needs and break-even scenarios up to the year 2000. The conclusion is that heavily subsidized tariffs —which do not currently meet O&M costs—will only continue to escalate with inflation. Unless strong interventions are taken to reduce expenditures and increase revenue efficiencies, the required tariff and subsidy will be higher than either consumers or the government can reasonably be expected to meet. Even with considerable cost savings and increased revenues, tariffs will need to be raised substantially if a break-even scenario is desired.

Operational Constraints

Except for newly constructed plants, water and wastewater systems operate inefficiently or (in wastewater) completely inadequately; distribution systems have problems and wastewater systems are marginally operational.

Distribution systems have an unacceptable volume of leakage. Several anomalies in the data do not allow certainty about current efficiencies in all cases. For example, in Beni Suef, inflow data for wastewater treatment indicate a much higher population served than is officially reported. In Fayoum, wastewater treatment plant staff numbers seem inordinately high. Follow-up field studies should be undertaken to better define short-term actions for improvement. Assessment findings indicate a number of operational shortcoming in infrastructure planning, design, construction, and O&M. In aggregate, these deficiencies negatively affect the quality of service, causing shortfalls in revenue, consumer dissatisfaction, and rapid deterioration of assets. Operational shortcomings are reflected at all stages in the service delivery process.

Future Actions

Any future development projects in the provincial cities will require a carefully designed integrated approach and several years of transformation activities in institutional development, policy support, and capital investments.

Priorities for intervention, which will be further developed in the action plan report, include the following:

- **Tariffs** will need to be escalated over time to account for inflation and increased operational costs, as well as to reduce the subsidy. Policies on tariffs will need attention at the national level, and management information will need to be provided to popular councils so they better understand the financial implications of tariff structures (see Appendix E).

- **Subsidies**, and the national policy related to them, should be structured to provide incentives for improved operational and financial performance. Over time they should be reduced and the reorganized governorate-level water utilities required to become self-sufficient.

- Improvements to **billing and collections** and the development of modern systems are key to providing more income. Future institutional development programs should include computerization, systems development, and training.

- Cost savings through improved **operations and maintenance**, attention to water loss, and **unaccounted-for water programs** can be undertaken immediately as indicators of interest and commitment to performance improvement. These efforts will need to be continued as permanent, continuous quality improvement programs over several years. Design of institutional improvement efforts should anticipate the development of standard operating procedures, training, leak detection, and provision of appropriate equipment for O&M.

- Future organizations, formed as true water utilities, will need to place emphasis on **attention to consumers** rather than treating them as adversaries. Community involvement and consumer education will be important to improving performance.

- A number of short-term **immediate actions** are possible to improve performance in operations and maintenance. These priorities are identified in Chapter 3 and in Appendixes B, C, D, and E. Follow-up actions that can take place over the next year will be identified in the companion action plan report.

There is sufficient interest on the part of the governorates involved to proceed with the development of suggested actions for future transformation and performance improvement. The design and development of comprehensive institutional improvement projects in each governorate should be undertaken and should include selected physical improvement activities to achieve better performance from current systems. A more comprehensive assessment of the wastewater situation and the water supply needs for villages and marakez should be made by updating the master plans in each of the governorates.

1 INTRODUCTION

1.1 Background

The Provincial Cities Development Project, begun in 1982, funded the construction of water treatment plants and selected upgrading of water and wastewater systems in the provincial cities of Fayoum, Beni Suef, and Menya in Egypt.

The project has undergone a series of strategic adjustments during the thirteen years of its existence. Initial project efforts were aimed at skills development and institutional and policy reform. There was a desire, perhaps most strongly held within USAID at project inception, to affect issues such as tariff policies, organization of utilities, management structures, delegation to local authorities, and the role of the National Organization for Potable Water and Sanitary Drainage (NOPWASD). It became increasingly clear that overall sectoral ministry policies would probably not change until physical systems were constructed, which was most desired by the leadership.

With considerable input from the concerned governorates, the project eventually became primarily construction-oriented, with training provided to ensure that the staff had the skills to operate the plants and the infrastructure funded by USAID. This training in plant management and operations and maintenance (O&M) continues through December 1995. Project activities may continue through the project completion date of August 1996.

Currently, the water treatment plants are managed by governorate/city/*markez*[1] water departments, although NOPWASD provides technical supervision and planning as well as construction supervision. The governorate organizations are responsible for network extension, service connections, billing, collection, and plant operations and maintenance. The PCD consultants, now in the last months of their efforts, generally provide technical support to operate and maintain the new plants as a part of the plant turnover procedures. However, the consultants are not responsible for institutional matters, utility management, financial systems, or infrastructure relating to wastewater or network rehabilitation (except in very specific instances). Responsibilities and utility functions are described in Chapters 4 and 5.

Other donors provide related assistance in Fayoum and Beni Suef. The government of the Netherlands has been assisting the governorate of Fayoum for several years through activities focused on the villages and marakez outside of the city of Fayoum.

Although a Dutch contractor has recently completed a master plan study for the governorate, the plan does not include water

[1]A *markez* is a political jurisdiction that exists as a subdivision of a governorate. A city, such as Beni Suef or Fayoum, is both a markez and a city. Each markez has an appointed chief and administrative staff. City mayors are appointed by the Prime Minister and are also chiefs of the marakez. (Note: the plural form of markez is *marakez*.)

and wastewater for the city of Fayoum. This contractor has also assisted the governorate with its decision to develop a governorate-wide water supply organization based on the current organizational experience of the El Azab water treatment plant (which supplies water to rural villages and towns in the governorate). This organization will eventually absorb the city of Fayoum's water services if current intentions are carried out. The governorate has requested a presidential decree to form a general economic authority (as in Cairo and Alexandria) for this purpose.

In Beni Suef, the government of Finland (through FINIDA) supports a contractor working in the rural villages and marakez. The contractor has been conducting technical studies and working on issues of community organization and contribution to water supply and sanitation.

The Provincial Cities Development (PCD) Project has maintained a project steering committee, comprising the three governors of this assessment and their top staff, plus representatives from NOPWASD, the Ministry of Local Administration (which relates to the governorates), and USAID. This committee has expressed interest in moving water services (and possibly wastewater services) toward managerial and financial autonomy and sustainability in the target cities. This interest resulted in the assessment described in this report.

1.2 Scope of Work

The USAID/Cairo mission requested the Environmental Health Project (EHP) to conduct a study and recommend actions to transform the three governorate organizations providing water and wastewater services into financially viable, autonomous, self-sustaining entities.

Action plans will recommend indicators and actions to achieve results so that the reorganized utilities will be capable of managing the newly constructed facilities. The transformation should produce entities capable of efficiently operating and maintaining the infrastructure provided, and should include restructuring the current institutional arrangements and forming substantially new organizations capable of managing water and wastewater systems, improving cost recovery, managing budgets, and maintaining and training staff.

The desired future for these utilities, after improvement efforts have been implemented over several years, will be for them to have:

- the capacity to make investment and borrowing decisions and be able to retain revenues collected;
- the capacity to select, remunerate, develop, and promote staff, without the burden of existing civil service regulations; and
- the authority to charge agreed-upon rates for water and wastewater to recover operations and maintenance costs.

These three essential conditions have been advanced by USAID as the "bottom line" required of any future agreements for technical assistance in transformation efforts.

The EHP team was requested to review the institutional options and legal framework, organizational structures and staff policies, and financial viability and cost recovery situation of each of the three provincial cities, and their governorates, given available data. The team was asked to do this by cooperating and working with USAID staff, governorate staff, and the other donors involved.

Within this overall scope of work, the following activities and deliverables were requested:

1. An assessment leading to an options report

Deliverables:
An overall work plan
An options report (this document)

Activities:
Review information and conduct field studies needed to assess tariff structures; tariff collection and commercial systems; financial relationships with the central government; regulations and policies; water production, distribution, and treatment systems; wastewater systems; operations and maintenance procedures; organizational and institutional structures; training; consumer relations; and community involvement.

Based on the information gathered and analyzed, present possible institutional alternatives to achieve transformation and determine the issues and needs to be addressed with future actions.

2. Prepare transformation actions for the next year (short-terms actions possible under the present project) and for the longer term.

Deliverable:
Action plan report

Action plans for each governorate should be reviewed with the governorate and USAID to solicit input and recommendations, and then should be summarized in an action plan report.

3. Prepare a final report summarizing the results of the activities conducted, issues to be addressed, observations of interest and willingness to move ahead by all parties, and recommended next steps.

Deliverable:
Final summary report

The EHP team consisted of the following individuals:

Team Leader: Institutional, organizational, training, and project strategy and design specialist. One U.S.-based staff.

Institutional: Specialist in institutional development and organization familiar with Egyptian public sector organizations. One U.S.-based staff with one Egyptian counterpart staff specialist.

Financial: Cost analysis and financial systems specialist. One U.S.-based staff with one Egyptian local counterpart financial specialist.

Technical: Water and wastewater design and operations and maintenance specialist. One Egyptian engineer supported by the institutional specialist and the financial specialist, who are also environmental engineers.

Consumer: Community involvement and consumer relations specialist. One Egyptian social scientist supported by the team leader.

1.3 Activities Completed to Date and Methodology Used

The team completed the activities listed below during the April–June time frame.

- Initial visits were conducted in each governorate to introduce staff to the

governors, secretary generals, assistant secretary generals, and governorate and city water and wastewater technical staff. These large meetings were conducted with USAID staff assistance to present an overview of assessment activities and define data gathering requirements.

- Data gathering visits, each lasting several days, were conducted in all three governorates. (Appendix A contains a list of individuals contacted.) Interviews were conducted with staff at all levels and with representative selections of consumers (where possible); records were inspected and copied, physical inspections were conducted, and written material was collected.

- Case studies were developed and data analyzed. The essential detailed findings (financial, institutional, technical, and consumer) were written in summary form. These data appear in Appendixes B, C, and D.

- Workshops were designed and conducted to review the findings and key indicators in the governorates of Fayoum and Beni Suef. Key problems and priority actions were solicited from workshop participants. Options for the appropriate institutional framework were reviewed with the leadership.

- The deliverable for the options stage of the work plan was written and submitted to USAID in draft form.

1.3.1 The Status of Efforts in Menya

Due to more pressing priorities, the local staff of the Menya governorate were not available until the last week in June to assist the team in gathering data and conducting an assessment of the current situation. The community-consumer specialist team was not permitted to conduct interviews with the public under any circumstances, perhaps due to local conditions affecting public safety. Consequently, the team began to collect data in Menya only in June. The team decided to move ahead with the options analysis because the preliminary information available indicated that problems, constraints, and the institutional picture in Menya are very similar to Beni Suef and Fayoum. Differences appear to be primarily on issues of magnitude rather than substance. The summarized data, written findings, profile, and suggested options for Menya were submitted in draft form in August 1995, and the material incorporated into the final version of this report.

1.4 Report Organization

This report is organized to review institutional options and recommend appropriate actions to achieve the preferred options, given the circumstances, issues, and priority needs of the provincial cities reviewed.

Chapter 2 presents the performance criteria and indicators and minimum desirable conditions required for reasonable future operations and maintenance of utilities, once the utilities have been developed institutionally.

Chapter 3 provides an analysis of how water and wastewater services are currently structured and how they could be restructured to give them more independence and accountability under appropriate legal and

organizational arrangements. Three alternatives are discussed and evaluated against desirable performance criteria.

Chapters 4, 5, and 6 present summary findings and essential operational, financial, and institutional data on current performance. Also included is a list of priority actions requiring attention for Fayoum, Beni Suef, and Menya.

Chapter 7 provides an analysis of the critical constraints and issues affecting current and future performance for the water and wastewater services and summarizes the recommendations that will lead to the action plan report.

A series of appendixes present detailed data and analyses: Appendix A provides a list of persons contacted and interviewed. Appendix B presents detailed data for the Fayoum governorate. Appendix C and D provide the same for Beni Suef and Menya, respectively. Appendix E provides a detailed financial analysis and a number of tables for financial options up to the year 2000. Appendix F gives detailed information on workshops held in Fayoum and Beni Suef. Appendix G provides a bibliography of documents reviewed that were available from the USAID library and other sources.

2 KEY INDICATORS FOR SUCCESSFUL UTILITY OPERATIONS

2.1 Defining a Desirable Future for the Water and Wastewater Sector

In discussions the EHP team held with USAID officers, three essential policy conditions were advanced as key to future institutional project collaboration. USAID's "ground rules" are as follows:

- **Self-sufficiency.** Water and wastewater utilities must create the financial conditions, through tariffs and cost savings, to be able to cover the costs of operations and maintenance.

- **Ability to define personnel regulations.** Utilities must have sufficient institutional authority over their staff to be able to retain qualified personnel and set staffing levels. They must be able to define internal regulations for staff compensation and dismissal without the burden of cumbersome civil service regulations or requirements to hire staff for political reasons.

- **Autonomy to set tariffs.** Utilities must be decentralized and must operate as autonomous units under the control of local authorities, with the capacity to set tariffs as needed to maintain self-sufficiency and reduce reliance on national subsidies.

These essential conditions for future cooperation with USAID were discussed with the senior staff and leadership of the three governorates. In addition, a set of important indicators relating to these conditions, "a vision of what a good water and wastewater utility" should be, was also presented and discussed during the workshops (see Appendix F). Data gathered and analyzed by the team that summarize current performance in each provincial city (see Chapters 4-6) were presented and compared with these indicators to identify performance gaps.

The key performance indicators are presented below. The findings from the field investigations presented in Chapters 4-6 are analyzed in comparison with these indicators. Future actions required to achieve strong performance, to be presented in the action plan report, will largely be organized in terms of these indicators. Chapter 3 presents an analysis of possible institutional options for the delivery of water and wastewater services using indicators that relate to the USAID "ground rules."

2.2 Essential Requirements for a Successful Utility

A study conducted by the Water and Sanitation for Health (WASH) Project, *Guidelines for Institutional Assessment: Water and Wastewater Utilities*, WASH Technical Report No. 37, 1988, found that successful water and wastewater utilities met the three essential elements listed above and were also able to perform well in nine essential categories of performance: management, cost-effectiveness, technical performance, leadership capacity, consumer relations, commercial

orientation, staff development, autonomy, and relations with external constituencies. For each of these performance categories, measurable indicators were developed, based on actual successful performance. In the years since this study, a limited number of key indicators have been distilled as indicative of successful performance. Those that were communicated to the three governorates are presented below.

Commercial Indicators

- A complete commercial system is in place to ensure that the time from billing to collection is from 30 to 60 days. This cycle includes reading the meter, issuing the bill to each consumer, and receiving payment.

Financial Indicators

- The percentage of billed revenue collected ranges from 90 to 100.
- Unaccounted-for water (the difference between the amount of water produced and the amount billed) is 20% or less.

Operational Efficiency and Quality (Operations and Maintenance)

- Facilities and equipment are maintained to manufacturer's specifications for useful life, with routine preventive maintenance systems in place.
- Water delivered per capita meets coverage demands.
- Service is 24 hours a day in sufficient quantity.
- Water quality is safe for consumption.

Technical and Engineering Capacity

- Sufficient technical capacity exists to prepare and implement written annual plans that anticipate future demand.
- Sufficient technical capacity exists to produce high-quality tender documents, supervise contracts, and manage the water system.

Consumer Relations

- Consumers have a consistent, reliable mechanism to pay for water services, with easy access to service centers; outreach programs are in place to ensure a minimum of consumer conflict regarding water supply service, billing levels, and justification for payments. A customer complaint mechanism is in place and is responsive.
- The water utility has a regular program to educate consumers about public health and environmental health aspects of proper water supply use and water loss/conservation.

Management

- Staff are able to work together as a team. Skills for communication, meeting management, work assignments, monitoring, feedback, and performance improvement are present.
- Staff are dedicated to the water organization and motivated to perform their jobs. Managers have the skills to create a motivating work environment.
- Decision making for most work is delegated to responsible managers. Managers and supervisors can make decisions without waiting for approval

from the top manager, and are prepared and empowered to do so.

- Managers are able to understand and use key management indicators such as water loss, income and expenditure accounts, budgets, billings and collections data, water quality monitoring, efficiencies of equipment, etc. A management information system is in place and is a regular part of the performance monitoring process used by managers.

Autonomy

- The water and wastewater organization has the authority to hire and dismiss staff as required to operate with quality and effectiveness.

- The organization is able to operate within an approved budget which it controls.

- Tariffs are set at the local organizational level according to overall national policy. Cost recovery through tariff charges is sufficient to cover operations and maintenance costs.

In addition to the above, the following standards are particular to wastewater performance:

Commercial Orientation

- Systems and capacity exist to coordinate the proper posting of surcharge revenue for wastewater services when collected by the water billing and collections group.

- A system exists to ensure that surcharge revenue for wastewater service, billed and collected by the water supply entity, is properly credited to wastewater accounts.

Financial

- Capacity exists to establish a budgeting system which allows setting a proper surcharge percentage for O&M cost recovery (allowing for proper O&M funding).

O&M

- Performance standards exist to operate all facilities to maximize environmental and public health benefits.

- Preventive maintenance is performed according to a routine program, and equipment is maintained to meet manufacturers specifications for normal design life.

- Treatment plants operate to produce effluent at a quality equal or close to standards 95% of the time.

Consumer Relations

- Education programs exist for consumers regarding public health issues related to the importance of proper wastewater collection, treatment, and disposal; education exists to communicate to local constituencies the need to coordinate the provision of wastewater services with water supply (proper wastewater service allows higher problem-free water use and maximizes water supply benefits).

2.3 Conclusions: Capacity to Apply Performance Standards

It is reasonable to expect that future Egyptian water and wastewater utilities be able to meet specified standards over time with the appropriate institutional conditions in place and with the help of a transformation program to meet these conditions. It should also be

recognized that transformation of systems, changes in individual and organizational behavior through training and technical assistance, and the development and implementation of new policy environments (such as tariff reform) to support these changes will require several years. Seven to ten years of sustained effort is not unreasonable based on the record of institutional change observed by the team in other countries and in Egypt.

During workshop sessions with the staff of the governorate and markez water and wastewater organizations, most of the above indicators were discussed. There was general agreement that these indicators are appropriate targets and many of the solutions suggested by Egyptian staff further verified that actions need to be taken to improve performance in these specific areas. However, there was no real sense of priorities among the staff about which actions to take first, given the overwhelming magnitude and interrelated nature of problems. However, the key problems identified related directly to the indicators, demonstrating that the perceived (and real) needs for performance improvements, and presumably the design of future action plans, will be able to include actions to tackle problems that are commonly perceived.

3 OPTIONS WITHIN EGYPT FOR WATER AND WASTEWATER UTILITY OPERATIONS

3.1 Alternative Institutions

The legal structures of the four current alternative institutional arrangements discussed below for water and wastewater service delivery are specific to Egypt. However, the basic forms of service delivery offered by these institutions are not unique to Egypt and can be characterized in terms of service delivery mechanisms that exist around the world. Consequently, the strengths and weaknesses of the alternative models can be seen in light of their basic characteristics:

- General purpose government delivery model
- Single- or limited-purpose government organization
- Privatization alternatives (in varying degrees)

In Egypt, the model found in the three governorates reviewed was a general purpose government model, specifically, a local administrative structure. In this model, service delivery is provided by a general purpose government organization with a wide range of responsibilities (water, sanitation, streets and roads, solid waste, other city maintenance). Of the existing models in Egypt, the most viable options for the future are either the public sector company or the public economic authority. In these models, delivery is provided through single- or limited-purpose government organizations, albeit through alternative government modes. The final model is privatization in some form.

These institutional structures are different points along a continuum from completely public to completely private service delivery. The general purpose government model represents completely public service provision. Economic authorities are an example of a public sector delivery mechanism, but with some features that are closer to private delivery, such as the ability to link tariffs and service delivery. Because the political relationships are less significant in public sector companies, they represent an additional step toward private service delivery. Different types of privatization include contracting out to a private water company or limited use of private sector services. Full privatization does not appear to be viable, given current economic conditions. Its place on the continuum depends on the specific type of privatization selected.

3.2 Available Institutional Models

The strengths or weaknesses of the different models result from the specific characteristics of Egyptian law and practice. Four possible institutional arrangements for the management of water and wastewater entities exist under current Egyptian law. Three of the examples have a history of experimentation or actual implementation over the past fifteen years in Egypt, and one option is legally possible but

has yet to be fully attempted. The four models are:

- **Local administration.** In this model, units from the national, governorate, markez, city, district, and village level share joint responsibility and divide functions (Law no. 43/1979, Article 2, and the Executive Bylaw, Article 7). This aspect of local administration law provides for local units to establish, manage, operate, and maintain water and wastewater utilities, maintenance centers, and wastewater farms. This is the current system of service delivery in the governorates under consideration.

- **Public sector companies** (Law no. 203/1991, which replaced Law no. 97/1983). This is the model of three operating public sector companies: Damietta Water Company (DWC), Kafr il-Sheikh Water Company (KISW), and the Beheira Water Company (BWC). Public sector companies have the ability to retain revenues.

- **Public authority or general organization** (Law no. 61/1963). This is the model represented by the General Organization for Alexandria Water (GOAW) and the General Organization for Water for Greater Cairo (GOGCWS). General organizations are incorporated public entities formed by presidential decree. General organizations may have a social or economic authority designation for MOF budget purposes. Economic authorities are expected to charge for services and maintain elements of cost recovery. Budgets must be submitted annually.

- **Contract management** by a private sector company under the provision of a public economic authority, as stated in Law no. 61/1963, Article 3, "The general authority may contract and undertake all the procedures and activities required to achieve its purpose." This model has not been yet attempted for the full range of water and wastewater utility operations, although general organizations in Egypt have been entering into contracts for specific services for years.

The guidelines provided by USAID/Cairo for future collaboration with Egyptian authorities to provide water and wastewater require that the following three general conditions be met (see Chapter 2 for related indicators): 1) the institution must have autonomy to be able to set tariffs sufficient to cover the costs of operations and maintenance (consistent with national policy and regulatory requirements); 2) it must be able to retain revenues at the institutional level of the water entity; and 3) it must be able to establish personnel regulations independent of civil service law and have the capacity to remunerate, engage, dismiss, offer incentives to, and retain qualified staff. All available options for transforming existing water and wastewater service providers meet these requirements.

3.3 Strengths and Weaknesses of the Local Administration Model

Description

The management of water and wastewater services under local administration in Egypt divides the responsibility among a number of national, governorate, city, markez, and village units. The model is based on a "village leader" or "town hall" administrative concept designed to serve small populations, with central government control over budgeting and financial management, including ensured subsidies to cover shortfalls in revenue. All revenues pass to the central treasury. Annual budgets are submitted through the governorate to the Ministry of Finance. Revenues and

expenditures are not related, nor is the accounting system designed to easily analyze their relationship. Over time, the demand, technical complexity, and financial requirements have grown with population increases so that the model as it exists in the governorates discussed here is dysfunctional. The management mechanisms have broken down and the centrally controlled administrative system does not have the flexibility, either financially or technically, to respond. A detailed description of the current model appears in Chapters 4, 5, and 6 on Fayoum, Beni Suef, and Menya. Salient points are summarized below.

The governorates under study have augmented the basic model by creating layers of departments to provide administrative and technical services. Typically, water and wastewater services are directed by a plant engineer (rather than a utility manager) who reports to a city utilities department. The city utilities department performs no administrative services or functions, as a utility normally would; it is solely an operations and maintenance unit. The administrative support function falls to either the governorate or the central ministry. The city utilities department usually has three sections, each headed by a manager: production, distribution, and wastewater. The sections may be further divided into subunits that perform technical services. For example, Beni Suef has three field offices to maintain the distribution network; three water treatment plants, each with a plant supervisor; and three wastewater field units.

Administration of water and wastewater services is separate from the technical functions and is located within the administrative structure of the markez (a markez can be contained within a city or can be a separate district government). Each markez has general service departments for all public services combined. Typically, this includes separate sections for contracts, vehicles, personnel, records, communications, billings and collections, and budgeting and accounting. The bills for water consumption are prepared and collected by the markez revenue office. Stamps certifying that bills have been paid are issued by MOF. Revenues collected are not retained locally but are sent directly to MOF. Financially, operation of the water and wastewater unit is included with other city or markez functions (streets, solid waste, buildings, etc.).

The budget is prepared by the markez and presented to the Ministries of Housing and Local Administration through the governorate, and once approved is passed on to MOF. Approved budgets may not reflect needs because they are based on quotas assigned to different accounts (e.g., personnel, materials and supplies, etc.). All employees are state civil servants under a system overseen by Ministries of Housing and Local Administration. The markez personnel office handles direct personnel matters.

Within a governorate, management and administration of the rural and village water systems are typically divided among the marakez. However, each village may also have offices or staff to collect bills, read meters, etc., and to monitor these functions.

Tariffs for water and wastewater are suggested, in the form of guidelines, by the Ministries of Housing and Local Administration. By law, only the local council at the governorate level may approve tariff rates. In practice, local councils in rural areas follow the guidelines; however, local councils in Cairo and Alexandria have sufficient political power to follow their own desires, and they frequently differ with national guidelines on tariffs.

Strengths

Small village units can operate relatively informally with this system, combining services so that key staff, such as accountants and administrators, can manage a number of public functions, including water, simultaneously. The model has evolved from the small administrative units that were designed to serve village-level needs. Although the local administration model breaks down when too heavily burdened with increased demand for services from a growing population and with more complex technology, the model does have some advantages, as explained below.

- **Achieving economies from joint delivery of services.** Economies may exist in the delivery of different services by the same government. For example, the same staff may be able to collect water tariffs and other fees, or the mayor's office may be able to manage the water system and the road network without many additional management staff. These economies can also be achieved through appropriate contracting. For example, the water authority could contract with the electric distribution company to collect fees, thus eliminating the need for a separate collection department for every limited purpose service deliverer.

- **Placing responsibility.** Residents often have trouble determining who is responsible for service delivery when many providers are involved, which makes it difficult for them to know where to direct their requests for service or complaints about poor delivery. A general purpose government model allows residents to hold the mayor or governor responsible for all public service problems and provides a central receiving point for complaints.

- **Priority setting.** General purpose governments can theoretically allow greater coordination in the setting of priorities for new investments and for service quality improvements. A general purpose government is in a better position to decide such issues as whether the most important next step is better paved roads or improved water systems.

Weaknesses

- **Linking tariffs and service delivery.** Within the context of the current Egyptian government, tariffs cannot be raised to provide improved service delivery, since no effective earmarking of funds occurs. The existing system requires that all government revenues go into general MOF accounts, with no direct link between revenues raised and resources available for service delivery.

- **Government distrust.** Reducing the existing distrust of the government's delivery of water services will be difficult without a change in the delivery mechanism. Thus, the general purpose government model is at a disadvantage because it is the existing system.

- **Failure to minimize costs.** The incentives in place aim to maximize political gains or bureaucratic practices, such as employee perks or number of employees, rather than to provide services at the lowest possible costs.

- **Lack of unified management utility concept.** Since plant equipment belongs to the city or markez, it can be used at any time for other duties. There is no assigned responsibility for the complete operation of the water service as a "utility" or enterprise, except at the level of the mayor. Additional weaknesses that stem from the lack of unified management include the following:

- Lack of dedicated utility budget. Water and wastewater costs and expenditures are not separately tracked and amalgamated, making it nearly impossible to maintain the utility as an economic unit.

- Because materials, parts, and the budget are controlled centrally, the existing system requires that express permission be obtained from the mayor before any broken parts are replaced or needed equipment or spare parts procured.

- Performance to date demonstrates that accountability for results is difficult to achieve.

- Staff incentives for cost savings in O&M are absent. Systems reviewed average about 55% nonrevenue water.

- Staffing and promotion is by seniority. Positions for the water and wastewater utilities are graded for purposes of determining pay, but may be taken by anyone within the markez system with sufficient seniority, regardless of experience and training (or lack thereof) in the water or wastewater field. Positions lack any official descriptions of duties.

3.4 Strengths and Weaknesses of the Public Sector Organization and Companies Model

Description

The enabling legislation for public sector companies (Law no. 203/1991 and Law no. 97/1983) applies to all market sectors in the Egyptian economy. The law allows up to 49% private capital participation. Public sector companies are formed by decree from the corresponding government minister, which in the case of water and wastewater services is the Minister of Housing and Public Utilities, at the request of the interested governorate and with the approval of the Prime Minister (Article 19). The Prime Minister may delegate this function to the authorized government minister, who in turn may delegate it to the governor of the province, as occurred when the Damietta Public Sector Water company was formed.

The law establishes a board of directors (seven members minimum, eleven maximum). The board has all the "powers required to perform the tasks needed for the achievement of the company purposes" (Article 32), including the establishment of personnel policies, regulations, and financial affairs. Theoretically, a decree may establish a board that meets the general provisions and includes local representatives of the community or consumer public. Under existing decrees, board membership of the three established companies comprises three members elected by company employees, three appointed by the governor, and a chairman (also chosen by the governor).

The law establishes a general assembly of 10-15 members, with a president appointed by the corresponding minister or designate (Article 34). The general assembly approves the actions of the board of directors, including budgets, balance sheets, plans, and reports, and has the power to suspend the chairman and members of the board. The bylaws may also establish the composition of the assembly.

Public sector companies have the authority to establish a capital reserve from annual net profits (Article 41) and to provide profit sharing for employees. This option has yet to be exercised by any existing public sector water company, nor does any existing company have any private shareholders, due to the companies' financial performance.

Specific bylaws that establish an identified company may further define or interpret the

general provisions of the law and give the company its sectoral character and purposes. The bylaws for the three existing public sector water companies were by Governor's Decree (No. 181/1981 Beheira, 21/1983 Kafir el Sheik, and 357/1984 Damietta), which established the main purpose of the companies as producing and distributing potable water (and, in the case of Kafir el Sheik, providing wastewater service as well). The bylaws specify the company's structure, its personnel regulations, and the composition of the board of directors. For example, the Damietta company has seven voting and two nonvoting board members, as follows: three company technical managers, three employees representing the rank and file, and the chairman of the water authority are voting members; the two nonvoting members are representatives of the local council (which regulates the water and wastewater tariff).

The following summarizes the bylaws that apply to all existing public water sector companies:

- To determine charges for services (meters, inspections)
- To determine the cost for selling water with the approval of the central authority concerned (the local council, unless superseded by cabinet-level decree)
- To collect and retain revenues according to the established tariff
- To act as a vendor of treated water outside of the designated service area
- To accept technical assistance, grants, and donations from foreign or national sources, according to required legal standards
- To collect arrears for water consumption by state seizure, with the assistance of appropriate government bodies and local government units
- To propose land acquisition to be used for the public good
- To monitor water taken from private sources, notify users if the water is unsafe for drinking, and close down those private sources if necessary
- Establish the company's structure and operating functions

The decree that establishes a company may specify its effective lifetime, allow participation with other companies, specify composition of the general assembly, specify how the chairman is hired and dismissed, designate the assets as public, and designate temporary company management.

In each of the three currently operating public sector companies, a temporary "state administrator" (*mofawad*) was designated as the operating authority by the governor, and a temporary board was set up. Unfortunately, the mofawad position became a lifetime appointment in two of the three water companies, and the intended company design, with checks and balances maintained by a general assembly and a managing board of directors, was never achieved. In actuality, the administration of existing public sector companies is very close to that of an economic authority. Only in the Damietta Water Company were an independent board and assembly set up, with the mofawad becoming chairman.

Damietta, Kafir el Sheik, and Beheira water companies have personnel policy bylaws that require that the general provisions of civil service regulations be in force until such time as the company wins board approval of an alternative policy. In practice, staff are remunerated far in excess of existing provisions, using special incentive pay and bonuses (this occurs in most public service agencies).

Strengths

When considering the strengths and weakness of the institutional form or arrangement of management structure, it is important to

differentiate between what the form "allows" or "limits" and the record of performance of particular companies operating within the model presented. In practice, the public sector water companies operating in Egypt have not taken full advantage of the opportunities allowed under the law. For example, with the exception of Daimetta, they have not formed their own personnel policies or constituted an independent operating board or working general assembly, nor have they taken opportunities for autonomy with tariffs, instead deferring to guidance from the Minster of Local Government and NOPWASD, even when the companies were operating at a loss. As a result, they have become dependent on subsidies, inviting endless scrutiny of their operating budgets, under the principle that if the central government is required to pay, it also has the right to approve the budget.

Only the Damietta Water Company has demonstrated cost-effective operations and maintenance, but it is not able to operate above break-even status. The key variable in performance appears to be the strength and vision of the individual managers and the chairman of the organization.

- **Legal status.** Legally, the companies have all the latitude necessary to operate an incorporated economic unit: ability to contract for services, board participation, flexible and adequate structure; checks and balances to management through the assembly board; and capacity to enter into financing arrangements with national and international sources.

- **Ownership.** Citizens are allowed to participate in ownership of shares and profit sharing; are accountable to all owners; and companies are allowed exclusive use of the physical assets for the company, without having to share them with other public entities.

- **Management.** The companies may formulate their own management and administrative procedures; delegate within the ranks from the chairman down; and modify management structure and decentralize as required (with appropriate board approval). Management success depends on the skills and vision of individual managers unhindered by the structure of the organizational model.

- **Financial affairs.** Companies may formulate tariffs with approval of the local council. Budgets may be developed and approved by the board, and revenues may be retained to cover operating costs. Financing for capital costs may come from a variety of sources.

- **Linking tariffs and service delivery.** With service companies able to retain revenues, a linkage can be made between the payment of tariffs and O&M. This provides an incentive to operate more efficiently, as was the case in the Damietta Water Company. However, in public sector companies receiving large subsidies, any attempt to save through efficiencies and improved performance is punished by a reduction in the transfer from the central treasury. Therefore this linkage has been theoretical in the case of Beheira.

- **Personnel affairs.** Staff may be engaged or dismissed within regulations established by the company, and remuneration may take a variety of forms, including bonus and incentive pay, as well as by salary scales (although no precedent exists to set wage scales above those of government employees).

- **Organizational culture.** The concept of a company, as differentiated from a government department or governmental authority, is of an economic unit that must operate cost-effectively while serving its

clients, who are the consumers of the service. The identity of the employee can be very strong and positive if the company is well-managed. The link between individual employee performance and the capacity of the company to pay incentives is a direct one. Influencing staff performance positively is easier in a company than in a government department. However, public attitudes towards companies may in the short run be a liability because it is commonly believed that a company will charge more for its services than will a government-subsidized operation.

- **Proper geographic size.** Companies can select the appropriate geographic size for service delivery. The geographic size of general purpose governments is set by historical accident. However, a newly formed single-purpose government organization can be sized to the particular service, whether it be one village or one governorate, or multiple villages, multiple marakez, or multiple governorates. Factors determining optimum size include extent of economies of scale, ability to articulate preferences to the government, and ability to incorporate all externalities in consumption and production of the service.

- **Borrowing.** Public sector companies can borrow from the private sector to finance water and wastewater systems. (Public sector companies traditionally have borrowed from the National Investment Bank, but currently are discouraged from doing so because so many public sector companies have been unable to repay their debts to the bank.) While the ability to borrow from the private sector allows the water and wastewater sector access to additional resources, public sector companies are only able to borrow if they are creditworthy, which means tariffs must be high enough to cover O&M and capital costs. Currently, the risk is too great for any private credit source or bank to even consider lending to any of the existing companies.

Weaknesses

- **Government policy.** Movement towards various forms of privatization is the policy of the government of Egypt, which has programs underway to sell off its publicly owned industries. Therefore, creation of new public sector companies is seen as inconsistent with this policy. Unfortunately, a public utility formed under the public sector law is subject to requirements designed for manufacturing and other state industrial enterprises. Without a law specific to the creation of public utilities, reliance has been on the legislative standards for either the public sector company or the general government organization. Also, because public sector companies have not been widely used to deliver water services, the unfamiliar must be overcome.

- **Holding company required.** Changes in the law governing public sector companies, made in 1991, require that all new public sector companies be established under the auspices of a holding company. Because the three public sector water companies were established prior to that change, they were formed without holding companies. In 1991, NOPWASD attempted to establish itself as a holding company for the existing water companies and was refused permission. However, no new companies can be formed without creation of a holding company.

3.5 Strengths and Weaknesses of the Model of Public Economic Authority

Description

The two best examples of public economic authorities are the water utility organizations for greater Cairo and Alexandria. The wastewater organizations of both greater Cairo and Alexandria are also public economic authorities, although in the past they have operated as service authorities. A service authority has no obligation to produce income or charge fees for services to meet operational costs. These wastewater service authorities are now converting to economic authorities. A public authority is established by presidential decree to manage a public service, but with an incorporated status. A general authority may contract and conduct business necessary to achieve its purpose and establish bylaws to regulate its affairs, including its management and accounting system. In the absence of such bylaws, general government accounting systems must be used. The authority is controlled by a board of directors whose form, composition, and conditions of appointment are established by the presidential decree forming the authority.

The board has the authority to set policy and regulations regarding the financial affairs, technical affairs, personnel policies (dismissal, promotion, salaries, wages, bonuses, and pensions), staffing, structure, budget, and balance sheet without regard to government civil service regulations and procedures. In the absence of such internally set policies and procedures, government civil service procedures are in effect, as is the case in Cairo and Alexandria. Accounts are kept according to the Unified Accounting System adopted by all Egyptian economic government agencies as well as public sector joint stock companies. The system has specific accounts for operations, profit and loss, and a balance sheet.

The board of directors must submit its resolutions, budgets, and plans to the competent minister or body (finance, local government, governor, local popular council) for review and approval. Changes in structure, staffing levels, or classification of jobs are reviewed by the government agency for organization.

The economic authority is designed as a self-sufficient unit for water utility operations. The water authorities in both Cairo and Alexandria establish internal divisions for technical affairs, which supervise treatment works operations and maintenance; distribution systems; stores and supplies; construction and contracts; personnel and administration, which manages employee relations and recruitment, training, manpower, and administrative procedures; finance and commercial operations, which handles budget, accounting, billings and collections, audits, automation and computerization, management information, and purchasing; and a division that includes the chairman, deputy chairman, and management secretariat, responsible for strategic planning, legal matters, and reporting to the board of directors.

Strengths

- **Experience.** Economic authorities are delivering water in Alexandria and Cairo. While the quality of the service needs to be improved, the organizational form is familiar to governors and officials, so there is no need to overcome major political resistance to the concept of a public authority.

- **Proper geographic size.** The appropriate geographic size for service delivery can be selected. The Alexandria Water Authority was established to provide water for Alexandria and parts of the Matrouh and Beheira Governorates. Factors determining the best size for single-purpose

organizations include extent of economies of scale, ability to articulate preferences to the government, and ability to incorporate all externalities in consumption and production of the service.

- **Linking tariffs and service delivery.** Economic authorities have the ability to retain revenues, so the payment of tariffs can be linked to O&M. Under current conditions, however, large subsidies and the MOF's ability to reduce the subsidies as more revenues are raised makes the linkage a theoretical rather than a practical matter, until tariffs are raised to the level necessary to cover existing O&M costs (see Chapter 7 for a fuller discussion of this point).

- **Borrowing.** Economic authorities can borrow, normally through the National Investment Bank. However, borrowing through the NIB is unlikely to provide any additional resources for the sector, since the NIB is also the government's source for capital resources. Economic authorities also appear to have the authority to borrow from the private sector, but they only will be able to do so if they are creditworthy.

- **Management.** The full range of management tools is potentially available to economic authorities. These include incentive pay, internal restructuring to meet changing needs, management information systems, capacity to formulate uniform internal management procedures, delegation of authority, and creation of a strong management team. In practice, only some of these tools have been used, although the institutional improvement program that USAID supports for GOGCWS is beginning to have some effect on their use. There is great reluctance in practice to create or apply management tools that require approval from higher authorities (such as restructuring, reclassification, or setting up a new compensation program) or that would appear to compensate staff above civil service levels. In practice, extra compensation is given by adding allowances for special activities rather than tackling the issue of formal compensation. The same is true of accounting systems. As new, modern accounting systems are installed, reports are formatted to allow data to be translated to conform to the old government reporting system. Efficiency is defeated when two sets of reports must be produced and when the standard government accounting report is not designed to meet business needs.

Weaknesses

- **Political influence.** For several reasons, economic authorities are open to much greater political influence than public or private sector companies. First, the board of directors of economic authorities normally is chaired by the concerned minister or the governor, whereas the chairman of a company is less likely to be a politician. Second, governorate-level approval is necessary to raise tariffs. Third, budgets of economic authorities must be approved by the People's Assembly. While the People's Assembly only approves the total current and the total capital budgets without the detailed evaluation that is undertaken for entities that are directly in the government, the fact that the review opens each economic authority to the potential for detailed scrutiny is likely to influence the authorities' behavior.

- **Presidential decree.** A presidential decree is required to establish a new economic authority, which takes special time and effort and opens the possibility for presidential intervention in local affairs. However, should a general agreement to move to economic authorities for water and wastewater be reached at high

government levels, a policy statement or blanket delegation of authority to the governorates may permit general approval for all governorates or service delivery areas simultaneously.

- **Accountability through ownership.** Because an economic authority is a form of government organization, it is not directly accountable to shareholders. Responsiveness to public need is expressed through many layers of government, rather than directly through an assembly of shareholders. Incentives for loyalty and performance of staff and leadership come from within the bureaucracy and from politicians, and only indirectly from consumers.

3.6 Strengths and Weaknesses of Privatization: Contract Management

Description

Privatization means different things to different people. The extent of any advantages from privatization depend on its definition. Possibilities range from contracting out limited functions of a public water or wastewater authority, to private operation of a publicly owned facility, to a private water company that owns, operates, and maintains the water system. The advantages of some types of privatization often can be combined with advantages from the other institutional structures discussed in this chapter. For example, an economic authority could be created that contracts out certain functions, giving it the strengths of economic authorities plus the strengths of the private sector.

Another option is to provide a competitive "concession contract." The contractor provides all services for water and wastewater supply, using publicly owned assets (infrastructure, treatment plants, some equipment). The tariff would be regulated to allow a fixed, agreed-on profit or fee for services and to cover the cost of operations and maintenance.

Strengths

- **Competition.** Most utilities are national monopolies regulated to protect the public interest. The extent to which costs are affected depends on the degree to which competition can be brought into play and how long it can be kept in place. Private sector water and wastewater participation offers the potential for competitive forces to lower service delivery costs. Because of the monopoly position of state-owned utilities, competitive pressures can only be established through creative means. Contracts must be rebid or alternative ways found to keep competitive pressures underway once a monopoly position is granted. Competitive forces should remain effective if certain aspects of a public system are contracted out.

- **Proper geographic size.** The appropriate geographic size for service delivery can be selected if private companies are responsible for delivery of water and wastewater services.

- **Setting tariffs.** Private companies can request tariff levels, and should be subject to some regulatory overview, since they would have a monopoly in the area where they are located.

- **Linking tariffs and service delivery.** Because private companies have the ability to retain revenues, the payment of tariffs can be linked to O&M.

- **Borrowing.** Private sector companies can borrow to finance water and wastewater systems. The ability to borrow private resources provides an additional

mechanism for bringing financial resources into the water and wastewater sector. Of course, private companies are only able to borrow if they are creditworthy, which means tariffs must be high enough to cover O&M and capital costs.

- **Management.** The private sector may formulate its management and administrative procedures, delegate within ranks from the manager down, and modify its management structure and decentralize as required. Management success depends on the skills and vision of managers who are free of major hindrances from the structure of the organizational model.

Weaknesses

- Structures that include mostly contracted service for water and wastewater, or concession contracts, are not currently in use in Egypt, except in tourist cities in the Sinai with very affluent populations. Lack of familiarity with this form would make it more difficult to gain acceptance in large population centers and governorates.
- Due to this lack of usage and familiarity, the private sector is not organized to provide the service, although limited experience with contract operations and maintenance does exist in the Sinai. Consequently, foreign companies with operational experience would probably be required initially.

3.7 Options Analysis and Comparison

The table which follows summarizes the advantages and disadvantages of the models reviewed, using indicators related to legal status, ownership, management capacity and autonomy, economic affairs, finance, potential for cost-effectiveness, autonomy in personnel, and organizational culture. A rating is indicated using a scale of good (meets the criteria), average (possible), and poor (not recommended under local conditions). Scoring is based on the professional judgement of the consulting team and its knowledge of conditions and review of current practice in Egypt. Where no data exist, or an indicator does not apply, "NA" appears.

Table 1:
Summary of Advantages and Disadvantages of Four Institutional Models

Item being Assessed	Public Sector Company	General Economic Authority	Contract Operations and Maintenance	Shared Local and National Administration
1. Legal Status				
Sufficient to operate as an incorporated economic entity under Egyptian law	good	good	good	poor
Capacity to contract for services	good	good	NA	good
Composition of the board represents interests of all key parties at local levels	good	average	NA	poor
Capacity to enter into agreements for national and international financing	good	good	NA	average
Current policy of GOE supports the formation of the legal entity.	average	good	poor	NA
2. Ownership				
Asset ownership can be retained at local citizen/ investor level for up to 49% of shares	good	poor	poor	poor
Accountability to owners for management of the assets of the company	good	good	good	poor
Capacity for local council and local citizen involvement in governance structure	good	good	average	good
Assets and equipment dedicated to the exclusive use of the w/ww entity	good	good	good	poor

Item being Assessed	Public Sector Company	General Economic Authority	Contract Operations and Maintenance	Shared Local and National Administration
3. Management Capacity and Autonomy				
Capacity to formulate uniform management and administrative procedures	good	good	good	poor
Charter permits delegation to appropriate levels of staff to ensure good performance	good	good	good	poor
Capacity to structure or restructure the organization as required for efficiency with approval of the board and competent local oversight	average	average	good	poor
4. Degree of Autonomy in Economic Affairs				
Capacity to formulate and approve policy regarding tariffs with approval at local council and governorate levels	good	good	NA	poor
Capacity to develop and manage budget free from control of authorities above	good	average	good	poor
Cost recovery: ability to retain revenues to cover operations and maintenance costs	good	good	NA	poor
5. Finance				
Capacity to raise revenues from municipal, governorate, national, and international sources	good	good	NA	good
Finance: capacity to raise revenues from private banks	poor	poor	average	poor

Item being Assessed	Public Sector Company	General Economic Authority	Contract Operations and Maintenance	Shared Local and National Administration
6. Cost-Effectiveness				
Organizational form provides incentives for staff to desire cost-effectiveness	good	average	good	poor
7. Degree of Autonomy in Personnel and Staffing				
Capacity to formulate plans relating to retention and compensation of staff without national civil service requirements	good	good	good	poor
Able to retain and train qualified staff at competitive salaries	good	good	good	poor
8. Organizational Culture				
Organizational system provides opportunity for attention to staff needs for a strong, unified, organizational identity	good	average	good	poor
Structure allows for staff to feel the organization is concerned for their well-being and motivation	good	average	good	poor
The option provides opportunity for staff to be motivated by performance incentives related to cost-effectiveness	good	good	good	poor
Public image implies local responsibility and a requirement to pay for services rather than be subsidization by the central government	good	average	good	poor

3.8 Conclusion

It is evident from this analysis that no significant advantages or disadvantages would prohibit either the general economic authority or the public sector company from providing water and wastewater services appropriate to either the general policy desires of USAID or to the requirements for successful utility operations outlined in Chapter 2. It is also clear that the current local administration model is inadequate.

The private sector model, while theoretically possible, presents the political risk of trying something that has no record of success in Egypt and that is largely unknown. The advantages of using some aspects of the private sector, however, can be obtained with either the public sector company or the economic authority. If one considers increased potential for delegation of authority and local management responsibility, the public sector company offers the best advantage, because it retains the character of a government sector organization. But a probably insurmountable disadvantage is the fact that formation of new public sector companies is against current policy. Unless there is an expressed desire by sectoral institutions to create a body of law and regulations for institutional arrangements specific to the water and wastewater sector, the most viable available model is the general authority.

A developmental strategy that moves away from centralization and creates the potential for improved management, using a widely accepted model, is available by using the general economic authority. With a strong desire by local leadership for improvement, combined with central government policies that reward cost-effectiveness, the general economic authority offers the possibility of improved performance.

4 FINDINGS: FAYOUM

This chapter and the two chapters following summarize technical, financial, and institutional findings in the three governorates studied.

4.1 Scope of Findings

The team collected data on both water and wastewater services in Fayoum City and Fayoum Markez. Published data, where available, were also collected governorate-wide. The team verified information in the field by conducting interviews with managerial and supervisory staff and service providers. Beneficiaries were surveyed only in Fayoum City. The team inspected records and ledgers as well as infrastructure and treatment facilities.

After discussion with USAID, the governor of Fayoum, and representatives of the Netherlands foreign assistance program, the team agreed to focus its effort on the city of Fayoum. USAID's primary activity has been the construction of the new water treatment plant there. The Netherlands government has been working for several years outside of Fayoum, at the governorate level and in the smaller marakez and villages. A Dutch contractor recently updated the governorate-wide master plan.

The team discovered on its first visit to Fayoum that the governorate had completed several months of discussions and studies, including two workshops assisted by the Netherlands government, aimed at defining the future institutional option for managing the water and wastewater needs of the governorate. Essential needs had been identified and a proposal put forth by the Dutch contractor to focus institutional development on a governorate-wide water utility, geographically based and built on the current structure of the El Azab water treatment facility. The governor had determined, with considerable advice from Egyptian legal experts and consultants, that the most appropriate institutional structure would be a general economic authority to manage the governorate's water supply. The necessary presidential decree was drafted by the governorate and submitted to the Ministry of Local Administration.

Given these developments, the team modified its goals for Fayoum (which had originally been to assist with the selection of an institutional option) to concentrate on assessing the needs for follow-up to the water treatment situation in Fayoum City and for consideration of wastewater development for Fayoum.

Appendix B contains the detailed findings in Fayoum in each of the four main investigation areas: technical, financial, institutional, and social. A synopsis is presented here, including a summary of key data, first for water supply, then for wastewater services.

4.2 Data Summary

Fayoum City is the capital of Fayoum governorate. It lies 80 km southwest of Cairo, and consists of five marakez: Fayoum, Tamia, Senoures, Ibshway, and Etsa. The Fayoum Markez includes the city and 38 satellite villages.

Key Water Supply Service Data

Area served (description)	Inside Fayoum City limits
Area served (size)	16.4 sq. km
Population in service area (city)	279,000 persons (1995)
Population directly served*	250,000
Household coverage	90%
Number of accounts	43,000 connections
Water supply production	18,013,845 m^3/year (1993/94) or 49,353 m^3/d
Water supply billed	10,633,698 m^3/yr or 29,133 m^3/d
Unaccounted-for water	41%
Production per account	1,148 liters/day
Water supply billed per account	677 liters/day
Persons served per water supply account	5.8 persons
Billed water supply per person served	116 liters/day
Kilometers of pipeline in system	152 km
Meters of pipeline per account	3.5 m/account
Number of water meters installed	43,000
Water meters working	75%

* by piped house connection

Water Treatment Facilities Data

Name	**Old Water Treatment Plant (Old Kuhafa)**
Type	Clarification - Filtration
Production capacity	25,920 m^3/day
Year of construction or rehab	1926/1970
Storage (treated water)	500 m^3
Name	**New Water Treatment Plant (New Kuhafa)**
Type	Clarification-Filtration
Production capacity	25,920 m^3/day
Year of construction or rehab	new 1993
Storage (treated water)	12,000 m^3
Name	**Lotfallah & Kiman-Farces Compact Units**
Type	Filtration
Production capacity	1,760 m^3/day
Year of construction or rehab	1986
Storage Facilities (Elevated Tanks)	
Number	3
Total Volume	(3 @ 4000 m^3) 12,000 m^3

Water Supply Financial Data (1993-94)

Cost (w/o financial admin.)	L.E 4,446 million
Revenue (billed)	L.E 2,341 million
Revenue collected	L.E 2,021,000
Deficit	L.E 2,425 million
Avg. tariff yield per m^3 billed	L.E 0.22
Avg. tariff yield required to break even	L.E 0.42
Direct employees	324
Indirect employees	420
Indirect/direct ratio	1.33

Key Wastewater Supply Data

Service area	Inside City Limit
Area served	16.4 sq. km
Population in service area	279,000 persons (1995)
Population served	200,000 persons (est.)
Population served	72%
Number of accounts	34,000
Wastewater treated	43,000 m^3/day
Wastewater per account	1,270 liters/day
Wastewater per person served	215 liters/day
Persons services per wastewater account	5.9 persons

Wastewater Facilities Data

Kilometers of sewers in system	168.4 km
Meters of sewers per account	6 m/account
Treatment Facilities	
Name	Fayoum
Type	Trickling filter
Production capacity	43,200 m^3/d (500 l/s)
Year of construction or rehabilitation	1985-1990
Pump Stations	
Number of main pump stations	6
Capacity	85 l/s-270 l/s
Number of substations	3
Capacity	15 l/s-40 l/s

Wastewater Service Financial Data

Wastewater revenue (=40% billed WS)	L.E 0.936 million/yr
Cost	L.E 6.466 million/yr
Direct employees	351
Indirect employees	677
% indirect employees to total staff	66%

4.3 Technical/Engineering Description

4.3.1 Water

Population

The total city area is 3,899 feddans; total population is 279,089. The city department is responsible for city water supply and wastewater services only. Based on the master plan studies conducted in 1994-1995 and on official census data, the population growth rate of Fayoum City has ranged between 2.47% in 1976 and 1.5% in 1995.

The following table shows the projected population to be served by the department in 1995 and in subsequent years:

Year	City Population
1995	279,089
2000	318,857
2010	398,312
2020	469,130

Water Sources/Intake

The main raw water source to feed the treatment plants is the Bahr Youssef canal, which is a branch of the Ibrahimia main canal. Four water intakes exist in Fayoum:

- The old water intake was constructed in 1926 and has a total capacity of 340 l/s. It has one pump station with two units, each discharging 120 l/s at 15m of head.
- The new intake transfers 330 l/s raw water from the Bahr Youssef canal to the new water treatment plant funded by USAID. It was constructed in 1993 and has one pump station with six units pumping 100 l/s each, at 10 meters of head.
- The Lotfallah intake transfers 1,760 m^3/day of raw water to the compact unit. It was built in 1986 and has a pump station with two units, each discharging 30 l/s at 10 meters of head.
- Kiman-Farces intake, built in 1988, transfers 1,760 m^3/day of raw water to the compact unit and is equipped with two pumps, each discharging 30 l/s at 10 meters of head.

Production Plants

The Fayoum City Water Department is responsible for the operation of two treatment plants and two compact units, with a total capacity 660 l/s.

Treatment Plant	Designed capacity (l/s)	Actual capacity (l/s)	Construction year
old water treatment plant	300	300	1926
new water treatment plant (USAID-sponsored)	300	300	1993
Lotfallah compact unit	30	10	1986
Kiman-Farces compact unit	30	10	1988

The old water treatment plant uses clarification and rapid sand filtration technology. The new USAID-sponsored plant uses flocculation, sedimentation, and rapid sand filtration. Prechlorination and postchlorination facilities are also used for disinfection. The plant produces high quality water. The compact units also use sedimentation, clarification, and filtration. However, the compact units are aging so their efficiency is low and operating costs are high.

Distribution

The city distribution network has a total of 152 km of pipe, of various sizes and materials. Pipe diameters range from 100 mm to 600 mm; materials used include cast iron, asbestos, steel, and PVC. The system suffers from poor pressure and chronic water shortages, especially at the ends of the network.

The city has divided the network into two zones, each with its own O&M daytime staff. One night O&M team is responsible for the entire city. The total number of meters installed is about 45,000; house connections number about 42,000. City records indicate that roughly 25% of the meters are not operating properly.

Storage Capacity

Existing ground storage capacity is 12,500 m^3; 12,000 m^3 located in the new water treatment plant and 500 m^3 in the old plant. In addition to the underground water storage tanks, there are three elevated steel storage tanks distributed in the city, each with a 4,000 m^3 capacity. These elevated tanks have just been completed but are not yet filled up. The city, the U.S. contractor, and USAID are currently trying to resolve this problem.

4.3.2 Wastewater

Collection System

The existing wastewater gravity sewer network serves the city of Fayoum and consists of roughly 168.4 km of various pipe diameters. Specifications for the gravity sewers are shown in the following table:

Pipe diameter in mm	175-400	400-600	200-400	500-600
Pipe material	vitrified clay	diutile iron	plastic	G.R.P
Length in km	50.0	1.0	80.0	3.0
Year constructed	1936-1980	1936	1982	1985

The system presently covers about 95% of the city area. Although the exact number of individuals directly connected to the system has not been found in the city records, it is believed that about 72% of the city's population is connected to the system. This estimate yields a very high volume of wastewater per capita, approximately 215 l per capita per day. This figure is much higher than the per capita figure for potable water, which is about 116 l per capita per day. However, it is not clear how this estimate was determined and further effort is needed to verify this number.

Those individuals who are not directly connected to the network rely on sewerage vaults, which are emptied once a week by hand or by suction trucks and discharged into manholes or even to an irrigation drain.

Force Mains

There are roughly 34.7 km of force mains in the city, ranging in diameter from 375 to 500 mm. They are made either from cast iron, steel, or GRP. Some of these mains date from as early as 1936, but the majority were built in 1972 and after.

Pumping Stations

The city is divided into six service areas; each is served by a main pump station. Three zones have a subsidiary pump station.

Main Pump Stations and Substations in Fayoum City Wastewater System

	Zone	No. of Units	Discharge l/s	Head (m)	Construction Year
Main Pump Stations					
1	Old governorate	4 3	125 85	38 38	1972 1936
2	Lotfallah	4 3	125 85	38 38	1972 1936
3	Kiman-Farces	3	270	38	
4	El-Salakhana	3	230	38	
5	Dalah	3	125	38	
6	Kuhafa	2	60	38	
Sub-stations					
1	Sheikh Haussen		2	40	10
2	Allaws		2	15	10
3	Nadi El Mohafaza		2	15	10

The old pump stations are now used as standby pump stations in case of emergency. El Taaweniate and El Stade pump stations back up Kiman-Farces, and Shiekha Sieffa pump station backs up El Salakhana.

Wastewater Treatment Plant

An existing 500 l/s wastewater treatment plant is located on the southern edge of town. The plant uses trickling filter technology, including screening, grit removal, primary sedimentation, trickling filters, and sludge drying beds with additional disinfection. Designed and constructed by NOPWASD between 1966 and 1970, the plant was rehabilitated in 1985. It has become overloaded, primarily because of improved potable water service. In addition, staff said that chlorine is not used due to a shortage of funds, so that the effluent is not disinfected before being discharged to El Bats drain, which is connected to Lake Quarun. The department uses a limited quantity of effluent for agriculture, and sells dried sludge for fertilizer, at L.E 4 per m^3.

The incoming wastewater does not include a significant portion of industrial waste. Although a laboratory was built at the wastewater treatment plant in 1970, it lacks sufficient equipment to provide laboratory results.

NOPWASD is constructing a new wastewater treatment plant that will use activated sludge technology and will have a total capacity of 40,000 m^3/d. Construction has been

underway for over 15 years, but the first phase with a 20,000 m^3/d capacity was expected to be operational in July 1995.

4.4 Financial Findings

4.4.1 Water Supply

Accounts for revenues and billings are kept according to the government accounting system, which means that the utility does not have a dedicated cost accounting system or a commercially organized data system. Water and wastewater accounts are not separated, and records are maintained centrally with the city/markez accounts. Accounting is done manually, although attempts are being made to use the computer for issuing water bills.

The following table shows financial data for revenues and expenditures in the markez for potable water service in fiscal year 93/94.

Fayoum Water Supply Service
Revenues and Expenditures, FY 1993-1994

	Revenues in L.E	Unit Revenue in P.T/ M^3	%
Current Revenues			
Production billed	2,341,045	22.00	
Production Collected	2,005,707	18.86	
Services	14,895	0.14	
Total Current Revenues	2,020,602	19.00	
	Costs	**Unit Cost P.T/M^3**	
Current Expenses			
Wages	2,506,353	23.57	56.39
Commodities input:			
Raw Materials	751,328	7.06	16.89
Electricity	1,176,000	11.06	26.46
Other commodities	12,155	0.11	0.26
Service inputs	——		
Total Current Expenditures	**4,445,836**	**41.80**	100.00

Annual billed volume = 10,633,698 m^3
Total Current Expenditures - Total Current Revenues = L.E 2,425,234 deficit

Labor expenditures and electricity boost Fayoum's costs above those of Cairo, Alexandria, or similar utilities like Beni Suef.

The average revenue from selling one cubic meter of water is P.T 22 based on the figure of total water billed, 10,633,698 m^3. Unit revenue from production billed closely parallels the current average P.T 21.5 tariff for household customers. Given total water production of 18,013,845 m^3, the amount of unaccounted-for water is about 7,380,147 m^3, or approximately 41% of total water produced.

Comparing collected revenue to the water produced yields an average revenue per cubic meter of P.T 13. Cost per cubic meter produced is P.T 24.68, and lost potential revenue per produced cubic meter is P.T 11.68, assuming an ideal relationship of 100%.

4.4.2 Commercial Activities

Procedures for establishing a new service account are time consuming; it can take several weeks from request to installation of a new meter. First, the customer presents a request with documentation to the revenue department for review including a location map, a building license, and a water contract. Next, a fee must be paid for site examination. The request file is then sent to various departments, such as the network, fiscal planning, and legal departments. The network department estimates the cost of installation and lists materials required; the customer must buy the needed materials and the meter and pay for installation. Then, the network department executes a start-up work order, and the connection is made and a meter installed.

As in other cities, it is likely that people who live near served areas or in apartments that have been recently added to existing buildings probably connect to the system illegally until they are officially included in the system. Although the utilities police have the authority to investigate and fine people for illegal connections, in practice this seldom occurs, first because of social and political considerations and second because of a shared recognition by all concerned that the system takes time to respond to requests for new accounts.

Six collection centers have been set up in Fayoum to collect payment of bills for water consumption. Each center has one collector. Customer bills are computed according to individual meter readings registered at the center. Registers are chronologically determined, handwritten records that represent steps in the billing process.

Meter readings are performed according to an involved and cumbersome system:

1. Meter readers take readings during the first 20 days of the month. Readings are recorded in register no. 27.
2. After the twenty-first day of the months, register no. 27 has to be submitted to the water accounts section.
3 The amount of consumption is calculated against the previous registered reading in register no.27 and is transferred to register no.6 for collection.
4. Information from register no. 6 is transferred to register no. 28.
5. Register no. 28 is submitted to the collection centers on the first day of each month so that customers can pay their bills.

For customers with defective meters, consumption is estimated by using a hypothetical consumption figure per living quarter, based on the number of rooms in the apartment. Customers can either pay the estimated amount or request replacement of the meter.

There are penalties for late payment of bills. However, because of a shortage of meter readers and the difficulty in reaching some meters, arrears accumulate and payment becomes more and more difficult. The problem is exacerbated by the fact that government agencies are allocated fixed annual amounts for water consumption, and when they exceed this amount, debt accumulates. Also, shortages of liquidity in public and private sector companies mean that companies accumulate debt and pay when they have the money.

Regulations require that when a customer fails to pay water bills, an arrears collector goes to the customer's house, accompanied by a technical employee to remove the meter. The meter is returned after payment is received. The team was told that this system is seldom enforced because of the social and political ramifications.

The accumulated arrears in the past three years were:

	91/92 L.E	92/93 L.E	93/94 L.E
Household/other	87,034	144,033	177,521
Government agency	51,852	63,291	172,712
Total	**138,886**	**207,324**	**350,233**

Clearly arrears are increasing from year to year; government arrears increased by 173% in the past two years.

4.4.3 Wastewater

The wastewater sector in the city of Fayoum seems to be in much worse shape financially than the water supply sector, because costs are significantly larger than potential and actual revenues.

The register shows the collected sewerage surcharge in 1993/94 as L.E 573,002, leaving a large gap between revenues and expenses.

	L.E
Potential Revenues*	**936,418***
O&M Costs	
Wages	4,929,557
Raw materials	344
Electricity	1,506,000
Other commodities	30,637
Total O&M Costs	**6,466,538**
Deficit:	**5,530,120**

*Estimated as 40% of the water production billed in 93/94, because the city collects for sewerage as a surcharge of the water bill at a rate of 35% for households and 60% for other users.

The two primary cost elements are wages and electricity. Wages, which represent 76% of total expenses, reflect the total cost of employee labor, including cash wages and allowances, payments in kind, insurance payments, and other payments. On average, fixed salaries account for 37% of total wage expense. The remaining 63% includes rewards, allowances, cash advantages, and insurance. From fiscal year 91/92 through fiscal year 93/94 total wages increased approximately 80% from L.E 2,734,452 to L.E 4,929,557. The total number of enrolled employees for wastewater is 1,028; the average income per employee is L.E 399 per month.

Electricity represents 23% of total costs. Together, wages and electricity represent 99% of total recurrent costs.

4.4.4 Analysis of Deficit and Projection of Future Tariff Requirements

Detailed financial analysis and supporting tables appear in Appendix F. This section briefly describes financial scenarios that would affect tariff requirements and subsidies.

Scenario I: If Current Conditions Are Unchanged

Assuming the following:

1. Tariffs and wastewater surcharges remain constant until the year 2000,
2. Current trends in inflation and cost increases are projected,
3. The level of unaccounted-for water and rate of billing collection remain constant,
4. No savings are achieved in O&M costs,

then the deficit conditions in the year 2000 for Fayoum will be:

Water supply deficit	L.E 6.8 million
Wastewater deficit	L.E 13.5 million
Total deficit	L.E 20.3 million

These figures represent about a 150% increase over the 93-94 deficit of L.E 8.3 million. For Fayoum to reach a zero deficit by the year 2000 without realizing cost savings, the tariff would need to be P.T 84/m^3, an increase of about four times the base year (P.T 19/m^3). The wastewater surcharge would have to be increased to 93% of the water bill for each consumer, or about 2.3 times the existing 40% surcharge.

Scenario II: Improve Unaccounted-for Water Performance and Billing and Collections

Assuming the following:

1. unaccounted-for water rate improved by 25%,
2. billing and collections improved by 90%,
3. water operations and maintenance cost savings of 20%,
4. wastewater operations and maintenance cost savings of 55% (assumed possible because Fayoum's current wastewater staffing of over 1,000 appears to be anomalous),

then the projected deficit for the year 2000 would be:

Water supply deficit	L.E 4.8 million
Waste water deficit	L.E 6.2 million
Total deficit	L.E 11.0 million

The tariff required to reduce the water supply deficit to zero would be P.T 51/m^3 (170% over current charges), and the wastewater surcharge would be 86% of the water bill (a little over twice the current surcharge).

Fayoum
Projected Deficits in 2000

Performance Factor	Base Year	Year 2000 with No Improvements	Year 2000 with Improvements
Unaccounted-for water	41%	41%	25%
Billings and collection rate	86%	86%	90%
O&M savings—water	0	0	20%
O&M savings—waste water	0	0	55%
Deficit, Water	L.E 2.4 million	L.E 6.8 million	L.E 4.8 million
Deficit, Wastewater	L.E 5.9 million	L.E 13.5 million	L.E 6.2 million
Current Tariff	P.T 19/m^3	--	--
Tariff yield required for zero deficit	–	P.T 84/m^3	P.T 51/m^3
Wastewater surcharge	40%	--	--
Surcharge required for zero deficit	--	93%	86%

4.5 Institutional Findings

4.5.1 Structure

Water and wastewater utilities are managed by local governmental entities under Local Administration Law 43/1979. Utilities are part of the markez administration, considered as a single legal entity. Fayoum Markez (including Fayoum City) is governed by a chief and a local popular council.

Water and wastewater sectors are each headed by a top manager. The managers report to the deputy chief of utilities for Fayoum Markez, who overseas water, wastewater, street paving and maintenance, electricity, and the central repair shop for vehicles. The deputy chief for financial and administrative affairs is responsible for the commercial, financial, and accounting functions related to water and wastewater (see Appendix B for organization charts). The deputy chiefs report to the mayor

The deputy chief for utilities coordinates the water and wastewater utilities and provides a linkage to other utility resources (workshops, laborers, equipment, vehicles, etc.). However, the revenue department and other departments concerned with auxiliary services such as accounting, personnel, stores, and contracting, are organized separately and report to a different

deputy chief. This situation makes coordination of the utility financial and administrative needs more difficult and means that the mayor must oversee utility management.

At the implementation levels, a layered chain of command results in narrowing the span of control and lengthening the channels of communication. For example, the old water treatment plant has a plant manager, a deputy manager, and a supervisor. Work is organized according to a division of labor among geographically defined teams, particularly in the water and wastewater distribution and collection network. However, there appears to be little understanding of teamwork and a lack of leadership or supervision.

4.5.2 Management

There is no dedicated utility management per se, nor do the water and wastewater sectors exist as managerial and financial units. These functions are all part of the integrated city or markez government. Consequently, a request from a water treatment shift for a replacement part moves up the chain of command first to the plant shift manager, then to the plant manager, to the chief of water, to the deputy chief of utilities, and finally to the mayor. The mayor then requests the deputy chief for administration to either enter into procurement or certify that it is appropriate to release a replacement part from stores. This communication then travels back down the chain of command, and weeks or months later a replacement part may appear.

This situation is made worse by the fact that city budgets do not allocate funds or maintain accounts for water and wastewater utilities. The markez is considered as a unit within the budget, under which funds are assigned to large accounts (personnel, supplies, capital investment). For each account, funds are allocated to the markez as a whole, including water and wastewater utilities. Markez utilities and other departments compete for limited financial resources.

Because decision making is centralized at the level of the chief of the markez, who is legally responsible as the chief officer, difficulties and bottlenecks are frequent, particularly when authority is not delegated. Ultimate decision-making authority for personnel appointments, tools, materials, and equipment resides with either the chief of the markez or the governor, according to the law. These functions are allowed to be delegated in writing, but this is seldom done. The only way to overcome these constraints is through individual initiative and informal interactions among staff.

4.5.3 Staffing

As local government entities, water and wastewater managers are committed to follow laws, regulations, and bylaws applicable to government agencies, such as Law no. 47/1978 concerning civil servants and Law no. 9/1983 concerning tendering and bidding. Law no. 47/1978 specifies that the governor is the concerned authority for the staff of local units (governorate, markez, cities, etc.), which means that personnel decisions such as promotion are up to the governor.

The present utility staff total is 1,782, based on personnel records. Staff are defined as those employees who draw special water and wastewater allowances, regardless of section placement, and includes staff working directly in the two technical departments as well as the indirect staff who perform support functions. The water sector employs 754 staff; wastewater employs 1,028 (681 direct, 1,101 indirect).

The water department has 333 direct staff distributed among the facilities as follows: 81 in the old water treatment plant; 76 in the new plant; 166 in the distribution/network department. Wastewater facilities have 348

direct staff distributed as follows: 78 at the wastewater treatment plant; 120 at the various pumping stations; 150 at the collection network.

4.5.4 Compensation

Although utility staff are eligible for Laws 26/1983 and 16/1985 and Prime Minister Decrees No. 955 and 956/1983, which organize the allowances given to water and wastewater employees, actual disbursement depends on the availability of funds in the budget. Employees' step increases and salaries follow yearly increment schedules. Promotions are given according to eligibility and seniority. These amounts are budgeted and usually granted, but funds for allowances and bonuses have remained static in past years. Work conditions, particularly in wastewater network cleaning, are extremely poor and although those workers are required to receive hazard pay, its disbursement is very limited. As a result, morale of these employees is very low.

The utilities follow the government salary scale. This includes basic salaries, yearly increases, and social increases. Law no. 26/1983, Law no. 16/1985, and Prime Minister Decrees no. 955/1983, 956/1983, and 711/1986 organize the allowances for water and wastewater staff for hazards and for meals and overtime. Within these laws and decrees, allowances for hazards range between 60% and 25% of basic salaries for wastewater staff depending on the nature of the job, and between 50% and 20% of basic salaries for water utility staff, depending on the nature of the job. Allowances for meals for both staffs ranges between L.E 10 and L.E 15 monthly; overtime ranges between 50% and 25% of basic salaries. For example, a wastewater utility worker whose basic monthly salary is L.E 100 can be disbursed allowances between L.E 125 and L.E 60, resulting in a total monthly income of between L.E 225 and L.E 160.

Although the pay is relatively attractive, funds allocated in the budget for the allowances are insufficient. Consequently, some allowances are disbursed only some of the time; other allowances are not paid at all.

There is no policy or system for incentives. All staff are eligible for allowances, irrespective of performance or productivity. Incentives should be established to compensate efficient and productive personnel and motivate staff in general. The lack of incentives is due to a lack of funds, although the existing laws for civil service could help in establishing incentive systems.

4.5.5 Performance and Training

Conditions at the new water treatment plant are quite different from conditions at the old WTP and at other water and wastewater facilities, especially in the areas of staff training and management. The new treatment plant is funded by a grant from USAID, and a U.S. contractor is in charge of construction and providing technical assistance during the beginning stage of operation. Part of this assistance includes offering training to the staff at the new plant in fields such as operations, maintenance, computers, and management. In comparison, training efforts at other facilities are nearly nonexistent. There are no local training resources nor are there funds for training in centers outside the city. No studies have been done to assess training needs. Also at the new plant, management techniques have been established that include a reporting system on production, operation, and allocation of manpower and materials; guidelines on preventive maintenance programs; and forms on implementation follow-up. Management at the old treatment plant and at other facilities appears traditional by comparison. The relatively advanced management techniques in the new treatment plant have not been established at other facilities.

Training Needs

Performance deficiencies will need to be assessed more systematically than was possible within the scope of this task, but consensus exists among the team members and those interviewed that training is needed across the board, particularly in treatment plants where no prior training has been given. Continuous training and refresher training should be a part of future institutional development efforts, along with the establishment of a basic training capacity and coordination to access existing resources in Egypt.

Training should include the following:

- Supervisory and management training: utility management, performance management, use of management information, staff and personnel communication, giving tasks, monitoring, feedback and communication, and measuring results.
- Teamwork and communication skills for teams
- Technical and hand-on training in operations and maintenance and process control
- Network maintenance, fittings, meter installation, and repair
- Motor and pump equipment maintenance and repair
- Record-keeping
- Computer use
- Consumer relations
- Accounting, bookkeeping, and commercial systems

4.6 Issues and Priorities for Fayoum

In addition to the findings about the needs and appropriate future actions for organizing water and wastewater in Fayoum city, there are a number of larger outstanding issues which any future development activity will need to address. These issues were identified in part through discussions with the Fayoum leadership and the technical staff during a two-day workshop conducted to review the team's findings (see Appendix F). An action plan, which will be a part of the next deliverable for the EHP team, will include suggestions to address these priorities.

The main issues that will have to be considered by any plant to improve the sustainability of the water and wastewater services in Fayoum are discussed below.

- **Ability to respond to increased potable water demand**

The technical staff of the Fayoum water treatment plant contends that there is insufficient water production, with the new water treatment plant and the old treatment plant combined, to meet current water supply needs. At the time of this report, the newly constructed elevated distribution tanks had not been filled to capacity, and a great deal of discussion and difference of opinion existed about the causes of this situation. The team observed that a satisfactory resolution of the situation is desired by all, and it will not be possible to move ahead with future actions until this is achieved. The issue arises from a deeply felt point of contention between the technical staff and the leadership on the need to meet potential new demand for potable water.

The governorate leadership believe that a master plan developed by USAID consultants a number of years ago, recommending the construction of two new water treatment plants, should be followed (with funding from USAID). Whether existing production is adequate to meet demand in the next five to six years remains a question.

- **Sustainability of the USAID-funded interventions to date**

Measures to ensure the continued proper operation and maintenance of the USAID-funded facilities under the Provincial Cities Development Project will have to be investigated. The workshop conducted with the service providers raised the issue of the availability of properly trained staff to operate and maintain the facilities. Recommendations for training, small tools, and on-the-job assistance were drawn up and should be investigated in more detail to develop facility specific recommendations.

Another equally important point is the availability of funds in the department's budget to ensure operation of the USAID-sponsored facilities. Mechanisms will have to be developed to ensure that such monies are made available and are actually disbursed to the facilities, not consumed elsewhere in the Fayoum system. This will probably form a major indicator in any action plan that might lead to further USAID involvement in Fayoum.

- **Development and organization of the wastewater sector to keep up with future growth in service**

The current situation calls for serious consideration to be given to the problem of wastewater treatment for Fayoum, including what to do with the existing and the NOPWASD-built plant, if and when the latter comes on-line. The current plant is not operating properly because it is old, overloaded, and apparently underfunded with respect to chlorine. The untreated effluent finds its way to Lake Quarun, creating a potentially hazardous environmental situation. The new plant under construction is long overdue, and predicting when or whether it will perform is beyond the scope of the current analysis. Investigation into this situation, either by consultants hired by the governorate or even using Provincial Cities Development Project funds would be a sound first step towards devising a reasonable wastewater action plan.

At the same time, the issue of overstaffing in the wastewater department must be addressed. The comparatively large number of staff assigned to the department, given the quantity handled and compared to other cities, should be adjusted, especially if the intention is to establish the utility in Fayoum City as a model and nucleus of a governorate-wide effort.

With the governorate's decision to move ahead with the creation of a governorate-wide water utility, the place of wastewater will have to be addressed in any action plan for institutional development. Investigation of actions that can be taken with the city wastewater department to improve conditions and set measurable targets to enable demonstration of progress will be attempted in the next phase of the study, with the idea that the city department will be the nucleus of a governorate-wide future effort.

- **The problem of unaccounted-for water**

That unaccounted-for water amounts to approximately 41% of the produced water must be investigated throughly and actions taken to attack its various causes; i.e., network leakage, inefficient collection, inadequate billing, illegal connections, etc. While unaccounted-for water will not be entirely eliminated, some actions can be taken to reduce the amount significantly. Many of these actions have been identified and are being partially addressed by the city and the Dutch government in their joint effort for El Azzab Water Utility. Similar programs and actions, like leakage detection programs and actual consumption surveys, should be imitated in the city of Fayoum. These actions can form part of any action plan for future interventions.

- **Scope of the proposed new utility and coordination with the program sponsored by the government of the Netherlands**

Given the fact that the governorate has taken steps to develop a governorate-wide water authority with the assistance of the Dutch government, an area of concern for USAID is how to allow for the identity of the water and wastewater departments of the city of Fayoum, USAID's infrastructure focus, within the governorate-wide structure. Any action plan for future interventions will have to concentrate on operation and maintenance issues for the existing facilities, including mechanisms of financial sustainability within the larger governorate-wide agency. Therefore, any meaningful action plan will have to include, in addition to actions aimed at ensuring training of staff and availability of spare parts, items like the proper establishment of cost centers and budgetary allocations to the city units.

A major concern in developing any action plan is how to coordinate actions and timing with whatever is being considered by the Dutch government and the governorate staff for the water sector. Close coordination with the governorate and the Dutch consultants will have to be maintained, not just over the coming phase of the current study, but throughout the life of any action plan adopted as a result of this effort.

5 FINDINGS: BENI SUEF

5.1 Scope of Findings

The team collected data for both the water and wastewater utilities in the city and markez of Beni Suef. Published data, where available, were also collected governorate-wide. Information was verified by conducting interviews with managerial and supervisory staff. Customers were surveyed only in the city of Beni Suef. The team inspected records, and reviewed ledgers, and inspected infrastructure and treatment facilities.

After discussions with USAID, the governor of Beni Suef, and other officials, the team agreed to focus its efforts on the city of Beni Suef. USAID's main activity there has been the construction of a new water treatment plant as well as rehabilitation of several sewerage pump stations. The government of Finland's development agency FINIDA provided some governorate-wide rural water and sanitation assistance focused at the village level, and they have begun a pilot in one markez. It was determined that the team's efforts in the city of Beni Suef would complement the rural focus of the FINIDA project.

Appendix C contains the team's detailed field findings in each of the four main investigation areas: technical, financial, institutional, and social. The following sections present a synopsis of the findings in each of these areas. The main points are summarized below, first for water supply and then for wastewater services.

5.2 Data Summary

Beni Suef is one of the seven marakez forming the governorate of Beni Suef. It lies about 100 km south of Cairo, in the Nile Valley. The markez includes the city of Beni Suef, the capital of the governorate, and seven satellite villages.

Key Water Supply Data

Area served	Inside city limits (45 villages)
Size	10 sq. km
Population in service area (city)	188,247 persons (1995)
Population directly served	178,340
Percentage of population directly served	95%
Number of accounts	29,100 connections
Water supply production	16,330,100 m^3/yr (1993/94) 45,361 m^3/d
Water supply billed	7,802,711 m^3/yr
% unaccounted-for	52%
Water supply produced per account	1,559 liters/day
Water supply billed per account	735 liters/day
Persons served per water supply account	6.2 persons
Water supply billed per person served	120 liters/day
Total kilometers of pipeline in system	210 km
Meters of pipeline per connection	7.2 m/connection
Number of water meters installed	29,100 number
Percentage of water meters working	40%

Water Treatment Facilities Data

Name	Type	Production Capacity	Year of Construction or Rehab	Ground Storage (Treated Water)
Old Water Treatment Plant	Clarification - Filtration	18,144 m^3/d	1907,1949, 1975	2,300 m^3
Czechoslovakian W.T.P	Sedimentation-Clarification-Filtration	14,256 m^3/d	1982	4,500 m^3
New U.S. W.T.P	Sedimentation - Clarification - Filtration	25,920 m^3/d (each)	1993	8,000 m^3

Water Supply Financial Data (1993-94)

Cost (w/o financial administration)	L.E 2,554 million
Revenue (billed)	L.E 1,776 million
Revenue (amount collected)	L.E 1,474 million
Deficit (cost minus revenue)	L.E 1,080 million
Average tariff yield per m^3 billed	L.E 0.23
Average tariff yield required to break even	L.E 0.33
Direct employees	400 persons
Indirect employees	40 persons

Key Wastewater Service Data

Service Area	Inside city limits
Size	10 sq. km (city only)
Population in service area city	188,247 persons (1995)
Population served	124,243 (approx.)
Percentage of population served	66%
Number of accounts	12,000
Wastewater treated	26,000 m^3/day
Wastewater per account	40,000 liters/d
Wastewater per person served	321 liters/day
Persons served per wastewater account	10.4 persons

Wastewater Facilities Data

Total km of sewers in system	81 Km
Meters of sewers per account	6.75 m/account
Wastewater treatment facilities	Name: Beni Suef Type: Trickling Filter Production Capacity: 43,000 m^3/d Year of Construction or Rehab: 1958,1992
Pump stations	9 pump stations (4 of which are not yet in service) Capacities range from 35 to 200 LPs

Wastewater Financial Data

WW revenue (=40 % billed WS)	L.E 0.710 million/yr
Cost	L.E.1.224 million/yr
Deficit	L.E 0.514 million/yr
Direct employee	265
Indirect employees	159
Percentage of indirect employees to total staff	37.5%

5.3 Technical/Engineering Description

5.3.1 Water

Population

The area is about 9.89 km^2 with a total population of 188,247. Some adjacent villages within Beni Suef Markez are supplied from the utility department of Beni Suef city. The city utility department is responsible for water supply and wastewater services.

The following projection shows the population to be served by the department in 1995 and the coming years:

Year	City Population
1995	188,247
2000	220,000
2020	224,870

Water Sources/Intakes

The main source of raw water for the treatment plants in the city of Beni Suef is the River Nile. It is supplied through two intakes, as follows:

- The Old Water Intake transfers 500 l/s of raw water to the old treatment plant. It has

four pump stations with four steel suction pipes (one 500 mm and three 300 mm in diameter) and four delivery pipes: three of asbestos cement (one 450 mm and two 300 mm in diameter) and one of 300 mm steel. The oldest pump station, built in 1974, has one pump discharging 100 l/s at 25 meters of head. Pump Station no. 2 has three such pumps, while Pump Station no. 3 has two. Stations 2 and 3 were built in 1976. Pump Station no. 4 was added in 1994, with two pumps discharging 330 l/s at 25 meters of head.

- The New Water Intake transfers another 550 l/s of raw water: 220 l/s to the Czechoslovakian-built treatment plant and 330 l/s to the new U.S.-built treatment plant. It has one pump station, built in 1992, with four pumps: two discharging 275 l/s and two discharging 138 l/s each, and all with 16 meters of head. It is fed by four steel suction pipes (two 750 mm and two 500 mm) and one 700 mm steel delivery pipe.

A 500 mm asbestos pipe also connects the delivery pipes of the old and new pump stations as a bypass between both pump stations.

Production Plants

The Beni Suef city water department operates three treatment plants for potable water production, with a total capacity of 600 l/s:

Service Area	Treatment Plant Name	Design Capacity (l/s)	Actual Capacity (l/s)	Construction/ Rehabilitation Year
1	Old	210	150	1907, 1949, 1975
2	Czechoslovakian	165	150	1982
3	New U.S.	300	300	1993

All plants use the same sedimentation and clarification system with alum. The treatment process produces a high quality water. Chlorine is added to the filtered water and sometimes to the raw water for disinfection.

Distribution

The city network has a total of 210 kilometers of pipe, of various diameters and types of material. Main line pipe diameters do not exceed 800 mm; they vary between cast iron, asbestos, steel, and plastic.

The city has divided the network into three separate zones, each zone with its own operation and maintenance staff. Water is pumped in the distribution network at an average pressure of 50 meters. Although the produced treated water and the pressure are adequate, the water has difficulty in reaching the second and third floors of apartment buildings because of network problems.

About 60% of connections have meters to measure consumption. The department allows the installation of individual meters for each apartment in multifamily dwellings at the request of the resident. The total number of installed meters is about 31,000, and about 60% of them are out of order.

Storage Capacity

In addition to the 14,800 m^3 underground water storage capacity at the treatment plants, four 50-meter high elevated tanks exist in the city. A 500 m^3 concrete tank is located at the Old Water Treatment Plant and three steel ones, each of 4,000 m^3 capacity, are located throughout the city.

Technical Services

There are three laboratories in the water department, one in each treatment plant. The laboratory in the USAID-sponsored treatment plant serves as a central laboratory for the city and performs the analyses needed for the operation of the reservoirs, the network, and the treatment plants. A meter repair and calibration workshop is also located at the Old Water Treatment Plant, although it is unclear how effective it is, given the condition of its equipment and the skill level of the repair technicians.

5.3.2 Wastewater

Collection System

The existing wastewater gravity sewer system was initiated in 1958 and expanded in 1984. It now consists of about 81 km of pipes, ranging from 175 mm to 600 mm in diameter, made of vitrified clay, PVC, and plastic.

Pump Stations

The city has been divided into nine wastewater services areas, each served by a pump station. Five of these stations, with their force mains, are currently operating: the rest are either under construction, installation, or rehabilitation.

Service Area	Pump Station No.	Zone	Area (Hect.)	No. of Pumps	Q(l/s)	H(m)	Construction Year
1	1	Mould el Nabi	112.8	3	80	25	1994
2	2	el Noukh	128.5	3	60	25	1984
3	3	el Ghamrawy	74.5	3	60	25	1984
4	4	el Mermah	159.5	2 1	80 200	25	1984 1994
5	5	el Baher	127.0	3	60	25	1989
6	6	Ezbet Belbel	85.7	4	35	30	U.C.
7	7	el Azhari	101.9	Land allocation procedures			
8	8*	el Gezuira	68.9	4	40	40	93
9	9	Ezbet el Tahrir	57.1	Under Construction			

(*) Pump Station no. 8 is complete but not working, because the sewer network in the service area is still under construction.

Force Mains

Since 1958, four cast iron 250, 300, 400 and 550 mm pipes have served pump stations 1, 2, 3, and 4. Zones 5 and 8 are served by a 400 mm cast iron pipe. An additional 500 mm line is proposed to serve zones 4, 6, and 7 and support other mains.

Wastewater Treatment Plant

A trickling filter type wastewater treatment plant was built in 1958 with a capacity of 140 l/s. In 1992, the treatment capacity was increased to 300 l/s (26,000 m^3/d). At present, the plant is overloaded because the water system capacity was increased. It receives a flow of more than 42,000 m^3/d. It is important to note that this figure does not include the flow that will be generated directly from zones 6, 7, 8, and 9 after their pump stations become operational. The effluent of the treatment plant is discharged by gravity to Beni-Bikhit drain.

Support Facilities

A laboratory at the wastewater treatment plant was rehabilitated in 1985. It is not clear, however, how reliable its results are. A limited workshop exists in Pump Station no. 4 that is used to maintain all mechanical and electrical equipment. It was also established in 1958. The team was unable to obtain detailed information on its capability in meeting system demand. This workshop was refurbished by the PCD Project.

5.4 Financial Findings

5.4.1 Water Supply

The Beni Suef City Council keeps its accounts according to the government accounting system, which means that there is no cost accounting system or concept of commercial budgeting, nor is there any separation between water and wastewater accounts and the headquarters budget and accounts. Bookkeeping is done manually, but there is an attempt to use the computer for issuing water bills.

The following table shows a comparison between the revenues from potable water and the cost both in total as well as per unit of billed water. The costs considered are only the current expenditures as defined by government accounting principles, i.e., the government accounts for personnel and supplies. This analysis uses billed volume as the basis for computing the average yield of the unit of water sold and allows some insight into the ability of the existing tariffs to cover those current costs.

Beni Suef Water Supply Service
Revenues and Expenditures, FY 1993-1994

	Revenues in L.E	Unit Revenue in P.T/M³	%
Current Revenues			
Production billed	1,775,502	22.75	
Production collected	1,358,509	17.41	
Services	15,000	.19	
Total Current Revenues	**1,373,509**	**17.60**	
	Costs	Unit Cost P.T./M³	%
Current Expenses			
Wages	793,651	10.17	31.0
Commodities Input:			
Raw Materials	287,529	3.69	11.3
Electricity	1,442,939	18.50	56.5
Other Commodities	15,417	.20	0.6
Service Inputs	14,916	.19	0.6
Total Current Expenditures	**2,554,452**	**32.75**	100.00

Annual billed volume = 7,802,711 m³
Total Current Expenditures - Total Current Revenues = L.E 1,180,943

In 1993-94, average revenue from the sale of one cubic meter of water in Beni Suef was P.T 17.60, while the average current cost of producing that cubic meter was P.T 32.75. This cost per cubic meter is higher than those of water companies in Cairo and Alexandria, because of the cost of electricity and labor.

The average revenue from selling one cubic meter is P.T 22.75, based on total water billed of 7,802,711 m^3. The unit revenue from production billed closely parallels the current P.T 23 tariff for household customers. Since water produced totals 16,330,100 m^3, the amount of leakage and unaccounted-for water is about 8,527,389 m^3, or approximately 52.2% of total water produced.

If revenues corresponded to the amount of water produced, i.e., 16,330,100m^3 instead of the 7,082,711m^3 currently billed, then the average revenue per cubic meter produced would be P.T 10.87 and the cost per cubic meter would be P.T 15.64. The loss per produced cubic meter would be halved, to P.T 4.77 per cubic meter, compared to the current P.T 10.00.

5.4.2 Commercial Activities

For billing and collection purposes, the Beni Suef water utility service area consists of six customer centers and a government center. Each center has a certain number of accounts, the largest customer class being household customers, both in number of accounts and in volume of usage.

There are no fixed or clear financial policies. The city departments follow the government regulations. There are no policies for meter reading, billing and collection, budget and accounting, and monitoring and fixing tariff. All the collected revenue is added to MOF accounts. There is no relationship between revenues and the expenditures.

The Ministry of Finance allocates the O&M funds needed in the city headquarters each year, under wages and general expenditures. The difference between collected revenues and expenditures is subsidized. For example, total current expenses in fiscal year 93/94 were L.E 2,554,452, while revenues were L.E 1,373,509. The difference, a deficit of L.E 1,180,940, has to be covered by MOF, although this amount does not appear in the accounts as a subsidy.

Unaccounted-for water amounts to approximately 52.2% of water produced (e.g., in 93/94, water production was 16.4 million m^3, while the amount of water billed through meters was 7.8 million m^3). During fiscal year 93/94, water service was billed to approximately 29,000 accounts.

The existing tariff structure consists of volume charges per cubic meter of billable usage for customer classes 1 through 7, and flat rates per number of rooms for governmental housing customers. The magnitude of the volume charge varies per customer class and also per grouping within each customer class. The current tariff structure was implemented in fiscal year 91/92 and increased in each subsequent fiscal year.

The following tabulation shows the amounts billed and collected for water and wastewater by the city in the last three years:

	91/92	92/93	93/94
	L.E	L.E	L.E
Production billed	875,542	1,072,383	1,775,502
Production collected	822,969	877,095	1,358,809

The amount billed has increased approximately 65% in the last two years, while the amount collected has increased only 55%. This means that the rate of collection has dropped from 93.99% to 76.5%. This increase in delinquency may be the result of several factors: the increase in rates, the sudden expansion in service areas and accounts, or a

slackening in the collection system. The accumulated arrears for fiscal year 93/94 are L.E 954,949, as follows:

Household	763,960 L.E
Governmental agencies	47,747 L.E
Industrial usage	19,099 L.E
Commercial usage	95,495 L.E
Other	28,648
Total	**954,949**

The arrears problem is a result of the collection system, which does not allow collectors to go door to door. Furthermore, the lack of funds allocated for water consumption in the budgets of civil governmental agencies, and the shortage of money in the public sector and private companies worsens the situation.

5.4.3 Wastewater Financial Situation

The financial situation of the wastewater sector is no better than that of the water supply sector. City collection for wastewater service seems much less effective than for water. The following table shows the potential wastewater revenues from the sale of potable water in the city and compares these to actual expenditures on operations and maintenance activities.

The potential revenues (*)	**L.E 710,200**
O&M Costs	
Wages	881,589
Raw materials	95,843
Electricity	231,838
Other commodities inputs	7,709
Services inputs	7,458
Total O&M Costs	**1,224,437**
Deficit	**514,237**

(*) Estimated as 40% of the water production billed in 93/94. The city collects sewerage fees as a surcharge on the water bill; 35% for households and 60% for other users.

While the potential revenue amounts to L.E 710,200, the city registers show that the collected sewerage surcharge in 93/94 was only L.E 23,924, making the gap between current expenditures and revenues L.E 1,200,513, rather than a more manageable L.E 514,237.

While the city administratively earmarks 10% of the revenue for O&M, the fact that collection is so far behind reduces the effectiveness of such actions.

As with potable water expenditures, the two main cost elements are wages and electricity, representing close to 91% of current expenditures. Wages alone represent 72% of total expenses; electricity accounts for 19%.

Wages, which reflect the total value of employee work efforts, consist of cash wages and allowances, advantages in kind, insurance benefits, and other forms of remuneration. On average, salaries account for 51% of total wage expenses, and the remaining 49% is associated with rewards, allowances, cash advantages, and insurance. From fiscal year 91/92 through fiscal year 93/94, wages increased approximately 54.6% from L.E 570,168 to L.E 881,589. The total number of employees in the sewerage utility is 424; the average monthly income per employee is L.E 173.3.

5.4.4 Projected Tariff Needs

A detailed financial analysis for Beni Suef can be found in Appendix E. This section summarizes options for achieving financial sustainability by the year 2000. The assumptions detail the requirements for cost-saving interventions and tariff increases in a series of areas.

Scenario I: If Current Conditions Are Unchanged

Assuming the following:

1. Tariffs and wastewater surcharges remain constant until the year 2000,
2. Current trends in inflation and cost increases are projected,
3. The level of unaccounted-for water and rate of billing collections remains constant, and
4. No savings are achieved in O&M,

then the deficit conditions in the year 2000 for Bene Suef will be:

Water supply deficit	L.E 4.3 million
Wastewater deficit	L.E 2.1 million
Total deficit	L.E 6.4 million

This figure represents about a 160% increase over the 93/94 deficit of L.E 2.4 million. For Beni Suef to reach zero deficit with no change in cost savings performance would require an increase of 4.5 times the current tariff, to P.T 82/m^3. The wastewater surcharge would also have to be increased to 130% of the water bill, an increase of about 3.3 times the existing 40% surcharge.

Scenario II: Improve Unaccounted-for Water Performance and Billing and Collections

Assuming the following:

1. Unaccounted-for water rate improved by 25%,
2. Billing and collections improved by 90%, and
3. Savings in operations and maintenance costs for both water and wastewater of 20%

then in the year 2000 the deficit would be:

Water supply deficit	L.E 2.8 million
Wastewater deficit	L.E 1.4 million
Total deficit	L.E 4.2 million

The tariff required to reduce the water supply deficit to zero would be P.T 36/m^3 (100% over current charges); the wastewater surcharge would increase to 100% of the water bill (150% over current charges).

Beni Suef:
Projected Deficits in 2000

Performance Factor	Base Year	Year 2000 with No Improvements	Year 2000 with Improvements
Unaccounted-for water	52%	52%	25%
Billings and collection rate	77%	77%	90%
O&M savings—water	0	0	20%
O&M savings—waste water	0	0	20%
Deficit, Water	L.E 1.2 million	L.E 4.3 million	L.E 2.8 million
Deficit, Wastewater	L.E 1.2 million	L.E 2.1 million	L.E 1.4 million
Current Tariff	P.T 18/m^3	—	—
Tariff yield required for zero deficit	—	P.T 82/m^3	P.T 36/m^3
Wastewater surcharge	40%	—	—
Surcharge required for zero deficit	—	130%	100%

5.5 Institutional Findings

5.5.1 Structure

The water and wastewater utilities are managed by local governmental entities under Local Administration Law 43/1979. Utilities are part of the city administration, which is considered a single legal entity governed by a city chief (mayor) and a local popular council.

The water and wastewater engineering functions in Beni Suef are combined in one organizational entity, with one top manager reporting directly to the city chief. This entity is subdivided into three main sectors: water production, water network, and wastewater facilities (including treatment plant, pumping stations, and network).

Each main division and each sector has a manager who reports to a superior, thus avoiding problems of inconsistency of command and repetition of supervisory levels. This newly established structure seems to maintain a reasonable balance between span of control and length of communication channels.

Work is organized according to division of labor, based on geographic work teams, particularly in the network and collection sectors for both water and wastewater. While for water production, the plant is the basis for division of labor, the network is organized

according to the geographical distribution throughout the city. Work is divided among shifts within the water production plants and the distribution network; the wastewater organization uses the same principles.

Although no legal districts exist in Beni Suef city under the local administration law, for operational purposes the city chief has divided the markez into six geographical districts. For the water and wastewater management, each two geographical districts form a zone. Organizational charts for the various departments in Beni Suef are found in Appendix C.

Some activities that relate directly to the utility are not assembled under one manager, which makes control and coordination difficult. For example, the revenue department is under the control of a separate manager in the city council. The utility manager has no influence on the revenue, which is an integral part of the utility. The same situation exists for all auxiliary services needed for the operation of water and wastewater utilities. Accounting, contracting and tendering, warehouses (stores), personnel affairs, workshops, vehicles, and information and documentation are located in other city departments, since they provide services to the city in general.

5.5.2 Management

Because the utilities are organizational units of the city council, decision-making authority resides with the city chief. Despite the existence of a utility manager, there is really no concept of dedicated utility management in Beni Suef, and there is no concept of these utilities as managerial and financial units. Consequently, all administrative and financial services required for water and wastewater utilities, in addition to other utilities in the city, are grouped centrally at the city level. Services required to support water and wastewater, such as personnel affairs, procurement, contracting, accounting, payroll, and vehicles, are provided to water and wastewater utilities by the central sections within the city council.

As government entities, these units must follow applicable laws, regulations, and bylaws, such as Law no. 47/1978 concerning civil service, and Law no. 9/1983 concerning tendering and bidding. As a consequence, the hierarchy shown on the organizational charts (Appendix C) does not represent levels of decision making or the distribution of authority. This is because the laws centralize the authority for decision making at the city chief level. There is no delegation of authority.

Centralized decision making creates difficulties and bottlenecks. When the utility needs a small spare part or any other article, it must pass a request up the chain of command to the chief of city for approval.

The difficult situation is made worse by the fact that there is no separate utilities budget or specific allocation of funds. The Ministry of Finance considers the city as a whole when drawing up a budget, which is line-item. Funds are allocated to the whole city including utilities, which must compete with other city services for a limited pot of funds.

The utility lacks institutionalized support for studies, data collection, analysis of current problems, analysis and education of the level of services, community development forecasts, or the establishment of future objectives and plans for utility development. All such activities depend to a large extent on individual initiatives. The utility is not well structured to face the demands of the future.

5.5.3 Staffing

Decisions on appointments and promotions are made at the governor level for all the employees in the governorate. The chief of the city does not have the authority to promote city staff; he can only present recommendations.

The present utility staff totals approximately 865 employees. This figure was provided by the department of personnel affairs in the city council, and was derived from an examination of the records of personnel who are awarded water and wastewater allowances within Law no. 26/1983 and Law no. 16/1985. This number includes direct (staff assigned to technical departments, 665) and indirect (staff who draw allowances from water and wastewater budgets who are in administrative support positions, 200) manpower and is divided between water and wastewater as follows: 441 water employees and 424 wastewater employees.

The number of direct staff working inside water and wastewater facilities is 665: 400 in water facilities and 265 in wastewater utilities. The proportion of indirect staff (200) to direct staff (665) is 30.07%. In addition, there are other staff who work in the auxiliary services sections and who are not awarded water or wastewater allowances, estimated to be 10% of direct staff, giving an average of total indirect staff to direct staff of about 40%.

In the water department, the 400 direct staff are distributed as follows: 106 in the network section, 75 at the USAID-sponsored treatment plant, 72 at the Czechoslovakian-sponsored plant, and 3 at department headquarters. The 265 direct wastewater staff are distributed as follows: 80 at the wastewater plant, 84 at the pump stations, 92 at the collection section, and 9 at department headquarters.

Overall, the utilities suffer from a serious shortage of skilled workers. 47.22% of water and wastewater staff are auxiliary (unskilled) laborers; while 35.49% are technicians, i.e., assistant engineers. Only 8.12% are technical laborers, i.e., qualified to perform O&M tasks. In the water sector, 48.25% of the work force has no formal education, while in the wastewater sector, this percentage jumps to 66. However, only about 20% of the staff are over fifty years old, which means that over the next ten years, there will be opportunities for manpower restructuring and retraining.

5.5.4 Performance and Training

Although supervisors complain that they face a manpower shortage and that the number of existing staff is less than required, in fact the number of staff working in the utilities is relatively large. This perception on the part of managers is due to the fact that recruitment, selection, and placment processes do not ensure the provision of qualified personnel, resulting in weak staff performance.

The city has no policy for human resource development. Recruitment is not based on actual needs, nor is any analysis performed to determine required performance standards. Training is unavailable, and funds for training almost nonexistent; for the 1993/94 fiscal year the entire city council training budget was L.E 200.

The training needs identified for Beni Suef are the same as those identified for the city of Fayoum in Chapter 4.

5.6 Issues and Priorities for Beni Suef

In addition to the findings used to analyze needs and list appropriate actions for organizing the water and wastewater sectors in

Beni Suef, a number of issues emerged that any future development activity will need to address. These issues were identified in part through discussions with officials in Beni Suef during the two day workshop conducted to review the team's findings (see Appendix F).

5.6.1 Operation and Maintenance of the USAID-sponsored Facilities

One of the main issues that will have to be addressed, by the action plan or any future activity, is the continued proper O&M of the infrastructure provided by USAID in the city of Beni Suef. While a sizable budget is currently allocated by USAID to finance O&M activities at the water treatment plant, it is unclear how the city budget will be adjusted to include the necessary funds after the PCD Project is completed. A mechanism must be devised for ensuring that the minimum budget required to properly operate the facility will be included in the city budget. This will have to include some kind of agreement that the money so allocated will actually flow to the plant and not be dissipated elsewhere in the city budget.

Any future action plan will have to include targets and verification systems for the allocation of budgets, the assignment of adequate trained staff, and other actions to ensure the sustainability of the facilities.

5.6.2 Unaccounted-for Water

The issue of unaccounted-for water (now 50% of produced water) must be addressed. Actions to be taken by the city will have to include leak detection studies and increased efficiency of the billing and collection systems. The current situation, with USAID-provided leak detection equipment lying idle at the city government because of lack of trained operators, must be addressed immediately. Pipe replacement programs will have to be drawn, costed, financed, and implemented in stages. Many of these actions can be initiated locally; some will require outside assistance.

5.6.3 Lack of Identity for the Sector

The fact that there are no incentives in the current system to operate the water and wastewater facilities as a utility has emerged as a serious constraint that needs to be addressed. Managers did not have adequate information to perform their functions because of the dispersion of responsibility among various departments under the current local administration management model. The service providers hoped that both the water and wastewater sectors in the city will be combined under one autonomous management structure so as to improve performance and aim for sustainability. During the workshop they identified this as the strategic goal and have discussed steps to achieve it.

A related aspect of autonomous identity that kept surfacing in discussions with service providers was the issue of a physical headquarters or location for the utility. Space limitations will certainly hinder the possibility of bringing together into one location employees who are currently in various city offices.

5.6.4 Wastewater Treatment in Beni Suef

While the current potable water needs in the city seem to be met, the service will need to be expanded in the future to meet increases in population. One estimate of future needs is another 300 l/s treatment plant, so it was not surprising to find during the workshop that service providers wanted to concentrate on the rehabilitation and expansion of the

Czechoslovakian water treatment plant to double its capacity and provide 200 l/s.

However, this concern would seem to be less of a priority than the issue of the serious overloading of the wastewater treatment facility. Any future USAID action in Beni Suef will have to address this environmental issue. The service providers raised the question of rehabilitating the current wastewater treatment plant. While it is not clear whether the NOPWASD-built plant is in good working condition, it is receiving 40,000 l/day, with a capacity of 26,000—a serious problem.

If any action is to be taken regarding the wastewater treatment plant, the issues of quality of the effluent and the water quality requirements of the Ministry of Irrigation will have to be addressed before any wastewater interventions are seriously considered. This is a national problem and applies to other USAID activities, not just the PCD cities.

5.6.5 Training and Performance Improvement

Any future action will have to address the issue of training. The fact that training budgets are inadequate and training needs are not being identified (or if identified, not met) are all issues that will have to surmounted to improve the sector. All service providers identified the lack of trained staff as a major constraint to performance.

While performance deficiencies will have to be studied more carefully than was possible under this assessment, it seems inevitable that there will be a serious need for across-the-board training. Continuous and refresher training will have to form part of any future institutional development effort in Beni Suef.

6 FINDINGS: MENYA

6.1 Scope of Findings

The team collected data for both water and wastewater in the city and markez of Menya. Governorate Housing Department data were collected where available as well. After discussions with USAID, the governor of Menya, and other officials, the team agreed to focus its efforts on the city of Menya for several reasons: because of the team's resources, the time available for the analysis, and USAID's activities there, which have included the construction of a new water treatment plant and rehabilitation of several sewerage pump stations.

The team verified information in the field by conducting interviews with managerial and supervisory staff and service providers. No interviews were conducted with beneficiaries, but the team inspected records and ledgers as well as infrastructure and treatment facilities.

Appendix D contains details of the team's findings in each of the main investigation areas: technical, financial, and institutional. A synopsis is presented here, first for water supply, then for wastewater services.

6.2 Data Summary

Menya city is the capital of Menya governorate. It lies 250 km south of Cairo in the Nile Valley. The city is one of nine marakez forming the governorate. Menya markez includes the city and seven satellite villages.

Key Water Supply Data

Service Area	Inside Menya city limits
Size	160 sq. km
Population in Service Area (city)	227,330 persons (1995)
Population directly served	215,963 persons
Household coverage	95%
Number of accounts	37,357 connections
Water supply production (actual)	18,606,240 m^3/yr (93/94) or 50,976 m^3/d
Water supply billed (estimated)	8,323,790 m^3/yr or 22,805 m^3/d
Unaccounted-for water (estimated)	55.3%
Production per account	1,365 l/d
Water supply accounted for per account	611 l/d
Persons served per water supply account	5.8 persons
Billed water supply per person served	106 l/d
Kilometers of pipeline in system	190 km
Meters of pipeline per account	5.1 m/account
Number of water meters installed	37,357
Water meters working	67%

Water Treatment Facilities

Name	Type	Production Capacity	Year of Construction or Rehabilitation	Ground Storage (Treated Water)
Old Water Treatment Plant (No. 1)	Clarification - Filtration	7,645 m^3/d	1927	500 m^3
Old Czechoslovakian Water Treatment Plant (No. 2)	Clarification - Filtration	14,688 m^3/d	1960	1000 m^3
Treated Water Compact Units (4 units)	Clarification - Filtration	3,672 m^3/d (each)	1987	
New U.S. Water Treatment Plant (PCD)	Clarification - Filtration	25,920 m^3/d	1993	12,000 m^3
Storage Facilities (Elevated Tanks)	**Number**	**Total Volume**	**Year of Construction**	**Type**
I.	1	1,000 m^3	1960	Concrete
II.	3	12,000 m^3	1993	Steel

Water Supply Financial Data (1993/94)

Cost (w/o financial admin.)	L.E 3.520 million
Revenue (billed)	L.E 2.236 million
Estimated revenue (amount collected)	L.E 0.749 million
Deficit (cost minus revenue)	L.E 2.771 million
Average tariff yield per m^3 billed	L.E 0.27
Average tariff yield required to break even	L.E 0.42
Direct employees	437
Indirect employees	358
% of indirect employees to total staff	82%

Key Wastewater Service Data

Service area	Inside Menya city limits
Size	16 sq. km
Population in city	227,330
Population served	147,000 (estimated)
Percentage of population served	65%
Number of accounts	14,035 connections
Wastewater treated	36,290 m^3/d
Wastewater per account	2.586 l/d
Wastewater per person served	246 l/d
Persons served per wastewater account	10.53 persons

Wastewater Facilities Data

Total km of sewers in system	162 km
Meters of sewers per account	8.1 m/account
Wastewater treatment facilities	Name: Menya WWTP Production capacity : 36,290 m^3/d (420 l/s) Year of construction: 1965
Pump stations	3 pump stations Capacities range from 200 l/s to 400 l/s Number of substations: 6 Capacities range from 50 l/s to 80 l/s Number of boosters: 6 Capacities range from 15 l/s to 20 l/s

Financial Data (1993/94)

Wastewater revenue (= 40% billed WS)	L.E 0.894 million
Wastewater revenue collected	L.E 0.312 million
Cost	L.E 1.964 million
Deficit	L.E 1.652 million
Direct employees	381
Indirect employees	317
% of indirect employees to total staff	45%

6.3 Technical/Engineering Description

6.3.1 Water

Population

The total residential area of the city is 16 sq. km; total population is 227,330. The city department is responsible for water supply and wastewater services to the city and to a portion of the Talla area. Based on official census data, the annual population growth rate of Menya city is 2.6%. The following shows the projected population that the department will likely have to serve in 1995 and in subsequent years:

Year	Population
1995	227,579
2000	260,006
2005	296,055
2015	339,382
2020	434,441

Water Sources/Intakes

The main raw water sources feeding the treatments plants are the Ibrahimia main canal and the Nile River, through four intakes:

Old Water Intake (1) was constructed in 1927 and transfers 120 l/s raw water to the old water treatment plant. It has three pumping units, each discharging 80 l/s. Two of them are operating and the third is a standby, with two delivery pipes from the Nile River (one 500 mm asbestos pipe and one 350 mm steel pipe).

Old Water Intake (2) was constructed in 1960 to feed the Czechoslovakian water treatment plant. It has a total capacity of 200 l/s from the Ibrahimia main canal, and four pumping units: two discharge 130 l/s, the third 100 l/s, and the fourth 70 l/s. Two of the pumps are operating and the others are stand-bys. The intake feeds the water treatment plant (2) through two delivery pipes (one 400 mm asbestos pipe and a new 350 mm steel pipe).

Both old water intakes are connected to allow rerouting of water in case of maintenance or failure of either intake.

The Compact Units Intake transfers 4,320 m^3/d of raw Nile water to the four compact units, each of which has 25 l/s capacity. It was built in 1987 and is fed by four steel pipes, each 200 mm in diameter.

The New Intake transfers 330 l/s raw water from the Nile to the USAID-funded new water treatment plant. The intake was constructed in 1992 and has one pump station with six pumping units, each at 82.5 l/s (four are working and two are stand-by). It feeds the water treatment plant through two 700 mm asbestos pipes.

Production Plants

The Menya city water department is responsible for operation and maintenance of three water treatment plants and four compact units, with a total designed capacity of 720 l/s, as shown in the table below.

Service Area	Treatment Plant	Design Capacity (l/s)	Actual Capacity (l/s)	Construction/ Rehabilitation Year
1	Old	120	85	1927
2	Czechoslovakian	200	170	1960
3	New PCD (USAID)	300	300	1993
4	Compact Unit	100	85	1987

The first two treatment plants listed use clarification and rapid filtration as their treatment technology. The USAID-sponsored plant includes flocculation, sedimentation, and rapid sand filtration, and prechlorination and postchlorination facilities for disinfection. The plant produces high quality water.

The compact units also use sedimentation, clarification and filtration systems, and disinfection.

Distribution

The city network has a total of 190 km of pipe, of various sizes and materials. Pipe diameters range from 100 mm to 800 mm; materials used include cast iron, asbestos, steel, PVC plastic, and prestressed concrete.

The city divides the network into three separate zones, west, south, and north. Each zone has its own operation and maintenance staff. Water is pumped in the distribution network at an average pressure of 52 m.

About 60% of water supply connections have meters for consumption measurement. In multifamily dwellings, the department allows the installation of individual meters for each apartment at the residents' request. The total number of installed meters is approximately 37,357, about 33% of which are out of order.

Storage Capacity

In addition to 13,500 m^3 of underground water storage capacity located in the treatment plants, there are four 50 m high elevated tanks in the city. A 1,000 m^3 concrete tank is located at the old treatment plant, and three new tanks, each with 4000 m^3 capacity, are located throughout the city.

Technical Services

There are two laboratories in the water department, one in the old treatment plant and one in the USAID-sponsored treatment plant. The latter serves as a central laboratory for the city and performs the analysis needed for the

operation of the reservoirs, the network, and the treatment plants.

A meter repair and calibration workshop also exists at the old water treatment plant, although it is unclear how effectively it operates, given the condition of its equipment and the skill of the technicians who perform repairs.

6.3.2 Wastewater

Collection System

The existing wastewater gravity sewer system, initiated in 1960 and expanded in 1967, consists of approximately 127 km of pipes. The pipes range in size from 175 mm to 650 mm; 75% are made from vitrified clay, 20% from PVC plastic, and 5% from G.R.P.

The system covers approximately 30% of the surface area of the city. Although the exact number of individuals directly connected to the system has not been found in city records, it is believed that about 20% of the population living in the area covered is not connected to the system because of the cost. Using this estimate to calculate the population served yields a very high volume of per capita wastewater, on the order of 160 liters per capita per day.

Those residents who are not directly connected to the network rely on sewerage and settlement vaults, which are emptied twice a week by hand or by suction trucks and discharged into manholes or even to an irrigation drain.

Force Mains

There are roughly 35 m of force mains in the city, ranging in diameter from 150 mm to 500 mm. They are made either from cast iron, ductile iron, asbestos, plastic, or G.R.P. Details on the force mains appear in Appendix D.

Pump Stations

The city of Menya is divided into nine service areas, which are served by three main pump stations and six substations, in addition to five boosting stations.

Service Area	Pump Station No.	Zone	No. of Pumps	Discharge (l/s)	Head (m)
Main Stations					
1	3	Sahrig	3	280	25
2	11	Magousa	3	200	20
3	6	Shahin	6	400	45
Substations					
4	2	Sultan	3	100	42
5	1	Magles	3	50	27
6	4	Helmia	3	50	27
7	5	Gharbia	3	180	30
8	9	Mansouria	3	160	30
9	10	Maklab	3	120	12

Wastewater Treatment Plant

An existing 420 l/s wastewater treatment plant is located 10 km from the southwest edge of the city. The plant uses trickling filter technology, including screening, grit removal, primary sedimentation, trickling filters, and sludge drying beds with additional disinfection. It was designed and constructed by NOPWASD in 1965, rehabilitated and expanded in 1985, and is now overloaded, primarily because of improved potable water service. The effluent is discharged to a drain, which is connected to the Nile through the Itsa main drain. The department uses a limited quantity of effluent for agriculture (flowers, olives), and sells the dried sludge for fertilizer.

The wastewater arriving at the plant does not include a significant quantity of industrial waste. Although a laboratory was built at the wastewater treatment plant in 1970, it lacks sufficient equipment to provide laboratory results.

6.4 Financial Findings

The Menya water utility keeps its accounts according to the government accounting system, which means that the utility does not use a cost accounting system or a concept of commercial budgeting. Water and wastewater accounts are not separated from each other or from the headquarters budgets. Bookkeeping is done manually, including the preparation of water bills.

A comparison of unit production costs and collected revenue in the following table illustrates the difference between costs and the current tariff. An estimate of recorded consumption is used as the basis for calculation of customer bills and corresponding revenues. The value was estimated by taking the amount of collected revenues and adding 35% of total unaccounted-for water, which is assumed to be the amount that is actually due to unpaid bills. This system of estimation was necessary

because current bookkeeping practices in Menya do not allow these values to be calculated easily. The calculations for the comparison can be found in detail in Appendix D.

The unit revenue from production billed closely parallels the average tariff for household customers. This estimate yields an average revenue of P.T 26.86 from selling one cubic meter of water, based on an estimated recorded consumption billed of 8,323,790 m^3 and the average water tariff. Therefore, the amount of unaccounted-for water is estimated at 55% of the total amount of water produced, which is 18,606,240 m^3. The ability of the existing tariff to cover costs is illustrated in the comparison of the unit revenue (P.T 26.86) with the unit cost of current expenditures (P.T 42.30).

The following table shows the existing revenue and cost situation described above.

1993/94	**Revenues in L.E**	**Unit Revenue P.T/m^3**	**%**
Current Revenues			
Production Billed	2,235,890	26.86	
Production Collected	748,651	8.99*	
Total Current Revenues	748,651	26.86**	
Current Expenses	**Costs in L.E**	**Unit Revenue P.T./m^3**	**%**
Wages	1,681,076	20.20	47.75
Raw Materials	516,600	6.21	14.68
Electricity	1,310,043	15.74	37.21
Other Commodities	12,400	0.15	0.36
Total Current Expenditures	**3,520,119**	**42.30**	100.00

Annual Billed Volume* = 8,323,790 m^3
Total Current Expenditures - Total Current Revenues = L.E 2,771,468

(*) Estimate based on 2,787,084 m^3 recorded consumption + 5,536,705 m^3 arrears, which are assumed to be 35% of unaccounted-for water.

(**) Estimate based on 2,787,084 m^3 recorded consumption.

This cost is higher than costs in the water organizations in Cairo and Alexandria as well as in the utilities in Fayoum and Beni Suef.

If we consider the revenue from recorded consumption corresponding to the amount of water produced then the average revenue per cubic meter produced would be P.T 12.00 and the cost per cubic meter produced is P.T 18.92; or a loss per produced cubic meter of P.T 6.92.

6.4.1 Commercial Activities

The procedure for requesting water service in Menya is similar to procedures in the other governorates.

1. The customer asks the construction permission department in the district to review the documents required to request service. The documents include the rental or property contract.
2. The construction permission department reviews the documents and issues the approval, which is signed by the district chief.
3. The file has to be sent to the network to estimate the bill and the customer has to buy the needed materials and the meter and pay the fees for installation.
4. The material needed has to be tested by the network people and a date has to be fixed for installation.
5. The network executes a start-up work order and the connection is made and a meter installed.
6. The customer account is established and the file sent to the revenue section and meter section to initiate meter reading and calculation of water consumption.

For billing and collection purposes, Menya is divided into 17 customer collection areas plus the governmental agencies office. One collector is assigned to each area. The collector does not go to the customers; they come to the collection center to pay their bills, which are calculated according to the registered meter readings. This system has several major problems. For instance, customers have trouble finding the appropriate collection center because the centers have moved so many times. Furthermore, the system is manual and is inaccurate, because it depends on inaccurate meter readings. Also, there is a shortage of collectors.

The existing tariff structure consists of volume charges per cubic meter of billable usage for customer classes 1 through 7, and flat rates per number of rooms for government housing customers. The magnitude of the volume charge varies per customer class and per grouping within each customer class. The current tariff structure was implemented in fiscal year 1991/92 and the rates have been increased each fiscal year since. However, the current tariff structure expired on June 30, 1995.

During 1993/94, water consumption was recorded for approximately 37,357 accounts. The largest customer class is household customers, who account for 34,708 of the accounts.

The financial system in Menya does not allow the identification of increases in production billed or production collected over the last three fiscal years, nor is the water utility able to easily calculate the increase in the number of accounts over time.

There are no fixed or clear financial policies. The utility follows all government regulations, which lack policies for meter readings, billing and collection, budgeting and accounting, or monitoring and setting tariff.

According to the government accounting system, all collected revenues must be turned over to the Ministry of Finance, which

allocates the city's annual O&M funds through Bab I wages and Bab II general expenditures. For water and wastewater services, there is no relationship between revenues and expenditures. Any deficit between collected revenues and expenditures is subsidized by MOF, e.g., total revenues in fiscal year 1993/94 were L.E 748,651; expenses were L.E 3,520,119, and the difference, a deficit of L.E 2,771,468, has to be covered by MOF, although it does not appear in the accounts as a subsidy.

The revenue collection problem in the city of Menya is more critical than in either Fayoum or Beni-Suef. Collectors are not allowed to go from door to door, with the result that customers delay paying their bills. The existing system prevents the tracking of arrears. The problem is compounded by a lack of funds allocated for water consumption in local government agency budgets and by a shortage of liquidity in public sector and private companies.

In 1993/94, expected revenues from production billed were L.E 2,235,890 (according to estimated recorded consumption), while actual collections were L.E 748,651, leaving L.E 1,487,239 in arrears. Arrears accumulate from previous years as well, but neither the revenue department nor the collections department are able to calculate them.

6.4.2 Wastewater Financial Situation

The financial situation of the wastewater sector in the city of Menya is worse than that of the water supply sector. Wastewater revenues are at best only 40% of water revenues, while operation and maintenance costs are higher than for water services. The following table compares actual collected wastewater revenue and O&M expenditures for 1993/94.

Revenues	L.E 312,335(*)	%
O&M Costs		
Wages	1,444,126	73.51
Raw materials	4,895	0.25
Electricity	420,000	21.39
Spare parts	42,100	2.14
Fuel and oil	46,583	2.37
Other commodities	6,527	0.34
Total O&M Costs	1,964,231	100.00
Deficit	*L.E 1,651,896*	

(*) Actual collection; estimated wastewater revenue based on 40% of the water production billed in 93/94 is L.E 894,356, making arrears in wastewater collection L.E 582,021.

This comparison confirms the existence of a significant gap between revenues and expenses. The primary two cost elements are wages and electricity. Wages represent 73.5% of total expenses and reflect the total value of employee work efforts, including cash wages and allowances, in-kind benefits, insurance benefits, etc. On average, salaries for permanent positions account for 34% of total wage expenses. The remaining 66% covers rewards, allowances, cash benefits, and insurance. There are a total of 402 wastewater employees, with an average yearly income each of L.E 3,592, or L.E 299 per month. The electricity cost represents 21.39% of total costs; combined with wages, the two categories account for 94.9 % of total costs.

6.4.3 Projected Tariff Needs

A detailed financial analysis for Menya can be found in Appendix D. This section briefly describes financial scenarios that would affect requirements for cost-saving interventions and tariff increases.

Scenario I: If Current Conditions are Unchanged

Assuming the following:

1. Tariffs and wastewater surcharges are held constant until the year 2000,
2. Current trends in inflation and cost increases are projected,
3. The level of unaccounted-for water and rate of billing collection remain constant,
4. No savings are achieved in O&M costs,

then the deficit conditions in the year 2000 for Menya will be:

Water supply deficit	L.E 6.7 million
Wastewater deficit	L.E 4.0 million
Total deficit	L.E 10.7 million

These figures represent about a 237% increase over the 1993/94 deficit of L.E 4.5 million. For Menya to reach a zero deficit without realizing cost savings, the tariff would need to be increased by 9.9 times over the current level, to P.T 228/m^3. The wastewater surcharge would have to increase to 164% of the water bill, an increase of about 4.1 times over the current 40% surcharge.

Scenario II: Improve Unaccounted-for Water Performance and Billing and Collections

Assuming the following:

1. Unaccounted-for water rate improved by 25%,
2. Billing and collections by improved by 90%,
3. Water operations and maintenance cost savings of 20%

then the projected deficit for the year 2000 would be:

Water supply deficit	L.E 3.7 million
Wastewater deficit	L.E 2.5 million
Total deficit	L.E 6.2 million

The tariff required to reduce the water supply deficit to zero would be P.T 40/m^3 (74% over current charges), and the wastewater surcharge would increase to 131% of the water bill (150% over current charges).

Projected Deficits in 2000

Performance Factor	Base Year	Year 2000 No Improvements	Year 2000 with Improvements
Unaccounted-for water	55%	55%	25%
Billings and collection rate	33%	33%	90%
O&M savings—water	0	0	20%
O&M savings—wastewater	0	0	20%
Deficit, Water	L.E 2.8 million	L.E 6.7 million	L.E 3.7 million
Deficit, Wastewater	L.E 1.7 million	L.E 4.0 million	L.E 2.5 million
Current tariff	P.T 23/m^3	–	–
Tariff yield required for zero deficit	–	P.T 228/m^3	P.T 40/m^3
Wastewater surcharge	40%	–	–
Surcharge required for zero deficit	–	164%	131%

6.5 Institutional Findings

6.5.1 Structure

The water and wastewater utilities in Menya city are operated as local governmental entities under Law no. 43/1979 concerning local administration. Water and wastewater managers are required to follow laws and regulations applicable to government agencies, such as Law no. 47/1978 concerning civil servants and Law no. 9/1983 concerning tendering and bidding.

Law no. 47/1978 specifies that the governor is the "concerned authority" for decision-making in personnel issues for all staff of the governorate, marakez, and cities. This means that the governor is the central decision maker for such personnel matters as appointments and promotions.

The organizational structure of the water and wastewater utilities needs to be studied and analyzed. There are some indicators that the structure is in need of development, such as the absence of clear channels of communication, delegation of authority, and span of control. In some cases, supervisory levels are repeated, e.g., having a department manager and an assistant manager. The existing structures are documented in Appendix D.

Since the utilities are considered part of the city government, all administrative and financial services required for the water and

wastewater utilities are handled centrally. The centralized services include personnel affairs, contracting, procurement, accounting, and payroll.

However, there are some exceptions to this situation. The water and wastewater utilities each have their own stores, fleets, and workshops that are independent from the city council and that are established in the utilities' organizational structures. In addition, billings and collections have been transferred from the city revenue department to the water utility, a remarkable development towards integrating the utilities. However, conflicts still arise over supervision of the section. Both the water utility manager and the city revenue department manager assume responsibility for the utility's billings and collections. Clear channels of communication are not yet in place.

The utilities lack institutionalized support for studies, data collection, analysis of current problems, evaluation of services, community development forecasts, or the establishment of future objectives and plans for utility development. All such activities depend completely on the individual initiative of the utility managers.

6.5.2 Management

Because the utilities are organizational units of the city council, decision-making authority resides with the chief of the city, or, as mentioned earlier, with the governor on such issues as personnel appointments and promotions. The local popular council is also involved in the decision-making process, particularly regarding the allocation of funds and approval of plans and tariffs.

Centralized decision making creates difficulties and bottlenecks. When the utility needs a spare part or any other article, it must pass a request up the chain of command to the chief of the city for approval.

The situation is made worse by the complicated system of budget distribution, which pits the various entities in the governorate against each other in competition for limited funds. The local popular council at the governorate level decides each year on allocations for each markez, village, and city. This method of funding makes it very difficult for the utility to operate efficiently.

However, Menya is different from the other two cities considered in this report. As mentioned above, both water and wastewater utilities have their own workshops, stores, and fleets that are under the supervision and control of the utility managers, and revenue functions have been transferred from the city council to the water utility, although this has not resulted in a positive change in relation to systems and performance of billings and collections. There are too few meter readers to cope with the increasing number of meters. The number of collectors (13) is also very low considering the number of consumers. Given the information provided on the number of staff and given logical and practical performance standards, a radical improvement in the revenue section of the water supply utility cannot be achieved under the current system.

6.5.3 Staffing

The present staff of both utilities totals 1,081 employees, 589 in the water supply sector and 492 in the wastewater sector.

An analysis of manpower reveals that the ratio of professionals (engineers, chemists) to total utility manpower in both water and wastewater is high. The water utility employs 63 professionals (10.7 %); wastewater employs 56 (11.38 %). These figures are high compared

to similar utilities, and do not necessarily result in higher performance levels. On the contrary, they indicate overstaffing and high personnel costs.

The same also applies to the high number of technicians employed: 205 in the water utility (34.80 %) and 154 (31.3%) in the wastewater utility. On the other hand, the number of technical laborers is very low, and the number of auxiliary laborers very high. The analysis reveals that about half of the utility staff has no education, a factor that necessarily affects performance levels. Staff over fifty years of age represent 15.18 % of total utilities staff, which means that there is no possibility of considerably decreasing manpower in the coming ten years. Instead, manpower can be redistributed and effective training to maximize the output of manpower can be established.

As is the case in other governorates, the city of Menya has trouble recruiting technical specialized staff because of government personnel policies, which allow recruitment, selection, and placing of employees without regard to the skills needed for specific jobs. For example, one supervisor possesses a certificate in textiles. The low salary scale discourages efficient and qualified personnel from applying, and the poor working conditions and lack of fair compensation leads to low morale among staff.

6.5.4 Compensation

The utilities follow the government salary scale. This includes basic salaries, allowances, incentives, and annual regular and social increases (Law no. 47/1978 and other laws). Law no. 26/1983, Law no. 16/1985, and Prime Minister Decrees no. 955/1983 and 956/1983 organize the allowances for water and wastewater staff for hazards and for meals and overtime. Within these laws and decrees, allowances for hazards range between 60% and 25% of basic salaries for wastewater staff depending on the nature of the job, and between 50% and 20% of basic salaries for water utility staff, depending on the nature of the job. Allowances for meals for both staffs ranges between L.E 10 and L.E 15 monthly; overtime ranges between 50% and 25% of basic salaries.

Although allowances are set for water and wastewater staff, the actual disbursement depends on the availability of funds. In actuality, 35% of water utility staff and 22% wastewater staff are not granted allowances.

There is no policy or system for incentives. All staff are eligible for allowances irrespective of performance. The concept of incentives as tool to compensate and encourage efficient and productive personnel and motivate staff in general does not exist in the utilities.

6.5.5 Performance and Training

In general, training efforts are not common in the utilities. There are no funds for training and no orientation courses for new employees. No studies are undertaken to assess training needs. Supervisors have not been taught a systematic approach to "on-the-job training." There is no task analysis for the purpose of on-job training.

6.6 Issues and Priorities for Menya

In addition to the findings about the needs and appropriate future actions for organizing water and wastewater in Menya city, there are a number of issues that surfaced during discussions with city officials that need to be addressed in any future development activity.

6.6.1 Amount of Arrears and Unaccounted-for Water

In spite of its efforts to determine the amount of arrears and unaccounted-for water, the team was unable to obtain a clear figure. City records do not allow easy calculation of the amount of water billed (i.e., sold), since the records only show collected revenue. Therefore, the team had to make several assumptions, which obviously need to be verified before any actions are taken to tackle the problems of arrears and unaccounted-for water.

6.6.2 Operations and Maintenance of USAID-Sponsored Facilities

Sufficient O&M funding from the city budget must be an important indicator of the city's ability to properly operate and maintain the facilities. Some mechanism must be devised to ensure that the minimum amount required will not only be included in the city budget, but that it will actually flow to the plant and not be used for other expenses.

Any future action plan must include targets and verification systems for budget allocations, the assignment of adequate trained staff, and other actions to ensure the sustainability of the facilities.

6.6.3 Wastewater Treatment in Menya

It was clear to the team that the existing treatment capacity is not adequate to handle the amount of water being produced. Complicating this situation is the fact that the sewerage includes some industrial waste from factories in Menya. This issue must be analyzed properly and actions identified to remedy the situation must be taken.

6.6.4 The Lack of Sector Identity

One of the main concerns that surfaced during discussions was the lack of identity of the water and wastewater sector, despite efforts by city management to internally reorganize the water utility. Many city and governorate officials felt that decisions on a new organization for the utility were beyond their control, and they were reluctant to discuss the merits of one form versus another. But they all agreed that creating an identity for the sector would significantly improve the existing situation and would greatly advance the process of identifying the magnitude of the problems and establishing ownership for the solutions.

7 CONSTRAINTS, ISSUES, AND CONCLUSION

7.1 Introduction to Constraints Analysis

The findings in Chapters 4, 5, and 6 provided the data for this analysis. Taken together, the data indicate a pattern of issues and constraints for all the provincial cities reviewed, even considering differences among the three sites. This analysis profiles those concerns that will need to be addressed in the future and should form part of any transition strategy and short-term action plan leading to institutional reform. Furthermore, the basic issues of performance and provision of services presented here will need to be addressed regardless of the institutional option that governorates choose. Identified constraints are institutional, organizational, financial, and operational in nature. It should be made clear, however, that the issues presented are not intended to unfairly judge the well-intentioned efforts of the technical and managerial staff of the governorates. In most cases these staff are hindered by limited funds, physical constraints, and government procedures and systems that were established for now long-outdated organizational forms. While improved management skills would be an asset, the limitations inherent in the system would likely overwhelm the best individual intentions and abilities. Indeed, overall performance in most cases is better than can be expected given the constraints.

It is important to recognize is that there is reason to expect that improvements are feasible. Furthermore, the attitude of the professional staff and the leadership with whom the team has interacted indicates that there is a readiness to move ahead with improvements, given awareness, assistance (in some cases), and appropriate direction. Some of the needs identified were brought to the leadership as new information (and were surprises in some cases) because they were presented analytically, in chart form, and explained clearly in terms of the consequences and the performance standards required. For example, discussion of the rate of unaccounted-for water in Beni Suef brought a pledge to move immediately toward corrective measures.

Other issues (even unaccounted-for water) may not lend themselves to immediate action or full resolution. For example, it will be important to determine what can be done in the short-term to make existing wastewater systems in Fayoum, Beni Suef, and Menya as operationally sound as possible, while planning and designing expansions or replacements to meet current demand, which far exceeds capacity. Such short-term field studies were beyond the scope and resources of this effort, but they are identified in Chapters 4, 5 and 6.

The analyses presented are summaries; conclusions are drawn from detailed technical findings that appear in the appendixes, such as a financial analysis with information on tariffs, break-even scenarios, and detailed tables in Appendix E.

Constraints and issues can be categorized under the following general areas: organizational, institutional, financial and budgetary, and operational. Summary comments on the requirements for sustainable future change and the possible effect of

national sectoral policies on institutional reform are presented in section 7.3. below.

7.1.1 Organizational Constraints

Local administration service delivery model is not suitable for modern utility management.

The team found that current institutional arrangements for water and wastewater utilities are characterized by overlapping responsibilities; an overly bureaucratic, procedure-laden administrative regimen; and a lack of organizational identity in the eyes of employees and managers. Water and wastewater officials consider themselves employees of the national government. Governorate and city-level departments respond to central ministries rather than to local demands or to consumers. Understandably, reward systems and organizational structures are designed to respond to this reality. The stipulation of Article 2 of Local Administration Law no. 145/1988 places these institutions under the jurisdiction of the localities, but government centralization of the budget, policy on tariffs, personnel, and the general purpose government delivery model all undermine local authority and responsibility.

The managerial consequence of the general purpose delivery model is a lack accountability and absence of monitoring mechanisms in the key areas discussed below.

Issues

- **Lack of organizational identity or utility management concept**

Water and wastewater services are treated as nontechnical, noncommercial municipal social services. There is no "utility management" per se, and groups responsible for water and wastewater service delivery systems have no specific organizational management perspective or identity in the governorate administrations.

- **Dispersed management, administration, and technical units**

The water supply and wastewater functions are dispersed among different city departments that answer to different administrators; these functions are managed as unrelated activities whose planning and supervision do not coalesce at a higher level of administration. Under these circumstances, it is surprising that services operate as well as they currently do.

- **The managerial norm of centralization and lack of delegation**

Major decisions are managed by local councils under the mayors. Local councils may decide, for example, not to measure or permit metering of water supplied to a village or a particular area in order to avoid accurate billing and to provide water at bulk rates below cost for political reasons. Such actions are common. Any expenditure for spare parts requires the approval of the mayor. Significant operational and budget decisions are not made by the personnel who actually operate and manage the services.

- **Lack of budget management and cost monitoring tools**

Because water and wastewater compete for resources with other services, shortcomings in service can always be attributed to the competing demands of other services. Water and wastewater are not treated as cost centers, hence their costs cannot be easily identified. The information shortfall caused by the lack of readily available cost data prevents budget levels from being matched to operational needs.

7.1.2 Institutional Constraints

Central government rules and lack of autonomy hinder utility effectiveness.

The structure of utilities according to a local service delivery model, following rules set by and designed for central government bureaucracies and with ministry decision making for key resources, creates insurmountable institutional constraints. Unless a locally controlled utility model is put in place, institutional constraints will prevent management performance from improving. It is impossible for local providers to maintain a service delivery orientation within the current structure.

Issues

- **Accounting model is not suitable for a utility**

Government recording and reporting systems do not provide accounting information that is useful for management purposes. Cost data are not aggregated to water supply or wastewater activities. The only aggregated value available is revenue collected, and this amount is posted to the Ministry of Finance.

- **Compensation and advancement policies are inadequate to retain qualified staff**

Salaries are set in conformity with national civil service pay scales; "incentive" payments are made mechanically, and promotion is based on seniority alone. If a job is available in the water plant at an attractively higher grade level, the next person in line in any city department is awarded the job.

- **Civil service and national employment policies hinder cost effectiveness**

Staffing policy is based on the directives of the Ministry of Manpower, which enforces the government of Egypt's policy of guaranteed employment. Actual staffing needs for utility management are far lower, in most cases. Overstaffing occurs as a result, but many of the engineers and technicians hired have limited practical experience. Many of the more motivated staff are attracted to the private sector, which generally offers much higher salaries and better working conditions.

- **Governors and mayors tightly control expenditures to stretch budgets; contracting and procurement procedures are cumbersome and require numerous approvals, while oversight of delivery of services is very weak.**

In summary, centrally controlled utilities lack the incentives to manage and operate services effectively and efficiently.

7.1.3 Financial and Budgetary Constraints

Current budgetary process and priorities are ill-suited for utility management

In the same way that institutional and organizational constraints limit the utilities' operating performance, constraints in the financial subsystem hamper financial performance. Most of the troublesome issues are related to budgeting and the allocation of funds. The consequences of the current system are financial assets that are not managed and an absence of forecasting tools.

Issues

- **The budget process is not applicable to the needs of a utility.**

Governorate-level staff prepare the initial budgets, but ultimate responsibility lies with central organizations in Cairo. In addition to

NOPWASD, the Ministries of Finance and Planning and the National Investment Bank play key roles in different parts of the recurrent cost budget (Bab I and II are the GOE names for accounts for personnel and supplies) and capital investment allocations (Bab III). Despite stringent requirements to justify budgets, there is little or no effort to provide budgets based on needs. In most cases, the priority in MOF budgetary allocations to local governments is for the personnel Bab, while allocations for materials and supplies take lower priority, with predictable effects on maintenance efforts.

- **Budgets grant lump sums for all municipal services together**

Budgets are not based on actual operations and maintenance requirements, but instead combine funds for all local services. The Ministry of Finance encourages repetition of previous year budgets with minor increases, and the governorate may switch line items as needed.

- **Lack of budget flexibility**

Because governorates do not have the ability to retain collected revenues, they have no flexibility in the budget allocation process. As a result, service provision expenditures often exceed revenues by a factor far in excess of collected revenues[2].

- **Cost center management is not possible**

Because nationally set tariffs are not structured to recover operating costs, and accounting procedures do not relate revenues to expenditures, a "cost center" approach, which would compare costs to revenues, is not possible. Currently all utility costs are embedded within the general local administration budget and are not aggregated for analysis.

- **The grant structure eliminates any relationship between locally raised revenues and local expenditures**

The Ministry of Finance provides a grant to cover about 80% of local expenditures. The grant is an ad hoc amount (reset each year; the amount is unpredictable for the local government) to balance the budget. The MOF reduces the grant to offset any additional revenues local governments raise, and effectively prevents local governments from being able to generate revenues which they can spend to improve service delivery. Therefore, any additional revenues raised at the local level, whether through taxes or water charges, do not enable additional expenditures. In this environment, local governments have no incentive to generate their own revenues. Further, local finances cannot be viewed as a source of revenue for improved water and wastewater service delivery.

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[2]Local government revenues (from all sources, including water and wastewater) finance only about 20% of expenditures. About one-half of local government revenues are generated with a series of taxes (Bab I) that are collected by the Ministry of Finance, but are said to be allocated for local purposes. These taxes include land, building, and vehicle taxes, and a surtax on imports. Taxes are levied at a fixed rate nationwide, and collected revenues go immediately into the Ministry of Finance account. Local governments also have a group of other current revenues (Bab II), including water and wastewater fees and a series of fees on items such as bicycles, dogs, work animals, and quarries. The local services and development fund (which receives revenues from a range of small sources), the cleansing fund, and the economy housing fund are the only local sources that lie outside the MOF budget structure, and are the only revenues over which local governments can be said to have any control. However, these funds have accumulated balances (not all of which would ever be spent in any one year) that total less than 5% of annual local expenditures.

The current financial performance demonstrates a serious imbalance between revenues and expenditures.

A number of factors contribute to the failure to collect enough revenues to meet operations and maintenance costs. These factors, combined with unnecessarily high expenditures for personnel, high operational costs, and unaccounted-for water, present a bleak financial picture for the utilities. Measures need to be taken immediately to address these problems.

Issues

- **Staffing levels are too high**

The vast majority of expenditures for water systems go for wages and electricity (see Tables 7.1 and 7.2). Combined, these two items account for 87.5% of expenditures in Beni Suef, 82.9% of expenditures in Fayoum, and about 85% of expenditures in Menya. The types of expenditures in Beni Suef and Fayoum are nearly reversed: Beni Suef spends much more for electricity and Fayoum much more for wages. Raw material purchases account for almost all of the other expenditures.

- **Billing and collection systems are inadequate**

The revenue collection mechanism requires users to make payments at the council revenues section, because no bills are delivered. Each customer's account is kept reasonably current (within a month of meter reading or estimating), but accounts are listed by the sequence in which customers subscribed rather than by district or street. Exception reports (caused by consumer complaints) cannot be generated except by manual review of every sheet in the ledgers, a situation that leads to endless adversarial exchanges between consumers and clerks. Interviews with consumers indicated a nearly total lack of confidence or trust in the billing and collection system. Consumers compare the water system billing process to the computer-generated bill they receive from the electric company, and although this bill may also be inaccurate, consumers have confidence in the process. Penalties for late payment are permitted under the regulations, but they are rarely enforced.

- **Rates of collection are insufficient.**

Collection efficiency, defined as the percentage of actual collections to billings, was 86.3% in Fayoum and 83% in Beni Suef in 1993/94 (see Table 7.4). In Menya, the percentage was only 34%. The amount of back revenues collected during the year would probably understate the annual arrearage, because some of the collections would probably have come from billings in earlier years. The amount of uncollected revenues can be reduced by cutting off service to users who fail to pay and by developing better commercial systems to make payment easier and more accurate. It appears that consumers seldom lose service for failure to pay. Government agencies receive an annual budget for the purchase of water services. Revenues billed and collected are reported in Table 7.3. A large volume of water is not metered, but is charged to a flat monthly user fee. Although conventional wisdom says that flat charges are higher than metered charges would be, the low average billing rate is inconsistent with this belief.

- **Billing efficiency is low**

Revenues, both billed and collected, have grown rapidly during the past several years (see Table 7.4). Billings have risen 67.6% in Fayoum and 102.8% in Beni Suef since fiscal year 1991/92. This data was not available for Menya. Most of the revenue growth is attributable to increasing tariff rates, since the number of accounts is growing much more slowly (estimated at 5% in Fayoum between 1992 and 1994). Billing efficiency (percentage

of billings collected) has fallen as tariff rates have risen, but actual receipts have increased 56.1% in Fayoum and 65.1% in Beni Suef. Collection efficiency is lower in Beni Suef, and has fallen much more rapidly than in Fayoum. One result of the falling collection efficiency is rising arrearage. Beni Suef reported an accumulated arrearage of L.E 954,949 at the end of 1993/94, two-thirds of which has developed over the past three years. Household arrearage made up 80%; followed by businesses at 12%, government at 5%, and other users at 3%.

- **High levels of unaccounted-for water**

Unaccounted-for water represents leakage, illegal taps, other water that is not billed, and so forth. Unaccounted-for water is 41% of production in Fayoum, 52.2% of production in Beni Suef, and 55.3% in Menya. Thus, revenues could be approximately doubled if unaccounted-for water could be eliminated and tariffs collected. Unaccounted-for water can never be totally eliminated, but there is considerable room to raise revenues (or lower costs) by reducing the amount. These levels of unaccounted-for water are very high by international standards. For example, unaccounted-for water averages 11% of production in the United States and 12% of production in Canada.

Table 7.1
Expenditures for Water Systems, 1993-94

Expenditure Item	Fayoum		Beni Suef		Menya	
	Amount (L.E)	Percent	Amount (L.E)	Percent	Amount (L.E)	Percent
Wages	2,506,353	56.4	793,651	31.0	1,681,076	47.8
Electricity	1,176,000	26.5	1,442,939	56.5	1,310,043	37.2
Raw Materials	751,328	16.9	287,529	11.3	516,600	14.7
Other Commodities	12,155	0.3	15,417	0.6	12,400	0.4
Service Inputs	0	0	14,916	0.6	0	0
Total	4,445,836	100.0	2,554,452	100.0	3,520,119	100.0

Source: Current Accounts Ledgers

Table 7.2
Expenditures per m^3 of Water
in piasters

Expenditure Item	Fayoum		Beni Suef		Menya	
	Billed Water	Produced Water	Billed Water	Produced Water	Billed Water	Produced Water
Wages	23.6	13.9	10.2	4.9	NA	9.0
Electricity	11.1	6.5	18.5	8.8	NA	7.0
Raw Materials	7.1	4.2	3.7	1.8	NA	2.8
Other Commodities	0.1	0	0.2	0.1	NA	0.1
Service Inputs		0	0.2	0.1	NA	0
Total	41.8	24.7	32.8	15.6	NA	18.9

Source: Current Accounts Ledgers

- **Subsidies are high, but the amount is not readily identifiable by management**

Revenues are considerably lower than expenditures in both cities (see Table 7.5), and the total deficit would be much greater if capital costs were included in the data. The deficits presumably are being met with subsidies from the Ministry of Finance. However, there is no linkage between expenditure and revenue accounts for Egyptian local governments, so no explicit subsidy for water and wastewater is reflected in municipal accounts.

Table 7.3
Revenues Billed and Collected, 1993-94
(in L.E)

	Fayoum	Beni Suef	Menya
Revenues Billed	2,341,045	1,775,502	NA
Revenues Collected	2,020,602	1,373,509	748,651
Difference	320,443	401,993	NA

Source: Current Accounts Ledgers

Table 7.4
Revenues Billed and Collected, 1991/92 through 1993/94
(L.E)

	Fayoum			Beni Suef			Menya		
	91/92	92/93	93/94	91/92	92/93	93/94	91/92	92/93	93/94
Revenues Billed (000)	1397	1589	2341	876	1072	1776	NA	NA	2,236*
Revenues Collected (000)	1258	1381	2006	823	877	1359	NA	NA	749
Billed/ Collected (percent)	90.1	86.8	85.7	93.9	81.8	76.5	NA	NA	33.5

(*) Estimate by EHP team

Source: Current Accounts

Table 7. 5
Current Expenditures, Revenues, and Subsidies, 1993-94
(L.E)

	Fayoum	Beni Suef	Menya
Expenditures	4,445,836	2,554,452	3,520,119
Revenues	2,020,602	1,473,509	748,651
Current Deficit	2,425,234	1,080,943	2,771,468
Percent Deficit	54.6%	42.3%	78.7%

Source: Analysis of raw data from accounts

Tariffs are inadequate to meet the goal of self-sufficiency

The detailed financial analysis in Appendix E projects tariff needs and break-even scenarios up to the year 2000. The conclusion is that current heavily subsidized tariffs that do not now meet O&M costs will only continue to escalate with inflation, and unless strong interventions are taken to reduce expenditures and increase revenue efficiencies, the required tariff and subsidy will be higher than either consumers or the government can reasonably be expected to meet. Even with considerable cost savings and increased revenues, tariffs will need to be raised considerably if a break-even scenario is desired.

Issues

- **The inadequacy of tariff-setting procedures**

Tariffs in Egypt are set by central and local governments. A national tariff schedule is published periodically under the direction of the High Consultative Committee on Utilities (HCCU) of the Ministry of Housing and the Public Committee on Policies and Economics Affairs, composed of the Ministries of Economy, Finance, Housing and Construction, Electricity, and Local Administration. The committee's role in tariff setting is to assess the social acceptability of the HCCU proposals. (The current schedules for the provincial cities appear in Appendix F.) The proposed tariffs are approved by the Ministry of Housing and Construction, but more importantly, by the elected (popular) council of the governorate, which may (and often does) reject increases. Thus, tariff levels vary from governorate to governorate, sometimes by as much as four to one, and at the same time, very few utilities have the necessary information to match tariff levels to their financial needs. For example, Beni Suef has yet to apply the 1994/95 tariff, which is in force in both Menya and Fayoum.

Wastewater tariffs are calculated as a surcharge on the water bill, and are thus subject to the same vagaries as the water supply tariffs. The surcharge has recently been increased to an average of 40% of water billed. Wastewater revenues tend to be extremely small.

- **Inadequacy of tariffs without considerable subsidies**

The subsidy in Fayoum is 54.6% of current expenditures, in Beni Suef, 42.3% of current expenditures, and in Menya, 78.7% of current

expenditures. The projected financial outlook indicates tariff increases will be required to reach break-even status even with aggressive cost-saving measures. If cost-saving improvements are not made (through better performance) and the tariff is not changed, by the year 2000, the deficit and subsidy picture for Beni Suef will be as follows:

Water supply deficit	L.E 4.3 million
Wastewater deficit	L.E 2.1 million
Total deficit	L.E 6.4 million

This total deficit represents an approximate 160% increase over the 1993/94 deficit (L.E 2.4 million). To reach zero deficit with no change in cost savings performance would require an increase 4.5 times over the current tariff, or an increase to P.T 82 per m^3. The wastewater surcharge would also increase to 130% of the water bill, an increase of about 3.3 times over the existing 40%.

The same scenario for Fayoum would result in the following:

Water supply deficit	L.E 6.8 million
Wastewater deficit	L.E 13.5 million
Total deficit	L.E 20.3 million

A scenario that projects targeted interventions to the year 2000 in Beni Suef by improving the unaccounted-for water rate by 25%, billing and collections by 90%, and savings in operations and maintenance costs for both water and wastewater of 20%, would yield the following:

Water supply deficit	L.E 2.8 million
Wastewater deficit	L.E 1.4 million
Total deficit	L.E 4.2 million

The tariff required to reduce the water supply deficit to zero would be P.T 36 m^3 (100% over current charges), and the wastewater surcharge would increase to 100% of the water bill (150% over current charges).

For Fayoum, with an additional savings in wastewater O&M costs by substantially reducing staff and realizing improved performance, the projection is:

Water supply deficit	L.E 4.8 million
Wastewater deficit	L.E 6.2 million
Total deficit	L.E 11 million

The tariff required to reduce the water supply deficit to zero would be P.T 51 per m^3 (170% over current charges), and the wastewater surcharge would be 86% of the water bill (a little over twice the current surcharge).

For Menya, with no cost-saving improvements and no tariff changes by the year 2000, the result is the following:

Water supply deficit	L.E 6.7 million
Wastewater deficit	L.E 4.0 million
Total deficit	L.E 10.7 million

With a saving of water and wastewater O&M costs and drastically reducing unaccounted-for water, the projection is:

Water supply deficit	L.E 3.7 million
Wastewater deficit	L.E 2.5 million
Total deficit	L.E 6.2 million

The tariff required to reduce the water supply deficit to zero would be P.T 40/m^3 (74% over the current charges), and the wastewater surcharge would increase to 131% of the water bill (150% over current charges).

- **A presumption that people cannot pay more**

Total collected annual revenues are L.E 53.5 per household in Fayoum and L.E 36.5 per

household in Beni Suef (assuming an average household size of 5). This expense corresponds to less than 1% of income in Fayoum (estimated at L.E 5,033 by the CAPMAS survey in 1992) and about 0.7% of income in Beni Suef (estimated at L.E 5,517 in 1992). Worldwide, household expenditures for water tariffs in the range of 1.5 to 2.5% of income are regarded as acceptable, so there is substantial room to raise tariffs in Egypt and still remain within the worldwide norm. Expenditure data indicate annual water consumption of about 280 m^3 per household in Fayoum and 205 m^3 of water per household in Beni Suef.

Table 7.6 Beni Suef
Projected Deficits in Year 2000

Performance Factor	Base Year	Year 2000, No Improvements	Year 2000, with Improvements
Unaccounted-for water	52%	52%	25%
Billings and Collections Rate	77%	77%	90%
O&M Savings, Water	0	0	20%
O&M Savings, Wastewater	0	0	20%
Deficit, Water	L.E 1.2 million	L.E 4.3 million	L.E 2.8 million
Deficit, Wastewater	L.E 1.2 million	L.E 2.1 million	L.E 1.4 million
Current Tariff	P.T 18/m^3	–	–
Tariff Yield Required for Zero Deficit	–	P.T 82/m^3	P.T 36/m^3
Wastewater Surcharge	40%	–	–
Surcharge Required for Zero Deficit	–	130%	100%

Table 7.7 Fayoum
Projected Deficits in Year 2000

Performance Factor	Base Year	Year 2000 No Improvements	Year 2000 with Improvements
Unaccounted-for water	41%	41%	25%
Billings and Collections Rate	86%	86%	90%
O&M Savings, Water	0	0	20%
O&M Savings, Wastewater	0	0	55%
Deficit, Water	L.E 2.4 million	L.E 6.8 million	L.E 4.8 million
Deficit, Wastewater	L.E 5.9 million	L.E 13.5 million	L.E 6.2 million
Current Tariff	P.T 19/m^3	–	–
Tariff Yield Required for Zero Deficit	–	P.T 84/m^3	P.T 51/m^3
Wastewater Surcharge	40%	–	–
Surcharge Required for Zero Deficit	–	93%	86%

Table 7.8 Menya
Projected Deficits in 2000

Performance Factor	Base Year	Year 2000 No Improvements	Year 2000 with Improvements
Unaccounted-for water	55%	55%	25%
Billings and collection rate	33%	33%	90%
O&M savings—water	0	0	20%
O&M savings—wastewater	0	0	20%
Deficit, Water	L.E 2.8 million	L.E 6.7 million	L.E 3.7 million
Deficit, Wastewater	L.E 1.7 million	L.E 4.0 million	L.E 2.5 million
Current tariff	P.T 23/m^3	–	–
Tariff yield required for zero deficit	–	P.T 228/m^3	P.T 40/m^3
Wastewater surcharge	40%	–	–
Surcharge required for zero deficit	–	164%	131%

7.1.4 Operational Constraints

Except for newly constructed plants, water and wastewater systems operate inefficiently or (in wastewater) completely inadequately; distribution systems have problems and wastewater systems are marginally operational.

Distribution systems have an unacceptable volume of leakage. Several anomalies in the data do not allow certainty about current efficiencies in all cases. For example, in Beni Suef, inflow data for wastewater treatment indicate a much higher population served than is reported. In Fayoum, wastewater treatment plant staff numbers seem inordinately high. Follow-up field studies should be undertaken to better define short-term actions for improvement. Assessment findings indicate a number of operational shortcomings in infrastructure planning, design, construction, and O&M . In aggregate, these deficiencies negatively affect the quality of service, causing shortfalls in revenue, consumer dissatisfaction, and rapid deterioration of assets. Operational shortcomings are reflected at all stages in the service delivery process.

Issues

- **Planning is insufficient**

No specific criteria were found to guide investment decisions. The team found no evidence that either central or local authorities generate or maintain data to permit ranking of relative needs against criteria. Consequently, impact allocation for the greatest social benefit or risk analysis is not possible, except intuitively, or based on crisis demand or immediate political imperative.

- **Design standards are not enforced or appropriate**

There was no evidence of specific design standards in force, except in the U.S.-financed construction facilities. The Ministry of Irrigation's popularly used standards for dumping in canals, especially for wastewater treatment, were found to be inappropriately high. There is evidence that supply facilities, treatment facilities, and networks in secondary cities have been planned and designed in isolation from one another.

- **Project implementation yields questionable results**

Outside of the biggest cities, contractors are not required to produce detailed designs, making it impossible to supervise construction and conduct a final review according to established standards. Reportedly, financial considerations drive the construction contract award decision, motivating contractors to use inferior materials and engage in other cost-cutting actions. Construction supervision is constrained by shortages of skilled manpower, and legal mechanisms have proven ineffective in enforcing accountability.

- **Operation and maintenance systems need development; water and wastewater plants do not operate according to standards.**

O&M responsibility for on-line facilities is assigned to the local technical unit, under the supervision of a plant manager. Wastewater facilities and small water production units have for the most part been designed and constructed by the central government organization (NOPWASD). When a locality takes over a newly constructed facility, it inherits all the embedded flaws in planning, design, and construction noted above, together with O&M costs and the need for skilled manpower. An exception to this situation can be found in the recently constructed water treatment plants financed by USAID.

- **Environmental monitoring is not addressed**

Few of the local utilities have the capacity to monitor compliance with standards for industrial wastewater discharge into sewers. These standards protect facilities, utility workers, and receiving waters from pollutants that flow through conventional treatment plants. This issue will become increasingly important as the newly formed Egyptian Environmental Affairs Agency implements the new environmental law, which makes controlling industrial pollution a high priority.

7.2 Implications for Future Projects

The team believes that future institution-building activities are needed and can be successfully undertaken in the provincial cities reviewed if certain conditions are met. First, the national policy on subsidies and tariffs needs to support efforts for decentralization. Second, projects need to be designed to ensure sustainability by linking institutional reform to the larger picture of sectoral reform. New

behavior learned through training and institution building (systems development and restructuring for utility management) requires an incentive structure nationally and locally for change to endure. Third, a demonstrated desire and willingness for improved management performance by local authorities and staff are essential if changes are to occur.

7.2.1 Effects of National Policy on Success of Local Institutional Reform

One presumption of this institutional assessment is that selection of the proper local institutional structure will lead to the ability to retain revenues, the use of these revenues for appropriate O&M, and the adoption of personnel policies that attract a higher caliber and more motivated set of employees. However, incentives created by national policies and practices can preclude any of the proposed local institutional structures from achieving the intended results and should be considered before undertaking future institutional development activities at the local level. Thus, national policy reform remains imperative if the water and wastewater sectors are to achieve the hoped-for effects from local reform. Below are two examples of undesirable incentives fostered by national behavior.

First, the alternative local institutional structures differ in their *ability* to retain revenues, but they do not differ in their *incentives* to raise revenues. The result is that selecting a structure that provides greater ability to retain revenues is unlikely to alter the willingness of the governorates to raise revenues. Beni Suef received an estimated subsidy from MOF equal to 42.3% of current expenditures in 1993/94; Fayoum received an estimated subsidy of 54.6% of current expenditures in 1993/94. Menya received an estimated subsidy of 78.7% of current expenditures in 1993/94. Recent data for the independent water companies in Beheira, Kafr-el-Shiek, and Damietta indicate subsidies of 20 to 40% of current expenditures, showing relatively little difference in the subsidy level across institutional structures. Whatever institutional structure is in place, there will be no incentive to generate revenues from the local population to balance budgets unless the GOE changes its policy of financing operating losses of water authorities. Similarly, institutions do not have incentives to raise revenues in hopes of improving O&M or employee satisfaction since the MOF is very likely to reduce the subsidy if water authorities generate more tariff revenues. The MOF can effectively keep any revenues raised through higher tariffs by reducing the subsidy, leaving the water authority with no greater ability to provide O&M.

Incentive effects of subsidizing water and wastewater authorities may be less than expected under several circumstances. Negative incentives are created by willingness to cover deficits in an ad hoc manner. Past practice indicates that subsidies will be provided and staff will be paid. An alternative is to subsidize through a predictable, fixed amount transfer and allow any savings to be retained locally. Fixed transfers, where the amount is independent of water authority behavior, need not cause inefficiency. On the contrary, an incentive is provided to increase efficiency because local costs can be systematically reduced by applying efficiency measures (leak detection, rational staffing), and income can be increased through improved collections.

Current MOF policy for general economic authorities and public sector companies is to eliminate subsidies. The present is viewed by the MOF as a transition period to self-sufficiency for these institutions. Presumably, newly formed economic authorities for water supply would require both subsidies and a transition period toward self-sufficiency. The negative incentives of current policy will

diminish over time, and the willingness to generate additional revenues through higher tariffs for balancing the budget and improving O&M will likely grow if the MOF is successful in achieving its stated policy. Should past practice overwhelm current policy, the institutional structure selected may have little implication for reform now, but may have an effect over time. A newly formed economic authority would be in a position to operate more efficiently than the current structures, given appropriate policy support.

Second, limited incentives exist to undertake improved O&M under each institutional form with current tariff policy. Tariff revenues, which are paid by local residents and businesses, are being contemplated to recover O&M costs but not capital investment costs, which are determined by the Ministry of Planning. Imposing tariffs to cover O&M but not capital investment creates undesired effects. Even with the ability to retain revenues, local water and wastewater authorities may have the incentive to undermaintain water and wastewater systems because they do not have to pay for rehabilitation, thereby allowing systems to deteriorate more rapidly than they normally would. The Ministry of Planning and the National Investment Bank can be asked to provide funding for major maintenance once deterioration has reached a substantial state and the cost is borne by national rather than local sources. Thus local water and wastewater authorities may not be motivated to use local revenues to sustain facilities as needed.

7.2.2 Sustainability

The constraints identified above will limit sustainability for past and current investments in infrastructure and training. This lack of an effective institutional structure makes it difficult for current operational staff to apply the training now provided by the contractors. Therefore, it is likely that recent utility investments completed by USAID will begin to experience deficiencies as equipment and spare parts wear out and if consultants are not present to support behavioral change.

One significant lesson learned from past USAID provincial city activities that can be applied to any future institutional development program is that the capacity-building approach (i.e., improvements in skills and support facilities) will not provide a firm basis for sustainability without fundamental changes to the sector at the national level and institutional reform at the local level.

7.2.3 Demonstrated Desire for Reform in the Governorates Reviewed

In the three provincial cities reviewed, there were degrees of demonstrated interest, although not full comprehension about what will be required to move ahead with institutional reform. The team conducted meetings, individual interviews at all levels, and review workshops in the three governorates under review. Three levels of response can be observed: consumers, plant employees, and top leadership.

Consumers

The social analysis conducted with plant employees and consumers (see Appendixes B and C) indicated an attitude of dependency and frustration with a system that is unresponsive to their needs. This was true of all governorates reviewed. A desire for improved service is felt most strongly by consumers, who want better service and who do not have confidence in the current water billing process, an ordeal involving long lines, inaccuracies, and indifferent clerks. Consumers regularly damage meters in order to be charged a flat rate, which they believe will be less than metered amounts.

Workers who read meters or cut off water service, and clerks who deal with the payment of bills are often verbally and physically abused.

At the same time, there is evidence that community members take the initiative to ensure that home connections are made and that minor repairs are performed to the system near their homes. They frequently pay for utility employees to come on their time off to conduct repairs. Consumers are largely unaware of water conservation measures, appropriate water usage, and public health behaviors related to wastewater. Community education and involvement is virtually nonexistent in the systems reviewed. Community-level demand for change is strong.

Employees

Staff of all water and wastewater treatment plants in the three cities reviewed have expressed a strong desire for institutional change. Many are aware that their colleagues in the Damietta Public Sector Water Company and in major economic authorities are paid better, have incentive pay for performance, and are accorded more importance as employees. Managers at higher levels of supervision, however, do not believe that it would make a difference if they were provided management training, because under current conditions, "doing a better job does not get you anywhere." Those asked directly if they would prefer that the utility become a different type of organization said that they would be better off as an economic authority. There is no social status in being a city employee. Employees of the utilities indicated little pride in working for the organization.

Leadership

The team discerned very strong indicators of cooperation, support for future institution building, and desire for action from the Beni Suef governorate and city. In workshop proceedings (see Appendix F), presentation of management information in summarized chart form was likely the first management information about the status of water and wastewater services ever seen by the leadership. While some of the operational staff were a bit defensive about the level of unaccounted-for water (for example), top-level leaders were fascinated to see where action could be taken that would make a difference. Commitments were made by the leadership to move ahead with efforts to improve financial and operational performance with or without future technical assistance from USAID.

The Fayoum governorate has been at the forefront of institutional development, as demonstrated by the collaboration with the Dutch government. Nevertheless, the level of interest expressed by some of the leadership for institution building was markedly lower. The primary interest expressed was "to complete the master plan (developed by USAID)," which presumed the construction of an additional water treatment plant for the city of Fayoum. Attempts to present and analyze data related to performance problems were responded to with expressions of prior knowledge and a strong desire for immediate actions by USAID to correct predetermined technical and infrastructure deficiencies with predetermined solutions. Unfortunately, the team believes that the identified problems are not correctly understood and that the identified solutions are not appropriate.

On the other hand, the working professional-level staff of Fayoum expressed interest in and understanding of institutional and systemic issues and actions to correct water loss and improve billings and collections. It is difficult to fully assess the level of desire for improved institutional performance until an action plan is developed and agreed to by the parties involved. It was clear that frustration exists at the top levels in the governorate

regarding the time and steps required to move ahead with external development assistance from donors. However, this impatience also demonstrates a strong desire for change.

7.3 Conclusions

The findings indicate that the water supply and sanitation sectors in the governorates reviewed are constrained organizationally, institutionally, financially, and operationally. These hindrances, which affect the ability of local service providers to manage their water and wastewater services properly, will need to be addressed in any transformation scenario (or project) designed in the future. The larger policy issues relating to sectoral finance, tariff, and subsidy will greatly affect any future decisions to create viable water utilities even if development interventions are designed in an action format to address constraints.

On balance, performance in the governorates reviewed is better than could be expected in the water sector, given the constraints. Wastewater is quite deficient, however. The lack of suitable infrastructure, combined with low-status, low-priority organizations, urgently needs to be improved, but prospects for success are limited, given the high levels of infrastructure required and the perceived political desire to emphasize provision of water rather than wastewater services (see Appendix E). Willingness to undertake reform by local authorities, and particularly by professional and working staff, is positive and forward-looking.

Any future development projects will require a carefully designed integrated approach and several years of transformation activities in institutional development, policy support, and capital investments.

Priorities for intervention, which will be further developed in the action plan report (a companion to this report), include the following:

- **Tariffs** will need to be escalated over time to account for inflation and increased operational costs, as well as to reduce the subsidy. Policies on tariffs will need attention at the national level, and management information will need to be provided to popular councils so they better understand the financial implications of tariff structures (see Appendix F).

- **Subsidies**, and the national policy related to them, should be structured to provide incentives for improved operational and financial performance. Over time they should be reduced and the reorganized governorate-level water utilities required to become self-sufficient.

- Improvements to **billing and collections** and the development of modern systems are key to providing more income. Future institutional development programs should include computerization, systems development, and training.

- Cost savings through improved **operations and maintenance**, attention to water loss, and **unaccounted-for water programs** can be undertaken immediately as indicators of interest and commitment to performance improvement. These efforts will need to be continued as permanent, continuous quality improvement programs over several years. Design of institutional improvement efforts should anticipate the development of standard operating procedures, training, leak detection, and provision of appropriate equipment for O&M.

- Future organizations, formed as true water utilities, will need to place emphasis on **attention to consumers** rather than treating them as adversaries. Community

involvement and consumer education will be important to improving performance.

- A number of short-term **immediate actions** are possible to improve performance in operations and maintenance. These priorities are identified in Chapter 3 and in Appendixes B, C, D, and E. Follow-up actions that can take place over the next year will be identified in the companion action plan report.

The development of a new institutional arrangement to create a unified water utility in each governorate reviewed is recommended and feasible. Options analysis (see Chapter 3) indicates that the appropriate organizational form (the general economic organization) has precedent in Egypt in Alexandria and Cairo (and has been requested in the Fayoum and Asuan governorates), is consistent with current national policy for water and wastewater, and can be obtained through presidential decree. An economic authority would provide a managerial structure for a modern water and wastewater utility able to move ahead, and would be a great improvement over the current situation, one step further toward local control and responsibility. This organizational form meets the essential criteria of autonomy, ability to retain revenues, and capacity for setting tariffs within national guidelines and popular council approval.

There is sufficient interest on the part of the governorates involved to proceed with the development of suggested actions for future transformation and performance improvement. The design and development of comprehensive institutional improvement projects in each governorate should be undertaken. These efforts should include selected physical improvement activities to improve the performance of current systems. A more comprehensive assessment of the wastewater situation and the water supply needs for villages and marakez should be made though updating the master plans in each of the governorates.

APPENDIX A

PERSONS CONTACTED

A.1 Fayoum

Governorate :

1. H. E. the Governor of Fayoum Governorate
2. Mr. Mohamed Ahmed Abd El Latif, Chief of the Popular Council
3. Mr. Salah Helmy, Secretary General of Fayoum Governorate
4. Mr. Mamdouh Abdallah Barakat, Head of Markaz Fayoum and Mayor of Fayoum City
5. Mr. Ibrahim Musa, Deputy Mayor of Fayoum City
6. Mr. Mohamed Shukry, Head of the water sector in Fayoum
7. Mr. Eid Rashed Ibrahim, General Manager for Organization and Administration Directorate
9. Mr. Fathy Hashem Ahmed Osman, Chief of the Housing Reconstruction and Public Utilities Committee
10. Mr. Mamdouh Anwar, Chief of the New Kohafa Station
11. Mr. Abdel Aziz Rabeha, Chief of the Old Kohafa Station
12. Mr. Mahmoud Farag, the Deputy of the Financial and Administration of the Fayoum City
13. Mr. Ahmed Mohamed, Chief of Contracting and Procurement of Fayoum Governorate
14. Mr.Farag Ali Ahmed, Chief of the Water Network of Fayoum City
15. Mr. Ruby Ramadan, Chief of Wastewater Supply of Fayoum Governorate
16. Mr. Marzouk Fahmy Mohamed, Chief of the Wastewater network of Fayoun City
17. Mr. Hussien Eid Morsy, Chief of Water Pumping
18. Mr. Mohamed Mohamed Ibrahim, Chief of Water Treatment Plant
19. Mr. Hassan Ali Abdel Tawab, Chief of WasteWaterof Fayoum City
20. Mr. Amr El Lethy, Chief of Water Revenue
21. Mr. Mamdouh Abdel Waheb, Chief of Finance of Fayoum City
22. Ms. Fayza Fawzy Hanna, Chief of the Planning of Fayoum City
23. Hussien El Zomor, Chief of Governorate Information Center
24. Mr. Mohamed Morsey, Chief of Housing Reconstruction and Public Utilities Committee
25. Mr. Thabet Mohamed Atwa, Chief of Housing Reconstruction
26. Mr. Maamoun Ali, New Water Treatment Chemist
27. Mr. Mohamed Shoeab, Chief of Wastewater Treatment
28. Mr. Mohammed Refaad, Manager of city Personnel Affairs
29. Mr. Mohammed Dakroury, Manager of city Personnel Affairs

USAID

30. Mr. Frederich Guymont, Associate Director Development Resource
31. Mr. Alvin Nenman, Office Director, Urban Administation Development
32. Mr. Thomas Marr, Project Officer Provincial Cities Project
33. Eng. Adel Halim
34 Eng. Motafa Dahi

El Azab Waterworks

35. Eng. Emiel Daniel General Manager

Fayoum Drinking Water and Sanitation Project

36. Mr. Cees Vulto, Project manager and Institutional Development Expert

Stanley/Harza

35. Mr. Carl Schwing,
36. Mr. Barry Hess

A.2 Beni Suef

Governorate

1. H.E. the Governor of Beni-Suef Governorate
2. Mr. Hussien Abdel Kawi, General Secretary of Beni-Suef Governorate
3. Mr. Hussien Samy Dawood, Assistant General Secretary of Beni-Suef Governorate
4. Mr. Reda Rageb, Chief of Markez and City of Beni-Suef
5. Eng. Ramsis Kamel Atalla, Under Secretary, Chief for Centeral Departement Financial Directorate.
6. Eng. Hassen El Bana , Chief of Housing Reconstruction
7. Mr. Salah El Zoghedy, Chief of Finance and Administration
8. Mr. Mohamed Said Salem, Chief of Planning of Beni-Suef City
9. Ms. Afet El Sagher, Chief of Information Center
10. Mr. Hassen Ahmed, Chief of Contracting and Procurment of Beni-Suef
11. Mr. Ahmed Shawki , Deputy of City Chief
12. Mr. Ibrahim Mostafa, Deputy of City Chief
13. Eng. Milad Sydehem, Chief of Utilities of Ben-Sue city
14. Eng. Salah Ali Hassen, Chief of Water Network Sector of Beni-Suef City
15. Mr. Anwar Mohamed, Chief of Wastewater of Beni-Suef
16. Eng. Hany Mostafa Kamel, Chief of the American Water Station

17. Mr. Mohamed Ali Aref., Chief of Old Water Station
18. Mr. Hamdi Ali, Chief of Planning in the local units of Beni-Suef City
19. Mr. Ahmed Fadaly, Chief of Revenue in local unit of Beni-Suef City
20. Mr. Samir Kamel El Shanawi, Chief of Finance in local unit of Beni-Suef City
21. Mr. Abdel Mohsen Mohamed, Sceretary of City Council
22. Ms. Nour Shiek Fathy, Chief of Personnel in local unit of Beni-Suef City
23. Mr. Hassen Abdel Atey, Chief of Water Projects in Housing Sector
24. Mr. Abdel Hamid Mohamed, Chief of Wastewater Sector
25. Eng. Mohamed Abdel Moniem, Wastewater Projects Engineer
26. Mr. Hassen Ahmed, Chief of Procurement of Beni-Suef Governorate
27. Mr. Mohammed Abu El Kasim, Manager of Wastewater Treatment Plant
28. Mrs. Fawzia Awad, Manager of wages and salaries section in Beni-Suef
29. Mrs. Hanim, Manager of Budget Section in Beni-Suef City.
30. Mr. Salah Abboud, Manager of Water Production Sector
31. Mr. Mohammed El Bahnasawy, Manager of Personnel Affairs in the Governorate

Finland Project

32. Eng. Pentti Ruohonen, Project Coordinator for regional water supply and wastewater
32. Mr. Moasd Radwan, Chief of Finance
33. Ms. Urpu-Liisa Airaksinen, Management and Financial Advisor
34. Ms. Reem Ahmed, Translator

Stanely/Harza

35. Mr. Othman Gogary

A.3 Alexandria

A.3.1 Water General Organization

1. Mohammed Ahmed Marzouk, Chairman of the Bord of Director
2. Hassan El-Shfi, Deputy Chairman
3. Fahima Awad Mohammed, General Director of Water Treatments

A.3.2 Wastewater General Organization

1. Mohammed Said Harfoush, Under Secretary for Financial and Administration Affairs

A.4 Behira

1. Ibrahim Khaled, Deputy Chairman
2. Salah Khalil, General Manager of Projects

A.5 Damietta Water Company

1. Mahmoud El Sherbini, Chairman of the Board.

APPENDIX B

DATA COLLECTED: FAYOUM GOVERNORATE

B.1 Technical

B.1.1 Water Supply System

The utility department in Fayoum City is responsible for the operation and maintenance of all water supply facilities within its boundaries. The department is divided into four sections, each responsible for a different service component:

- old water treatment plant and compact units
- new water treatment plant
- networks (distribution systems)
- elevated tanks

Water is taken from the Bahr Youssef canal, which flows from the Ibrahimia main canal. The city's supply and distribution system is supported by two water treatment plants and two compact units, with a total water production capacity of 660 l/s (49,353 m^3/d), as summarized in Table B-1:

Table B-1
Water Production Capacity in Fayoum City

	Name	Type	Capacity liters per second	Year Constructed/ Year rehabilitated	Ground Storage m^3
1	Old Kuhafa	Clarification Filtration	300	1926/1970	500
2	New Kuhafa	Clarification Filtration	300	1993	12,000
3	Lotfallah compact unit	Filtration	30	1987	
4	Kiman-Farces compact unit	Filtration	30	1985	

The old water treatment plant (WTP) was constructed in 1926 with a capacity of 90 l/s and was expanded in 1973, adding 210 l/s for a total capacity of 300 l/s. The plant uses clarification and rapid sand filtration technology. During the EHP team's visit to the plant, no "as built drawings" or

operation and maintenance (O&M) manuals were available. The plant and the equipment are old and in need of rehabilitation or replacement. A 25,000 m^3 ground storage tank at the plant is no longer used because of its deteriorated condition.

The new water treatment plant, constructed in 1993 under the sponsorship of USAID, is located at the same site as the old WTP and has a capacity of 300 l/s. The plant's treatment technology includes flocculation, sedimentation, and rapid sand filtration. Prechlorination, alum, and postchlorination facilities are used, and the water produced is of high quality. The plant includes a 12,000 m^3 ground water storage tank.

In addition to the treatment plants described above, the city is served by two water treatment compact units built by NOPWASD. One is located in Lotfallah; it was constructed in 1986 and has a capacity of 30 l/s. The other unit is located in Kiman Fares; it was constructed in 1987 and also has a capacity of 30 l/s. Both units are in extremely poor condition, so O&M costs are high.

The water distribution system serves about 90% of Fayoum. It consists of about 152 km of different types of pipes, including asbestos cement, steel, cast iron, and PVC. The pipes range in size from 100 mm to 600 mm in diameter and serve 43,000 house connections. Three 4,000 m^3 steel elevated storage tanks serve the city. The water distribution system suffers from low pressure and water shortages most of the year, especially at the end of the network. Approximately 25% of the 43,000 water meters in Fayoum do not operate properly.

An estimated 41% of the total amount of water produced is lost in the system from leakage, illegal connection, and underbilling, either because of the use of averaging or other inefficiencies. Assuming an unaccounted-for water loss of 41%, domestic use can be calculated at 29,130 m^3/d. The present residential rate is therefore calculated to be about 116 l/p/d.

Recommendations for Water Supply System

A. Improve quality of the waterworks staff

1. Prepare program for training engineers and technical managers.
2. Design training courses.
3. Allocate necessary funds for training.
4. Establish a permanent training center for technicians and laborers and provide necessary funds.

B. Reduce water loss (unaccounted-for water)

1. Rehabilitate existing network to reduce leakage.
2. Allocate the funds needed to educate the public about conserving water.

C. Mechanical Fleet

1. Implement a strategy for provision of spare parts.
2. Install a computerized system for O&M.

B.1.2 Wastewater System

The wastewater collection system covers approximately 95% of the city directly and serves about 72% of the population.

The system consists of roughly 168.4 km of vitrified clay, diutile iron, plastic, and G.R.P. Specific features of the wastewater collection system are shown in Table B-2.

Table B-2
Fayoum City Wastewater Collection System

Pipe diameter in mm	175-400	400-600	200-400	500-600
Pipe material	vitrified clay	diutile iron	plastic	G.R.P
Length in km	50.0	1.0	80.0	3.0
Year constructed	1936-1980	1936	1982	1985

Most of those not served directly have pipes in front of their buildings but are not connected because of the high cost. They rely on sewerage vaults that are emptied either manually or by suction trucks once a week by governmental or private haulers. Collected wastes are discharged into manholes or drains.

The Fayoum sewerage system is divided into six services zones. Each zone has a main pump station and three lift stations (substations) that discharge to three of the main pump stations connected to the wastewater treatment plant.

In addition, three old pump stations back-up the main pump station. Table B-3 shows the number of units, discharge amount, head size, and construction year for the main pump stations and substations in each service zone.

Table B-3
Main Pump Stations and Substations in Fayoum City Wastewater System

	Zone	No. of Units	Discharge l/s	Head (m)	Construction Year
Main Pump Stations					
1	Old governorate	4 3	125 85	38 38	1972 1936
2	Lotfallah	4 3	125 85	38 38	1972 1936
3	Kiman-Farces	3	270	38	
4	El-Salakhana	3	230	38	
5	Dalah	3	125	38	
6	Kuhafa	2	60	38	
Sub-stations					
1	Sheikh Haussen	2	40	10	
2	Allaws	2	15	10	
3	Nadi El Mohafaza	2	15	10	

The Fayoum wastewater treatment plant (WWTP) is located on the southern edge of the city, approximately 7 km from the city center. The plant is a secondary treatment facility that uses trickling filter technology. The treatment process includes screening, grit removal, primary sedimentation, trickling filtration, and sludge drying beds with additional disinfection. The plant was designed and constructed by NOPWASD in 1966. The plant currently receives 43,200 m^3/d, which is overloaded. The wastewater is partially treated. The dried sludge is sold to farmers for soil enhancement. The WWTP discharges the low-quality effluent to the El Bats drain, which is connected to Lake Quarun. Operation and maintenance is minimal, mainly because there are too few trained technical staff and the O&M budget is limited.

NOPWASD is currently constructing a new activated sludge wastewater treatment plant. When completed, the plant's total capacity will be 40,000 m^3/d. The first stage, with a capacity of 20,000 m^3/d, began operation in July 1995.

Recommendations for Wastewater System

A. Wastewater treatment

1. Prepare a project design and construction works for a new wastewater treatment plant.
2. Upgrade the existing plant.
3. Accelerate implementation of the plant under construction.

B. Operation and maintenance

1. Staff training for engineers, laborers, and technicians.
2. Separate equipment pool for wastewater and water supply utilities.
3. Create a workshop and stores for utility.
4. Implement a long-term plan to provide the needed spare parts for at least five years.

C. Financial and technical management

1. Create an organization for the water utility.
2. Implement a computerized system for the utility.

B.2 Financial Options Report

B.2.1 Unit Cost Analysis

A comparison of cost per billable volume, with unit production billed revenue and unit production collected revenue, will illustrate the impact of costs as they relate to the tariff. Billable volume is used for comparison, as it is the basis for calculating customer bills and the corresponding revenues. The unit revenue from production billed closely parallels the tariff for the household customer.

The unit costs were developed for current expenses. The ability of existing tariffs to cover costs is illustrated in the comparison of the unit production billed revenue (P.T 22.00) with the unit cost of current expenditures (P.T 41.80).

B.2.2 Revenues

Tariff Structure

The existing tariff structure consists of volume charges per cubic meter of billable usage for customer classes 1 through 7, and flat rates per number of rooms for the customer class in government housing. The magnitude of the volume charge varies per customer class and also per grouping within each customer class. The current tariff structure was implemented in fiscal year 91/92 and increased in each

fiscal year. The existing tariff expired on 30 June 1994, and the governorate did not use the new tariff, which witch started on 1 July 1994 and runs until June 1995.

Customer Data

During 1993/1994, water service was billed to approximately 38,850 accounts categorized within the tariff schedule.

Growth Patterns

Table B-4 below shows production billed and production collected during the last three years.

Table B-4
Production Billing and Collection 91/92-93/94

	91/92 (in L.E)	92/93 (in L.E)	% increase	93/94 (in L.E)	% increase
Production billed	1,396,895	1,588,549	13.7	2,341,045	47.4
Production collected	1,258,008	1,381,225	9.8	2,005,707	45.2

The production billed increased approximately 47% in the last two years. Production collected increased 45%, because the utility service area expanded. The largest customer class in both number of accounts and usage is household. The number of accounts has increased approximately 5% (37,000 in fiscal year 91/92 to 38,850 in fiscal years 93/94) in the three year period.

Existing Financial Policies

No financial policies have been established. While the utility follows all government regulations, there are no policies covering meter reading, billing and collection, budget and accounting, or monitoring and fixing tariff.

Subsidies

The government accounting system requires all the collected revenues to be added to the Ministry of Finance accounts. There is no relationship between revenues and expenditures. The Ministry of Finance allocates the O&M fund every year through Bab I wages and Bab II general expenditures. The difference between collected revenues and expenditures is actually a subsidy. Total current expenses in fiscal year 93/94 were L.E 4,445,836, while revenues were L.E 2,020,602. The difference is a deficit, L.E 2,425,234, which has to be covered by the Ministry of Finance but does not appear in the accounts as a subsidy.

B.3 Institutional Structure

The water and wastewater utilities in Fayoum City are run as local government entities, according to law no. 43/1979 concerning local administration. Water and wastewater managers must follow laws and regulations, applicable to government agencies, such as law no. 47/1978 concerning civil servants and law no. 9/1983 concerning tendering and bidding. Law no. 47/1978 specifies that the governor is the responsible authority for staff of the local units (governorates, markez, cities, etc.). This means that personnel decisions such as promotion are made at the governor level. Utilities are part of the machinery of the markez, which is considered to be one integrated entity.

Decision-making authority for the provision of personnel, tools, material, and equipment resides with either the chief of the city or the governor. This situation creates difficulties and bottlenecks, especially during emergencies. The principle of delegation of authority is not practiced.

Two top managers, one for each of the water and the wastewater sectors, report to the deputy chief of utilities for Fayoum. The deputy chief reports to the chief of the city.

The organizational structure of the water and wastewater utilities is presented below. In many instances, the repetition of supervising levels narrows control and lengthens channels of communication.

The water sector includes:

- new treatment plant
- old treatment plant
- water distribution network

The wastewater sector includes:

- pumping stations department
- wastewater treatment plant
- wastewater collection network

The manger of the new water treatment plant supervises

- laboratory
- security
- substores
- the three operating shifts
- maintenance

The manager of the old treatment plant controls:

- laboratory
- administration section

The deputy plant manager supervises the plant supervisor, who controls the shifts.

The manager of the distribution network supervises

- The head of the north sector
- The head of the south sector

Each sector head supervises:

- Four technical supervisors, each of whom controls two foremen; each foreman supervises a group of workers.
- The boss of the evening shift
- The boss of the night shift

The manager of the meters section supervises five technicians, each of whom supervises two workers.

The head of the elevated tanks supervises three technicians for the three tanks. Each technician supervises four workers.

The manager of the wastewater pumping stations supervises the head of the wastewater pumping stations, who supervises the nine bosses of the nine pumping stations. Each pumping station boss supervises three technicians for the three shifts. Each technician supervises a team of three to four workers.

The manager of the wastewater treatment plant supervises:

- one chemist
- one laboratory technician
- two drivers
- six shifts heads

The day shift is headed by a technician and comprises a team of ten to twelve workers. Each evening and night shift is headed by a technician and comprises a team of three to four workers.

The manager of the collections network supervises a technician for maintenance and work orders and a technician for the network.

These two technicians supervise:

- the maintenance and orders division, which comprises two technicians and one worker
- the network section, which comprises eight technicians, and includes:
  - South district section, comprising seven teams
  - East district section, comprising five teams
  - West district section, comprising five teams

Each team comprises from 3-4 workers.

- Vehicle section, which comprises two technicians, three drivers, and a worker.
- A technician for home connections, who supervises the home connection section.

The water and wastewater utilities currently employ 1,782 people: 754 in the water sector and 1,028 in the wastewater sector. This figure was provided by the city's department of personnel affairs, based on the criteria of "personnel who are awarded water and wastewater allowances" within law no. 26/1983 and law no. 16/1985. The number includes direct and indirect staff. The number of direct staff in the water sector is 323; direct staff in the wastewater sector totals 352, for a combined direct staff total of 675.

Comparison between direct staff (675) and total staff (direct and indirect, 1,782) reveals that the ratio of indirect staff (1,107) to the direct staff in the utility as a whole is 164%. In the water utility, the ratio is 133.4% and in the wastewater utility, 192.04%.

Water staff are distributed among different facilities as shown in Table B-5.

Table B-5
Water Staff Distribution and Productivity

Facility	No. of staff	Size of production	Productivity (Ratio of production to individual)	
			Per year	Per working day
Old treatment plant	81	7,868,445 m^3/yr	97,141.30	346.93
New treatment plant	76	10,140,000 m^3/yr	133,421.05	476.50
Total treatment plants	157	18,008,445 m^3/yr	114,652.51	409.47
Distribution network	166	380 km	2.289 km per person	

The figures above on the number of staff do not include employees working in the revenue department outside the control of the manager of the water utility.

Wastewater staff is distributed among different facilities as shown in Table B-6.

Table B-6
Wastewater Staff Distribution and Productivity

Facility	No. of staff	Size of production	Productivity	
			Per year	Per working day
Wastewater treatment plant	78	15,768,000 m^3/yr	202,153.84 m^3/per	721.98
Pumping stations	120	9 pumps	13.33	Man/per pump
Collection network	154	134 km.	.87	km/person

Although the utility staff are subject to laws 26/1983 and 16/1985 and prime minister decrees 955 and 956/1983, which organize the allowances given to the employees of water and wastewater utilities, actual disbursement depends on the availability of funds in the budget.

Although the number of employees increases, and salaries increase with annual raises and promotions, funds for allowances do not increase. Despite the fact that work conditions, particularly in wastewater network cleaning, are very bad, allowances are very limited. As a result, employee morale is likely to be very low.

Conditions at the new water treatment plant are quite different from conditions at the old WTP and at other water and wastewater facilities, especially in the areas of staff training and management. The new treatment plant is funded by a grant from USAID, and a U.S. contractor is in charge of construction and providing technical assistance during the beginning stage of operation. Part of this assistance includes offering training to the staff at the new plant in fields such as operations, maintenance, computers, and management. In comparison, training efforts at other facilities are nearly nonexistent. There are no local training resources nor are there funds for training in centers outside the city. No studies have been done to assess training needs. Also at the new plant, management techniques have been established that include a reporting system on production, operation, and allocation of manpower and materials; guidelines on preventive maintenance programs; and forms on implementation follow-up. Management at the old treatment plant and at other facilities appears traditional by comparison. The relatively advanced management techniques in the new treatment plant have not been established at other facilities.

Tables B-7 through B-10 show a breakdown of direct staff according to occupation, age, level of education, and grade.

Table B-7
Direct Staff Grouped According to Occupation

Occupation	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
Professionals	20	6.19	15	4.26	35	5.19
Technicians	94	29.10	70	19.89	164	24.30
Clerical	9	2.79	5	1.42	14	2.07
Technical Laborers	39	12.07	76	21.59	115	17.04
Auxiliary Laborers	155	47.99	173	49.15	328	48.59
Not provided	6	1.86	13	3.69	19	2.81
Total	323	100	352	100	675	100

Table B-8
Direct Staff Grouped According to Age

Age	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
20-29	21	6.50	11	3.13	32	4.74
30-39	132	40.87	91	25.85	223	33.04
40-49	113	34.98	157	44.60	270	40.00
50-54	21	6.50	38	10.80	59	8.74
55-57	10	3.10	15	4.26	25	3.70
58 and over	8	2.48	15	4.26	23	3.41
Unknown	18	5.57	25	7.10	43	6.37
Total	323	100	352	100	675	100

Table B-9
Direct Staff Grouped According to Level of Education

Highest Level of Education	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
University	20	6.19	13	3.69	33	4.89
Technical Institute	4	1.24	2	0.57	6	0.89
Secondary School	92	28.48	63	17.90	155	22.96
Preparatory School	7	2.17	1.13	1.13	11	1.63
Primary School	---	---	—	—	—	—
Vocational Training	—	—	—	—	—	—
No Education	198	61.30	246	69.89	444	65.78
Unknown	2	0.62	24	6.82	26	3.85
Total	323	100	352	100	675	100

Table B-10
Direct Staff Grouped According to Grade

Grade	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
First	6	1.86	6	1.70	12	1.78
Second	28	8.67	41	11.65	69	10.22
Third	59	18.27	77	21.88	136	20.15
Fourth	68	21.05	54	15.34	122	18.07
Fifth	66	20.43	106	30.11	172	25.48
Sixth	83	25.70	57	16.90	140	20.74
Unknown	13	4.02	11	3.13	24	3.56
Total	323	100	352	100	675	100

Managers complain that they face shortages, particularly in technicians and supervisors, and that the supervisors are not qualified for their jobs. They also complain that due to the poor working conditions, staff absenteeism from illness is a problem, and some laborers are physically unable to perform their tasks. Utilities are not involved in recruitment, selection, or placing of their staff. There are no job descriptions or job specifications.

Utilities follow the government's salary scale, which includes basic salaries, yearly increases, and social increases. Law no. 26/1983, Law no. 16/1985, and Prime Minister Decrees no. 955/1983, 956/1983, and 711/1986 set allowances for water and wastewater staff for hazards, meals, and overtime. Within these laws and decrees, allowances for hazards range between 60% and 25% of the basic salary of staff of the wastewater utility, depending on the nature of the job, and between 50% and 20% of the basic salary of staff of the water utility, depending on the nature of the job. Meal allowance for staff of both utility sectors ranges between L.E 10 and L.E 15 monthly, and overtime ranges between 50% and 25% of the basic salary.

For example, a worker whose basic monthly salary is L.E 100 can be disbursed allowances from a maximum of L.E 125 to a minimum of L.E 60. Total income for wastewater staff ranges from L.E 160 to L.E 225.

Although the pay is relatively good, funds allocated in the budget for allowances are insufficient. Consequently, some allowances are actually disbursed only for some months depending on the adequacy of funds. Other allowances are not paid at all.

There is no policy or system for incentives. The allowances are general to all staff, depending on the nature of the position, irrespective of performance or productivity. Incentives to compensate efficient and productive personnel and motivate staff in general have not been adopted in the utilities because of a lack of funds, although laws exist to help establish incentive systems for civil service employees.

In general, there are no training efforts in the utilities. Funds for training are not available, no studies are undertaken to assess training needs, and supervisors are not qualified or instructed in a systematic approach to "on job training."

B.4 Analysis

The utilities are actually organizational units of the city council. Decision-making authority resides with the chief of the city. This centralized decision making creates difficulties and bottlenecks. When a utility needs a small spare part or any other article, it must submit a memo that has to travel up the hierarchy to the chief of city, who has the authority to approve the request. While informal interactions between individuals can help alleviate some of the difficulties, there is no institutionalized method for addressing administrative problems.

Auxiliary services needed for the operation of the water and wastewater utilities, such as accounting, contracting, warehousing, personnel, workshops, vehicles, and information and documentation, are handled by the city departments that provide the same services for other entities. This centralization of services complicates communication between the operating units at the base of the utility organization and the auxiliary services departments, making it troublesome to request or deliver services. Even worse, there is no budget for or allocation of funds to the utilities. The national budget is line-item; funds are allocated to the city as a whole, including the utilities. All sectors of the city that receive public funding compete to get what they need from the limited pot of funds.

In addition, because of the centralization of administrative functions, utility revenue is under the control of a separate manager in the city council; the deputy chief for utilities has no influence on the revenue, even though it is an integral aspect of running the utility.

The utility lacks institutionalized support for studies, data collection, analysis of current problems, analysis and evaluation of the level of services, community development forecasts, or the establishment of future objectives and plans for utility development. All such activities depend mostly on individual initiatives. The utility is not well structured to face the demands of the future.

The following factors make it difficult to recruit technical specialized staff:

- Government personnel policies that do not consider the requirements of a particular position or the specifications needed to fill it. For example, one supervisor possesses a certificate in textiles.

- Noncompetitive salary scale which fails to attract efficient and qualified personnel.
- Poor working conditions and a lack of fair allowances to compensate these conditions.
- Low morale among personnel in general.
- Allowances are determined as a percentage of the individual's salary and are not affected by performance.

An analysis of manpower data reveals the following:

- The percentage of auxiliary laborers to total utility staff is 48:59, whereas the percentage of technical laborers is only 7:17.04. Auxiliary laborers are those workers who are considered unskilled and work as messengers or at similar tasks which primarily require physical fitness. Technical laborers are usually craftsmen, such as plumbers, mechanical electricians, turners, etc. Both categories of workers are needed in water and wastewater activities, but the balance between the two is important in maintaining productivity and level of performance. The number of the auxiliary laborers is high in comparison with the number of technical laborers, which is too low.

On the other hand, number of technicians who are supposed to work as assistant engineers is relatively high (24:30).

The ratio between engineers and assistant engineers in both the water and wastewater sectors is 1:4.7 which means that for every engineer, there are 4.7 assistant engineers. The ratio is supposed to be 1:3.

- The percentage of uneducated personnel out of total staff is relatively high (65.78%), which affects the level of performance.
- Total percentage of personnel over fifty is only 13.48%.The percentage of personnel between 30 and 50 is 73.04%, which means that most employees will continue working in the utility for the next 10 to 30 years. A training plan should be developed to develop workers' skills, particularly those who are auxiliary laborers, in order to increase the efficiency and productivity.

B.5 Recommendations

Water

1. The utility should be reorganized to develop its economic and commercial viability.

2. The distribution of manpower should be restructured to meet actual needs, based on objective and scientific criteria. A comprehensive plan for the transition stage should be developed.

3. Management skills should be developed.

4. Work procedures should be simplified and new regulations developed.

5. Advanced technology computers should be put into use.

6. As a strategic solution, develop an economically viable organizational entity for the water utility.

Wastewater

1. The utility should be reorganized and the positions required should be determined.

2. Job descriptions, specifications, and minimum qualifications should be determined.

3. The distribution of manpower should be restructured to meet actual needs, based on objective and scientific criteria. A comprehensive plan for the transition stage should be developed.

4. Management skills should be developed.

5. New computer technology should be put into use.

6. A headquarters for the utility should be established.

B.6 Consumer Relations

Findings

Interviews conducted with employees in the water department revealed a number of problems that were perceived as hindrances to efficiency.

Comments made by Employees about Customers

1. The water meters are sometimes located in areas that are difficult to reach unless the householder is present. When he or she is absent, an average charge is imposed on the household. This average charge is one of the main causes of friction between meter readers and householders. At present approximately 30% of customers are billed on a minimum or average basis because meters are inaccessible or damaged.

2. Inadequate installation of water pumps often damages meters, adding to the tension that already exists between meter readers and household residents.

3. Employees and workers are often abused if they have to remove a meter because of unpaid consumption or if they have to collect bills or fines for delayed payment.

4. The internal household connections are the consumer's responsibility. Consequently, pipes are often of poor quality and are largely responsible for the weakness of the water flow.

Another major problem mentioned by water and wastewater sector employees was the scarcity of resources. Both departments complained of shortages in manpower and equipment.

Responsible employees in both departments mentioned that a large portion of the sector's manpower was unskilled and that there were minimal training opportunities available to them. Wastewater employees said that they were unable to repair major breakdowns or to undertake major work. They were therefore obliged to contract such operations while retaining a supervisory role. Sector employees also voiced complaints about the laborious and tedious manual procedures on which the system depends, and about the time-consuming bureaucratic procedures related to the imposition of penalties.

Comments Made by Consumers

Interviews with a target sample of customers (37 households) revealed the following:

Many interviewees, especially in low income areas, complained that due to irregular meter reading or broken meters, they were charged an average that was inconsistent with their actual consumption. In high income areas, residents said their meters were read more or less regularly, so that they were seldom charged on an average basis. The average monthly charge per household, in low-income areas where the meter is not read regularly, is fixed at L.E 8. In high income areas, it ranges between L.E 8 and L.E 25. The system for settling water and wastewater bills is relatively efficient. People settle their bills either monthly, or at most, every three months. After three months a fine is imposed on delayed payments. As would be expected, the low-income people are the most vulnerable to this system and therefore the most likely to oppose the fine.

Despite their acknowledgments that service had improved and that there were fewer water cutoffs and breakdowns, consumers remain unhappy, in both lower and higher income areas, about the weakness of water flow during peak times. Residents of upper floors (3rd floor and up in multiunit buildings) cannot access the service during daylight hours except through water pumps. As for the quality of the water provided, a number of high- and middle-income area residents complained that when the pipes were being washed or repaired, the water was smelly and murky. This complaint, however, was voiced by residents of lower income areas, who instead were more concerned with having affordable access to water and wastewater services. When asked if they were ready to pay higher fees for better service, the majority of people said they could not afford to pay more. There were no complaints in middle- and higher-income areas concerning the quality or outreach of wastewater services. However, certain areas, such as Dar Al

Ramad or Al Iwaa, are completely deprived of wastewater service. In other low-income areas, people do not have access to wastewater service because they cannot afford to pay for the connections. The minimum cost for connecting is L.E 200; however, depending on the type and quality of the connection, the actual price can run up to L.E 1,000.

Finally, improving water flow and quality, ensuring the regular meter reading, and extending wastewater services to deprived areas were mentioned by most respondents as priority interventions needed to improve water and wastewater services.

Conclusions

Conclusions regarding data collected in Fayoum and in Beni Suef appear at the end of Appendix C.

APPENDIX C

DATA COLLECTED IN BENI SUEF

C.1 Technical

C.1.1 Potable Water System

The utility department in Beni Suef city is responsible for the operation and maintenance of the water and wastewater works in the markaz.

The water supply system provides water to customers in Beni Suef markaz, Beni Suef city, five surrounding villages, and eight ezabes. The utility department is divided into three main sections: water production, water distribution system, and wastewater.

Three water treatment plants supply the service area. The total water production capacity is 600 l/s (45,361 m^3/d).

Table C-1 summarizes the data available for these plants:

Table C-1
Water Production Capacity in Beni Suef City

Name	Type	Capacity liters per second	Year constructed or rehabilitated	Ground storage m^3
1. Old Water Treatment Plant	Clarification Filtration	150	1907 1949 1975	2800
2. Czechoslovakia Water Treatment Plant	Filtration	150	1982	4000
3. New U.S. Water Treatment Plant	Filtration	300	1993	8000

The current theoretical total plant capacity is 210 l/s. The old water treatment plant was initially constructed in 1907 with capacity of 60 l/s. It was first expanded and rehabilitated in 1949, increasing capacity to 100 l/s. In 1975, the plant was again expanded and rehabilitated, bringing capacity to 150 l/s. The plant uses chemical settling with rapid sand filtration technology, and chlorine for pre- and post-

disinfection. Because of the limited number of filter units and no standby filter for the backwash, the plant cannot produce more than 150 l/s.

The second treatment plant uses the same treatment technology, with a total capacity of 150 l/s. Maintenance of the plant civil works is currently underway. The plant has two underground tanks with 2,000 m^3 capacity each.

The new 300 l/s water treatment plant has the same clarification, sedimentation, and filtration technology, and pre- and post-chlorination is added. The quality of the effluent water is excellent. Underground storage consists of two 4,000 m^3 tanks.

The three treatments plants have two separate intakes, using the Nile River as a source of raw water. The first intake serves the old treatment plant and the other serves the Czech plant and the new plant.

Existing elevated storage consists of a 500 m^3 tanks at the old water treatment plant plus three steel elevated tanks, each with 4,000 m^3 capacity.

C.1.2 Water Distribution System

The water distribution system consists of about 210 kilometers of pipes ranging in diameter from 50 mm to 800 mm, predominantly 100 mm diameter piping. The piping material for most of the system is asbestos cement, with some cast iron, steel, and plastic.

The distribution system serves about 95% of Beni Suef city. Low pressure in the dead-ends in the system is a problem.

There are approximately 30,000 water meters in the city, roughly 60% of which are not working properly. City data indicate that 52% of the total water production is unaccounted for in the system due to leakage, illegal connection, averaged billing, public taps, and free supply to villages and ezabes.

The present domestic usage is calculated to be 120 l/s/d.

C.1.3 Wastewater System

The wastewater collection system covers approximately 10 square kilometers and serves 66% of the city's population.

The system consists of roughly 81 kilometers of vitrified clay, polyvinyl chloride (PVC), and plastic piping which ranges in size from 175 mm to 600 mm in diameter. The system was constructed in 1950 and expanded continuously.

Residents in areas without sewers who have plumbing rely on sewage septic tanks and vaults that are emptied mechanically or manually about once a week by either government-owned or privately owned suction trucks. Collected wastewater is typically discharged into either system manholes or nearby drains. Citizens without residential plumbing use pit latrines. In either case, high groundwater levels and relatively impervious soils may limit the effective capacities of these in-ground systems.

Beni Suef city sewerage system is divided into nine zones, each of which has a pump station. Each pump station discharges to the wastewater treatment plant. At present, five pump stations and associated force mains are operating. The remaining four have not been connected to the system, either because the collection system is not complete or because pump station construction is not complete.

The working pump stations are in good condition because they were rehabilitated in 1993 under the PCD projects.

The Beni Suef wastewater treatment plant is located at the western edge of the city. The trickling filter plant is a secondary treatment facility that includes screening, grit removal, primary sedimentation, trickling filtration, final clarification, and sludge drying beds. After thickening, the sludge is placed in drying beds and the dried sludge is sold to farmers for agricultural uses.

The plant was designed and constructed in 1968 with 140 l/s capacity. It was expanded and rehabilitated in 1988 to handle 26,000 m^3/day. The plant currently receives approximately 40,000 m^3/day, which means it is highly overloaded with poor effluent quality, causing an environmental hazard.

Technical assistance is needed to identify corrective actions that should be taken to achieve a proper standard of operation and maintenance at the wastewater facilities.

To accommodate the flow coming from the four new stations that will soon be connected to the system, additional wastewater treatment capacity is required. The lack of availabile land at the existing plant site and the irrigation authority regulations pose serious problems that must be solved.

C.2 Financial Options Report

C.2.1 Unit Cost Analysis

Table C-2 compares cost per billable volume unit production billed revenue and unit production collected revenue to illustrate the impact of costs as they relate to the tariff.

Billable volume is used because it is the basis for calculation of customer bills and the corresponding revenues. The unit revenue from production billed closely parallels the tariff for the household customer.

Unit costs were developed for current expenses. The ability of existing tariffs to cover costs is illustrated in the comparison of the unit production billed revenue (P.T 22.75) with the unit cost of current expenditures (P.T 32.75).

C.2.2 Revenues

Tariff Structure

The existing tariff structure consists of volume charges per cubic meter of billable usage for customer classes 1 through 7 and flat rates per number of rooms for the governmental housing customer class. The magnitude of the volume charge varies per customer class and also per grouping within each customer class. The current tariff structure was implemented in fiscal year 91/92 and increased in each fiscal year. The existing tariff will be valid to 30 June 1995.

Customer Data

During 1993/1994, water service was billed to approximately 29,000 accounts which were categorized within the tariff schedule.

Growth Patterns

The following is the production billed and the production collected through the last three years:

	91/92	92/93	%	93/94	%
	L.E	L.E		L.E	
Production billed	875542	1072383	22	1775502	65.6
Production collected	822969	877095	.06	1358809	55

The production billed has increased approximately 65% in the last two years, while production collected has increased 55%. This increase is due to the expansion of the utility service area. The largest customer class in both number of accounts and usage is household.

Existing Financial Policies

There are no fixed financial policies; the utility follows all government regulations. There are no policies for meter reading, billing and collection, budget and accounting, or monitoring and fixing tariff.

Subsidies

The government accounting system requires all the collected revenues to be added to the Ministry of Finance accounts. There is no relationship between revenues and expenditures. The Ministry of Finance allocated the O&M fund every year through Bab I wages and Bab II general expenditures. The difference between collected revenues and expenditures is actually a subsidy. Total current expenses in fiscal year 94/93 were L.E 2,554,452 while revenues were L.E 1,373,509. The difference is a deficit, L.E 1,180,940, which has to be covered by the Ministry of Finance but does not appear in the accounts as a susbidy.

C.2.3 Comparison of Water Unit Cost with Unit Revenues

Table C-2
Comparison of Water Unit Cost with Unit Revenues

Fiscal Year 93/94	**Revenues in L.E**	**Billable Usage M^3**	**Unit Revenue**	**%**
Production billed	1,775,502	7,802,711	22.75	
Production collected services	1,358,509	7,802,711	17.41	
	15,000	7,802,711	.19	
Total current revenues (1)	**1,373,509**	**7,802,711**	**17.60**	
Current expenses	Costs L.E	Billable usage M^3	Unit cost P.T./M^3	
Wages	793,651	7,802,711	10.17	31.0
Commodities input				
Raw materials	287,529	7,802,711	3.69	11.3
Electricity	1,442,939	7,802,711	18.50	56.5
Other commodities	15,417	7,802,711	.20	0.6
Service inputs	14,916	7,802,711	.19	0.6
Total current expenditures (2)	**2,554,452**	**7,802,711**	**32.75**	100.00

The deficit (2-1) 1,180,943

C.2.3.1 Cost of the Cubic Meter

The cost of one cubic meter in fiscal year 1993/1994 was P.T 32.75, which can be broken down as follows:

Cost elements	P.T/M^3	%
♦ Wages	10.17	31.0
♦ Raw materials	3.69	11.3
♦ Electricity	18.50	56.5
♦ Other commodities	0.20	0.6
♦ Service inputs	0.19	0.6
Total Current Cost	32.75	100.00

This cost is higher than costs in water organizations in Cairo and Alexandria because of the electricity and labor costs. The average revenue from selling one cubic meter is P.T 22.75, based on total water billed of 7,802,711 m^3. The unit revenue from production billed closely parallels the current P.T 23 tariff for household customers. Since produced water totals 16,330,100 m^3, the amount of leakage and unaccounted-for water is about 8,527,389 m^3, i.e., approximately 52.2% of total produced water.

Assuming that achieved revenue corresponds to the amount of water produced, the average revenue per cubic meter produced is P.T 10.87, and the cost per cubic meter produced is P.T 15.64, making the loss per produced cubic meter P.T 4.77.

C.2.4 Applied Tariff Category Schedule

1. Household Usage

P.T/m3

a.	Residential units consuming up to 30 m3/month	23
	Residential units consuming more than 30 m^3/month	30
b.	Building and construction	50

2. Service Usage

a.	Charitable associations, public centers, youth centers	35

	b.	Athletic and social facilities and Empasis	40
3.	**Commercial Usage**		
	a.	Small factories, public restaurants, gas stations, third and second class hotels, private schools, public hospitals, garages, mills, and bakeries	50
	b.	Large factories	53
4.	**Production and Investment Usage:**		
		Private hospitals, first class hotels, nightclubs, first class restaurants, investment companies, and free zones and tourism companies.	85
5.	**Raw water**		
		Residential and government	16
6.	**Nonresidential activity**		
		Public sector factories, government agencies and local units	40
7.	**Clarified water**		18
8.	**Monthly fixed prices**		
		One-room apartment	200
		Two-room apartment	300
		Three-room apartment	400
		Apartment of more than three rooms	500

Ratification of the tariff and its amendments must be approved by the local popular council.

Accounting System

The water utility keeps its accounts according to the government accounting system. This means that the utility lacks a cost accounting system or commercial concepts budget and that there is no separation between water and wastewater accounts and the headquarters budget and account. Accounting is done manually but there is an attempt to use the computer for issuing the water bills.

Problems Facing the Water Utility

Following are the most prominent problems facing the utility:

1. Unaccounted-for water

The leakage amounts to approximately 52.2% of produced water (e.g., in 93/94, water production was 16.4 million m^3, while the amount of water billed through meters was 7.8 million m^3). Causes of leakage include:

- Pipe explosions
- Network leakage
- Inadequate preventive maintenance
- Breakdown of 60% of meters, so that consumers are charged on an average basis.
- Illegal connections

2. Accumulated arrears

Accumulated arrears for fiscal year 1993/1994 are L.E 954,949, broken down as follows:

Household	763,960 L.E
Government agencies	47,747
Industrial usage	19,099
Commercial usage	95,495
Other	28,648
Total	**954,949**

This problem has been caused by the collection system, which does not allow collectors to go from door to door, so that customers delay paying their bills. It has been exacerbated by the lack of funds allocated for water consumption in the budgets of civil government agencies and by a shortage of liquidity of the public sector and private companies.

C.2.3 Comparison between Sewerage Revenues and O&M Costs

The revenues (*)	710,200
O & M Costs	
Wages	881,589
Raw materials	95,843
Electricity	231,838
Other commodities inputs	7,709
Services inputs	7,458
Total O & M Costs	**1,224,437**
The deficit	*514,237*

(*) Estimated as 40% of the water production billed in 93/94 because the city collects the sewerage as surcharge of the water bill in 35% for the household and 60% of the other usage.

As shown in Table C-3, the two main cost elements are wages and electricity. Wages represent 72% of total expenses. Wages, which reflect the total value of employee work efforts, include cash wages and allowances, in-kind benefits, and insurance benefits. On average, salaries for permanent posts account for 51% of total wage expenses; the remaining 49 percent goes to allowances, bonuses, and benefits. From fiscal year 91/92 through fiscal year 93/94, wages have increased approximately 54.6% from L.E 570,168 to L.E 881,589. The sewerage utility employs 424 people with an average income of L.E 173.3. Electricity costs make up 18.9% of the total costs, so wages and electricity represent 91% of total current costs.

System for Requesting Initial Customer Service

The customer fill a form contains the name, the building address, the owner name and the purpose. This form has to be sent to the Revenue department to check that there is no arrears, i.e cleaning fees, then they approve the request and send it to the eng. department to check the building license and send it to the water network to prepare bill of quantities and sent it back to the revenue department for paying the costs and prepare form 14 similar to work order and sending the file to the net work for registration and finally to the collection offices (Record 6) accounting then to meter reading.

Meter Reading System

Meter reading employee reads the meters every month. Readings are register in Record No. 27 and send it to the water book keeping in the collection offices and registrated in another record no, 6 accounting. Present and previous reading are recorded and the value of consumption is calculated. After payment according to the form 33. These amounts are added in form 32. Every item is added

separately. Total bill is submitted with form 32 and send to the revenue to be registrated in the record no. 10 accounting every item separately.

Collection System

Customers have to go to the collection center to pay their bills.

Collection Problems

The water meters are sometimes located in places that are difficult to reach unless the householder is present, leading to the accumulation of arrears. If bills go unpaid, the meter is removed. After payment is made, the meter is returned.

There are six collection centers in the city of Beni Suef. There are not enough meter readers nor are readings performed systematically.

There is no financial penalty for delayed payments.

C.2.5 Performance Indicators

1. Oper. Rev. per Capita Served = $\frac{\text{Operating Revenue}}{\text{Population Served}} = \frac{1,775,502}{188,274}$

= L.E 9.43

2. Oper. Rev. per m^3 produced = $\frac{\text{Annual Oper. Rev.}}{\text{Water production } (m^3)} = \frac{1,775,502}{16,330,100}$

= P.T 10.87

3. Total Revenue per capita served = $\frac{\text{Total Annual Revenue}}{\text{Population Served}} = \frac{1,508,509}{188,274}$

= L.E 8.01

4. Operating Revenue per connection = $\frac{\text{Annual Oper. Revenue}}{\text{No. of Connections}} = \frac{1,775,502}{29,000}$

= L.E 61.22

5. Total Revenue per connection = $\frac{\text{Total Annual Revenue}}{\text{No. of Connections}} = \frac{1,508,509}{29,000}$

= L.E 52.01

6. Oper. Rev. Billed per m^3 water = $\frac{\text{Annual Oper. Revenue}}{\text{Billed water production}} = \frac{1,775,502}{7,802,711}$

= P.T 22.75

7. Operating Costs per capita served = $\frac{\text{Operating Costs}}{\text{Population Served}} = \frac{2,554,452}{188,274}$

= L.E 13.56

8. Oper. Surplus (loss) per capita servred = $\frac{\text{Oper. Rev. - Oper. Costs}}{\text{Population Served}}$

$= \frac{2,554,452-1,775,502}{188,274}$

= L.E 4.13

9. Total Surplus (loss) per capita served = $\frac{\text{Total Rev.-Total Cost}}{\text{Population Served}}$

$= \frac{2,554,452-1,508,509}{188,274}$

= L.E 5.55

10. Operating Costs per connection = Operating Costs / No. of Connections = 2,554,452 / 29,000

= L.E 88.08

11. Operating Costs per m^3 water produced = Annual Oper. Costs / Total water production = 2,554,452 / 16,330,100

= P.T 15.64

12. Operating Costs per m^3 water billed = Annual Oper. Costs / Total Water Billed = 2,554,452 / 7,802,711

= P.T 32.74

13. Cost Recovery % = Oper. Rev. / Oper. Exp. = 1,775,509 / 2,554,452

= 69.50 %

14. Arrears % = Rev. Collected / Rev. Billed = 1373509 / 1775502

= 100 % - 77.4 %

= 22.6 %

C.3.1 Institutional

The water and wastewater utilities are run as local governmental entities, according to law 43/1979 concerning local administration. Water and wastewater utilities must follow laws, regulations, and by-laws applicable to governmental agencies, such as law 47/1978 concerning civil service, and law no. 9/1983 concerning tendering and bidding.

Utilities are part of the city administration. The city has a chief of city (mayor) and a local popular council.

Consequently, all administrative, and financial services required for the water and wastewater utilities, in addition to other utilities existing in the city are grouped centrally at the city level. Hence, services required for water and wastewater utilities such as personnel affairs,procurement, contracting, accounting, payroll, vehicles, ...etc are offered to water and wastewater utilities by the central sections located in the City Council.

One top manager is responsible for the water and wastewater facilities. He reports directly to the chief of Beni Suef city. This means that the water and wastewater utilities form a single administrative entity. This two-sector entity is divided into three subsectors:

- Water production
- Water network
- Wastewater facilities (plant, pumping stations, and distribution networks)

Each sector and each subsector has a manager who reports to the top manager. This newly established structure is based on the kind of utility and on the subsector's main function. It seems to maintain a reasonable balance between breadth of responsibility and length of communication channels.

The organizational structure does not reflect the actual decision-making structure or the distribution of authority. Decision-making authority rests with the chief of the city, according to existing laws. Authority is not delegated.

Regarding personnel, authority in issues such as appointment and promotion is centralized at the governor level for all the employees of the governorate. Therefore, the chief of the city does not possess the authority to promote city staff. His role is restricted to making recommendations.

The manager of utilities controls

Auxiliary offices:

- Projects
- Technical office
- Administrative officer

Water production sector

- American Treatment Plant
- Czechoslovakian Treatment Plant
- Old Treatment Plant

Each water treatment plant has a maintenance department and an operating department.

- Maintenance department
  - Preventive maintenance section
  - Corrective maintenance section
  - Warehouse
- Operating department
  - Gardens section
  - Shift workers
  - Laboratory
  - Security section

The water production sector also includes a central workshop for the utilities.

Water Distribution

- Operations and maintenance, comprising three city sector zones and an emergency unit. (Beni Suef city is divided into six districts. Each two districts form a geographical zone.)
- Consumer records unit
- Projects comprising three city sector zones.

Wastewater utility

- Two consulting units, Projects and Laboratory.
- Network
  - Operations and maintenance, comprising three city sector zones and a mechanical cleaning section.
  - Projects
- Pump stations unit
  - Operating section, comprising seven pump stations in different areas in the city.
- Maintenance section
  - Stores
  - Electrical maintenance
  - Mechanical maintenance
- Wastewater treatment plant unit, comprising operations and maintenance.

The present utility staff totals about 865 employees, divided almost equally between the two sectors:

Water	Wastewater	Total
441	424	865

These figures were provided by the Department of Personnel Affairs in the city council and are based on the criteria of "personnel who are awarded water and wastewater allowances within the law 26/1983 and the law 16/1985." The figures include direct and indirect manpower.

The number of direct staff working inside the water and wastewater facilities is 665, divided between water and wastewater as follows:

Water	Wastewater	Total
400	265	665

Water staff are distributed among facilities as shown in Table C-4.

Table C-4
Water Staff Distribution and Productivity

Facility	No. of staff	Size of production	Productivity (Ratio of production to individual)	
			Per year	Per working day
American treatment plant	75	8,080,047 m^3/yr	107,733.96	384.76
Czechoslovakian treatment plant	72	3,339,933 m^3/yr	46,387.96	165.67
Distribution network	106	210 km (length)	1.98	
Headquarters	3			
Total	400			

The figures above do not include 87 employees working in the revenue department, outside the control of the manager of the utilities.

Wastewater staff are distributed among facilities as shown in Table C-5.

Table C-5
Wastewater Staff Distribution and Productivity

Facility	**No. of staff**	**Size of production**	**Productivity (Ratio of production to individual)**	
			Per year	Per working day
Wastewater treatment plant	80	16,330,000 m^3/yr	204,125	729.02
Pump station	84	pumps	16.8	Man/per pump
Collection network	92	81 km	.88	km/person
Headquarters	9			
Total	265			

Tables C-6 through C-9 show a breakdown of direct staff according to occupation, age, level of education, and grade.

Table C-6
Direct Staff Grouped According to Occupation

Occupation	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
Professionals (engineers, chemists, accountants)	19	4.75	4	1.51	23	3.46
Technicians (assistant engineers, etc.)	152	38.00	84	31.70	236	35-49
Management development	3	.75	—	—	3	.45
Clerical	18	4.50	9	3.40	27	4.06
Technical laborers (craftsmen)	29	7.25	25	9.43	54	8.12
Auxiliary labor	171	42.75	143	53.96	314	47.22
Unknown	8	2.00	—	—	8	1.20
Total	400	100.00	265	100.00	665	100.00

Table C-7
Direct Staff Grouped According to Age

Age	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
20-29	2	.50	1	0.38	3	.45
30-39	147	36.75	74	27.92	221	33.23
40-49	175	43.75	112	42.26	287	43.16
50-54	30	7.50	45	16.98	75	11.28
55-57	19	4.75	25	9.43	44	6.62
58 and over	3	0.75	5	1.89	8	1.20
Unknown	24	6.00	3	1.14	27	4.06
Total	400	100	265	100	665	100.00

Table C-8
Direct Staff Grouped According to Level of Education

Level of education	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
University	21	5.25	4	1.51	25	3.76
Technical Institutes	3	.75	2	0.75	5	.75
Secondary School	166	41.50	81	30.57	247	37.14
Preparatory School	3	.75	2	.75	5	.75
Primary School	—	—	1	.38	1	.15
Vocational Training	1	.25	—	—	1	.15
No education	193	48.25	175	66.04	368	55.34
Unknown	13	3.25	---	---	13	1.96
Total	400	100	265	100	665	100

Table C-9
Direct Staff Grouped According to Grade Completed

Grade	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
First	13	3.25	7	2.64	20	3.01
Second	23	5.75	19	7.17	42	6.32
Third	101	25.25	66	24.91	167	25.11
Fourth	126	31.50	83	31.32	209	31.43
Fifth	105	26.25	65	24.53	170	25.56
Sixth	24	6.00	23	8.68	47	7.07
Unknown	8	2.00	2	.75	10	1.50
Total	400	100	265	100	665	100

Supervisors complain that they face a manpower shortage and that the number of existing staff is less than required. In fact, the number of staff working in the utilities is relatively large, but recruitment, selection, and placement processes fail to ensure that personnel have the qualifications that fit the jobs they are hired to perform. For this reason, managers feel that they face a manpower shortage.

Wages and Salaries

Utility employees are paid according to the governmental salary scale. This includes basic salaries, yearly increases, and social increases. Law no. 26/1983, Law no. 16/1985, Prime Minister Decrees no. 955/1983, 956/1983, and 711/1986, which concern the staff of water and wastewater utilities, establish allowances for hazards, meals, and overtime. Allowances for hazards range between 60% and 25% of basic salaries for wastewater utility staff, depending on the nature of the job, and between 50% and 20% of the basic salaries for water utility staff, depending on the nature of the job. Meal allowances for the staff of both utilities ranges between L.E 10 and L.E 15 monthly. Overtime range between 50% and 25% of basic salaries. For example, a worker whose basic monthly salary is L.E 100 can receive a maximum allowance of L.E 125 and a minimum of L.E 60.

Although the pay is relatively attractive, funds allocated in the budget for allowances are insufficient. Consequently, disbursement of some allowances depends on the availability of funds; other allowances are not paid at all.

There is no policy or system for incentives. The allowances are general to all staff, depending on the nature of the position, irrespective of performance or productivity. Incentives to compensate efficient and productive personnel and to motivate the staff in general have not been adopted in the utilities because of a lack of funds, although laws exist to help in establishing incentive systems for civil service employees.

Analysis

The utilities are actually organizational units of the city council. Decision-making authority resides with the chief of the city. This centralized decision making creates difficulties and bottlenecks. When a utility needs a small spare part or any other article, it must submit a memo requesting what it needs that has to travel up the heirarchy to the chief of the city, who has the authority to approve the request. While informal interactions between the individuals can help alleviate some of the difficulties, there is no institutionalized method for addressing administrative problems.

Auxiliary services needed for the operation of the water and wastewater utilities, such as accounting, contracting, warehousing, personnel, workshops, vehicles, and information and documentation, are handled by the city departments that provide the same services for other entities. This centralization of services complicates communication between the operating units at the base of the utility organization and the auxiliary services departments, making it troublesome to request or deliver services. Even

worse, there is no budget for or allocation of funds to the utilities. The national budget is line-item; funds are allocated to the city as a whole, including the utilities. All sectors of the city that receive public funding compete to get what they need from the limited pot of funds.

In addition, because of the centralization of administrative functions, utility revenue is under the control of a separate manager in the city council; the manager of the utilities has no influence on revenue, even though it is an integral aspect of running the utility.

The utility lacks institutionalized support for studies, data collection, analysis of current problems, analysis and evaluation of the level of services, community development forecasts, or the establishment of future objectives and plans for utility development. All such activities depend mostly on individual initiatives. The utility is not well structured to face the demands of the future.

Utility staff are city employees. Appointments, yearly increases, promotions, etc., are based on central decisions at the city level. No job descriptions for the utilities are available. There are no specifications for utility personnel. There is no process undertaken to ensure that personnel are qualified. Appointments and replacements are made according to seniority among available manpower at the city level.

All governorate staff, including those of the utilities, are promoted according to seniority. There is no relationship between the grade of a utility employee and the level of skill and experience required for his job. Promotion is not based on performance, but mainly on an employee's seniority among the governorate staff (within the employee's occupational group).

There is no logical relationship among different categories of manpower. 47.22% of the utilities staff are auxiliary laborers; 8.12% are technical laborers. Technicians (assistant engineers) make up 35.49% of staff, which seems higher than the number needed. Estimating the logical distribution of manpower and comparing the estimate with the existing situation, it appears that Beni Suef is suffering from a shortage of technical laborers and a surplus of technicians and auxiliary laborers.

Category	Proposed ratios	Existing ratios
Engineers and professionals	5%	3.45
Technicians	15%	35.49
Technical labors	35%	8.12
Auxiliary labors	35%	47.22
Others		5.72
Total	100	100

The analysis also shows that 55.34% of utility staff are uneducated. The percentage of staff who attend vocational training is 0.15%; primary school education, 0.15%; and preparatory school, 0.75%. Generally speaking, the level of education and vocational training among utility laborers is very low.

However, about 20% of the staff are over fifty years old, which means that the utility will have an opportunity to adjust the distribution of manpower during the coming ten years.

Motivation policy is an important tool for maximizing manpower efforts and raising productivity. Concepts of efficiency and productivity do not assist in raising the service and quality of water even with the limited available facilities through an effective operation and maintenance systems, but also help in minimizing costs of service. Hence narrowing the gap between costs and revenues. Adoption of an effective motivation policy should be based on the level of individual performance, quality and quantity of production. It should differentiate between the efficient and normal employees. Whether it is a governmental agency or public company or general organization, the absence of a motivation policy will certainly cause waste in the manpower efforts and costs.

Law no. 47/1978 provide the conditions for the adoption of effective incentives for civil servants. In Beni Suef Utilities, the policy of motivating personnel is not adopted.
Job allowances are general to all employees irrespective of their performance. Funds are not available even to cover the determined allowance.

No Policy for Human Resource Development is Adopted

This is general trend that can noticed in all aspects of human resources management inside the utilities. Recruitement, selection or appointing workers actually occurs at the city level within the over-all manpower budget of the city.

All man-power issues are undertaken on the basis of seniority and within the government policy of "man-power distribution." In addition there are no job-descriptions or job analysis on which to base requirement for staff. Promotions of all the staff of the Governorate is unified within seniority in the occupation groups irrespective of the place where they work.

The relation between two factors is absent resulting in the ability to rationalize manpower costs.
No training efforts is undertaken. The fund for training at the city level is only L.E 200.

C.4 Consumer Relations

C.4.1 Findings

Interviews were conducted with employees in the water department. Most said that despite the improvements due to the construction of the new plant, there were still a number of problems detracting from the efficiency of the service. Some of the employees' complaints were related to the

behavior of consumers, while others were related to the organization of the department and the resources at its disposal.

Comments Made by Employees about Consumers:

1. Connections inside households, which are the water consumer's responsibility, are often of poor quality. The weakness of water flow, one of the main complaints of end-users, is to a great extent due to these inadequate connections.

2. Purposeful wrecking of water meters is another problem. In certain cases, consumers perceive it as more advantageous for them to be billed on an average basis, and consequently they damage meters.

3. Illegal connections are rare. The city council imposes penalties on people who connect illegally, although the effectiveness of such measures is reduced by time-consuming bureaucratic procedures.

4. Water department workers get caught in the middle of disputes between householders seeking water connections and building owners opposed to such requests.

5. Workers and employees are often verbally and even physically abused by consumers either because they think they are being overcharged or because their meter is being removed as a penalty for unpaid consumption. This problem often impedes needed repair work, reducing the quality of service.

Comments Made by Employees about the Water Utility

One major work-related problem mentioned by employees was the scarcity of resources, specifically, shortages of manpower and equipment. These shortages become acute during winter, when consumption is low and there are more breakdowns, possibly as a result of strong water pressure.

Criticism was also directed at the actual billing system, which allows for a large measure of unpaid consumption and delayed settlement. The lack of coordination between various utility departments was also mentioned. For example, repair work is often hampered by problems related to other utilities such as telephones or electricity. The location of water connections at ground level and in close proximity to main water connections often endangers worker safety. Lastly, the city council regulations that restrict digging for three years in streets that have been newly paved are not always consistent with the water sector's requirements and obligations.

Interviews with employees in the wastewater department revealed problems not much different from those in the water department. Wastewater employees also complained that their dealings with beneficiaries were somewhat tense because of the latter's lack of awareness concerning environmental

and hygienic issues, which leads them to misuse the facilities. Many breakdowns are caused by solid matters and industrial residues that are thrown down the drain. In addition, quite a number of illegal connections do not conform to the sector's specifications. Employees in the wastewater department also complained of being abused by beneficiaries while performing their jobs. They also expressed some resentment at being treated as inferior to their counterparts in the water department. Other problems mentioned were the scarcity of resources (equipment and manpower), minimal training opportunities, lack of coordination with other utilities, and an inadequate billing system.

Comments Made by Consumers

Interviews with a target sample of beneficiaries (25 households) produced the following:

Most interviewees, especially in lower income areas where water meters are nonexistent or nonfunctional, voiced objections to the average charge. Given the generally low economic standard of these residents, any charge is likely to be perceived as unaffordable. However, people do spend relatively substantial sums for repairs. When asked if they would be ready to pay more if service were improved, most residents responded negatively.

In more affluent areas, residents also said they were not ready to pay more, not because they could not afford to, but because they did not trust the sector to improve service and figured that they would end up paying both a higher fee and the cost of repairs. The fact that the charge for water consumption is not settled on a regular monthly, bi-monthly, or even yearly basis, but instead whenever convenient, causes friction between the consumers on one hand, and the service providers on the other. The service fee accumulates and becomes even more unaffordable, and people become resentful, resorting to various ways of circumventing the system. Moreover, penalties such as meter removal or service stoppage are met with aggressive behavior on the part of beneficiaries who do not perceive the system as user-friendly.

The main grievances listed by consumers concerned the weakness of water flow during peak hours or days, specifically, in the morning, on Fridays, and during the summer holidays. This problem is further aggravated in upper floors (3rd floor onwards), where residents complain of water shortages throughout the day. These residents only have water at night, unless they have a congenial relationship with their neighbors, whereby the latter agree to refrain from using water during a specific time of the day to enable the other residents to do their washing and other household chores. The fact that the meter reader came irregularly if at all, and without notifying residents, was another issue which prompted many complaints. While employees at the water department claimed that some consumers purposefully damaged their water meters in order to pay less than they would if they were being charged according to actual consumption, most consumers complained that due to the inconsistency of meter reading, they were paying an average that was much higher than their actual consumption.

Most consumers unfavorably compared the water billing system to that of the electric utility, preferring the latter because they pay for their consumption on a monthly basis according to a

computerized bill. Consumers also complained about the slowness of response of both the water and wastewater departments whenever major breakdowns occurred. An average of two to three days was mentioned as the period between reporting a breakdown and the start of repairs. Consequently, many people prefer to assume the responsibility of minor repairs, albeit at a higher cost, instead of having to wait for the department to send its own workers. Complaints about water quality came last and only after probing. Residents in Beni Suef have minimal environmental and health awareness and are only disturbed if water is noticeably murky or smells bad. When consumers were asked about areas of improvement, water quality was rarely mentioned. Consumers considered improvements related to water flow, the billing system, and water and wastewater service outreach in deprived areas as priorities.

C.4.2 Conclusion

The data collected on water and wastewater services in Beni Suef and Fayoum reveal that despite some differences regarding service coverage, the problems in both governorates are quite similar. The main issue is not availability of or access to the service, but rather the way the service is delivered. The majority of respondents, both employees and consumers, complained about uneasy interactions stemming mainly from a general perception that the system is outdated and inadequate. Constant comparisons are made with the efficient way electricity bills are calculated, presented, and settled. This is not to say that people do not complain about the size of their electricity bills, but rather that a regular, computerized billing process has definitely given the system a large measure of credibility. However, it is only fair to mention that it is much more difficult and costly to circumvent the electricity system. Computerization of the water and wastewater sector should be seriously considered. It would enhance the efficiency of the system and make the work of sector employees more gratifying. In addition, a more participatory approach, whereby the consumer's suggestions or complaints are heeded, would help reduce the tension between water sector employees and consumers. It was observed both in Beni Suef and Fayoum that people were skeptical about the usefulness of any active involvement with the system. Whenever consumers were asked where they went if they had a complaint or suggestion related to service, they said they could only appeal to God.

In both governorates, people expressed unwillingness to pay. However, in both cases people undertake much of the repair work needed at their own expense. While efforts should aim to improve revenue collection, given the low economic status of consumers, it is also important to start building a trusting relationship between the sector and beneficiaries. Otherwise, any attempts at raising tariffs will be met with objections. Such trust can only be established if the approach to service becomes consumer-oriented and if penalties are applied strictly but equitably. In this respect, it is worth reiterating the importance of devising appropriate mitigating measures to avoid adding to the plight of vulnerable socioeconomic groups, such as the establishment of a revolving fund to be used to help low-income people pay for connections on an installment basis.

Lastly, attention should be paid to consumer awareness campaigns and to training. The problems related to water and wastewater service are to a certain extent due to the lack of consumer awareness.

Campaigns targeted at consumers should therefore be considered, together with training programs for employees and workers in the sector. These programs should be tailored to the needs of specific groups of consumers and employees, and should be adapted to the requirements of the utilities in each governorate.

APPENDIX D

DATA COLLECTED: MENYA

D.1 Technical

D.1.1 Potable Water System

The total residential area of the city is 16 square kilometers with a population of 227,330. The City Water Department is responsible for water supply and wastewater services to the city and a portion Talla area. Based on official census data (Governorate Information Center), the population growth rate of Menya city is 2.6% per year. The following projection shows the population to be served by the department in 1995 and coming years:

Year	Population
1995	227,579
2000	260,006
2005	296,055
2015	339,382
2020	434,441

Water Sources/Intakes

The main raw water sources to feed the treatment plants is Ibrahimia main canal and Nile River through four intakes as follows:

- **Old Water Intake (1):** Constructed in 1927 and transfers 120 l/s raw water to the old water treatment plant. It has three pumping units; each discharges 80 l/s, two of them are working and the third as stand by with two delivery pipes from the Nile river (one 500 mm asbestos pipe and one 350 mm steel pipe).

- **Old Water Intake (2):** Constructed in 1960 to feed the Czechoslovakian Water Treatment Plant with a total capacity of 200 l/s on Ibrahimia main canal. It has four pumping units: two discharge 130 l/s, the third 100 l/s, and fourth 70 l/s (two of them are working and the third as stand-by). It feeds the water treatment plant (2) by two delivery pipes (one asbestos pipe 400 mm diameters and one steel pipe 350 mm diameter).

Both intakes are connected to provide backup in case either is not working.

- **Compact Units Intake:** Transfers 4,320 m^3/day of raw water from the Nile to the four compact units; each has 25 l/s capacity. It was built in 1987. It is fed by four steel pipes, each 200 mm in diameter.

- **The New Intake:** Transfers 330 l/s of raw water from the Nile River to the PCD new water treatment plant funded by USAID. It was constructed in 1992 and has one pump station with six pumping units each with a capacity of 82.5 l/s (four are working and two are stand-by). It is fed by two asbestos pipes, each 700 mm in diameter.

Production Plants

The Menya City Water Department is responsible for operation and maintenance of three water treatment plants and four compact units with a total designed capacity of 720 l/s:

Service Area	Treatment Plant	Design Capacity	Actual Capacity	Construction Year
1	Old WTP	120	85	1927
2	Czecholoslovakia	200	170	1960
3	New PCD (USAID)	300	300	1993
4	Compact Unit	100	85	1987

The old water treatment plant uses clarification and rapid filtration with post-chlorination as the treatment technology. The USAID sponsored plant includes flocculation, sedimentation, and rapid sand filtration as a treatment technology. Pre-chlorination and post-chlorination facilities are also used for disinfection. The plant produces high quality water.

The compact units also use sedimentation, clarification, and filtration systems and disinfection.

Distribution

The city network has a total of 190 km of pipe of various diameters and types of material. Pipe diameter ranges from 100 to 800 mm. Pipe materials are cast iron, asbestos, steel, PVC plastic, and prestressed concrete pipes.

The city has divided the network into three separate zones: west, south, and north. Each zone has its own operations and maintenance (O&M) staff. Water is pumped in the distribution network at an average pressure of 52 meters.

About 60% of the connections are metered. The department allows installation of individual meters for each apartment in a multi-family dwelling at the request of the resident. The total number of installed meters is 37,357; about 33% of these meters are out of order.

Storage Capacity

In addition to an underground water storage capacity of 13,500 m^3 at the treatment plants, four 50-meter-high elevated tanks exist in the city. A 1,000 m^3 concrete tank at the old treatment plant and three new ones, with 4,000 m^3 capacity each, are distributed through the city.

Technical Services

There are two laboratories in the water department, one in the old treatment plant. The other laboratory, in the USAID-sponsored treatment plant, serves as a central laboratory for the city and performs the analysis needed for operation of the reservoirs, the network, and treatment plants.

A meter repair and calibration workshop also exists at the Old Water Treatment Plant. It is not clear how effective its operation is given the condition of its equipment and the skill of the technicians.

D.1.2 Wastewater System

Collection System

The existing wastewater gravity sewer system was initiated in 1960 and expanded in 1967. It now consists of about 127 km of pipes ranging from 175 to 650 mm in vitrified clay (75%), PVC plastic (20%), and G.R.P pipes (5%).

The system presently covers about 30% of the city area. While the exact number of individuals connected to the system has not been found in the city records, we understand that about 20% of the population living in the covered area are not connected because of the cost of connection. This estimate yields a very high volume of wastewater per capita, on the order of 160 liters per capita per day.

Residents who are not directly connected to the network rely on the sewerage and settlements vaults which are emptied twice a week manually or by suction trucks and discharged into manholes or even to an irrigation drain.

Force Mains

There are about 35 km of force mains in the city ranging in diameter from 150 to 500 mm. These are made higher from cast iron, ductile iron, asbestos, plastic, or G.R.P.

The details of force mains is as follows:-

Pipeline No.	From	To	Diameter Inch	Length Meter	Material
1 (a)	Helmia	Sahrig	10 ~	1330	Cast Iron
(b)	Helmia	V.Chamber 22	12	300	Cast Iron
2	Magles	Sahrig	10	1630	Cast Iron
3 (a)	Sahrig	V. Chamber (T.P)	16	5460	Cast Iron
(b)	Sahrig	V. Chamber No.15	10	5460	Cast Iron
4	Gharbia	V.Chamber (T.P)	12	4000	Cast iron
5 (a)	Sultan	Gharbia	10	3600	Cast iron
(b)	Sultan	Manhall (saad Zaghlol + Ahmed Maher Streets)	6	1020	Asbestos
6	Shahin	M.H Shanawany Street	6	1000	Asbestos
7	Mouled	M.H Helmia Street	6	500	Asbestos
8	Segn	M.H Taha El Saba Street	6	1000	Asbestos
9	Taha Hussien	M.H Ahmed Maher Abaa Jesus Square	6	535	Asbestos
10	Selakhna	M.H El Ganain street	6	330	Asbestos
11	El Ewaa	M.H Helmia P.S M.H Sahrig	6	1100	Asbestos
12	Mostashfa	M.H Gamhoria	8	1117	Cast Iron
13	Bus Station	school	6	435	Cast Iron
14	Shahin	M.H W.W.T.P M.H Shahin	24	5500	Cast Iron
	Alf Masken		6	403	PVC

Pump Stations

The city of Menya is divided into nine services areas, each area served by a pump station. There are three main pump stations and six substations in addition to five boosting stations.

Service Area	Pump Station No.	Zone	No. of Pumps	Discharge (l/s)	Head (m)
Main Stations					
1	3	Sahrig	3	280	25
2	11	Magousa	3	200	20
3	6	Shahin	6	400	45
Substations					
4	2	Sultan	3	100	42
5	1	Magles	3	50	27
6	4	Helmia	3	50	27
7	5	Gharbia	3	180	30
8	9	Mansouria	3	160	30
9	10	Maklab	3	120	12
Boosting Stations					
10	1	Ard el Mould	3	15	12
11	2	El Ewaa	3	15	12
12	3	Alf Masken	3	15	12
13	4	Moustashfa	3	20	15
14	5	Taha Housien	1	15	10

Wastewater Treatments Plant

An existing 420 l/s wastewater treatment plant is located on the southwest edge 10 km outside the city. It uses trickling filter technology including screening, grit removal, primary sedimentation, trickling filters and sludge drying beds with additional disinfection. It was designed and constructed by NOPWASD in 1965, and rehabilitated and expanded in 1985. The plant is overloaded, due primarily to the increased load from improved potable water service. Additionally, the effluent is discharged to

a drain, which is connected to the River Nile through Itsa main drain. The department uses a limited quantity of effluent in agriculture (flowers, olives). It also sells the dried sludge for fertilizer.

The wastewater arriving at the plant does not include a significant portion of industrial waste. A laboratory was built in the wastewater treatment plant in 1970, but it lacks sufficient equipment to provide laboratory results.

D.2 Financial Situation

D.2.1 Unit Cost Analysis

Billable volume or total water consumed is used for the development of comparison as the basis for calculation of customer bills and the corresponding revenues. Because Menya city records do not give access to such data, the following is the EHP team's estimate, based on the tariff schedule for average rate per connection.

Type	No. of connections	Rate/m^3 L.E
1. Housing	34,708	0.23 70% + 0.3 30% = 0.251
2. Commercial	1,630	0.50
3. Hotels/bank	26	0.85
4. Mosques, Churches	75	0.35
5. Bakers	65	0.50
6. Governmental	649	0.50
7. Factories	19	0.53
8. Construction Usage	185	0.50
Total	37,357	

Billed Rate / m^3 average rate (determined arithmetically by weighted average) = L.E 0.2686/m^3

Given the total collected = L.E 748,651

Total billed water collected	=	$\frac{748{,}651 \text{ L.E}}{.2686 \text{ L.E/m}^3} = 2{,}787{,}084 \text{ m}^3$
Total water produced	=	18,606,240 m^3
Unaccounted-for water	=	15,819,156 m^3
Assuming arrears	35% of all unaccounted-for water 0.35 * 15,819,156 =	5,536,705 m^3
Arrears	0.2686 * 5,536,705 =	L.E1,487,238
Estimated total water consumed	2,787,084 + 5,536,705 =	8,323,789 m^3
The quantity of unaccounted-for water	18,606,240 -(2,787,084 + 5,536,705) = 10,282,451 m^3	
Percentage unaccounted-for	=	55.3%

The unit cost was developed for current expenses. The relationship of existing tariff to costs is shown in the following table.

Fiscal Year 93/94	Revenues L.E	Unit Revenue P.T /M^3	%
Current Revenue Production Billed*	2,235,890	26.86	
Production collected	748,651	9.00	
Current Expenses			
Wages	1,681,076	20.20	47.75
Commodities Input			
Raw Materials	516,600	6.21	14.68
Electricity	1,310,043	15.74	37.21
Other Commodities	12,400	0.15	0.36
Service Inputs			
Total current expenditures	3,520,119	42,30	100.00

Annual Billed Volme = L.E 8,323,790
Total Current Expenditures - Total Current Revenues = L.E 2,771,468

(*) Based on estimated water billed (8,323,789 m^3) multiplied by the average water tariff (.2686 L.E/m^3)

This cost/m^3 is higher than that of water organizations in Cairo and Alexandria and as well as Fayoum and Beni Suef.

The average revenue from selling one cubic meter is P.T 26.86, based on estimated water billed of 8,323,790 m^3 and the average water tariff. Therefore the amount of unaccounted-for water is estimated at 55% of the total produced water, 18,606,240 m^3.

Comparing the revenue to the amount of water produced, the average revenue per cubic meter produced is P.T 12.00 and the cost per cubic meter produced is P.T 18.92. So the loss per produced cubic meter is P.T 6.92.

D.2.2 Revenues

- **Tariff Structure**

  The existing tariff structure consists of charges per cubic meter of usage for customer classes 1 through 7 and flat rates per number of rooms for the governmental housing customer class. The magnitude of the charge varies per customer class and also per grouping within each customer class. The current tariff structure was implemented in fiscal year 91/92 and increased in each fiscal year. The existing tariff expired 30 June 1995.

- **Customer Data**

  During 1993/1994 water service was billed on approximately 37,357 accounts which were categorized within the tariff schedule.

  The system does not allow the utility to determine the increase in water billed and bills collected in the last three fiscal years. At the same time the water utility can not calculate the increase in accounts in the same three year period.

  Billing and collection transactions are all performed manually and centrally processed. There are 17 customer collection areas plus the governmental agency offices. Each area has a number of accounts and the largest class within the areas is household customers, (34,708 household customers out of 37,357 the total customers).

- **Existing Financial Policies**

  There are no fixed or clear financial policies. The utility follows all the government regulations, no policies are in place for meter readings, billing and collection, budget and accounting, monitoring and fixing tariff.

- **Subsidies**

  According to the government accounting system, all the collected revenues go into Ministry of Finance accounts. For the city water utility itself, there is no relationship between the revenues and the expenditures.

  The Ministry of Finance allocates O&M funds to the city headquarters every year through Bab I (wages) and Bab II (general expenditures). The difference between collected revenues and expenditures is a subsidy; current expenses in fiscal year 93/94 were L.E 3,520,119, while revenues were L.E 748,651. The difference was a deficit of L.E 2,771,468. This deficit had to be covered by the Ministry of Finance, but it does not show up in the accounts as a subsidy.

D.2.3 Commercial Activity

D.2.3.1 The System of Requesting the Service for the First Time

1. The customer presents the documents required to request water service to the construction permission department in the district for review. The documents include a rental or property contract.

2. Construction permission department reviews the documents and location and issues the approval, signed by the district chief.

3. The file has to be sent to the network for estimating the installation cost. The customer has to buy the needed materials and the meter and pay the fees for installation.

4. The material needed has to be tested by the network people and a date has to be fixed for installation.

5. The network executes a start-up work order and the connection is made and a meter installed. The customer account is now established and the file has to be sent to the revenue section and meter section to start meter reading and calculate the water consumed.

D.2.3.2 Meter Reading System

- A meter reading employee reads the meters. Readings are not regularly performed or registered in record No.6
- Based on the present and previous reading registered in register No. 6, the water bill is calculated according to the tariff category schedule.
- Now the water bill for each customer is ready for collection.
- There is lack of meter readers and the incentives for job performance are very low.

D.2.3.3 Accounting System Used

The water utility keeps its accounts according to the governmental accounting system. This means that the utility does not have a cost accounting system or commercial concepts budget, and there is no separation between water and wastewater accounts or the headquarters budget and water department account.

Bookkeeping, including water bills, is done manually.

D.2.4 Problems Facing the Water Utility

The following are the most prominent problems facing the utility:

D.2.4.1 Unaccounted-for Water Problem

Unaccounted-for water amounts to approximately 55% of the produced water (e.g. in 1993/1994); water production was 18,606,240 m^3, while the (estimated) amount of water billed was 8,323,790 m^3. Among the causes of this problem are:

- Pipe explosions
- Network leakage
- Inadequate preventive maintenance
- Breakdown of 33% of meters (customers are charged an average basis which is not accurate)
- Monthly fixed prices for the governmental houses.
- Illegal connections

D.2.4.2 Problems of Collection and Accumulated Arrears

The collection problem in Menya is greater than Fayoum and Beni Suef. The billing and collection system does not allow tracking of arrears. The collection system also does not allow collectors to go from door-to-door, so customers delay paying their bills. There is no system for following up on collection. Funds are not allocated for water consumption in the budget of civil government agencies. Public sector and private companies suffer from lack of financial liquidity.

In 1993/1994 the expected revenues from the production billed was L.E 2,235,890, while the actual collection was L.E 748,651. So the arrears were L.E 1,487,239. There are accumulated arrears from the previous years, but the revenue or collections department were not able to calculate them.

D.2.5 Comparison between sewerage revenues and O&M Costs

L.E

Actual Revenues	**312,335(*)**	%
O&M Costs		
Wages	1,444,126	73.51
Raw materials	4,895	0.25
Electricity	420,000	21.39
Spare Parts	42,100	2.14
Fuel & Oil	46,583	2.37
Other Commodities	6,527	0.34
Total O&M Costs	**1,964,231**	100.00
Deficit	1,651,896	

(*) Estimated sewerage revenue, based on 40% of the water production billed in 93/94, was L.E 894,356, so arrears in the sewerage collection is L.E 582,021.

- There is a big gap between the revenues and the expenses (L.E 1,651,896).
- The two main cost elements are wages and electricity.
- Wages, which reflect the total value of employee work efforts, consist of cash wages and allowances, benefits in kind, insurance, and others. On average, salaries associated with permanent posts account for 34% of total wage expenses. The remaining 66% is associated with rewards, allowances, cash advantages, and insurance. The total number of employees in the sewerage utility is 402; the average income yearly per employee is L.E 3,592 or L.E 299 per month. Wages and electricity together present 94.9% of the total current costs.

Applied Tariff Category Schedule

			P.T/m3
1.	**Household Usage**		
	a.	Residential units consuming up to 30 m^3/month	23
		Residential units consuming over 30 m^3/month	30
	b.	Building and construction	50
2.	**Service Usage**		
	a.	Charitable associations, public centers, youth centers	35
	b.	Sport clubs-syndicates, parties building and Emphasis	40
3.	**Companies and Commercial shops**		
	a.	Small factories, public restaurants, coffee shops. Gas stations, third and second class hotels, private schools, public hospitals, Garages, mills and bakeries	50
	b.	Big factories	53
4.	**Production and Investment Usage**		
		Private hospitals, first class hotels, night club, first class restaurants, Investment companies and free Zones and tourism companies.	85
5.	**Raw water**		
		Residential and Governmental	16
6.	**Non-residential activity**		
		Public sector factories, Governmental agencies and local units	40
7.	**Clarified water**		18

8. **Monthly fixed prices**

Single-room apartment	200
Double-room apartment	300
Three-room apartment	400
Apartment of more than three rooms	500

Approval of the local popular council is essential for ratification of the tariff and its amendments.

PERFORMANCE INDICATORS

For Menya City

1. Oper. Rev. per Capita Served = $\frac{\text{Operating Revenue}}{\text{Population Served}} = \frac{2,235,890}{215,963}$

   = L.E 10.35

2. Oper. Rev. per m^3 produced = $\frac{\text{Annual Oper. Rev.}}{\text{Water production } (m^3)} = \frac{2,235,890}{18,606,240}$

   = P.T 12.00

3. Total Revenue per Capita Served = $\frac{\text{Total Annual Revenue}}{\text{Population Served}} = \frac{748,651}{215,963}$

   = L.E 3.47

4. Operating Revenue per connection = $\frac{\text{Annual Oper. Revenue}}{\text{No. of Connections}} = \frac{2,235,890}{37,357}$

   = L.E 59.85

5. Total Revenue per Connection = $\frac{\text{Total Annual Revenue}}{\text{No. of Connections}} = \frac{748,651}{37,357}$

   = L.E 20.04

6. Oper. Rev. Billed per m^3 water =

$$\frac{\text{Annual Oper. Revenue}}{\text{Billed water production}} = \frac{2,235,890}{8,323,790}$$

= P.T 26.86

7. Operating Costs per Capita Served

$$= \frac{\text{Operating Costs}}{\text{Population Served}} = \frac{3,520,119}{215,963}$$

= L.E 16.30

8. Oper. Surplus (loss) per Capita Served

$$= \frac{\text{Oper. Rev. - Oper. Costs}}{\text{Population Served}}$$

$$= \frac{3,520,119 - 2,235,890}{215,963}$$

= L.E 5.95

9. Total Surplus (loss) per Capita Served

$$= \frac{\text{Total Rev.-total cost}}{\text{Population served}}$$

$$= \frac{3,520,119 - 748,651}{215,963}$$

= L.E 12.83

10. Operating Costs per Connection

$$= \frac{\text{Operating Costs}}{\text{No. of Connections}} = \frac{3,520,119}{37,357}$$

= L.E 94.23

11. Operating costs per m^3 water produced = $\frac{\text{Annual Oper. Costs}}{\text{Total water production}} = \frac{3,520,119}{18,606,240}$

= P.T 18.92

12. Operating Costs per m^3 water billed = $\frac{\text{Annual Oper. Costs}}{\text{Total Water Billed}} = \frac{3,520,119}{8,323,790}$

= P.T 42.30

13. Cost Recovery % = $\frac{\text{Oper. Rev.}}{\text{Oper. Exp.}} = \frac{2,235,890}{3,520,119}$

= 63.51%

14. Arrears % = $\frac{\text{Rev. Collected}}{\text{Rev. Billed}} = \frac{748,651}{2,235,890}$

= 33.48% - 100% = 66.52%

D.3 Institutional Findings

The water and wastewater utilities in Menya City are run as local governmental entities within Law 43/1979 concerning local administration.

As being local governmental entities, water and wastewater managers are committed to follow laws, regulations, applicable to government agencies, such as Law no. 47/1978 concerning civil servants and Law no. 9/1983 concerning tendering and bidding.

In relation to Law no. 47/1978, it has been specified that the governor is the "concerned authority" for decision-making in personnel issues for all staff of governorate, markez, and cities within the governorate. This situation requires that personnel decisions such as appointments or promotions are centralized at the governor level.

Utilities are part of the machinery of the city which is considered one integrated local personality. The city has a chief a deputy chief and a local popular council.

Consequently, all administrative and financial auxiliary services required for the water and wastewater utilities, along with other utilities and activities existing in the city, are grouped centrally at the city level. Hence, services required for water and wastewater utilities such as personnel affairs, contracting, procurement, accounting, and payroll are offered to water and wastewater utilities by central sections located in the city council. There are some exceptions to this situation. Steps had been accomplished to attach the stores, workshop, and vehicle fleet to each of the water and wastewater utilities. Currently, each of water and wastewater utilities has its own stores, fleet, and workshop and is actually independent from the city council in regard to these facilities. In addition, water revenue activity has been transferred from the revenue department in the city headquarters to the water utility. This is actually a remarkable development towards the integration of each of the two utilities.

A section for stores, workshop, and fleet has been established in the organizational structures of water and wastewater utilities. A section for "collections and revenues" has been also established in the organizational structure of the water utility. However, conflicts regarding supervision of the section still arise. Channels of communication are still unclear. The manager of the water utility and manager of the revenue department in the city council both assume responsibility for activity of the section.

The authority for decision-making in regard to manpower, tools, material, and equipments resides with either the chief of the city or even the governor.

This situation create difficulties and bottlenecks, particularly in emergencies. The principle of delegation of authority is not adopted or practiced.

Water and wastewater facilities existing in Menya city are:

A. Potable Water

- Three water treatment plants as follow:-

The Plant	Total Water Production m^3/Year
Treatment Plant no. 1	2,680,560
Treatment Plant no.2	5,361,120
Treatment Plant in Kedwan	7,584,400

- Four water compact units with total water production 2,680,560 m^3/y
- Four elevator tanks
- Water distribution network; total length is 190 km.

B. Wastewater

- Wastewater treatment plant
- Three main and six branch pumping stations
- Collection network. 162 km. in length

The organizational structure includes two managers—one each for water and wastewater sectors. They report to the manager of utilities. Organizational charts are attached at the end of this appendix describing the status of the utilities department in the city.

There is a difference between the formal and the existing (informal) organizational structure. In accordance with the formal one, there is a job "General Manager of Engineering Affairs" existing in the structure of the city council. This manager is in charge of supervision and control of public utilities. (see org. chart no. 1 attached). In actuality, the manager of utilities reports directly to the deputy chief and chief of the city. (see Organizational Chart no.1 A).

Also, the Manager of Utilities holds the position, "Manager of Water Utility."

The water sector is divided into three tiers:

First Tier:

- Tec. Office and training
- Administration

Second tier:

a.) Water distribution network (see Charts 2 and 2A)

1) Consumer services
- Revenues and collections
- Meter-readings
- Meter maintenance

2) Network Maintenance
- West network
- South network
- North network

3) New Projects

b.) Water treatment plants (see Charts 2 and 2B)

1) Kedwan water treatment plant
2) Water treatment plant no. I
3) Water treatment plant no. II
4) Compact units
5) New projects
6) Laboratory (central)

Third tier:
- Workshop
- Vehicles
- Stores

The wastewater sector is divided into

First tier:
- Secretary

Second tier: (see Charts 3 and 3A)

a) Collecting Network :
- West network
- South network
- North network

b) Operations: (see Charts 3 and 3B)
- Pumping stations

c) Wastewater Treatment Plant

d) Project Implementation

Third tier:

a) Mechanical and electrical maintenance (workshop)
b) Stores
c) Vehicles

The present utility staff totals 1,081, with 589[1] employed in water and 492[2] in wastewater services.

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[1]This figure includes

43	personnel working inthe utility workshop
14	personnel working in the utility stores
14	personnel working in the utility fleets
81	personnel working in the utility revenue sections
152	Total

[2]This figure includes

37	personnel working in the utility workshop
14	personnel working in the utility stores
60	personnel working in the utility vehicles
111	Total

With regard to water, the staff is distributed among different facilities as follows:

The facility	No. of staff	Size of production	Productivity (Ratio of production to individual)	
			Per year	Per working day
Old Treatment Plant I	48	2,680,560 m^3/yr	55,845 m^3/y	199$m^{3/d}$
Treatment Plant II	18	5,361,120 m^3/yr	297,840	1064
Treatment plant in Kedwan	82	7,584,000 m^3/yr	92,488	330
Compact units	23	2,680,560 m^3/yr	116,546	416
Elevator Tanks	20	4 units	5 per unit	
Network	151	190 km	1.26 km/person	
Meter-readers	9	37,357 meters	4,150 m/per person	
Collections	16	37,357 consumers	2,335 c/per person	
Revenue accounting	32	37,357 consumers	1,167 c/per person	

With regard to wastewater, the staff is distributed among facilities as follows:

The facility	No. of staff	Size of production	Staff productivity	
			Per year	Per working day
Treatment Plant	39	13,875,840 m^3/yr	3,357,970 $m^{3/y}$	1,270 $m^{3/day}$
Pumping Stations	60	9 pumps	6.7	man/per pump
Collection Network	142	162 km.	1.14	km./person

With regard to salaries, allowances, and incentives, the government salary scale is applied. Regular annual and social increases are also applied within Law 47/1978 and laws issued for social annual

increases. In respect to allowances, the utility staff are subject to the Laws 26/1983 and 16/1985 and Prime Minister Decrees no. 955,956/1983 which specifies:

- Hazard allowances, which range between 60 and 25% from the basic salaries for staff of wastewater, depending on the nature of the job.
  It also ranges between 50% and 20% for basic salaries of water utility staff.

- Allowances for a meal, which range between L.E 15 - 10 monthly, depending on nature of the job. This rate is applied to both water and wastewater utilities.

- Overtime allowances, which range between 50% and 25% over basic salaries for water and wastewater utilities, depending on the nature of jobs.

Although allowances are set for water and wastewater staff, actual disbursement depends on the availability of funds. About 35% of water utility staff and 22% of wastewater staff are not granted allowances. There is no policy or system for incentives. The allowances are granted to the staff according to the nature of the job, irrespective of level of performance or productivity. In theory, incentives are designed to compensate and encourage efficient and productive personnel, and to motivate staff in general. The policy of incentives is not adopted in the utilities. Lack of financial funds does not allow the adoption of an incentive policy.

Generally speaking, training programs are not available in the utilities (there is no training budget). There are no orientation courses for new employees. No studies are undertaken to assess training needs. Supervisors are not qualified or instructed for a systematic approach of "on-the-job training." Task analysis for the purpose of on-the-job training is not performed, and there is no awareness of the importance of task analysis to improve productivity.

The direct manpower can be classified according to occupation as follows:

Occupation	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
Professionals	63	10.70	56	11.38	119	11.01
Admin. Dev.	1	.17	--	--	1	0.09
Technicians	205	34.80	154	31.30	359	33.21
Clerical	68	11.54	9	1.83	77	7.13
Technical Laborer	64	10.87	89	18.09	153	14.15
Auxiliary Labors	188	31.92	184	37.40	372	34.41
Total	**589**	**100.00**	**492**	**100.00**	**1,081**	**100.00**

They can be classified according to age as follows:

Age	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
20 - 30 yrs.	32	5.43	25	5.08	57	5.27
31 - 40 yrs.	292	49.58	157	31.91	449	41.53
41 - 50 yrs.	191	32.43	220	44.71	411	38.02
51 - 55 yrs.	37	6.28	52	10.57	89	8.23
56 - 58 yrs.	25	4.24	17	3.46	42	3.89
Over 58 yrs.	10	1.70	16	3.25	26	2.41
Age unknown	2	.34	5	1.02	7	0.65
Total	589	100.00	492	100.00	1,081	100.00

Staff can be classified according to the level of education as follows:

Level Education	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
University	64	10.87	55	11.18	119	11.01
Technical Institute	2	.34	—	—	2	0.18
Secondary School Level	241	40.92	161	32.72	402	37.19
Preparatory school Level	23	3.90	3	.61	26	2.40
Primary School Level	2	.34	—	—	2	0.19
Vocational Training	—	—	—	—	—	—
No Education	257	43.63	273	55.49	530	49.03
Total	589	100.00	492	100.00	1,081	100.00

Classification of staff according to grade is as follows:

Grade	Water		Wastewater		Total	
	No.	%	No.	%	No.	%
First	11	1.87	13	2.64	24	2.22
Second	62	10.53	74	15.04	136	12.58
Third	153	25.98	112	22.77	265	24.51
Fourth	173	29.37	113	22.97	286	26.46
Fifth	33	5.60	78	15.85	111	10.27
Sixth	157	26.65	102	20.73	259	23.96
Total	589	100.00	492	100.00	1,081	100.00

Analysis

The utilities are actually organizational units of the city council. The decision-making authority resides with the chief of the city (or even with the governor), particularly in issues of personnel appointments and promotions. The local popular council is also involved in the process of decision making, particularly for allocation of funds and approval of plans and tariffs.

Centralized decision making creates difficulties and bottlenecks. The local popular council at the governorate level decides on the distribution of funds allocated for Menya governorate as a whole. The council decides every year on allocations for each markez, village, utility, and headquarters of governorate cities. Due to the limited budget, competition exists among all entities in the governorate, and the complicated mechanism of budget distribution, meeting the utility's needs for effective and efficient operations becomes impossible. Hence, problems and difficulties can be expected.

The general trend in utilities in other governorates is the same as Menya's. As a branch of the city council, auxiliary services are centralized to serve the city as a whole, i.e., accounting, personnel, procurement and contracting, and information. When the utility needs a small spare part or any other article, all it can do is present memos for that request.

Menya does have one major difference, however. For both water and wastewater activities, workshops, stores, and vehicle fleets have been transferred to the utilities within their organizational structure, supervision, and control. In addition, water revenue and collections have been transferred from the revenue department in the city council to the water utility. Yet there has been no positive

change in relation to mechanisms, registers and the performance of revenue collection in general. There are too few meter readers to cope with expansion of number of meters. Number of collectors (13) is also very low in comparison with number of consumers. On the basis of information provided on the number of staff and performance standards, radical change and improvement in the revenue aspects of the utility are unlikely to occur.

The organizational structure of the water and wastewater utilities needs study and analysis. Channels of communication, delegation of authority, and span of control are some examples. In some cases, supervisory levels are repetitive, e.g., managers and assistant managers.

The organizational structure does not include resources for studies, data collection, problem analysis, evaluation of services, forecast of future development in the community, and future objectives and plans for the utility. All these activities depend completely on initiatives of individual managers and put a heavy burden on them.

Difficulties in recruiting technical specialized staff arise for several reasons:

- Governmental personnel policies in relation to recruitment, selection and placement without regard to specifications required to fill the jobs. For example, one supervisor has a certificate in textiles.
- Weak salary scale which is not attractive to efficient and qualified personnel.
- Bad work conditions and lack of fair allowances to fit these conditions.
- Low morale in general.
- Allowances determined as a percentage of the individual salary, not affected by the level of performance.

An analysis of manpower reveals the following:

- The ratio of professionals (engineers, chemists) to the total manpower in both water and wastewater is high. Water has 63 professionals (10.7%), wastewater has 56 personnel (11.38%). These figures are high in comparison with other similar utilities. This high ration does not necessarily result in increasing overall level of performance or productivity. On the contrary, it indicates waste.
- The same issue applies to technicians. Water has 205 technicians (34.80% of water staff). Wastewater has 154 technicians (31.3% of total wastewater staff).
- On the other hand, the number of technical laborers is very low, whereas the number of auxiliary laborers is very high.
- About half the utility staff has no education, which affects the overall level of performance.
- Staff over 50 years represent 15.18% of total staff. This means that there is no possibility for decreasing manpower considerably in the coming 10 years.

What can be done is the redistribution of manpower and the introduction of effective training to maximize staff productivity and efficiency.

PROVINCIAL CITIES ASSESSMENT

City : MENYA

Water Supply Service General Data:

A.	Area Served (service area)	Inside Menya City Limits
B.	Area Served	160 sq. km
C.	Population in Service Area City	227,330 persons (1995)
D.	Population Directly Served	215,963 persons
E.	Population Directly Served	95%
F.	Number of Accounts	37,357
G.	Water Supply Production (actual)	18,606,240 m^3/year(1993/94) 50,976 m^3/d
H.	Water Supply Billed (estimated)	8,323,790 m^3/y 22,805 m^3/day
I.	Unaccounted for Water (estimated)	55.3%
J.	Production Per Account	1365 l/day
K.	Water Supply Production Per Account	611 l/day
L.	Persons served per W.S. Connections	5.8 persons
M.	Billed W.S. Per Person Served	106 l/day
N.	Total Kilometers of pipeline distribution	190 km
O.	Meters of Pipeline Per Account	5.1 m/account
P.	Number of Meters Installed	37,357
Q.	Water Meters Working	67%

Treatment Facilities

R. Water Treatment Facilities

1. Name: Old Water Treatment Plant No.(1)
   Type: Clarification - Filtration
   Production Capacity: 7,645 m^3/day
   Year of Construction or Rehab.: 1927
   Ground Storage (Treated Water): 500 m^3

2. Name: Old Czechoslovakia Water Treatment Plant (No.2)
   Type: Clarification-Filtration
   Production Capacity: 14688 m^3/day
   Year of Construction: 1960
   Storage (Treated Water) 1000 m^3

3.	Name:	Treated Water Compact Units
	Type:	Clarification-Filtration
	Number of Units:	4 units
	Production Capacity:	3,672 m^3/day (each
	Year of Construction:	1987
4.	Name:	New U.S.Water Treatment Plant (PCD)
	Type:	Clarification-Filtration
	Production Capacity:	25,920 m^3/day
	Year of Construction:	1993
	Storage (Treated Water)	12,000 m^3

S. Storage Facilities (Elevated Tanks)

I.	Number	1
	Total Volume	1,000 m^3
	Year of Const.	1960
	Type	Concrete
II.	Number	3
	Total Volume (3 @ 4000)	12,000 m^3
	Year of Const.	1993
	Type	Steel

Financial Data (1993 - 1994)

Cost (W/O Financial Admin.)	L.E 3.520 million
Revenue (billed)	L.E 2.236 million
Estimated Revenue (collected)	L.E 0.749 million
Actual Deficit	L.E 2.771 million
Avg. Tariff Yield/m^3 billed	L.E 0.27
Avg. Tariff Yield required to break even	L.E 0.42
Direct Employees	437
Indirect Employees	358
Indirect/Direct Ratio	82%

Wastewater Service General Data

A.	Area Served (Describe)	Inside Menya City Limits
B.	Area Served	16 sq.km
C.	Population in Service Area City	227,330
D.	Population Served	147,765
E.	Population Served Percentage	65%
F.	Number of Accounts	14,035 connections
G.	Wastewater Treated	36,290 m^3/day
H.	Wastewater Per Account	2.586 l/day
I.	Wastewater Per Person served	246 l/day
J.	Persons served per W.W. Account	10.53

Facilities Data

K.	Total Kilometers of Sewers in system	162 km
L.	Meters of Sewers Per Account	8.1 m
M.	Wastewater Treatment Facilities	

1. Name: Menya W.W.T.P
   Production Capacity : 36,290 m^3/d (420 lps)
   Year of Construction: 1965

N. Pump Stations

Number of Main PS = 3 PS
Capacity Range From 200 l/s to 400 l/s
Number of Substations = 6 PS
Capacity Range From 50 lps to 80 lps

Number of booster	6 PS
Capacity Range form 15 l/s to 20 l/s	

Wastewater Financial Data (1993 - 1994)

Wastewater Revenue (= 40% billed WS)	L.E 0.894 million
Wastewater Revenue Collected	L.E 0.312 million
Cost	L.E 1.964 million
Deficit	L.E 1.652 million
Direct Employees	381
Indirect Employees	317
Indirect/Direct Ratio	83%

APPENDIX E

FINANCIAL ANALYSES

E.1 Introduction

This appendix presents the financial analyses conducted for the provincial cities assessment report. These analyses were conduced as part of the options study, the purpose of which was to describe the financial situation in the water supply and wastewater sectors of the provincial cities under various future scenarios. Financial autonomy or self-suffiency—that is, the ability of a utility to set tariffs and retain the revenue so derived to effect cost recovery sufficient to cover the total operation and management (O&M) cost—is a key requirement for USAID's future participation in projects for the provincial cities. Thus, the methodology formulated allows the analyses to illustrate how the utilities must improve their financial performance in order to reduce the operational deficits (i.e., subsidy conditions) substantially or completely by the year 2000.

The various components of the analyses examined the subsidy situation, based on assumptions regarding the following factors, either alone or in combination:

- a continuation of the present financial performance levels
- improvements to the unaccounted-for water conditions and billing collection levels
- savings in operational cost due to gains obtained through greater efficiency in operation and/or transfer of personnel
- assumed increases of varying levels to the water supply tariffs and wastewater surcharges

The financial analyses also included a rough estimate of household income distribution in the provincial cities to use as a surrogate measure of customers' ability to pay for water and wastewater service.

The results of the financial analyses are shown in Tables E-1 through E-24. The following sections discuss the basis of the analyses and specifics in each city.

E.2 Basis of Analysis

The financial analysis for each city was based in part on several assumptions, including base year costs, inflation rates, the end of the GOE's subsidy for electricity, projected water supply production levels, and the nature of savings generated through improvements in operations and performance.

Base Year Costs

For the purposes of this analysis, the costs of water supply and wastewater service are taken from the costs posted in the ledgers of each city for the water supply and wastewater activities (see Chapter 4 and Appendixes B and C). These costs are really the budget levels allocated to the cities by the governorate; the actual costs of service can only be determined through a detailed study of the activities. Using the budget values, the base year (1993/94) costs for both water supply and wastewater services are L.E 3.8 million and L.E 10.9 million for the cities of Beni Suef and Fayoum, respectively. Based on the findings of this study, both cities' budget values appear to be high, and the cost differential between the two cities appears to be extremely skewed, with Fayoum's cost inordinately high, given the level of services it provides compared to those provided by Beni Suef. This is especially true for Fayoum's wastewater service budget, which for the base year is almost L.E 6.5 million.

The assumed savings used in the analysis makes up for part of the high budget values. However, it is important to recognize that because there are no accurate data available regarding cost of service, budget data were used as a surrogate. The budget costs for Fayoum will produce an O&M cost picture which is overly conservative on the high side. The situation for Beni Suef will probably be on the high side as well, but only moderately so.

Inflation

Inflation, at a rate of 10% per year, was applied each year up to 2000 to all costs related to water supply production and distribution and wastewater collection and treatment. The 10% per year rate is the value USAID expects Egypt's economy to support over the next several years.

Electricity Subsidy

The GOE has subsidized the cost of producing electrical power. Although it has been reduced over the last several years, a large subsidy still exists. The GOE's announced policy indicates that the remaining subsidy will be ended, but no time frame has been given. For purposes of the analyses in this report, the remaining subsidy—approximately 25% of the existing rate as estimated by the EHP team economist—was assumed to end in the period covered by the fiscal years 1995/96 and 1996/97. Thus, the analyses include a 12% increase in electrical power cost for each of these years.

Production Levels

Water supply production levels, and, by inference, the component of the wastewater treated, were assumed to increase at a nominal value of three percent per year. This assumption infers that the capacity of the existing facilities will be adequate. As some of the nominal facility capacities are now close to their existing levels, the assumption may introduce a slight inaccuracy. However, any such inaccuracy will be on the conservative side as far as cost and will have little effect on the overall conclusion.

Savings Due to Improvements

Cost savings due to improvements can be defined in this analysis as factors acting to reduce deficits. These savings are thus comprised of savings in O&M due to direct cost reductions, increased collection

of billings, and reduction of the leakage portion of the unaccounted-for water.

The analysis utilizes target percentage values for the O&M savings components, set as percentage levels in a given year. The areas in which the savings occur are not specified, but the inference is that they will, for the most part, come in the form of personnel transfers.

The percentage of O&M savings used for the analyses are as follows:

Beni Suef. Both water supply and wastewater O&M savings taken at 20%, applied in year 1996/97.

Fayoum. Water supply O&M savings taken as 20% applied in year 1996/97; wastewater O&M savings taken as 35% and 15% applied in years 1996/97 and 1997/98, respectively.

Menya. Both water supply and wastewater O&M savings taken at 20%, applied in year 1996/97.

Unaccounted-for water levels used in the analyses are as follows:

Beni Suef. Present level of approximately 52% decreased to levels of 42%, 32%, and 25% in years 1995/96, 1996/97, and 1997/98, respectively.

Fayoum. Present level of approximately 41% decreased to levels of 36%, 30%, and 25% in years 1994/95, 1995/96, and 1996/1997, respectively.

Menya. Present level of approximately 55% decreased to levels of 52%, 42%, 32%, and 25% in years 1994/95, 1995/96, 1996/97, and 1997/98, respectively.

Percentages of billings collected used in the analyses are as follows:

Beni Suef. Present level of 77% increased to 85% and 90% in the years 1996/97, and 1997/98.

Fayoum. Present levels of approximately 86% increased to 90% in year 1994/95.

Menya. Present levels of approximately 33% increased to 55%, 65%, 75%, 85%, and 90% in years 1994/95, 1995/96, 1996/1997, 1997/98, and 1998/99, respectively.

Limitations of the Analysis

The methodology formulated for this financial analysis results in the portrayal of the most conservative financial condition for each city's water supply and wastewater sector. In other words, the cases presented herein, assumed improvements in operations notwithstanding, can all be considered parts of a worst case scenario.

Improvements in the physical infrastructure for each city, such as the provision of new or rehabilitated water supply, wastewater treatment, and water supply distribution facilities, or improvements in the commercial components of each sector, would significantly increase the revenues derived from the

new service levels. At the same time, economies of scale in providing the services would drive down the unit cost of production. These conditions would produce a much less constrained financial situation than that portrayed.

Thus, while the situation pictured in these analyses has purposely been burdened to create a series of worst case scenarios, actual future conditions may lead to a more positive outcome.

E.3 Financial Analysis for Beni Suef

Tables E-1 through E-5 present the financial analyses for Beni Suef, Tables E-6 and E-7 present summaries for each of the water supply and wastewater cases, and Table E-8 presents the ability-to-pay illustration.

Table E-1 presents the situation if the base year costs and performance levels are continued to 2000, with no increases to tariffs or surcharges. Table E-2 presents the situation for increased performance levels and savings in O&M costs. Table E-3 presents the situation for the improvements in E-2, with moderate increases to the tariff and surcharge levels. Table E-4 presents the same situation as E-3, but with greater increases to the tariffs and surcharges. Table E-5 presents the effects of raising the tariff and surcharge levels to produce a zero deficit in 2000.

E.3.1 Effects of Savings, Better Performance, and Increased Charges

Table E-1, the base case, indicates the trends for Beni-Suef's water supply and wastewater situation through fiscal year 2000 if all performance factors in terms of unaccounted-for water, billing collection rate, water supply tariff, and wastewater surcharges continue at the levels of fiscal year 1993/94, with no savings in the cost of water supply or wastewater service. Water supply costs increase due to inflation, the removal of the electrical subsidy, and the 3% increase in production. This is the "worst case scenario," with the deficit increasing to about 3.5 times the present deficit and the average tariff yield to break even in fiscal year 2000 increasing to L.E 82 per m^3, about 4.5 times the present tariff yield. The wastewater sector's financial condition over the next several years appears similarly intolerable, with the deficit in the year 2000 almost doubling the present level and the break-even surcharge value increasing to over 100% of the water supply billings.

Table E-2 illustrates the situation with savings in production of 20% and increased billing collections to 90% in year 1996/97, and a reduction of unaccounted-for water to 25% (down from the present 52%) in year 1997/98. The deficit situation is better for both water supply and wastewater, but still very high—about twice the existing deficits for both services.

Table E-3 illustrates the effect of increasing the water supply tariff level by 35% in year 1996/97 and raising the wastewater surcharge to 60% in the same year. These increases indicate that the water supply deficit will increase to about 90% of the present level and the wastewater deficit will drop to about one-third of the existing level. This improved case is the first example of the actions which must be taken to bring the financial outlook into line: the imposition of increased charges, coupled with savings and increased performance, are necessary for substantial deficit reduction.

Table E- 4 gives further support to the conclusion drawn from the previous improved case. This table illustrates the effect of increasing the water supply tariff by approximately 62%, in two steps: a 35% increase in 1996/97 and an additional 20% increase in the following year. Concurrently, the wastewater surcharge is increased to 70% in three steps of 10% each, starting in year 1997/98. These combined increases cause the water supply deficit to increase by about 50% over the present level and causes the wastewater deficit to drop to zero.

Table E-5 illustrates the increases required to produce a zero deficit in the year 2000.
Water supply tariffs must be increased starting in year 1996/97 and continuing for four years at rates of 33%, 30%, 30%, and 10% respectively. The wastewater surcharge, benefitting from the substantial water supply tariff increases, has to be increased to only 46% starting in year 1997/98.

A summary of the discussion of Tables E-1 through E-5 appears in Tables E-6 and E-7. Conclusions are presented in Section F.3.3 below.

E.3.2 Ability to Pay

Table E-8 presents an ability-to-pay illustration for Beni Suef. It approximates the distribution of household (HH) income in Beni Suef, assuming the distribution of income in the governorate is similar to the national distribution given by the CAPMAS household income survey conducted in 1992. The governorate values for income ranges are obtained by prorating the national average by the ratio of the average HH income in the governorate to the national average HH income.

The HH incomes for 1995 and 1998 are projected using 11% per year. This value is estimated using CAPMAS data on the annual rate of growth in wage income during the period 1987 to 1992. The CAPMAS data indicate a 15% average annual growth rate; their data also indicate that about 50% of the average HH income is from wages. The annual growth rate used in the analysis assumed that the annual growth in nonwage HH income was half the wage growth rate. Thus, the average growth rate of all HH income was approximated at 11%.

Table E-8 also illustrates the value of 2% of the projected average HH incomes in Beni Suef. Levels of 2% to 3% of average HH income are considered reasonable as the total annual payment for both water supply and wastewater services. Table E-8 further illustrates the payments required under the existing tariff and surcharge schedules for Beni Suef. These values can be compared to the required tariffs indicated in Table E-5 to produce a zero deficit in 2000.

The tariff and surcharge increases in Table E-5 indicate that the tariff yield per m^3 of water billed in Beni Suef would increase to a level of about L.E .36 per m^3. For a household of five persons and a consumption of 150 to 200 liters per capita per day, the monthly charges would range from about L.E 9 to L.E 11 per month. or about L.E 100 to L.E 130 per year.

Wastewater charges would add an additional L.E 45 to L.E 58 per year, making the total annual charge for both services equal to about L.E 150 to L.E 190 per year. Table E-8 indicates that on average, about 70% of the households in Beni Suef would generate sufficient income to pay these charges if the 2% of total income target is accepted. (At a 3% level, about 85% of the households, on average, would generate the income required for the estimated charges.)

E.3.3 Conclusions

Indications from the financial analysis for Beni Suef are listed below.

- A continuation of the existing trends in performance in Beni Suef's water and wastewater sector will produce an estimated combined deficit in the year 2000 of over L.E 6.3 million, about 75% of the estimated total O&M cost for both services.
- Improvements in the current performance indicators in Beni Suef, coupled with savings in O&M cost, will only provide marginal improvements at best.
- Substantial increases in water supply tariffs will be necessary under any condition. The inflation levels alone will require tariff increases; these will be exacerbated if the performance indicators are not raised.
- The increases in tariff and surcharge levels necessary to substantially improve the financial situation in Beni Suef over the next several years and reduce deficits (i.e., subsidies) to zero in 2000 may pose a financial burden to as many as 15 to 30% of the households.

E.4 Financial Analysis for Fayoum

Tables E-9 through E-13 present the financial analyses for Fayoum, Tables E-14 and E-15 present summaries for each of the water supply and wastewater cases, and Table E-16 presents the ability-to-pay illustration.

Table E-9 presents the situation if the base year costs and performance levels are continued to year 2000, with no increases to tariffs or surcharges. Table E-10 presents the situation for increased performance levels and savings in O&M costs. Table E-11 presents the situation for the improvements in E-10, with moderate increases to the tariff and surcharge levels. Table E-12 presents the same situation as E-11, but with greater increases to the tariffs and surcharges. Table E-13 presents the effects of raising the tariff and surcharge levels to produce a zero deficit in the year 2000.

E.4.1 Effects of Savings, Better Performance, and Increased Charges

Table E-9, the base case, indicates the trends for Fayoum's water supply and wastewater situation through fiscal year 2000 if the performance factors for unaccounted-for water, billing collection rates, and the water supply tariff and wastewater surcharge continue at the levels of fiscal year 1993/94, with no savings in O&M cost. Water supply costs increase due to inflation, the removal of the electrical subsidy, and the 3% increase in production. This is the "worst case scenario," with the deficit increasing to nearly L.E 6.8 million—almost three times the present deficit—and the break-even tariff yield in fiscal year 2000 increasing to P84 per m^3, over four times the present tariff yield.

The analysis for the wastewater sector's base case indicates an even worse outlook. The seemingly enormous wastewater service cost of about L.E 6.5 million in fiscal year 1993/94 grows to almost L.E 14.5 million in the year 2000. The high O&M costs, combined with relatively low levels of surcharge revenue, cause the wastewater deficit in the year 2000 to increase to more than L.E 13.5 million, about 93% of the O&M cost.

Table E-10 illustrates the water supply situation with savings production costs of 20% and increased billing collections to 90% in year 1996/97, and a reduction of unaccounted-for water to 25% (down from the present 52%) by year 1997/98. The deficit produced drops to about L.E 7.3 million, indicating an improvement from the base case. However, the deficit is still high—about twice the existing water supply deficit. Table E-10 also illustrates the effect of large savings in wastewater O&M costs. The 50% reduction, considered reasonable for the seemingly enormous base-case budget, combined with the improving water supply situation, produces a deficit in year 2000 only slightly above the present level.

Table E-11 illustrates the effect of increasing the water supply tariff level by 35% and raising the wastewater surcharge to 80% in year 1996/97, and to 100% in 1998/99. These increased charges indicate that the water supply deficit would increase to about one-and-a-half times the present level, and the wastewater deficit would drop to about two-thirds the existing level. This improved case provides the first example of the actions which must be taken to bring the financial outlook into line: the imposition of increased charges, coupled with savings and increases in performance, are necessary for substantial deficit reduction.

Table E-12 provides further support for the conclusion drawn from the previous improved case. This table illustrates the effect of increasing the water supply tariff by approximately 90% in two steps, starting in 1996/97, with wastewater surcharge levels as indicated on Table E-11. These combined substantial increases would cause a water supply deficit in the year 2000 about equal to the present level, and would cause the wastewater deficit to drop to about 40% of the present level.

Table E-13 illustrates the increases required to produce a zero deficit in the year 2000. Water supply tariffs must be increased starting in year 1996/97 and continuing for four years, at rates of 50%, 35%, 20%, and 20%, respectively. The wastewater surcharge levels are the same as in Tables E-11 and E-12.

A summary of the discussion of Tables E-9 through E-13 appears in Tables E-14 and E-15. Conclusions are presented in Section F.4.3 below.

E.4.2 Ability to Pay

Table E-16 presents an ability-to-pay illustration for Fayoum, based on the same methodology used for Beni Suef and presented in section F.3.2

The tariff increases to produce a zero deficit in year 2000, as shown in Table E-13, require that the tariff yield per m^3 of water billed in Fayoum increase to a level of about L.E 51 per m^3. For a household of five persons and a consumption of 150 to 200 liters per capita per day, monthly charges would range from about L.E 11.5 to L.E 15.3 per month, or about L.E 138 to L.E 184 per household

per year. Wastewater charges at a level of 100% surcharge would be equal to those assessed for water supply, making the total annual payment per household in the year 2000 between L.E 276 to L.E 368.

The ability-to-pay illustration in Table E-16 indicates that only the highest income households would have sufficient income to pay these charges if the 2% of total income target is accepted as the reasonable value of percentage of household income to pay for both services.

There is little question that these charges are excessive. They are caused in large part by the inordinately high base-year costs for these services. (See Section E.3.2.) If Fayoum's base cost were reduced by about one-third (which would bring it more in line with Beni Suef), the analysis indicates that the year 2000 annual per household charges for both services would range from approximately L.E 150 to L.E 210. These charges could be accommodated by over 70% of the households at a 3% level of household income.

A more accurate indication of the future financial situation and ability to pay in Fayoum will require better estimates of the city's cost of service.

E.4.3 Conclusions

The conclusions indicated by the Fayoum analyses are the same as those for Beni Suef (see E.3.3). As noted above, better estimates of the cost of service are needed to provide a better indication of the future financial situation and ability to pay in Fayoum.

E.5 Financial Analysis for Menya

Tables E-17 through E-24 present the financial analyses for Menya, Tables E-22 and E-23 present summaries for each of the water supply and wastewater cases, and Table E-24 presents the ability-to-pay illustration.

Table E-17 presents the situation if the base year costs and performance levels are continued to 2000, with no increases to tariffs or surcharges. Table E-18 presents the situation for increased performance levels and savings in O&M costs. Table E-19 presents the situation for the improvements in E-18, with moderate increases to the tariff and surcharge levels. Table E-20 presents the same situation as E-19, but with greater increases to the tariffs and surcharges. Table E-21 presents the effects of raising the tariff and surcharge levels to produce a zero deficit in 2000.

E.5.1 Effects of Savings, Better Performance, and Increased Charges

Table E-17, the base case, indicates the trends for Menya's water supply and wastewater situation through fiscal year 2000 if all performance factors in terms of unaccounted-for water, billing collection rate, water supply tariff, and wastewater surcharges continue at the levels of fiscal year 1993/94, with no savings in the cost of water supply or wastewater service. Water supply costs increase due to inflation, the removal of the electrical subsidy, and the 3% increase in production. This is the "worst case scenario," with the deficit increasing to about 3.2 times the present deficit and the average tariff

yield to break even in fiscal year 2000 increasing to L.E 2.28 per m^3, about 5.4 times the present tariff yield. The wastewater sector's financial condition over the next several years appears similarly intolerable, with the deficit in the year 2000 at 2.5 times the present level and the break-even surcharge value increasing to over 64% of the water supply billings.

Table E-18 illustrates the situation with savings in production of 20% and increased billing collections to 90% in year 2000, and a reduction of unaccounted-for water to 25% (down from the present 55%) in year 1997/98. The deficit situation is better for both water supply and wastewater, but is still very high—about 70% higher for water supply and 50% for wastewater—than the existing deficits.

Table E-19 illustrates the effect of increasing the water supply tariff level by 35% in year 1996/97 and raising the wastewater surcharge to 60% in the same year. These increases indicate that the long-term water supply deficit will increase to slightly above the present level, and the wastewater deficit will drop to just under the existing level. This improved case is the first example of the actions which must be taken to bring the financial outlook into line: the imposition of increased charges, coupled with savings and increased performance, are necessary for substantial deficit reduction.

Table E-20 gives further support to the conclusion drawn from the previous improved case. This table illustrates the effect of increasing the water supply tariff by approximately 75%, in two steps: a 35% increase in 1996/97 and an additional 30% increase in the following year. Concurrently, the wastewater surcharge is increased to 70% in three steps of 10% each, starting in 1997/98. These combined increases cause the water supply deficit to increase by about 34% over the present level and the wastewater deficit to drop to a level about one-third of the existing value.

Table E-21 illustrates the increases required to produce a zero deficit in the year 2000. Water supply tariffs must be increased starting in 1996/97 and continue for four years at rates of 35%, 30%, 30%, and 10% respectively. The wastewater surcharge, benefitting from the substantial water supply tariff increases, has to be increased to only 58% starting in 1997/98.

A summary of the discussion of Tables E-17 through E-21 appears in Tables E-22 and E-23.

E.5.2 Ability to Pay

Table E-24 presents an ability-to-pay illustration for Menya, based on the same methodology used for Beni Suef and presented in section E.3.2

The tariff increases to produce a zero deficit in year 2000, as shown in Table E-21, require that the tariff yield per m^3 of water billed in Menya increase to a level of about L.E 40 per m^3. For a household of five persons and a consumption of 150 to 200 liters per capita per day, monthly charges would range from about L.E 9 to L.E 12 per month, or about L.E 108 to L.E 144 per household per year. Wastewater charges at a level of 100% surcharge would be equal to those assessed for water supply, making the total annual payment per household in the year 2000 between L.E 166 to L.E 217.

The ability-to-pay illustration in Table E-24 indicates that only the top 70-75% of the families in Menya have sufficient income to pay these charges if the 2% of total income target is accepted as the reasonable value of percentage of household income to pay for both services.

There is little question that these charges are excessive. They are caused in large part by the inordinately high base-year costs for these services. (See Section E.3.2.) If Menya's base cost were reduced by about one-third (which would bring it more in line with Beni Suef), the analysis indicates that the year 2000 annual per household charges for both services would range from approximately L.E 150 to L.E 210. These charges could be accommodated by over 70% of the households at a 3% level of household income.

A more accurate indication of the future financial situation and ability to pay in Menya will require better estimates of the city's cost of service.

E.5.3 Conclusions

The conclusions indicated by the Menya analyses are the same as those for Beni Suef (see E.3.3).

TABLE E - 1 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

BENI SUEF -- WATER SUPPLY — BASE CASE

Basis: Inflation at 10%/yr. Decreases in electricity subsidy increases operations costs by 12%/yr. in years 1995/96 and 1996/97. Production increases at 3%/yr. Other performance factors as shown.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	793,651	873,016	960,318	1,056,349	1,161,984	1,278,183	1,406,001
Electricity		1,442,939	1,634,850	2,074,559	2,632,533	2,982,659	3,379,353	3,828,807
Raw Materials		287,529	325,770	369,098	418,188	473,807	536,823	608,221
Other Commodities		15,417	17,467	19,791	22,423	25,405	28,784	32,612
Service Inputs		14,916	16,900	19,148	21,694	24,579	27,849	31,552
Total Yearly Expenditure	LE/Yr.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
Level Of New Savings In Year	%	--	--	--	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
Water Produced	M3/Yr.	16,330,100	16,820,003	17,324,603	17,844,341	18,379,671	18,931,062	19,498,993
Water Billed	M3/Yr.	7,802,711	8,039,961	8,281,160	8,529,595	8,785,483	9,049,047	9,320,519
Unaccounted-For Water	%	52.2%	52.2%	52.2%	52.2%	52.2%	52.2%	52.2%
Production Cost Per M^3 Billed	LE/M3	0.33	0.36	0.42	0.49	0.53	0.58	0.63
REVENUES								
Tariff Increases In Year	--	--	--	--	--	--	--	--
Amount of Water Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	1,940,139	1,998,343	2,058,293	2,120,042
Percentage Collected	%	77%	77%	77%	77%	77%	77%	77%
Amount Collected = Revenue	LE/Yr.	1,373,528	1,414,734	1,457,176	1,500,892	1,545,918	1,592,296	1,640,065
Tariff Yield Per M3 Billed	LE/M3	0.18	0.18	0.18	0.18	0.18	0.18	0.18
DEFICIT	LE/Yr.	1,180,924	1,453,269	1,985,737	2,650,295	3,122,517	3,658,696	4,267,129
Deficit As % Of Cost	%	46%	51%	58%	64%	67%	70%	72%
Break Even Tariff Yld. Per M^3 Billed	LE/M3	0.42	0.46	0.54	0.63	0.69	0.75	0.82
Daily Water Production	M3/Yr.	44,740	46,082	47,465	48,889	50,355	51,866	53,422

BENI SUEF -- WASTEWATER — BASE CASE

Basis: Inflation at 10%/yr. Decreases in electricity subsidy increases operations costs by 12%/yr. in years 1995/96 and 1996/97. Other performance factors as shown.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	881,589	998,840	1,131,686	1,282,200	1,452,733	1,645,946	1,864,857
Raw Materials		95,843	108,590	123,033	139,396	157,936	178,941	202,740
Electricity		231,838	262,672	333,321	422,971	479,226	542,963	615,177
Other Commodity Inputs		7,709	8,734	9,896	11,212	12,703	14,393	16,307
Service Inputs		7,458	8,450	9,574	10,847	12,290	13,924	15,776
Total Yearly Expenditure	LE/Yr.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
Level Of New Savings In Year	%	--	--	--	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
WW Collected and Treated	M3/Yr.	14,600,000	15,038,000	15,489,140	15,953,814	16,432,429	16,925,401	17,433,164
WW Service Unit Cost per M^3 Treat.	LE/M3	0.08	0.09	0.10	0.12	0.13	0.14	0.16
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	40%	40%	40%
WS Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	1,940,139	1,998,343	2,058,293	2,120,042
Surcharged Amount	LE/Yr.	710,201	731,507	753,452	776,056	799,337	823,317	848,017
Collection Rate of Surch. Amt.	%	4%	77%	77%	77%	77%	77%	77%
Surcharge Collected = Revenue	LE/Yr.	29,118	565,894	582,870	600,357	618,367	636,918	656,026
WW Revenue Per M^3 Treated	LE/M3	--	0.04	0.04	0.04	0.04	0.04	0.04
DEFICIT	LE/Yr.	1,195,319	821,393	1,024,639	1,266,270	1,496,520	1,759,249	2,058,832
Deficit As % Of Cost	%	98%	59%	64%	68%	71%	73%	76%
SURCHARGE FOR BREAKEVEN	%	--	76%	85%	96%	106%	116%	128%
Equiv. WW Tariff Per M^3	LE/M3	--	0.12	0.13	0.15	0.17	0.18	0.20
WW Treated Per Day	M3/Day	40,000	41,200	42,436	43,709	45,020	46,371	47,762

TABLE E - 2 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

BENI SUEF -- WATER SUPPLY — IMPROVED CASE I

Basis: As per Base Case, with improvements to performance factors and savings as shown; NO TARIFF INCREASE.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	793,651	873,016	960,318	1,056,349	1,161,984	1,278,183	1,406,001
Electricity		1,442,939	1,634,850	2,074,559	2,632,533	2,982,659	3,379,353	3,828,807
Raw Materials		287,529	325,770	369,098	418,188	473,807	536,823	608,221
Other Commodities		15,417	17,467	19,791	22,423	25,405	28,784	32,612
Service Inputs		14,916	16,900	19,148	21,694	24,579	27,849	31,552
Total Yearly Expenditure	LE/Yr.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
Water Produced	M3/Yr.	16,330,100	16,820,003	17,324,603	17,844,341	18,379,671	18,931,062	19,498,993
Water Billed	M3/Yr.	7,802,711	8,039,961	10,048,270	12,134,152	13,784,754	14,198,296	14,624,245
Unaccounted-For Water	%	52.2%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M^3 Billed	LE/M3	0.33	0.36	0.27	0.27	0.27	0.30	0.32
REVENUES								
Tariff Increases In Year	--	--	--	--	--	--	--	--
Amount of Water Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	1,940,139	1,998,343	2,058,293	2,120,042
Percentage Collected	%	77%	77%	85%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	1,373,528	1,408,151	1,601,086	1,746,125	1,798,509	1,852,464	1,908,038
Tariff Yield Per M^3 Billed	LE/M3	0.18	0.18	0.16	0.14	0.1305	0.13	0.13
DEFICIT	LE/Yr.	1,180,924	1,459,853	1,153,245	1,574,824	1,936,239	2,348,329	2,817,717
Deficit As % Of Cost	%	46%	51%	42%	47%	52%	56%	60%
Break-Even Tariff Yld. Per M^3 Billed	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
Daily Water Production	M3/Yr.	44,740	46,082	47,465	48,889	50,355	51,866	53,422

BENI SUEF -- WASTEWATER — IMPROVED CASE I

Basis: As per Base Case, with improvements to performance factors and savings as shown; NO TARIFF INCREASE.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	881,589	998,840	1,131,686	1,282,200	1,452,733	1,645,946	1,864,857
Raw Materials		95,843	108,590	123,033	139,396	157,936	178,941	202,740
Electricity		231,838	262,672	333,321	422,971	479,226	542,963	615,177
Other Commodity Inputs		7,709	8,734	9,896	11,212	12,703	14,393	16,307
Service Inputs		7,458	8,450	9,574	10,847	12,290	13,924	15,776
Total Yearly Expenditure	LE/Yr.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
WW Collected and Treated	M3/Yr.	14,600,000	15,038,000	15,489,140	15,953,814	16,432,429	16,925,401	17,433,164
WW Service Unit Cost per M3 Treat.	LE/M3	0.08	0.09	0.10	0.12	0.13	0.14	0.16
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	40%	40%	40%
WS Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	1,940,139	1,998,343	2,058,293	2,120,042
Surcharged Amount	LE/Yr.	710,201	731,507	753,452	776,056	799,337	823,317	848,017
Collection Rate of Surch. Amt.	%	4%	77%	85%	90%	90%	90%	90%
Surcharge Collected = Revenue	LE/Yr.	29,118	563,260	640,434	698,450	719,404	740,986	763,215
DEFICIT	LE/Yr.	1,195,319	824,027	645,573	794,851	972,507	1,175,948	1,408,671
Deficit As % Of Cost	LE/Yr.	98%	59%	50%	53%	57%	61%	65%
SURCHARGE FOR BREAKEVEN	%	--	76%	68%	77%	85%	93%	102%
Equiv. WW Tariff Per M3	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WW Treated Per Day	M3/Day	40,000	41,200	42,436	43,709	45,020	46,371	47,762

TABLE E - 3 | USAID -- EHP PROVINCIAL CITIES ASSESSMENT

BENI SUEF -- WATER SUPPLY | IMPROVED CASE II

Basis: As per Water Supply Improved Case I. Improvements to performance factors and savings as shown; and TARIFF INCREASES averaging 35% in the year 1996/97.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	793,651	873,016	960,318	1,056,349	1,161,984	1,278,183	1,406,001
Electricity		1,442,939	1,634,850	2,074,559	2,632,533	2,982,659	3,379,353	3,828,807
Raw Materials		287,529	325,770	369,098	418,188	473,807	536,823	608,221
Other Commodities		15,417	17,467	19,791	22,423	25,405	28,784	32,612
Service Inputs		14,916	16,900	19,148	21,694	24,579	27,849	31,552
Total Yearly Expenditure	LE/Yr.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
Water Produced	M3/Yr.	16,330,100	16,820,003	17,324,603	17,844,341	18,379,671	18,931,062	19,498,993
Water Billed	M3/Yr.	7,802,711	8,039,961	10,048,270	12,134,152	13,784,754	14,198,296	14,624,245
Unaccounted-For Water	%	52.2%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.33	0.36	0.27	0.27	0.27	0.30	0.32
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	35%	--	--	--
Amount of Water Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	2,619,188	2,697,763	2,778,696	2,862,057
Percentage Collected	%	77%	77%	85%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	1,373,528	1,408,151	1,601,086	2,357,269	2,427,987	2,500,827	2,575,851
Tariff Yield Per M3 Billed	LE/M3	$0.18	$0.18	$0.16	$0.19	$0.18	$0.18	$0.18
DEFICIT	LE/Yr.	1,180,924	1,459,853	1,153,245	963,681	1,306,761	1,699,967	2,149,903
Deficit As % Of Cost	%	46%	51%	42%	29%	35%	40%	45%
Break-Even Tariff Yld. Per M3 Billed	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
Daily Water Production	M3/Yr.	44,740	46,082	47,465	48,889	50,355	51,866	53,422

BENI SUEF -- WASTEWATER | IMPROVED CASE II

Basis: As per Improved Case II for WS, with WW SURCHARGE INCREASED to a level equal to 60% of the water bill, imposed in the year 1996/97.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	881,589	998,840	1,131,686	1,282,200	1,452,733	1,645,946	1,864,857
Raw Materials		95,843	108,590	123,033	139,396	157,936	178,941	202,740
Electricity		231,838	262,672	333,321	422,971	479,226	542,963	615,177
Other Commodity Inputs		7,709	8,734	9,896	11,212	12,703	14,393	16,307
Service Inputs		7,458	8,450	9,574	10,847	12,290	13,924	15,776
Total Yearly Expenditure	LE/Yr.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
WW Collected and Treated	M3/Yr.	14,600,000	15,038,000	15,489,140	15,953,814	16,432,429	16,925,401	17,433,164
WW Service Unit Cost per M3 Treat.	LE/M3	0.08	0.09	0.10	0.12	0.13	0.14	0.16
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	60%	60%	60%	60%
WS Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	2,619,188	2,697,763	2,778,696	2,862,057
Surcharged Amount	LE/Yr.	710,201	731,507	753,452	1,571,513	1,618,658	1,667,218	1,717,234
Collection Rate of Surch. Amt.	%	4%	77%	85%	90%	90%	90%	90%
Surcharge Collected = Revenue	LE/Yr.	29,118	563,260	640,434	1,414,361	1,456,792	1,500,496	1,545,511
DEFICIT	LE/Yr.	1,195,319	824,027	645,573	78,940	235,118	416,438	626,376
Deficit As % Of Cost	LE/Yr.	98%	59%	50%	5%	14%	22%	29%
SURCHARGE FOR BREAKEVEN	%	--	76%	68%	57%	63%	69%	76%
Equiv. WW Tariff Per M3	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WW Treated Per Day	M3/Day	40,000	41,200	42,436	43,709	45,020	46,371	47,762

TABLE E - 4 | USAID -- EHP PROVINCIAL CITIES ASSESSMENT

BENI SUEF -- WATER SUPPLY | IMPROVED CASE III

Basis: As per Water Supply Improved Case II. Improvements to performance factors and savings as shown; TARIFF INCREASES averaging approx. 62% in two steps: 35% in year 1996/97, and an additional 20% in year 1997/98.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	793,651	873,016	960,318	1,056,349	1,161,984	1,278,183	1,406,001
Electricity		1,442,939	1,634,850	2,074,559	2,632,533	2,982,659	3,379,353	3,828,807
Raw Materials		287,529	325,770	369,098	418,188	473,807	536,823	608,221
Other Commodities		15,417	17,467	19,791	22,423	25,405	28,784	32,612
Service Inputs		14,916	16,900	19,148	21,694	24,579	27,849	31,552
Total Yearly Expenditure	LE/Yr.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
Water Produced	M3/Yr.	16,330,100	16,820,003	17,324,603	17,844,341	18,379,671	18,931,062	19,498,993
Water Billed	M3/Yr.	7,802,711	8,039,961	10,048,270	12,134,152	13,784,754	14,198,296	14,624,245
Unaccounted-For Water	%	52.2%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.33	0.36	0.27	0.27	0.27	0.30	0.32
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	35%	20%	--	--
Amount of Water Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	2,619,188	3,237,316	3,334,435	3,434,468
Percentage Collected	%	77%	77%	85%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	1,373,528	1,408,151	1,601,086	2,357,269	2,913,584	3,000,992	3,091,022
Tariff Yield Per M3 Billed	LE/M3	0.18	0.18	0.16	0.19	0.2114	0.21	0.21
DEFICIT	LE/Yr.	1,180,924	1,459,853	1,153,245	963,681	821,164	1,199,801	1,634,733
Deficit As % Of Cost	%	46%	51%	42%	29%	22%	29%	35%
BreakEven Tariff Yld. Per M3 Billed	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
Daily Water Production	M3/Yr.	44,740	46,082	47,465	48,889	50,355	51,866	53,422

BENI SUEF -- WASTEWATER | IMPROVED CASE III

Basis: As per Improved Case III for WS, with WW SURCHARGE INCREASED to a level equal to 70% of the water bill in the year 2000 by, imposing three increases of 10 % each starting in the year 1997/98.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	881,589	998,840	1,131,686	1,282,200	1,452,733	1,645,946	1,864,857
Raw Materials		95,843	108,590	123,033	139,396	157,936	178,941	202,740
Electricity		231,838	262,672	333,321	422,971	479,226	542,963	615,177
Other Commodity Inputs		7,709	8,734	9,896	11,212	12,703	14,393	16,307
Service Inputs		7,458	8,450	9,574	10,847	12,290	13,924	15,776
Total Yearly Expenditure	LE/Yr.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
WW Collected and Treated	M3/Yr.	14,600,000	15,038,000	15,489,140	15,953,814	16,432,429	16,925,401	17,433,164
WW Service Unit Cost per M3 Treat.	LE/M3	0.08	0.09	0.10	0.12	0.13	0.14	0.16
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	50%	60%	70%
WS Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	2,619,188	3,237,316	3,334,435	3,434,468
Surcharged Amount	LE/Yr.	710,201	731,507	753,452	1,047,675	1,618,658	2,000,661	2,404,128
Collection Rate of Surch. Amt.	%	4%	77%	85%	90%	90%	90%	90%
Surcharge Collected = Revenue	LE/Yr.	29,118	563,260	640,434	942,908	1,456,792	1,800,595	2,163,715
DEFICIT	LE/Yr.	1,195,319	824,027	645,573	550,393	235,118	116,339	8,171
Deficit As % Of Cost	LE/Yr.	98%	59%	50%	37%	14%	6%	0%
SURCHARGE FOR BREAKEVEN	%	--	76%	68%	57%	52%	57%	63%
Equiv. WW Tariff Per M3	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WW Treated Per Day	M3/Day	40,000	41,200	42,436	43,709	45,020	46,371	47,762

TABLE E - 5 | USAID -- EHP PROVINCIAL CITIES ASSESSMENT

BENI SUEF -- WATER SUPPLY | IMPROVED CASE IV

Basis: As per Water Supply Improved Case II. Improvements to performance factors and savings as shown; TARIFF INCREASES imposed as shown to produce a zero deficit in year 2000. Increases equivalent to incr. exist tariff by approx. 150%.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	793,651	873,016	960,318	1,056,349	1,161,984	1,278,183	1,406,001
Electricity		1,442,939	1,634,850	2,074,559	2,632,533	2,982,659	3,379,353	3,828,807
Raw Materials		287,529	325,770	369,098	418,188	473,807	536,823	608,221
Other Commodities		15,417	17,467	19,791	22,423	25,405	28,784	32,612
Service Inputs		14,916	16,900	19,148	21,694	24,579	27,849	31,552
Total Yearly Expenditure	LE/Yr.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
Water Produced	M3/Yr.	16,330,100	16,820,003	17,324,603	17,844,341	18,379,671	18,931,062	19,498,993
Water Billed	M3/Yr.	7,802,711	8,039,961	10,048,270	12,134,152	13,784,754	14,198,296	14,624,245
Unaccounted-For Water	%	52.2%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.33	0.36	0.27	0.27	0.27	0.30	0.32
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	33%	30%	30%	10%
Amount of Water Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	2,580,385	3,455,135	4,626,426	5,241,741
Percentage Collected	%	77%	77%	85%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	1,373,528	1,408,151	1,601,086	2,322,346	3,109,622	4,163,784	4,717,567
Tariff Yield Per M3 Billed	LE/M3	0.18	0.18	0.16	0.19	0.23	0.29	0.32
DEFICIT	LE/Yr.	1,180,924	1,459,853	1,153,245	998,603	625,126	37,010	8,188
Deficit As % Of Cost	%	46%	51%	42%	30%	17%	1%	0%
Break-Even Tariff Yld. Per M3 Billed	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
Daily Water Production	M3/Yr.	44,740	46,082	47,465	48,889	50,355	51,866	53,422

BENI SUEF -- WASTEWATER | IMPROVED CASE IV

Basis: As per Water Supply Improved Case IV. Surcharges increased to produce a zero deficit in year 2000. Surcharge increases up to 46% required, starting in year1997/98.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	881,589	998,840	1,131,686	1,282,200	1,452,733	1,645,946	1,864,857
Raw Materials		95,843	108,590	123,033	139,396	157,936	178,941	202,740
Electricity		231,838	262,672	333,321	422,971	479,226	542,963	615,177
Other Commodity Inputs		7,709	8,734	9,896	11,212	12,703	14,393	16,307
Service Inputs		7,458	8,450	9,574	10,847	12,290	13,924	15,776
Total Yearly Expenditure	LE/Yr.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
WW Collected and Treated	M3/Yr.	14,600,000	15,038,000	15,489,140	15,953,814	16,432,429	16,925,401	17,433,164
WW Service Unit Cost per M3 Treat.	LE/M3	0.08	0.09	0.10	0.12	0.13	0.14	0.16
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	45%	45%	46%
WS Billings	LE/Yr.	1,775,502	1,828,767	1,883,630	2,580,385	3,455,135	4,626,426	5,241,741
Surcharged Amount	LE/Yr.	710,201	731,507	753,452	1,032,154	1,554,811	2,081,892	2,411,201
Collection Rate of Surch. Amt.	%	4%	77%	85%	90%	90%	90%	90%
Surcharge Collected = Revenues	LE/Yr.	29,118	563,260	640,434	928,939	1,399,330	1,873,703	2,170,081
DEFICIT	LE/Yr.	1,195,319	824,027	645,573	564,362	292,580	43,232	1,806
Deficit As % Of Cost	LE/Yr.	98%	59%	50%	38%	17%	2%	0%
SURCHARGE FOR BREAKEVEN	%	--	76%	68%	58%	49%	41%	41%
Equiv. WW Tariff Per M3	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WW Treated Per Day	M3/Day	40,000	41,200	42,436	43,709	45,020	46,371	47,762

TABLE E - 6 BENI SUEF WATER SUPPLY -- SUMMARY OF FINANCIAL ANALYSES

SITUATION	BASIS	RESULTS/INDICATORS	UNITS	FISCAL YEAR ENDING IN						
				1994	1995	1996	1997	1998	1999	2000
WATER SUPPLY BASE CASE	Existing situation, with costs increasing due to: - Inflation at 10 % per year. - Subsidy for Electricity cut, causing operation cost to increse by 12 % yr. in yrs.1995/96 and 1996/97 - Increases in production at 3% per yr.	OPERATIONS COST	LE/YR.	2,554,452	2,868,004	3,442,913	4,151,187	4,668,435	5,250,991	5,907,193
		REVENUES	LE/YR.	1,373,528	1,414,734	1,457,176	1,500,892	1,545,918	1,592,296	1,640,065
		DEFICIT	LE/YR.	1,180,924	1,453,269	1,985,737	2,650,295	3,122,517	3,658,696	4,267,129
		DEFICIT AS % OF COST	%	46%	51%	58%	64%	67%	70%	72%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	--	--	--	--
		BILLING COLLECTION RATE	%	77%	77%	77%	77%	77%	77%	77%
		UNACCOUNTED FOR WATER	%	52%	52%	52%	52%	52%	52%	52%
		TARIFF INREASES ASSUMED	%	--	--	--	--	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.18	0.18	0.18	0.18	0.18	0.18	0.18
		TARIFF YIELD TO BREAKEVEN	LE/M3	0.42	0.46	0.54	0.63	0.69	0.75	0.82
WATER SUPPLY IMPROVED CASE I	- As for Base Case, with improved collections of billings, and decreses to unaccounted for water, as shown. - Savings of 20% in operations cost assumed in year 1996/97. - No tariff increases assumed.	OPERATIONS COST	LE/YR.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
		REVENUES	LE/YR.	1,373,528	1,408,151	1,601,086	1,746,125	1,798,509	1,852,464	1,908,038
		DEFICIT	LE/YR.	1,180,924	1,459,853	1,153,245	1,574,824	1,936,239	2,348,329	2,817,717
		DEFICIT AS % OF COST	%	46%	51%	42%	47%	52%	56%	60%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	77%	77%	85%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	33%	36%	27%	27%	27%	30%	32%
		TARIFF INREASES ASSUMED	%	--	--	--	--	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.18	0.18	0.16	0.14	0.13	0.13	0.13
		TARIFF YIELD TO BREAKEVEN	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
WATER SUPPLY IMPROVED CASE II	- As for Improved Case I, for savings and increased performance indicators, BUT with tariff increases - averaging 35% - imposed in year 1996/97.	OPERATIONS COST	LE/YR.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
		REVENUES	LE/YR.	1,373,528	1,408,151	1,601,086	2,357,269	2,427,987	2,500,827	2,575,851
		DEFICIT	LE/YR.	1,180,924	1,459,853	1,153,245	963,681	1,306,761	1,699,967	2,149,903
		DEFICIT AS % OF COST	%	46%	51%	42%	29%	35%	40%	45%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	77%	77%	85%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	52%	52%	42%	32%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	35%	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.18	0.18	0.16	0.19	0.18	0.18	0.18
		TARIFF YIELD TO BREAKEVEN	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
WATER SUPPLY IMPROVED CASE III	- As for Improved Case II, but with tariffs increases - averaging approx. 62% - imposed in two steps: 35 % in year 1996/97, and an additional 20% added in year 1997/98.	OPERATIONS COST	LE/YR.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
		REVENUES	LE/YR.	1,373,528	1,408,151	1,601,086	2,357,269	2,913,584	3,000,992	3,091,022
		DEFICIT	LE/YR.	1,180,924	1,459,853	1,153,245	963,681	821,164	1,199,801	1,634,733
		DEFICIT AS % OF COST	%	46%	51%	42%	29%	22%	29%	35%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	77%	77%	85%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	52%	52%	42%	32%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	35%	20%	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.18	0.18	0.16	0.19	0.21	0.21	0.21
		TARIFF YIELD TO BREAKEVEN	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36
WATER SUPPLY IMPROVED CASE IV	- As for Improved Case II, but with tariffs increases assumed to produce a deficit equal to zero in year 2000. The assumed tariff increases start in in year 1996/97, and are imposed yearly till the year 2000, at rates of 33%, 30%, 30% and 10% respectivel	OPERATIONS COST	LE/YR.	2,554,452	2,868,004	2,754,330	3,320,949	3,734,748	4,200,793	4,725,755
		REVENUES	LE/YR.	1,373,528	1,408,151	1,601,086	2,322,346	3,109,622	4,163,784	4,717,567
		DEFICIT	LE/YR.	1,180,924	1,459,853	1,153,245	998,603	625,126	37,010	8,188
		DEFICIT AS % OF COST	%	46%	51%	42%	30%	17%	1%	0%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	77%	77%	85%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	52%	52%	42%	32%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	33%	30%	30%	10%
		AVERAGE TARIFF YIELD	LE/M3	0.18	0.18	0.16	0.19	0.23	0.29	0.32
		TARIFF YIELD TO BREAKEVEN	LE/M3	0.42	0.46	0.32	0.30	0.30	0.33	0.36

TABLE E - 7 BENI SUEF WASTEWATER -- SUMMARY OF FINANCIAL ANALYSES

SITUATION	BASIS	RESULTS/INDICATORS	UNITS	FISCAL YEAR ENDING IN						
				1994	1995	1996	1997	1998	1999	2000
WASTEWATER BASE CASE	Existing situation, with costs increasing due to: - Inflation at 10 % per year. - Subsidy for Electricity cut, causing operation cost to increse by 12 % yr. in yrs.1995/96 and 1996/97	OPERATIONS COST	LE/YR.	1,224,437	1,387,287	1,607,509	1,866,626	2,114,888	2,396,168	2,714,858
		REVENUES	LE/YR.	29,118	565,894	582,870	600,357	618,367	636,918	656,026
		DEFICIT	LE/YR.	1,195,319	821,393	1,024,639	1,266,270	1,496,520	1,759,249	2,058,832
		DEFICIT AS % OF COST	%	98%	59%	64%	68%	71%	73%	76%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	40%	40%	40%
		SURCHARGE TO BREAKEVEN	%	--	76%	85%	96%	106%	116%	128%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.12	0.13	0.15	0.17	0.18	0.20
WASTEWATER IMPROVED CASE I	- As for Base Case. Revenue benefits from WS improvements in billing collections, and decreases in level of unaccounted for water. - Savings of 20% in operations cost assumed in year 1996/97. - No increases in surcharge level.	OPERATIONS COST	LE/YR.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
		REVENUES	LE/YR.	29,118	563,260	640,434	698,450	719,404	740,986	763,215
		DEFICIT	LE/YR.	1,195,319	824,027	645,573	794,851	972,507	1,175,948	1,408,671
		DEFICIT AS % OF COST	%	98%	59%	50%	53%	57%	61%	65%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	40%	40%	40%
		SURCHARGE TO BREAKEVEN	%	--	76%	68%	77%	85%	93%	102%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WASTEWATER IMPROVED CASE II	- As for Improved Case I, for savings, BUT with surcharg level increased to 60% starting in year 1996/97.	OPERATIONS COST	LE/YR.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
		REVENUES	LE/YR.	29,118	563,260	640,434	1,414,361	1,456,792	1,500,496	1,545,511
		DEFICIT	LE/YR.	1,195,319	824,027	645,573	78,940	235,118	416,438	626,376
		DEFICIT AS % OF COST	%	98%	59%	50%	5%	14%	22%	29%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	60%	60%	60%	60%
		SURCHARGE TO BREAKEVEN	%	--	76%	68%	57%	63%	69%	76%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WASTEWATER IMPROVED CASE III	- As for Improved Case II, but with surcharges increased, to 70 % in imposed in three steps of 10% each. Starting in year 1997/98 the surcharge increases to 50 % and then to 60, and 70% respectively, in the two following years.	OPERATIONS COST	LE/YR.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
		REVENUES	LE/YR.	29,118	563,260	640,434	942,908	1,456,792	1,800,595	2,163,715
		DEFICIT	LE/YR.	1,195,319	824,027	645,573	550,393	235,118	116,339	8,171
		DEFICIT AS % OF COST	%	98%	59%	50%	37%	14%	6%	0%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	50%	60%	70%
		SURCHARGE TO BREAKEVEN	%	--	76%	68%	57%	52%	57%	63%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17
WASTEWATER IMPROVED CASE IV	- As for Improved Case II, but with WW surcharges increased to produce zero deficit in the year 2000. Wastewater revenue is greatly enhanced by the large increases assumed in the water supply tariff. Thus, increases to the wastewater surcharge for this case requires only an increase to 46% in the year 1997/98.	OPERATIONS COST	LE/YR.	1,224,437	1,387,287	1,286,007	1,493,301	1,691,910	1,916,934	2,171,886
		REVENUES	LE/YR.	29,118	563,260	640,434	928,939	1,399,330	1,873,703	2,170,081
		DEFICIT	LE/YR.	1,195,319	824,027	645,573	564,362	292,580	43,232	1,806
		DEFICIT AS % OF COST	%	98%	59%	50%	38%	17%	2%	0%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	45%	45%	46%
		SURCHARGE TO BREAKEVEN	%	--	76%	68%	58%	49%	41%	41%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.12	0.12	0.13	0.14	0.16	0.17

TABLE E -8

EHP PROVINCIAL CITIES ASSESSMENT
ESTIMATES OF HOUSEHOLD INCOME

BENI SUEF

AVERAGE YRLY. INCOME PER HH (Yr. 1992):

GOVERNORATE	=	5,517	(CAPMAS data)
NATIONAL	=	6,120	(CAPMAS data)
RATIO GOVER.YRLY. AVG. TO NATIONAL AVG.	=	90.1%	
HH INCOME GROWTH RATE	=	11%	
AVG. YRLY. INC.-LOWEST 30% OF GOVERN. HH	=	2,200	

(Computed using CAPMAS data)

RANGE OF HH INCOME	% OF HH IN RANGE	AVERAGE ANNUAL HOUSEHOLD INCOME		HH INCOME PROJECTED TO YR. 1995	HH INCOME PROJECTED TO YR. 2000	2% OF HOUSEHOLD INCOME	
		NATIONAL BASIS	GOVERN. BASIS			YR. 1995	YR. 2000
(LE)	(%)	(LE)	(LE)	(NOTE 1)	(NOTE 1)	(LE/YR.)	(LE/YR.)
UNDER 1,500	4.4%	1,083	976	1,335	2,250	26.7	45.0
1,550 to 2,500	11.0%	2,066	1,862	2,547	4,292	50.9	85.8
2,500 to 3,500	16.2%	3,017	2,720	3,720	6,268	74.4	125.4
3,500 to 6,500	36.3%	4,611	4,157	5,685	9,579	113.7	191.6
6,500 to 12,000	25.9%	7,941	7,159	9,790	16,497	195.8	329.9
OVER 12,000	6.2%	25,266	22,777	31,150	52,489	623.0	1,049.8
FOR LOWEST 30% OF GOVERN. HH			2,200	3,009	4,115	60.2	82.3

Note (1) Projections from 1992 at 11% per year, based upon CAPMAS data. See Appendix F for explanation.

COMPARISON OF PROJECTED HH INCOME TO
TO WS TARIFF, AND WW SURCHARGE

BENI SUEF (Domestic Consumption Estimated in 1986 USAID Master Plan as 83% Of Total WS).

WS DOMESTIC TARIFF, PRESENT RATES:

UP TO 30 M3 / MO. at LE PER M3	=	0.23
OVER 30 M3 / MO. at LE PER M3	=	0.30
WW SURCHARGE: @ PERCENT OF WATER BILL	=	40%

THE FOLLOWING CHARGES ARE APPLICABLE
FOR HH's OF 5 PERSONS:

CONSUMPTION PER PERSON	MONTHLY HH CONSUMPTION	MONTHLY CHARGE AT PRESENT WS TARIFF	WW CHARGE AT PRESENT SURCHARGE	TOTAL MONTHLY CHARGE	ANNUAL CHARGE
(LPCD)	(M3)	(LE/MO.)	(LE/MO.)	(LE/MO.)	(LE/YR.)
100	15	3.5	1.4	4.8	58.0
150	22.5	5.2	2.1	7.2	86.9
200	30	6.9	2.8	9.7	115.9
250	37.5	9.2	3.7	12.8	153.7

TABLE E - 9 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

FAYOUM -- WATER SUPPLY — BASE CASE

Basis: Inflation at 10%/yr. Decreases in electricity subsidy increases operations costs by 12%/yr. in years 1995/96, and 1996/97. Production increases at 3%/yr. Other performance factors as shown.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	2,506,353	2,756,988	3,032,687	3,335,956	3,669,551	4,036,507	4,440,157
Electricity		1,176,000	1,332,408	1,690,772	2,145,523	2,430,877	2,754,184	3,120,490
Raw Materials		751,328	851,255	964,471	1,092,746	1,238,081	1,402,746	1,589,312
Other Commodities		12,155	13,772	15,603	17,678	20,030	22,694	25,712
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
Level Of New Savings In Year	%	--	--	--	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
Water Produced	M3/Yr.	18,013,845	18,554,260	19,110,888	19,684,215	20,274,741	20,882,983	21,509,473
Water Billed	M3/Yr.	10,633,698	10,947,014	11,275,424	11,613,687	11,962,097	12,320,960	12,690,589
Unaccounted For Water	%	41.0%	41.0%	41.0%	41.0%	41.0%	41.0%	41.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.45	0.51	0.57	0.62	0.67	0.72
REVENUES								
Tariff Increases In Year	--	--	--	--	--	--	--	--
Amount of Water Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	2,558,123	2,634,867	2,713,913	2,795,330
Percentage Collected	%	86.3%	86.3%	86.3%	86.3%	86.3%	86.3%	86.3%
Amount Collected = Revenue	LE/Yr.	2,020,602	2,080,931	2,143,359	2,207,660	2,273,890	2,342,107	2,412,370
Tariff Yield Per M3 Billed	LE/M3	0.19	0.19	0.19	0.19	0.19	0.19	0.19
DEFICIT	LE/Yr.	2,425,234	2,873,491	3,560,175	4,384,243	5,084,650	5,874,024	6,763,301
Deficit As % Of Cost	%	55%	58%	62%	67%	69%	71%	74%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	0.48	0.52	0.59	0.66	0.71	0.77	0.84
Daily WaterProduction	M3/Yr.	49,353	50,834	52,359	53,929	55,547	57,214	58,930

FAYOUM -- WASTEWATER — BASE CASE

Basis: Inflation at 10%/yr. Decreases in electricity subsidy increases operations costs by 12%/yr. in years 1995/96, and 1996/97. Other performance factors as shown.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	4,929,557	5,585,188	6,328,018	7,169,645	8,123,207	9,203,594	10,427,672
Raw Materials		344	390	442	500	567	642	728
Electricity		1,506,000	1,706,298	2,165,224	2,747,583	3,113,011	3,527,041	3,996,138
Other Commodity Inputs		30,637	34,712	39,328	44,559	50,485	57,200	64,808
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	6,466,538	7,326,588	8,533,012	9,962,286	11,287,271	12,788,477	14,489,345
Level Of New Savings In Year	%	--	--	--	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	6,466,538	7,326,588	8,533,012	9,962,286	11,287,271	12,788,477	14,489,345
WW Collected and Treated	M3/Yr.	15,768,000	16,241,040	16,728,271	17,230,119	17,747,023	18,279,434	18,827,817
WW Service Unit Cost per M3 Treat.	LE/M3	0.41	0.45	0.51	0.58	0.64	0.70	0.77
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	40%	40%	40%
WS Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	2,558,123	2,634,867	2,713,913	2,795,330
Surcharged Amount	LE/Yr.	936,418	964,511	993,446	1,023,249	1,053,947	1,085,565	1,118,132
Collection Rate of Surch. Amt.	%	61%	86%	86%	86%	86%	86%	86%
Surcharge Collected = Revenue	LE/Yr.	571,215	832,373	857,344	883,064	909,556	936,843	964,948
WW Revenue Per M3 Treated	LE/M3	--	0.05	0.05	0.05	0.05	0.05	0.05
DEFICIT	LE/Yr.	5,895,323	6,494,215	7,675,668	9,079,222	10,377,714	11,851,635	13,524,397
Deficit As % Of Cost	%	91%	89%	90%	91%	92%	93%	93%
SURCHARGE FOR BREAK EVEN	%	453%	352%	398%	451%	496%	546%	601%
Equiv. WW Tariff Per M3	LE/M3	0.67	0.52	0.59	0.67	0.74	0.81	0.89
WW Treated Per Day	M3/Day	43,200	44,496	45,831	47,206	48,622	50,081	51,583

TABLE E - 10 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

FAYOUM -- WATER SUPPLY — IMPROVED CASE I

Basis: As per Base Case, with improvements to performance factors and savings as shown; NO TARIFF INCREASE.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	2,506,353	2,756,988	3,032,687	3,335,956	3,669,551	4,036,507	4,440,157
Electricity		1,176,000	1,332,408	1,690,772	2,145,523	2,430,877	2,754,184	3,120,490
Raw Materials		751,328	851,255	964,471	1,092,746	1,238,081	1,402,746	1,589,312
Other Commodities		12,155	13,772	15,603	17,678	20,030	22,694	25,712
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
Level Of New Savings In Year	%	--	--	--	20%	--	--	--
Total Expenditure Including Savings	LE/Yr.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
Water Produced	M3/Yr.	18,013,845	18,554,260	19,110,888	19,684,215	20,274,741	20,882,983	21,509,473
Water Billed	M3/Yr.	10,633,698	11,874,727	13,377,622	14,763,161	15,206,056	15,662,238	16,132,105
Unaccounted For Water	%	41.0%	36.0%	30.0%	25.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.42	0.43	0.36	0.39	0.42	0.46
REVENUES								
Tariff Increases In Year	--	--	--	--	--	--	--	--
Amount of Water Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	2,558,123	2,634,867	2,713,913	2,795,330
Percentage Collected	%	86.3%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
Amount Collected = Revenue	LE/Yr.	2,020,602	2,170,149	2,235,253	2,302,311	2,371,380	2,442,521	2,515,797
Tariff Yield Per M3 Billed	LE/M3	0.19	0.18	0.17	0.16	0.16	0.16	0.16
DEFICIT	LE/Yr.	2,425,234	2,784,274	3,468,281	2,971,212	3,515,452	4,130,383	4,824,740
Deficit As % Of Cost	%	55%	56%	61%	56%	60%	63%	66%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
Daily WaterProduction	M3/Yr.	49,353	50,834	52,359	53,929	55,547	57,214	58,930

FAYOUM -- WASTEWATER — IMPROVED CASE I

Basis: As per Base Case, with improvements to performance factors and savings as shown; NO SURCHARGE INCREASE.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	4,929,557	5,585,188	6,328,018	7,169,645	8,123,207	9,203,594	10,427,672
Raw Materials		344	390	442	500	567	642	728
Electricity		1,506,000	1,706,298	2,165,224	2,747,583	3,113,011	3,527,041	3,996,138
Other Commodity Inputs		30,637	34,712	39,328	44,559	50,485	57,200	64,808
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	6,466,538	7,326,588	8,533,012	9,962,286	11,287,271	12,788,477	14,489,345
Level Of New Savings In Year	%	--	--	--	35%	15%	--	--
Total Expenditure Including Savings	LE/Yr.	6,466,538	7,326,588	8,533,012	6,475,486	5,643,635	6,394,239	7,244,672
WW Collected and Treated	M3/Yr.	15,768,000	16,241,040	16,728,271	17,230,119	17,747,023	18,279,434	18,827,817
WW Service Unit Cost per M3 Treat.	LE/M3	0.41	0.45	0.51	0.58	0.64	0.70	0.77
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	40%	40%	40%
WS Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	2,558,123	2,634,867	2,713,913	2,795,330
Surcharged Amount	LE/Yr.	936,418	964,511	993,446	1,023,249	1,053,947	1,085,565	1,118,132
Collection Rate of Surch. Amt.	%	61%	90%	90%	90%	90%	90%	90%
Amount of Surcharge Collected	LE/Yr.	571,215	868,059	894,101	920,924	948,552	977,009	1,006,319
WW Revenue Per M3 Treated	LE/M3	0.04	0.05	0.05	0.05	0.05	0.05	0.05
DEFICIT	LE/Yr.	5,895,323	6,458,528	7,638,911	5,554,562	4,695,083	5,417,230	6,238,354
Deficit As % Of Cost	LE/Yr.	91%	88%	90%	86%	83%	85%	86%
SURCHARGE FOR BREAK EVEN	%	453%	338%	382%	281%	238%	262%	288%
Equiv. WW Tariff Per M3	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
WW Treated Per Day	M3/Day	43,200	44,496	45,831	47,206	48,622	50,081	51,583

TABLE E - 11 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

FAYOUM -- WATER SUPPLY — IMPROVED CASE II

Basis: As per Water Supply Improved Case I. Improvements to performance factors and savings as shown; and TARIFF INCREASES averaging 35% in the year 1996/97.

	UNITS	YEAR 1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	2,506,353	2,756,988	3,032,687	3,335,956	3,669,551	4,036,507	4,440,157
Electricity		1,176,000	1,332,408	1,690,772	2,145,523	2,430,877	2,754,184	3,120,490
Raw Materials		751,328	851,255	964,471	1,092,746	1,238,081	1,402,746	1,589,312
Other Commodities		12,155	13,772	15,603	17,678	20,030	22,694	25,712
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
Level Of New Savings In Year	%	--	--	--	20%	--	--	--
Total Expenditure Including Savings	LE/Yr.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
Water Produced	M3/Yr.	18,013,845	18,554,260	19,110,888	19,684,215	20,274,741	20,882,983	21,509,473
Water Billed	M3/Yr.	10,633,698	11,874,727	13,377,622	14,763,161	15,206,056	15,662,238	16,132,105
Unaccounted For Water	%	41.0%	36.0%	30.0%	25.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.42	0.43	0.36	0.39	0.42	0.46
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	35%	--	--	--
Amount of Water Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	3,453,466	3,557,070	3,663,782	3,773,696
Percentage Collected	%	86.3%	90%	90%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	2,020,602	2,170,149	2,235,253	3,108,120	3,201,363	3,297,404	3,396,326
Tariff Yield Per M3 Billed	LE/M3	0.19	$0.18	$0.17	$0.21	$0.21	$0.21	$0.21
DEFICIT	LE/Yr.	2,425,234	2,784,274	3,468,281	2,165,403	2,685,469	3,275,500	3,944,211
Deficit As % Of Cost	%	55%	56%	61%	41%	46%	50%	54%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
Daily WaterProduction	M3/Yr.	49,353	50,834	52,359	53,929	55,547	57,214	58,930

USAID -- EHP PROVINCIAL CITIES ASSESSMENT

FAYOUM -- WASTEWATER — IMPROVED CASE II

Basis: As per Improved Case II for WS, with WW SURCHARGE INCREASED to 100% in two steps, 80% for yrs. 1996/97, and 1997/98 and 100% thereafter. Savings in O&M cost in two steps, at 35% and 15% in yrs. 1996/97, and 1997/98 rspectively.

	UNITS	YEAR 1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	4,929,557	5,585,188	6,328,018	7,169,645	8,123,207	9,203,594	10,427,672
Raw Materials		344	390	442	500	567	642	728
Electricity		1,506,000	1,706,298	2,165,224	2,747,583	3,113,011	3,527,041	3,996,138
Other Commodity Inputs		30,637	34,712	39,328	44,559	50,485	57,200	64,808
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	6,466,538	7,326,588	8,533,012	9,962,286	11,287,271	12,788,477	14,489,345
Level Of New Savings In Year	%	--	--	--	35%	15%	--	--
Total Expenditure Including Savings	LE/Yr.	6,466,538	7,326,588	8,533,012	6,475,486	5,643,635	6,394,239	7,244,672
WW Collected and Treated	M3/Yr.	15,768,000	16,241,040	16,728,271	17,230,119	17,747,023	18,279,434	18,827,817
WW Service Unit Cost per M3 Treat.	LE/M3	0.41	0.45	0.51	0.58	0.64	0.70	0.77
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	80%	80%	100%	100%
WS Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	3,453,466	3,557,070	3,663,782	3,773,696
Surcharged Amount	LE/Yr.	936,418	964,511	993,446	2,762,773	2,845,656	3,663,782	3,773,696
Collection Rate of Surch. Amt.	%	61%	90%	90%	90%	90%	90%	90%
Amount of Surcharge Collected	LE/Yr.	571,215	868,059	894,101	2,486,496	2,561,091	3,297,404	3,396,326
WW Revenue Per M3 Treated	LE/M3	0.04	0.05	0.05	0.14	0.14	0.18	0.18
DEFICIT	LE/Yr.	5,895,323	6,458,528	7,638,911	3,988,991	3,082,545	3,096,835	3,848,346
Deficit As % Of Cost	LE/Yr.	91%	88%	90%	62%	55%	48%	53%
SURCHARGE FOR BREAK EVEN	%	453%	338%	382%	208%	176%	194%	213%
Equiv. WW Tariff Per M3	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
WW Treated Per Day	M3/Day	43,200	44,496	45,831	47,206	48,622	50,081	51,583

TABLE E - 12 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

FAYOUM -- WATER SUPPLY — IMPROVED CASE III

Basis: As per Water Supply Improved Case II. Improvements to performance factors and savings as shown; TARIFF INCREASES averaging approx. 90% in two steps: 40% in year 1996/97, and an additional 35% in year 1997/98.

	UNITS	YEAR 1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	2,506,353	2,756,988	3,032,687	3,336,956	3,669,551	4,036,507	4,440,157
Electricity		1,176,000	1,332,408	1,690,772	2,145,523	2,430,877	2,754,184	3,120,490
Raw Materials		751,328	851,255	964,471	1,092,746	1,238,081	1,402,746	1,589,312
Other Commodities		12,155	13,772	15,603	17,678	20,030	22,694	25,712
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
Level Of New Savings In Year	%	--	--		20%	--	--	--
Total Expenditure Including Savings	LE/Yr.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
Water Produced	M3/Yr.	18,013,845	18,554,260	19,110,888	19,684,215	20,274,741	20,882,983	21,509,473
Water Billed	M3/Yr.	10,633,698	11,874,727	13,377,622	14,763,161	15,206,056	15,662,238	16,132,105
Unaccounted For Water	%	41.0%	36.0%	30.0%	25.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.42	0.43	0.36	0.39	0.42	0.46
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	40%	35%	--	--
Amount of Water Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	3,581,372	4,979,898	5,129,295	5,283,174
Percentage Collected	%	86.3%	90%	90%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	2,020,602	2,170,149	2,235,253	3,223,235	4,481,908	4,616,366	4,754,857
Tariff Yield Per M3 Billed	LE/M3	0.19	$0.18	$0.17	$0.22	$0.29	$0.29	$0.29
DEFICIT	LE/Yr.	2,425,234	2,784,274	3,468,281	2,050,287	1,404,923	1,956,539	2,585,680
Deficit As % Of Cost	%	55%	56%	61%	39%	24%	30%	35%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
Daily WaterProduction	M3/Yr.	49,353	50,834	52,359	53,929	55,547	57,214	58,930

FAYOUM -- WASTEWATER — IMPROVED CASE III

Basis: As per Improved Case II for WS, with WW SURCHARGE INCREASED to 100% Of the water supply bill in two steps. The surcharge is pegged at 80% for years 1996/97, and 1997/98, and then at 100% thereafter.

	UNITS	YEAR 1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	4,929,557	5,585,188	6,328,018	7,169,645	8,123,207	9,203,594	10,427,672
Raw Materials		344	390	442	500	567	642	728
Electricity		1,506,000	1,706,298	2,165,224	2,747,583	3,113,011	3,527,041	3,996,138
Other Commodity Inputs		30,637	34,712	39,328	44,559	50,485	57,200	64,808
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	6,466,538	7,326,588	8,533,012	9,962,286	11,287,271	12,788,477	14,489,345
Level Of New Savings In Year	%	--	--	--	35%	15%	--	--
Total Expenditure Including Savings	LE/Yr.	6,466,538	7,326,588	5,546,458	6,475,486	5,643,635	6,394,239	7,244,672
WW Collected and Treated	M3/Yr.	15,768,000	16,241,040	16,728,271	17,230,119	17,747,023	18,279,434	18,827,817
WW Service Unit Cost per M3 Treat.	LE/M3	0.41	0.45	0.51	0.58	0.64	0.70	0.77
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	80%	80%	100%	100%
WS Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	3,581,372	4,979,898	5,129,295	5,283,174
Surcharged Amount	LE/Yr.	936,418	964,511	993,446	2,865,098	3,983,919	5,129,295	5,283,174
Collection Rate of Surch. Amt.	%	61%	90%	90%	90%	90%	90%	90%
Amount of Surcharge Collected	LE/Yr.	571,215	868,059	894,101	2,578,588	3,585,527	4,616,366	4,754,857
WW Revenue Per M3 Treated	LE/M3	0.04	0.05	0.05	0.15	0.20	0.25	0.25
DEFICIT	LE/Yr.	5,895,323	6,458,528	4,652,357	3,896,898	2,058,109	1,777,873	2,489,816
Deficit As % Of Cost	LE/Yr.	91%	88%	84%	60%	36%	28%	34%
SURCHARGE FOR BREAK EVEN	%	453%	338%	248%	201%	126%	139%	152%
Equiv. WW Tariff Per M3	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
WW Treated Per Day	M3/Day	43,200	44,496	45,831	47,206	48,622	50,081	51,583

TABLE E - 13 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

FAYOUM -- WATER SUPPLY — IMPROVED CASE IV

Basis: As per Water Supply Improved Case II. Improvements to performance factors and savings as shown; TARIFF INCREASES imposed as shown to produce a zero deficit in year 2000. Increases equivalent to incr. exist tariff by approx. 190%.

	UNITS	YEAR 1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	2,506,353	2,756,988	3,032,687	3,335,956	3,669,551	4,036,507	4,440,157
Electricity		1,176,000	1,332,408	1,690,772	2,145,523	2,430,877	2,754,184	3,120,490
Raw Materials		751,328	851,255	964,471	1,092,746	1,238,081	1,402,746	1,589,312
Other Commodities		12,155	13,772	15,603	17,678	20,030	22,694	25,712
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
Level Of New Savings In Year	%	--	--	--	20%	--	--	--
Total Expenditure Including Savings	LE/Yr.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
Water Produced	M3/Yr.	18,013,845	18,554,260	19,110,888	19,684,215	20,274,741	20,882,983	21,509,473
Water Billed	M3/Yr.	10,633,698	11,874,727	13,377,622	14,763,161	15,206,056	15,662,238	16,132,105
Unaccounted For Water	%	41.0%	36.0%	30.0%	25.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.42	0.43	0.36	0.39	0.42	0.46
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	50%	35%	20%	20%
Amount of Water Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	3,837,185	5,335,605	6,594,808	8,151,183
Percentage Collected	%	86.3%	90%	90%	90%	90%	90%	90%
Amount Collected = Revenue	LE/Yr.	2,020,602	2,170,149	2,235,253	3,453,466	4,802,045	5,935,327	7,336,064
Tariff Yield Per M3 Billed	LE/M3	0.19	$0.18	$0.17	$0.23	$0.32	$0.38	$0.45
DEFICIT	LE/Yr.	2,425,234	2,784,274	3,468,281	1,820,056	1,084,787	637,577	4,472
Deficit As % Of Cost	%	55%	56%	61%	35%	18%	10%	0%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
Daily WaterProduction	M3/Yr.	49,353	50,834	52,359	53,929	55,547	57,214	58,930

FAYOUM -- WASTEWATER — IMPROVED CASE IV

Basis: As per Water Supply Improved Case IV. Surcharges increased to to 100% of the water supply bill in two steps. The surcharge is pegged at 80% years 1996/97, and 1997/98, and then at 100% thereafter.

	UNITS	YEAR 1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	4,929,557	5,585,188	6,328,018	7,169,645	8,123,207	9,203,594	10,427,672
Raw Materials		344	390	442	500	567	642	728
Electricity		1,506,000	1,706,298	2,165,224	2,747,583	3,113,011	3,527,041	3,996,138
Other Commodity Inputs		30,637	34,712	39,328	44,559	50,485	57,200	64,808
Service Inputs		--	--	--	--	--	--	--
Total Yearly Expenditure	LE/Yr.	6,466,538	7,326,588	8,533,012	9,962,286	11,287,271	12,788,477	14,489,345
Level Of New Savings In Year	%	--	--	--	35%	0.15	--	--
Total Expenditure Including Savings	LE/Yr.	6,466,538	7,326,588	8,533,012	6,475,486	5,643,635	6,394,239	7,244,672
WW Collected and Treated	M3/Yr.	15,768,000	16,241,040	16,728,271	17,230,119	17,747,023	18,279,434	18,827,817
WW Service Unit Cost per M3 Treat.	LE/M3	0.41	0.45	0.51	0.58	0.64	0.70	0.77
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	80%	80%	100%	100%
WS Billings	LE/Yr.	2,341,045	2,411,276	2,483,615	3,837,185	5,335,605	6,594,808	8,151,183
Surcharged Amount	LE/Yr.	936,418	964,511	993,446	3,069,748	4,268,484	6,594,808	8,151,183
Collection Rate of Surch. Amt.	%	61%	90%	90%	90%	90%	90%	90%
Amount of Surcharge Collected	LE/Yr.	571,215	868,059	894,101	2,762,773	3,841,636	5,935,327	7,336,064
WW Revenue Per M3 Treated	LE/M3	0.04	0.05	0.05	0.16	0.22	0.32	0.39
DEFICIT	LE/Yr.	5,895,323	6,458,528	7,638,911	3,712,713	1,801,999	458,912	(91,392)
Deficit As % Of Cost	LE/Yr.	91%	88%	90%	57%	32%	7%	-1%
SURCHARGE FOR BREAK EVEN	%	453%	338%	382%	188%	118%	108%	99%
Equiv. WW Tariff Per M3	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
WW Treated Per Day	M3/Day	43,200	44,496	45,831	47,206	48,622	50,081	51,583

TABLE E - 14 FAYOUM WATER SUPPLY -- SUMMARY OF FINANCIAL ANALYSES

SITUATION	BASIS	RESULTS/INDICATORS	UNITS	FISCAL YEAR ENDING IN						
				1994	1995	1996	1997	1998	1999	2000
WATER SUPPLY BASE CASE	Existing situation, with costs increasing due to: - Inflation at 10 % per year. - Subsidy for Electricity cut, causing operation cost to increse by 12 % yr. in yrs.1995/96 and 1996/97 - Increases in production at 3% per yr.	OPERATIONS COST	LE/YR.	4,445,836	4,954,423	5,703,534	6,591,903	7,358,540	8,216,130	9,175,671
		REVENUES	LE/YR.	2,020,602	2,080,931	2,143,359	2,207,660	2,273,890	2,342,107	2,412,370
		DEFICIT	LE/YR.	2,425,234	2,873,491	3,560,175	4,384,243	5,084,650	5,874,024	6,763,301
		DEFICIT AS % OF COST	%	55%	58%	62%	67%	69%	71%	74%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	--	--	--	--
		BILLING COLLECTION RATE	%	86%	86%	86%	86%	86%	86%	86%
		UNACCOUNTED FOR WATER	%	41%	41%	41%	41%	41%	41%	41%
		TARIFF INREASES ASSUMED	%	--	--	--	--	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.19	0.19	0.19	0.19	0.19	0.19	0.19
		BREAK EVEN TARIFF YIELD	LE/M3	0.48	0.52	0.59	0.66	0.71	0.77	0.84
WATER SUPPLY IMPROVED CASE I	- As for Base Case, with improved collections of billings, and decreses to unaccounted for water, as shown. - Savings of 20% in operations cost assumed in year 1996/97. - No tariff increases assumed.	OPERATIONS COST	LE/YR.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
		REVENUES	LE/YR.	2,020,602	2,170,149	2,235,253	2,302,311	2,371,380	2,442,521	2,515,797
		DEFICIT	LE/YR.	2,425,234	2,784,274	3,468,281	2,971,212	3,515,452	4,130,383	4,824,740
		DEFICIT AS % OF COST	%	55%	56%	61%	56%	60%	63%	66%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	20%	--	--	--
		BILLING COLLECTION RATE	%	86%	90%	90%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	41%	36%	30%	25%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	--	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.19	0.18	0.17	0.16	0.16	0.16	0.16
		BREAK EVEN TARIFF YIELD	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
WATER SUPPLY IMPROVED CASE II	- As for Improved Case II, for savings and increased performance indicators, BUT with tariff increases - averaging 35% - imposed in year 1996/97.	OPERATIONS COST	LE/YR.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
		REVENUES	LE/YR.	2,020,602	2,170,149	2,235,253	3,108,120	3,201,363	3,297,404	3,396,326
		DEFICIT	LE/YR.	2,425,234	2,784,274	3,468,281	2,165,403	2,685,469	3,275,500	3,944,211
		DEFICIT AS % OF COST	%	55%	56%	61%	41%	46%	50%	54%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	20%	--	--	--
		BILLING COLLECTION RATE	%	86%	90%	90%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	41%	36%	30%	25%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	35%	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.19	0.18	0.17	0.21	0.21	0.21	0.21
		BREAK EVEN TARIFF YIELD	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
WATER SUPPLY IMPROVED CASE III	- As for Improved Case II, but with tariffs increases - averaging approx. 90% - imposed in two steps: 40% in year 1996/97, and an additional 35% added in year 1997/98.	OPERATIONS COST	LE/YR.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
		REVENUES	LE/YR.	2,020,602	2,170,149	2,235,253	3,223,235	4,481,908	4,616,366	4,754,857
		DEFICIT	LE/YR.	2,425,234	2,784,274	3,468,281	2,050,287	1,404,923	1,956,539	2,585,680
		DEFICIT AS % OF COST	%	55%	56%	61%	39%	24%	30%	35%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	20%	--	--	--
		BILLING COLLECTION RATE	%	86%	90%	90%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	41%	36%	30%	25%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	40%	35%	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.19	0.18	0.17	0.22	0.29	0.29	0.29
		BREAK EVEN TARIFF YIELD	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51
WATER SUPPLY IMPROVED CASE IV	- As for Improved Case II, but with tariffs increases assumed to produce a deficit equal to zero in year 2000. The assumed tariff increases start in in year 1996/97, and are imposed yearly till the year 2000, at rates of 50%, 35%, 20% and 20% respectivel	OPERATIONS COST	LE/YR.	4,445,836	4,954,423	5,703,534	5,273,523	5,886,832	6,572,904	7,340,537
		REVENUES	LE/YR.	2,020,602	2,170,149	2,235,253	3,453,466	4,802,045	5,935,327	7,336,064
		DEFICIT	LE/YR.	2,425,234	2,784,274	3,468,281	1,820,056	1,084,787	637,577	4,472
		DEFICIT AS % OF COST	%	55%	56%	61%	35%	18%	10%	0%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	20%	--	--	--
		BILLING COLLECTION RATE	%	86%	90%	90%	90%	90%	90%	90%
		UNACCOUNTED FOR WATER	%	41%	36%	30%	25%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	50%	35%	20%	20%
		AVERAGE TARIFF YIELD	LE/M3	0.19	0.18	0.17	0.23	0.32	0.38	0.45
		BREAK EVEN TARIFF YIELD	LE/M3	0.48	0.46	0.47	0.40	0.43	0.47	0.51

TABLE E - 15 FAYOUM WASTEWATER -- SUMMARY OF FINANCIAL ANALYSES

SITUATION	BASIS	RESULTS/INDICATORS	UNITS	FISCAL YEAR ENDING IN						
				1994	1995	1996	1997	1998	1999	2000
WASTEWATER BASE CASE	Existing situation, with costs increasing due to: - Inflation at 10 % per year. - Subsidy for Electricity cut, causing operation cost to increse by 12 % yr. in yrs.1995/96 and 1996/97	OPERATIONS COST	LE/YR.	6,466,538	7,326,588	8,533,012	9,962,286	#########	#########	#########
		REVENUES	LE/YR.	571,215	832,373	857,344	883,064	909,556	936,843	964,948
		DEFICIT	LE/YR.	5,895,323	6,494,215	7,675,668	9,079,222	#########	#########	#########
		DEFICIT AS % OF COST	%	91%	89%	90%	91%	92%	93%	93%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	40%	40%	40%
		SURCHARGE TO BREAKEVEN	%	453%	352%	398%	451%	496%	546%	601%
		EQUIV. WASTEWATER TARIFF	LE/M3	0.67	0.52	0.59	0.67	0.74	0.81	0.89
WASTEWATER IMPROVED CASE I	- As for Base Case. Revenue benefits from WS improvements in billing collections, and decreases in level of unaccounted for water. - Savings of 20% in operations cost assumed in year 1996/97. - No increases in surcharge level.	OPERATIONS COST	LE/YR.	6,466,538	7,326,588	8,533,012	6,475,486	5,643,635	6,394,239	7,244,672
		REVENUES	LE/YR.	571,215	868,059	894,101	920,924	948,552	977,009	1,006,319
		DEFICIT	LE/YR.	5,895,323	6,458,528	7,638,911	5,554,562	4,695,083	5,417,230	6,238,354
		DEFICIT AS % OF COST	%	91%	88%	90%	86%	83%	85%	86%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	35%	15%	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	40%	40%	40%
		SURCHARGE TO BREAKEVEN	%	453%	338%	382%	281%	238%	262%	288%
		EQUIV. WASTEWATER TARIFF	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
			LE/M3							
WASTEWATER IMPROVED CASE II	- Savings assumed in operations cost equal to 35% in 1996/97 and 15% in 1997/98. Surcharge level increased to 80% for years 1996/97 and 1997/98,and to 100% thereafter.	OPERATIONS COST	LE/YR.	6,466,538	7,326,588	8,533,012	6,475,486	5,643,635	6,394,239	7,244,672
		REVENUES	LE/YR.	571,215	868,059	894,101	2,486,496	2,561,091	3,297,404	3,396,326
		DEFICIT	LE/YR.	5,895,323	6,458,528	7,638,911	3,988,991	3,082,545	3,096,835	3,848,346
		DEFICIT AS % OF COST	%	91%	88%	90%	62%	55%	48%	53%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	35%	15%	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	80%	80%	100%	100%
		SURCHARGE TO BREAKEVEN	%	453%	338%	382%	208%	176%	194%	213%
		EQUIV. WASTEWATER TARIFF	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
WASTEWATER IMPROVED CASE III	- As for Improved Case II. (WW revenues benefit from increases in the water supply tariff.)	OPERATIONS COST	LE/YR.	6,466,538	7,326,588	5,546,458	6,475,486	5,643,635	6,394,239	7,244,672
		REVENUES	LE/YR.	571,215	868,059	894,101	2,578,588	3,585,527	4,616,366	4,754,857
		DEFICIT	LE/YR.	5,895,323	6,458,528	4,652,357	3,896,898	2,058,109	1,777,873	2,489,816
		DEFICIT AS % OF COST	%	91%	88%	84%	60%	36%	28%	34%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	35%	15%	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	80%	80%	100%	100%
		SURCHARGE TO BREAKEVEN	%	453%	338%	248%	201%	126%	139%	152%
		EQUIV. WASTEWATER TARIFF	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86
WASTEWATER IMPROVED CASE IV	- Surcharge level set to produce a zero deficit. Due to benefits in WW revenue from the assumed large increases in the water supply tariff, the surcharge level for this case is the same as that for Improved Case II.	OPERATIONS COST	LE/YR.	6,466,538	7,326,588	8,533,012	6,475,486	5,643,635	6,394,239	7,244,672
		REVENUES	LE/YR.	571,215	868,059	894,101	2,762,773	3,841,636	5,935,327	7,336,064
		DEFICIT	LE/YR.	5,895,323	6,458,528	7,638,911	3,712,713	1,801,999	458,912	(91,392)
		DEFICIT AS % OF COST	%	91%	88%	90%	57%	32%	7%	-1%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	35%	15%	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	80%	80%	100%	100%
		SURCHARGE TO BREAKEVEN	%	453%	338%	382%	188%	118%	108%	99%
		EQUIV. WASTEWATER TARIFF	LE/M3	0.67	0.50	0.57	0.64	0.71	0.78	0.86

TABLE E - 16

EHP PROVINCIAL CITIES ASSESSMENT
ESTIMATES OF HOUSEHOLD INCOME

FAYOUM

AVERAGE YRLY. INCOME PER HH (Yr. 1992):

GOVERNORATE	=	LE 5,033	(CAPMAS data)
NATIONAL	=	LE 6,120	(CAPMAS data)
RATIO GOVER.YRLY. AVG. TO NATIONAL AVG.	=	82.2%	
HH INCOME GROWTH RATE	=	11%	
AVG. YRLY. INC.-LOWEST 30% OF GOVERN. HH	=	LE 2,007	

(Computed using CAPMAS data)

RANGE OF HH INCOME	% OF HH IN RANGE	AVERAGE ANNUAL HOUSEHOLD INCOME		HH INCOME PROJECTED TO YR. 1995	HH INCOME PROJECTED TO YR. 2000	2% OF HOUSEHOLD INCOME	
		NATIONAL BASIS	GOVERN. BASIS			YR. 1995	YR. 2000
(LE)	(%)	(LE)	(LE)	(NOTE 1)	(NOTE 1)	(LE/YR.)	(LE/YR.)
UNDER 1,500	4.4%	1,083	891	1218	1666	24.4	33.3
1,550 to 2,500	11.0%	2,066	1699	2324	3178	46.5	63.6
2,500 to 3,500	16.2%	3,017	2481	3393	4641	67.9	92.8
3,500 to 6,500	36.3%	4,611	3792	5186	7093	103.7	141.9
6,500 to 12,000	25.9%	7,941	6531	8931	12215	178.6	244.3
OVER 12,000	6.2%	25,266	20778	28417	38864	568.3	777.3
FOR LOWEST 30 % OF GOVERN. HH			2,200	3,009	4,115	60.2	82.3

Note (1) Projections from 1992 at 11% per year, based upon COMAS data. See text for explanation.

COMPARISON OF PROJECTED HH INCOME TO
TO WS TARIFF, AND WW SURCHARGE

FAYOUM (Domestic Consumption Estimated in 1986 USAID Master Plan as 95% Of Total WS).

WS DOMESTIC TARIFF, PRESENT RATES:

UP TO 30 M3 / MO. at LE PER M3 =	0.18	
OVER 30 M3 / MO. at LE PER M3 =	0.25	
WW SURCHARGE: @ PERCENT OF WATER BILL =	40%	

THE FOLLOWING CHARGES ARE APPLICABLE FOR HH's OF 5 PERSONS:

CONSUMPTION PER PERSON	MONTHLY HH CONSUMPTION	MONTHLY CHARGE AT PRESENT WS TARIFF	WW CHARGE AT PRESENT SURCHARGE	TOTAL MONTHLY CHARGE	ANNUAL CHARGE
(LPCD)	(M3)	(LE/MO.)	(LE/MO.)	(LE/MO.)	(LE/YR.)
100	15	2.7	1.1	3.8	45.9
150	22.5	4.1	1.6	5.7	68.0
200	30	5.4	2.2	7.6	90.7
250	37.5	7.3	2.9	10.2	122.2

TABLE E - 17 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

MENYA -- WATER SUPPLY — BASE CASE

Basis: Inflation at 10%/yr. Decreases in electricity subsidy increases operations costs by 12%/yr. in years 1995/96, and 1996/97. Production increases at 3%/yr. Other performance factors as shown.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	1,681,076	1,849,184	2,034,102	2,237,512	2,461,263	2,707,390	2,978,129
Electricity		1,310,043	1,484,279	1,883,490	2,390,074	2,707,954	3,068,112	3,476,170
Raw Materials		516,600	585,308	663,154	751,353	851,283	964,504	1,092,783
Other Commodities		12,400	14,049	15,918	18,035	20,433	23,151	26,230
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
Level Of New Savings In Year	%	--	--	--	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
Water Produced	M3/Yr.	18,606,240	19,164,427	19,739,360	20,331,541	20,941,487	21,569,732	22,216,824
Water Billed	M3/Yr.	8,323,790	8,566,499	8,823,494	9,088,199	9,360,845	9,641,670	9,930,920
Unaccounted For Water	%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%
Production Cost Per M3 Billed	LE/M3	0.42	0.46	0.52	0.59	0.65	0.70	0.76
REVENUES								
Tariff Increases In Year	--	--	--	--	--	--	--	--
Amount of Water Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	2,443,217	2,516,514	2,592,009	2,669,770
Percentage Collected	%	33%	33%	33%	33%	33%	33%	33%
Amount Collected = Revenue	LE/Yr.	748,654	771,114	794,247	818,075	842,617	867,895	893,932
Tariff Yield Per M3 Billed	LE/M3	0.09	0.09	0.09	0.09	0.09	0.09	0.09
DEFICIT	LE/Yr.	2,771,465	3,161,705	3,802,416	4,578,899	5,198,317	5,895,261	6,679,380
Deficit As % Of Cost	%	79%	80%	83%	85%	86%	87%	88%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	1.26	1.37	1.56	1.77	1.93	2.09	2.28
Daily WaterProduction	M3/Yr.	50,976	52,505	54,080	55,703	57,374	59,095	60,868

MENYA -- WASTEWATER — BASE CASE

Basis: Inflation at 10%/yr. Decreases in electricity subsidy increases operations costs by 12%/yr. in years 1995/96, and 1996/97. Other performance factors as shown.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	1,444,126	1,636,195	1,853,809	2,100,365	2,379,714	2,696,216	3,054,812
Raw Materials		4,895	5,546	6,284	7,119	8,066	9,139	10,355
Electricity		420,000	475,860	603,847	766,258	868,170	983,637	1,114,461
Other Commodity Inputs		95,210	107,873	122,220	138,475	156,893	177,759	201,401
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
Level Of New Savings In Year	%	--	--	--	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
WW Collected and Treated	M3/Yr.	13,245,850	13,643,226	14,052,522	14,474,098	14,908,321	15,355,570	15,816,238
WW Service Unit Cost per M3 Treat.	LE/M3	0.15	0.16	0.18	0.21	0.23	0.25	0.28
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	40%	40%	40%
WS Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	2,443,217	2,516,514	2,592,009	2,669,770
Surcharged Amount	LE/Yr.	894,356	921,187	948,822	977,287	1,006,606	1,036,804	1,067,908
Collection Rate of Surch. Amt.	%	35%	35%	35%	35%	35%	35%	35%
Surcharge Collected = Revenue	LE/Yr.	312,335	321,705	331,356	341,297	351,536	362,082	372,944
WW Revenue Per M3 Treated	LE/M3	--	0.02	0.02	0.02	0.02	0.02	0.02
DEFICIT	LE/Yr.	1,651,896	1,903,769	2,254,803	2,670,921	3,061,307	3,504,669	4,008,085
Deficit As % Of Cost	%	84%	86%	87%	89%	90%	91%	91%
SURCHARGE FOR BREAK EVEN	%	--	97%	109%	123%	136%	149%	164%
Equiv. WW Tariff Per M3	LE/M3	--	0.47	0.53	0.60	0.66	0.72	0.79
WW Treated Per Day	M3/Day	36,290	37,379	38,500	39,655	40,845	42,070	43,332

TABLE E - 18 | USAID -- EHP PROVINCIAL CITIES ASSESSMENT

MENYA -- WATER SUPPLY | IMPROVED CASE I

Basis: As per Base Case, with improvements to performance factors and savings as shown; NO TARIFF INCREASE.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	1,681,076	1,849,184	2,034,102	2,237,512	2,461,263	2,707,390	2,978,129
Electricity		1,310,043	1,484,279	1,883,490	2,390,074	2,707,954	3,068,112	3,476,170
Raw Materials		516,600	585,308	663,154	751,353	851,283	964,504	1,092,783
Other Commodities		12,400	14,049	15,918	18,035	20,433	23,151	26,230
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
Water Produced	M3/Yr.	18,606,240	19,164,427	19,739,360	20,331,541	20,941,487	21,569,732	22,216,824
Water Billed	M3/Yr.	8,323,790	9,160,596	11,448,829	13,825,448	15,706,115	16,177,299	16,662,618
Unaccounted For Water	%	55.3%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.43	0.32	0.31	0.31	0.33	0.36
REVENUES								
Tariff Increases In Year	--	--	--	--	--	--	--	--
Amount of Water Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	2,443,217	2,516,514	2,592,009	2,669,770
Percentage Collected	%	33%	55%	65%	75%	85%	90%	90%
Amount Collected = Revenue	LE/Yr.	748,654	1,266,632	1,541,836	1,832,413	2,139,037	2,332,808	2,402,793
Tariff Yield Per M3 Billed	LE/M3	0.09	0.14	0.13	0.13	0.1362	0.14	0.14
DEFICIT	LE/Yr.	2,771,465	2,666,188	2,135,495	2,485,166	2,693,710	3,077,717	3,655,857
Deficit As % Of Cost	%	79%	68%	58%	58%	56%	57%	60%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
Daily WaterProduction	M3/Yr.	50,976	52,505	54,080	55,703	57,374	59,095	60,868

MENYA -- WASTEWATER | IMPROVED CASE I

Basis: As per Base Case, with improvements to performance factors and savings as shown; NO TARIFF INCREASE.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	1,444,126	1,636,195	1,853,809	2,100,365	2,379,714	2,696,216	3,054,812
Raw Materials		4,895	5,546	6,284	7,119	8,066	9,139	10,355
Electricity		420,000	475,860	603,847	766,258	868,170	983,637	1,114,461
Other Commodity Inputs		95,210	107,873	122,220	138,475	156,893	177,759	201,401
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
WW Collected and Treated	M3/Yr.	13,245,850	13,643,226	14,052,522	14,474,098	14,908,321	15,355,570	15,816,238
WW Service Unit Cost per M3 Treat.	LE/M3	0.15	0.16	0.18	0.21	0.23	0.25	0.28
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	40%	40%	40%
WS Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	2,443,217	2,516,514	2,592,009	2,669,770
Surcharged Amount	LE/Yr.	894,356	921,187	948,822	977,287	1,006,606	1,036,804	1,067,908
Collection Rate of Surch. Amt.	%	35%	55%	65%	75%	85%	90%	90%
Surcharge Collected = Revenue	LE/Yr.	312,335	506,653	616,734	732,965	855,615	933,123	961,117
DEFICIT	LE/Yr.	1,651,896	1,718,821	1,452,193	1,676,809	1,874,660	2,160,278	2,543,706
Deficit As % Of Cost	LE/Yr.	84%	77%	70%	70%	69%	70%	73%
SURCHARGE FOR BREAK EVEN	%	--	97%	87%	99%	108%	119%	131%
Equiv. WW Tariff Per M3	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WW Treated Per Day	M3/Day	36,290	37,379	38,500	39,655	40,845	42,070	43,332

TABLE E - 19 | USAID -- EHP PROVINCIAL CITIES ASSESSMENT

MENYA -- WATER SUPPLY | IMPROVED CASE II

Basis: As per Water Supply Improved Case I. Improvements to performance factors and savings as shown; and TARIFF INCREASES averaging 35% in the year 1996/97.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	1,681,076	1,849,184	2,034,102	2,237,512	2,461,263	2,707,390	2,978,129
Electricity		1,310,043	1,484,279	1,883,490	2,390,074	2,707,954	3,068,112	3,476,170
Raw Materials		516,600	585,308	663,154	751,353	851,283	964,504	1,092,783
Other Commodities		12,400	14,049	15,918	18,035	20,433	23,151	26,230
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
Water Produced	M3/Yr.	18,606,240	19,164,427	19,739,360	20,331,541	20,941,487	21,569,732	22,216,824
Water Billed	M3/Yr.	8,323,790	9,160,596	11,448,829	13,825,448	15,706,115	16,177,299	16,662,618
Unaccounted For Water	%	55.3%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.43	0.32	0.31	0.31	0.33	0.36
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	35%	--	--	--
Amount of Water Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	3,298,343	3,397,294	3,499,213	3,604,189
Percentage Collected	%	33%	55%	65%	75%	85%	90%	90%
Amount Collected = Revenue	LE/Yr.	748,654	1,266,632	1,541,836	2,473,758	2,887,700	3,149,291	3,243,770
Tariff Yield Per M3 Billed	LE/M3	$0.09	$0.14	$0.13	$0.18	$0.18	$0.19	$0.19
DEFICIT	LE/Yr.	2,771,465	2,666,188	2,135,495	1,843,822	1,945,047	2,261,234	2,814,880
Deficit As % Of Cost	%	79%	68%	58%	43%	40%	42%	46%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
Daily WaterProduction	M3/Yr.	50,976	52,505	54,080	55,703	57,374	59,095	60,868

MENYA -- WASTEWATER | IMPROVED CASE II

Basis: As per Improved Case II for WS, with WW SURCHARGE INCREASED to a level equal to 60% of the water bill, imposed in the year 1996/97.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	1,444,126	1,636,195	1,853,809	2,100,365	2,379,714	2,696,216	3,054,812
Raw Materials		4,895	5,546	6,284	7,119	8,066	9,139	10,355
Electricity		420,000	475,860	603,847	766,258	868,170	983,637	1,114,461
Other Commodity Inputs		95,210	107,873	122,220	138,475	156,893	177,759	201,401
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
WW Collected and Treated	M3/Yr.	13,245,850	13,643,226	14,052,522	14,474,098	14,908,321	15,355,570	15,816,238
WW Service Unit Cost per M3 Treat.	LE/M3	0.15	0.16	0.18	0.21	0.23	0.25	0.28
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	60%	60%	60%	60%
WS Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	3,298,343	3,397,294	3,499,213	3,604,189
Surcharged Amount	LE/Yr.	894,356	921,187	948,822	1,979,006	2,038,376	2,099,528	2,162,513
Collection Rate of Surch. Amt.	%	35%	55%	65%	75%	85%	90%	90%
Surcharge Collected = Revenue	LE/Yr.	312,335	506,653	616,734	1,484,255	1,732,620	1,889,575	1,946,262
DEFICIT	LE/Yr.	1,651,896	1,718,821	1,452,193	925,520	997,655	1,203,826	1,558,561
Deficit As % Of Cost	LE/Yr.	84%	77%	70%	38%	37%	39%	44%
SURCHARGE FOR BREAK EVEN	%	--	97%	87%	73%	80%	88%	97%
Equiv. WW Tariff Per M3	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WW Treated Per Day	M3/Day	36,290	37,379	38,500	39,655	40,845	42,070	43,332

TABLE E - 20 | USAID -- EHP PROVINCIAL CITIES ASSESSMENT

MENYA -- WATER SUPPLY | IMPROVED CASE III

Basis: As per Water Supply Improved Case II. Improvements to performance factors and savings as shown; TARIFF INCREASES averaging approx. 65% in two steps: 35% in year 1996/97, and an additional 30% in year 1997/98.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	1,681,076	1,849,184	2,034,102	2,237,512	2,461,263	2,707,390	2,978,129
Electricity		1,310,043	1,484,279	1,883,490	2,390,074	2,707,954	3,068,112	3,476,170
Raw Materials		516,600	585,308	663,154	751,353	851,283	964,504	1,092,783
Other Commodities		12,400	14,049	15,918	18,035	20,433	23,151	26,230
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
Water Produced	M3/Yr.	18,606,240	19,164,427	19,739,360	20,331,541	20,941,487	21,569,732	22,216,824
Water Billed	M3/Yr.	8,323,790	9,160,596	11,448,829	13,825,448	15,706,115	16,177,299	16,662,618
Unaccounted For Water	%	55.3%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.43	0.32	0.31	0.31	0.33	0.36
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	35%	30%	--	--
Amount of Water Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	3,298,343	4,416,482	4,548,976	4,685,446
Percentage Collected	%	33%	55%	65%	75%	85%	90%	90%
Amount Collected = Revenue	LE/Yr.	748,654	1,266,632	1,541,836	2,473,758	3,754,010	4,094,079	4,216,901
Tariff Yield Per M3 Billed	LE/M3	0.09	0.14	0.13	0.18	0.2390	0.25	0.25
DEFICIT	LE/Yr.	2,771,465	2,666,188	2,135,495	1,843,822	1,078,737	1,316,446	1,841,749
Deficit As % Of Cost	%	79%	68%	58%	43%	22%	24%	30%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
Daily WaterProduction	M3/Yr.	50,976	52,505	54,080	55,703	57,374	59,095	60,868

MENYA -- WASTEWATER | IMPROVED CASE III

Basis: As per Improved Case III for WS, with WW SURCHARGE INCREASED to a level equal to 70% of the water bill in the year 2000 by, imposing three increases of 10 % each starting in the year 1997/98.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	1,444,126	1,636,195	1,853,809	2,100,365	2,379,714	2,696,216	3,054,812
Raw Materials		4,895	5,546	6,284	7,119	8,066	9,139	10,355
Electricity		420,000	475,860	603,847	766,258	868,170	983,637	1,114,461
Other Commodity Inputs		95,210	107,873	122,220	138,475	156,893	177,759	201,401
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
WW Collected and Treated	M3/Yr.	13,245,850	13,643,226	14,052,522	14,474,098	14,908,321	15,355,570	15,816,238
WW Service Unit Cost per M3 Treat.	LE/M3	0.15	0.16	0.18	0.21	0.23	0.25	0.28
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	50%	60%	70%
WS Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	3,298,343	4,416,482	4,548,976	4,685,446
Surcharged Amount	LE/Yr.	894,356	921,187	948,822	1,319,337	2,208,241	2,729,386	3,279,812
Collection Rate of Surch. Amt.	%	35%	55%	65%	75%	85%	90%	90%
Surcharge Collected = Revenue	LE/Yr.	312,335	506,653	616,734	989,503	1,877,005	2,456,447	2,951,831
DEFICIT	LE/Yr.	1,651,896	1,718,821	1,452,193	1,420,271	853,270	636,954	552,992
Deficit As % Of Cost	LE/Yr.	84%	77%	70%	59%	31%	21%	16%
SURCHARGE FOR BREAK EVEN	%	--	97%	87%	73%	62%	68%	75%
Equiv. WW Tariff Per M3	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WW Treated Per Day	M3/Day	36,290	37,379	38,500	39,655	40,845	42,070	43,332

TABLE E - 21 USAID -- EHP PROVINCIAL CITIES ASSESSMENT

BENI SUEF -- WATER SUPPLY — IMPROVED CASE IV

Basis: As per Water Supply Improved Case II. Improvements to performance factors and savings as shown; TARIFF INCREASES imposed as shown to produce a zero deficit in year 2000. Increases equivalent to incr. exist tariff by approx. 105%.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WATER PRODUCTION COSTS								
Wages	LE/Yr.	1,681,076	1,849,184	2,034,102	2,237,512	2,461,263	2,707,390	2,978,129
Electricity		1,310,043	1,484,279	1,883,490	2,390,074	2,707,954	3,068,112	3,476,170
Raw Materials		516,600	585,308	663,154	751,353	851,283	964,504	1,092,783
Other Commodities		12,400	14,049	15,918	18,035	20,433	23,151	26,230
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
Water Produced	M3/Yr.	18,606,240	19,164,427	19,739,360	20,331,541	20,941,487	21,569,732	22,216,824
Water Billed	M3/Yr.	8,323,790	9,160,596	11,448,829	13,825,448	15,706,115	16,177,299	16,662,618
Unaccounted For Water	%	55.3%	52.2%	42.0%	32.0%	25.0%	25.0%	25.0%
Production Cost Per M3 Billed	LE/M3	0.42	0.43	0.32	0.31	0.31	0.33	0.36
REVENUES								
Tariff Increases In Year	LE/M3	--	--	--	35%	30%	30%	10%
Amount of Water Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	3,298,343	4,416,482	5,913,669	6,700,187
Percentage Collected	%	33%	55%	65%	75%	85%	90%	90%
Amount Collected = Revenue	LE/Yr.	748,654	1,266,632	1,541,836	2,473,758	3,754,010	5,322,302	6,030,169
Tariff Yield Per M3 Billed	LE/M3	0.09	0.14	0.13	0.18	0.24	0.33	0.36
DEFICIT	LE/Yr.	2,771,465	2,666,188	2,135,495	1,843,822	1,078,737	88,223	28,481
Deficit As % Of Cost	%	79%	68%	58%	43%	22%	2%	0%
Break Even Tarrif Yld. Per M3 Billed	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
Daily WaterProduction	M3/Yr.	50,976	52,505	54,080	55,703	57,374	59,095	60,868

MENYA -- WASTEWATER — IMPROVED CASE IV

Basis: As per Water Supply Improved Case IV. Surcharges increased to produce a zero deficit in year 2000. Surcharge increases from 50% to 58% required, starting in year1997/98.

		YEAR						
	UNITS	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
WASTEWATER SERVICE COST								
Wages	LE/Yr.	1,444,126	1,636,195	1,853,809	2,100,365	2,379,714	2,696,216	3,054,812
Raw Materials		4,895	5,546	6,284	7,119	8,066	9,139	10,355
Electricity		420,000	475,860	603,847	766,258	868,170	983,637	1,114,461
Other Commodity Inputs		95,210	107,873	122,220	138,475	156,893	177,759	201,401
Service Inputs		0	0	0	0	0	0	0
Total Yearly Expenditure	LE/Yr.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
Level Of New Savings In Year	%	--	--	20%	--	--	--	--
Total Expenditure Including Savings	LE/Yr.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
WW Collected and Treated	M3/Yr.	13,245,850	13,643,226	14,052,522	14,474,098	14,908,321	15,355,570	15,816,238
WW Service Unit Cost per M3 Treat.	LE/M3	0.15	0.16	0.18	0.21	0.23	0.25	0.28
REVENUES								
Surcharge Level on WS Charge	%	40%	40%	40%	40%	50%	55%	58%
WS Billings	LE/Yr.	2,235,890	2,302,967	2,372,056	3,298,343	4,416,482	5,913,669	6,700,187
Surcharged Amount	LE/Yr.	894,356	921,187	948,822	1,319,337	2,208,241	3,252,518	3,886,109
Collection Rate of Surch. Amt.	%	35%	55%	65%	75%	85%	90%	90%
Surcharge Collected = Revenues	LE/Yr.	312,335	506,653	616,734	989,503	1,877,005	2,927,266	3,497,498
DEFICIT	LE/Yr.	1,651,896	1,718,821	1,452,193	1,420,271	853,270	166,135	7,325
Deficit As % Of Cost	LE/Yr.	84%	77%	70%	59%	31%	5%	0%
SURCHARGE FOR BREAK EVEN	%	--	97%	87%	73%	62%	52%	52%
Equiv. WW Tariff Per M3	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WW Treated Per Day	M3/Day	36,290	37,379	38,500	39,655	40,845	42,070	43,332

TABLE E - 22 MENYA WATER SUPPLY -- SUMMARY OF FINANCIAL ANALYSES

SITUATION	BASIS	RESULTS/INDICATORS	UNITS	FISCAL YEAR ENDING IN						
				1994	1995	1996	1997	1998	1999	2000
WATER SUPPLY BASE CASE	Existing situation, with costs increasing due to: - Inflation at 10 % per year. - Subsidy for Electricity cut, causing operation cost to increse by 12 % yr. in yrs.1995/96 and 1996/97 - Increases in production at 3% per yr.	OPERATIONS COST	LE/YR.	3,520,119	3,932,819	4,596,664	5,396,974	6,040,934	6,763,156	7,573,312
		REVENUES	LE/YR.	748,654	771,114	794,247	818,075	842,617	867,895	893,932
		DEFICIT	LE/YR.	2,771,465	3,161,705	3,802,416	4,578,899	5,198,317	5,895,261	6,679,380
		DEFICIT AS % OF COST	%	79%	80%	83%	85%	86%	87%	88%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	--	--	--	--
		BILLING COLLECTION RATE	%	33%	33%	33%	33%	33%	33%	33%
		UNACCOUNTED FOR WATER	%	55%	55%	55%	55%	55%	55%	55%
		TARIFF INREASES ASSUMED	%	--	--	--	--	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.09	0.09	0.09	0.09	0.09	0.09	0.09
		TARIFF YIELD TO BREAKEVEN	LE/M3	1.26	1.37	1.56	1.77	1.93	2.09	2.28
WATER SUPPLY IMPROVED CASE I	- As for Base Case, with improved collections of billings, and decreses to unaccounted for water, as shown. - Savings of 20% in operations cost assumed in year 1996/97. - No tariff increases assumed.	OPERATIONS COST	LE/YR.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
		REVENUES	LE/YR.	748,654	1,266,632	1,541,836	1,832,413	2,139,037	2,332,808	2,402,793
		DEFICIT	LE/YR.	2,771,465	2,666,188	2,135,495	2,485,166	2,693,710	3,077,717	3,655,857
		DEFICIT AS % OF COST	%	79%	68%	58%	58%	56%	57%	60%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	33%	55%	65%	75%	85%	90%	90%
		UNACCOUNTED FOR WATER	%	42%	43%	32%	31%	31%	33%	36%
		TARIFF INREASES ASSUMED	%	--	--	--	--	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.09	0.14	0.13	0.13	0.14	0.14	0.14
		TARIFF YIELD TO BREAKEVEN	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
WATER SUPPLY IMPROVED CASE II	- As for Improved Case I, for savings and increased performance indicators, BUT with tariff increases - averaging 35% - imposed in year 1996/97.	OPERATIONS COST	LE/YR.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
		REVENUES	LE/YR.	748,654	1,266,632	1,541,836	2,473,758	2,887,700	3,149,291	3,243,770
		DEFICIT	LE/YR.	2,771,465	2,666,188	2,135,495	1,843,822	1,945,047	2,261,234	2,814,880
		DEFICIT AS % OF COST	%	79%	68%	58%	43%	40%	42%	46%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	33%	55%	65%	75%	85%	90%	90%
		UNACCOUNTED FOR WATER	%	55%	52%	42%	32%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	35%	--	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.09	0.14	0.13	0.18	0.18	0.19	0.19
		TARIFF YIELD TO BREAKEVEN	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
WATER SUPPLY IMPROVED CASE III	- As for Improved Case II, but with tariffs increases - averaging approx. 65% - imposed in two steps: 35 % in year 1996/97, and an additional 30% added in year 1997/98.	OPERATIONS COST	LE/YR.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
		REVENUES	LE/YR.	748,654	1,266,632	1,541,836	2,473,758	3,754,010	4,094,079	4,216,901
		DEFICIT	LE/YR.	2,771,465	2,666,188	2,135,495	1,843,822	1,078,737	1,316,446	1,841,749
		DEFICIT AS % OF COST	%	79%	68%	58%	43%	22%	24%	30%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	33%	55%	65%	75%	85%	90%	90%
		UNACCOUNTED FOR WATER	%	55%	52%	42%	32%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	35%	30%	--	--
		AVERAGE TARIFF YIELD	LE/M3	0.09	0.14	0.13	0.18	0.24	0.25	0.25
		TARIFF YIELD TO BREAKEVEN	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40
WATER SUPPLY IMPROVED CASE IV	- As for Improved Case II, but with tariffs increases assumed to produce a deficit equal to zero in year 2000. The assumed tariff increases start in in year 1996/97, and are imposed yearly till the year 2000, at rates of 35%, 30%, 30% and 10% respectivel	OPERATIONS COST	LE/YR.	3,520,119	3,932,819	3,677,331	4,317,579	4,832,747	5,410,525	6,058,650
		REVENUES	LE/YR.	748,654	1,266,632	1,541,836	2,473,758	3,754,010	5,322,302	6,030,169
		DEFICIT	LE/YR.	2,771,465	2,666,188	2,135,495	1,843,822	1,078,737	88,223	28,481
		DEFICIT AS % OF COST	%	79%	68%	58%	43%	22%	2%	0%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		BILLING COLLECTION RATE	%	33%	55%	65%	75%	85%	90%	90%
		UNACCOUNTED FOR WATER	%	55%	52%	42%	32%	25%	25%	25%
		TARIFF INREASES ASSUMED	%	--	--	--	35%	30%	30%	10%
		AVERAGE TARIFF YIELD	LE/M3	0.09	0.14	0.13	0.18	0.24	0.33	0.36
		TARIFF YIELD TO BREAKEVEN	LE/M3	1.26	0.78	0.49	0.42	0.36	0.37	0.40

TABLE E - 23 MENYA WASTEWATER -- SUMMARY OF FINANCIAL ANALYSES

SITUATION	BASIS	RESULTS/INDICATORS	UNITS	FISCAL YEAR ENDING IN						
				1994	1995	1996	1997	1998	1999	2000
WASTEWATER BASE CASE	Existing situation, with costs increasing due to: - Inflation at 10 % per year. - Subsidy for Electricity cut, causing operation cost to increse by 12 % yr. in yrs.1995/96 and 1996/97	OPERATIONS COST	LE/YR.	1,964,231	2,225,474	2,586,160	3,012,218	3,412,843	3,866,751	4,381,029
		REVENUES	LE/YR.	312,335	321,705	331,356	341,297	351,536	362,082	372,944
		DEFICIT	LE/YR.	1,651,896	1,903,769	2,254,803	2,670,921	3,061,307	3,504,669	4,008,085
		DEFICIT AS % OF COST	%	84%	86%	87%	89%	90%	91%	91%
		ASSUMED SAVINGS IN OPS.	%	--	--	--	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	40%	40%	40%
		SURCHARGE TO BREAKEVEN	%	--	97%	109%	123%	136%	149%	164%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.47	0.53	0.60	0.66	0.72	0.79
WASTEWATER IMPROVED CASE I	- As for Base Case. Revenue benefits from WS improvements in billing collections, and decreases in level of unaccounted for water. - Savings of 20% in operations cost assumed in year 1996/97. - No increases in surcharge level.	OPERATIONS COST	LE/YR.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
		REVENUES	LE/YR.	312,335	506,653	616,734	732,965	855,615	933,123	961,117
		DEFICIT	LE/YR.	1,651,896	1,718,821	1,452,193	1,676,809	1,874,660	2,160,278	2,543,706
		DEFICIT AS % OF COST	%	84%	77%	70%	70%	69%	70%	73%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	40%	40%	40%
		SURCHARGE TO BREAKEVEN	%	--	97%	87%	99%	108%	119%	131%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WASTEWATER IMPROVED CASE II	- As for Improved Case I, for savings, BUT with surcharg level increased to 60% starting in year 1996/97.	OPERATIONS COST	LE/YR.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
		REVENUES	LE/YR.	312,335	506,653	616,734	1,484,255	1,732,620	1,889,575	1,946,262
		DEFICIT	LE/YR.	1,651,896	1,718,821	1,452,193	925,520	997,655	1,203,826	1,558,561
		DEFICIT AS % OF COST	%	84%	77%	70%	38%	37%	39%	44%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	60%	60%	60%	60%
		SURCHARGE TO BREAKEVEN	%	--	97%	87%	73%	80%	88%	97%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WASTEWATER IMPROVED CASE III	- As for Improved Case II, but with surcharges increased, to 70 % in imposed in three steps of 10% each. Starting in year 1997/98 the surcharge increases to 50 % and then to 60, and 70% respectively, in the two following years.	OPERATIONS COST	LE/YR.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
		REVENUES	LE/YR.	312,335	506,653	616,734	989,503	1,877,005	2,456,447	2,951,831
		DEFICIT	LE/YR.	1,651,896	1,718,821	1,452,193	1,420,271	853,270	636,954	552,992
		DEFICIT AS % OF COST	%	84%	77%	70%	59%	31%	21%	16%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	50%	60%	70%
		SURCHARGE TO BREAKEVEN	%	--	97%	87%	73%	62%	68%	75%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31
WASTEWATER IMPROVED CASE IV	- As for Improved Case II, but with WW surcharges increased to produce zero deficit in the year 2000. Wastewater revenue is greatly enhanced by the large increases assumed in the water supply tariff. Thus, increases to the wastewater surcharge for this case requires only an increase to 58% in the year 1999/2000.	OPERATIONS COST	LE/YR.	1,964,231	2,225,474	2,068,928	2,409,774	2,730,274	3,093,401	3,504,823
		REVENUES	LE/YR.	312,335	506,653	616,734	989,503	1,877,005	2,927,266	3,497,498
		DEFICIT	LE/YR.	1,651,896	1,718,821	1,452,193	1,420,271	853,270	166,135	7,325
		DEFICIT AS % OF COST	%	84%	77%	70%	59%	31%	5%	0%
		ASSUMED SAVINGS IN OPS.	%	--	--	20%	--	--	--	--
		SURCHARGE LEVEL	%	40%	40%	40%	40%	50%	55%	58%
		SURCHARGE TO BREAKEVEN	%	--	97%	87%	73%	62%	52%	52%
		EQUIV. WASTEWATER TARIFF	LE/M3	--	0.30	0.28	0.28	0.27	0.28	0.31

TABLE E - 24

EHP PROVINCIAL CITIES ASSESSMENT
ESTIMATES OF HOUSEHOLD INCOME

MENYA

AVERAGE YRLY. INCOME PER HH (Yr. 1992):

GOVERNORATE	= LE	5,168	(CAPMAS data)
NATIONAL	= LE	6,120	(CAPMAS data)
RATIO GOVER.YRLY. AVG. TO NATIONAL AVG.	=	84.4%	
HH INCOME GROWTH RATE	=	11%	
AVG. YRLY. INC.-LOWEST 30% OF GOVERN. HH	= LE	2,040	

(Computed using CAPMAS data)

RANGE OF HH INCOME	% OF HH IN RANGE	AVERAGE ANNUAL HOUSEHOLD INCOME		HH INCOME PROJECTED TO YR. 1995	HH INCOME PROJECTED TO YR. 2000	2% OF HOUSEHOLD INCOME	
		NATIONAL BASIS	GOVERN. BASIS			YR. 1995	YR. 2000
(LE)	(%)	(LE)	(LE)	(NOTE 1)	(NOTE 1)	(LE/YR.)	(LE/YR.)
UNDER 1,500	4.4%	1,083	915	1,251	2,108	25.0	42.2
1,550 to 2,500	11.0%	2,066	1,745	2,386	4,021	47.7	80.4
2,500 to 3,500	16.2%	3,017	2,548	3,484	5,871	69.7	117.4
3,500 to 6,500	36.3%	4,611	3,894	5,325	8,973	106.5	179.5
6,500 to 12,000	25.9%	7,941	6,706	9,171	15,454	183.4	309.1
OVER 12,000	6.2%	25,266	21,336	29,179	49,169	583.6	983.4
FOR LOWEST 30 % OF GOVERN. HH			2,040	2,790	3,816	55.8	76.3

Note (1) Projections from 1992 at 11% per year, based upon CAPMAS data. See Appedix E for explanation.

COMPARISAN OF PROJECTED HH INCOME TO
TO WS TARIFF, AND WW SURCHARGE

MENYA

WS DOMESTIC TARIFF, PRESENT RATES:

	UP TO 30 M3 / MO. at LE PER M3 =	0.23
	OVER 30 M3 / MO. at LE PER M3 =	0.30
WW SURCHARGE:	@ PERCENT OF WATER BILL =	35%

THE FOLLOWING CHARGES ARE APPLICABLE FOR HH's OF 5 PERSONS:

CONSUMPT PER PERSO	MONTHLY CONSUMP	MONTHLY CHARGE AT PRESENT WS TARIFF	WW CHARGE AT PRESENT SURCHARGE	TOTAL MONTHLY CHARGE	ANNUAL CHARGE
(LPCD)	(M3	(LE/MO.)	(LE/MO.)	(LE/MO.)	(LE/YR.)
100	15	3.5	1.2	4.7	55.9
150	22.	5.2	1.8	7.0	83.8
200	30	6.9	2.4	9.3	111.8
250	37.	9.2	3.2	12.4	148.2

APPENDIX F

WORKSHOP MEETINGS: FAYOUM, BENI SUEF, AND MENYA

F.1 Fayoum Workshop

June 14 & 15, 1995

Workshop Objectives

To explore what can be done in the City of Fayoum to ensure water supply and wastewater utilities operation and maintenance.

To share knowledge on how this effort can be made part of a governorate-wide program.

To explore what can be done to improve wastewater in the Fayoum Governorate.

Workshop Schedule

Day One

10:00 - 11:00	**Session I:**	**Workshop Opening** - Welcome H.E. Governor El Tawaly - Background, Tom Mark, USAID - Expectations & Outcomes - Schedule & Norms
11:00 - 11:30	**Session II:**	**Defining the Current Water Supply Situation and a Desirable Future** - Common Performance Standards - Presentation on Data Findings
11:30 - 12:45		Large Group Discussion
12:45 - 2:00		Small Group Activity
2:00 - 3:00		Lunch
3:00 - 4:15		Small Group Report Outs
4:15 - 4:45		Day One Closure

Day Two

9:00 - 9:30		Day Two Opening
9:30 -10:30	**Session III:**	**Defining The Current Wastewater Situation** - Common Performance Standards - Presentation of Data Findings
10:30		Break
10:40 - 11:30		Small Group Task
11:30 - 12:30		Small Group Report Outs
12:30 - 1:15	**Session IV:**	**Defining the Next Steps** Small Group Discussion
1:15 - 1:45		Small Group Report Outs
1:45 - 2:15	**Session V:**	**Workshop Conclusions & Closing**
2:15		Lunch

Session II: Defining the Current Situation of Water in the City of Fayoum

Presentation of Common Performance Indicators of a Well Operated Water Authority:

Commercial:

- Time from billing to collection is 30 to 60 days, including reading meter, issuing a bill to each consumer, and receiving payment. A complete system must be in place.

Financial:

- Percentage of Revenue Collected: 90 - 100%
- Amount of water produced compared with amount billed (unaccounted-for water) is 20% or less.

Operational Efficiency & Quality:

- Water delivered per capita
- Service 24 hours a day in sufficient quantity
- Water quality is safe for consumption

Technical/Engineering:

- Sufficient technical capacity to produce written annual plans to anticipate future demand.
- Sufficient technical capacity to produce high quality tender documents, supervise constraints, and manage water system.

Consumer:

- Ability to provide consumers with consistent, reliable mechanism to pay for water services, easy-to-pay bills, minimum of consumer conflict about payments.
- The water utility has a regular program to educate consumers about the use of water and water loss.

Management:

- Staff are able to work together as a team.
- Staff are dedicated to the water organization and motivated to perform their jobs.
- Decision making for most work is delegated to responsible managers. Managers can make decisions and are prepared to do so.

Autonomy:

- The water organization has the authority to hire and dismiss staff as required.
- Operates with quality and effectiveness.
- The organization is able to operate within an approved budget, which it controls.
- Tariffs are set at the local organizational level according to overall national policy.

Water Supply Service General Data

A.	Area Served	Inside Fayoum City Limits
B.	Area Served	16.4 sq. km
C.	Population in Service Area City	279,000 no persons (1995)
D.	Population Directly Served (piped connection)	250,000
E.	Population Directly Served	90%
F.	Number of Accounts	43,000 connections
G.	Water Supply Production	18,013,845 m^3/year(1993/94) 49,353 m^3/d
H.	Water Supply Billed	10,633,698 m^3/yr 29,133 m^3/d
I.	% Unaccounted for	41%
J.	Water Supply Production per Account	1148 liters/day
K.	Water Supply Billed per Account	677 liters/day
L.	Persons served per W.S. Account	5.8 persons
M.	Billed W.S. per Person Served	116 liters/day
N.	Total Kilometers of Pipeline in System	152 km
O.	Meters of Pipeline per Account	3.5 m/account
P.	Number of Water Meters Installed	43,000
Q.	Number of Water Meters Working	75%

Treatment Facilities Data

R. Water Treatment Facilities

1. Name: Old Water Treatment Plant (Old Kuhafa)
   Type: Clarification - Filtration
   Production Capacity: 25,920 m^3/day
   Year of Construction or Rehab.: 1926/1970
   G.Storage (Fin. Water): 500 m^3

2. Name: New Water Treatment Plant (New Kuhafa)
   Type: Clarification-Filtration
   Production Capacity: 25920 m^3/day
   Year of Construction or Rehab.: new 1993
   G. Storage (Fin. Water): 12000 m^3

3. Name: Lotffalla & Kiman Farces Compact Units
   Type: Filtration
   Production Capacity: 1,760 m^3/day (each)
   Year of Construction or Rehab: 1986

S. Storage Facilities (Elevated Tanks)

Number: 3
Total Volume (3 @ 4,000 m^3): 12,000 m^3

Financial Data (1993-94)

T.	Cost (W/O Financial Admin.)	L.E 4,446 million
U.	Revenue (Billed)	L.E 2,341 million
V.	Deficit	L.E 2,425 million
W.	Avg. tariff yield per m^3 billed	L.E 0.22
X.	Avg. tariff yield required to break even	L.E 0.42
Y.	Increase to avg. yield to break even	91%

Water Supply Small Group Task

Participants broke up into three technical groups

- Operations & Maintenance
- Financial and Commercial
- Management

Groups were asked to do the following:

- Describe the two most important problems that are constraining effective and efficient performance of water sector in the City of Fayoum
- Identify and list solutions to the problems.
- Identify and list the most important action needed in the next 3 to 5 years in a project to transform the current situation to a desirable future.

Small Group Report Outs

Operations and Maintenance Small Group

Problem: Shortage of trained staff (O&M)
- a. engineer and managers
- b. workers & technicians

Solutions:
- a. Prepare program for training of engineers and managers
- b. Design training courses
- c. Allocate necessary funds for training
- d. Establish permanent training center and provide necessary funds

Action: Conduct study and prepare plan for training
Design and construct training center

Problem: Water loss and pressure
- a. leakage
- b. public use (government building, place of worship, etc.)

Solutions:
- a. leakage
  - Rehabilitation of old existing network
  - Study problems related to network ends
- b. public education
  - Educate the public about water
  - Allocate funds needed

Action: Design and execute project for rehabilitation of network
Establish a department to educate the public about issues related to water

Problem: O&M

Solutions: The mechanical fleet
- a. Put a strategy for the provision of spare parts
- b. Computerize the entire system

Action: Study of O & M requirements provide the water and wastewater sector with its own mechanical fleet.

Financial and Commercial Group

Problems: Financial systems are not autonomous
Insufficient funds for O & M
Government accounting system does not reflect work results
Billing system is neither accurate nor fair

Solutions: The establishment of an independent entity with its own laws and by laws.
This entity will put in place the necessary systems to resolve all previously mentioned problems. Until this entity is established it is recommended that:

1) Funds for O & M (of meters) be increased
2) Funds for repair of pipes be allocated.
3) Incentives be allocated for increasing revenue collection.

Action: Steps for establishing an independent entity

Forming a transition committee to supervise institutional reform.
This committee would branch out into specialized subcommittees who would perform the necessary work. It is important that the following systems be changed or put in place:

accounting systems
meter reading system
purchase and procurement
employee incentives
supervision and follow up
training programs
simplified procedures for dealing with consumers
computerization of the system

Management Small Group

Problem: The organizational structure of the water utility does not assist in fulfilling efficiency and effectiveness. The most important impeding factors are:

a. Unclear functions and overlapping of tasks.
b. Fragmentation of activities and divisions necessary for running the water utility in different organizational locations. These are not integrated under one umbrella organization.
c. Centralization and complication of decision making and approvals, and absence of delegation of authority policy.
d. Unclear concept of the job, and need to establish objective specifications and minimum requirements for occupying the job.
e. Duplication of supervisory levels and hence, the length of channels of communication.

Solution: The reorganization of the utility consistent with the nature of water utilities as an economic and commercial entity. This is necessary for efficiency and effectiveness and taking into account social dimensions.

Problem: Inadequate manpower structure both in quality of staff and number of employees; absence of criteria and standards. Constraints on personnel affairs include the inability to provide

qualified staff through recruitment, selection, placement, promotion, motivation, and training.

Solution: The restructuring of manpower consistent with the organizational structure and actual needs. This should be based on objective and scientific criteria. Also need to establish reasonable and acceptable plan for transition, to ensure maximum use of existing human resources.

Problem: Management not provided with the venue to learn about advanced water utility techniques. Management is made up of civil servants unaware of the economic view water utilities as commercial.

Solution: The development of management group skills.

Problem: Finance, administration, procurement, and contracting are complicated and time consuming. The system is based on centralized government regulations and therefore cannot respond to emergencies and basic utility needs.

Solution: The simplification of work utility and procedures, and the creation of new regulations to address needs.

Problem: Administration is slow and not equipped to run a commercial type of operation.

Solution: The use of advanced technology computers.

Actions:

The formation of a working team to study and propose the changes required to achieve the five above-mentioned topics. The team can cooperate with specialized consulting firms in order to meet the transition stage. This is also important for the creation of skilled personnel to follow-up the tasks of organization and administration development in the future as being a continuous process.

A decree could be issued by the governor to form this team in order to start this task immediately, without waiting for the presidential decree for creating a general organization. The work of the team could take 12 months.

Required obligations: Financial support is required:

- To provide technical assistance for the team.
- To provide training for management for them to understand new concepts. Training can be conducted in Egypt or outside the country.
- For the provision of computers and training users.
- For the construction of a building to house water utility management, including furniture and equipment.

The group is looking to USAID to provide assistance towards this effort.

Session III: Defining a Desirable Future for Wastewater in Fayoum

Wastewater Standards of Performance

Commercial:

- Coordinate the proper posting of surcharges revenue for WW service collected by the water billing and collections group.
- Institute a system which assures that surcharge revenue for wastewater service billed and collected by the water supply entity is properly credited to wastewater.

Financial:

- Ability to establish a budgeting system which allows setting a proper surcharge percentage for O&M cost recovery (allowing for proper O&M funding)

O&M:

- Operate all facilities to maximize environmental and public health benefits.
- Incorporate preventive maintenance as a routine program.
- Provide WW effluent at a quality equal or close to standards 95% of the time.

Technical:

- Sufficient technical capacity to produce written annual plans to anticipate future demand.

- Sufficient technical capacity to produce high quality tender documents, supervise constraints, and manage water system.

Consumer:

- Institute education programs for consumers regarding public health issues related to the importance of proper wastewater collection, treatment, and disposal.
- Coordinate the provision of wastewater services with water supply (proper wastewater service allows higher problem-free water use and maximizes water supply benefits)

Management:

- Staff are able to work together as a team.
- Staff are dedicated to the water organization and motivated to perform their jobs.
- Decision making for most work is delegated to responsible managers. Managers can make decisions and are prepared to do so.

Autonomy:

- The water organization has the authority to hire and dismiss staff as required.
- Operates with quality and effectiveness.
- The organization is able to operate within an approved budget that it controls.
- Surcharges are set at the local organizational level according to overall national policy.

Wastewater Service General Data
City of Fayoum

A.	Area Served	Inside City Limit
B.	Area Served	16.4 sq.km
C.	Population in Service Area	279,000 persons (1995)
D.	Population Served	200,000 persons (EST)
E.	Population Served	72%
F.	Number of Accounts	34,000
G.	Wastewater Treated	43,200 m^3/yr
H.	Wastewater per Account	1,270 liters/day
I.	Wastewater per Person Sewed	215 liters/day
J.	Persons Services per WW Account	5.9 persons

Facilities Data

K.	Total Kilometers of Sewers in System	168.4 km
L.	Meters of Sewers per Account	6 m/account
M.	Wastewater Treatment Facilities	
	Name: Fayoum	
	Type: Trickling Filter	
	Production Capacity: 43,200 m3/d (500 lps)	
	Year of Construction or Rehab: 1985-1990	
N.	Pump Stations	
	Number of Main PS = 6 PS	
	Capacity Range from 85 lps to 270 lps	
	Number of Substation = 3 PS	
	Ranged Capacity From 15 lps to 40 lps	

Financial Data

O.	WW Revenue (=40% Billed WS)	L.E. 0.936 million/yr
P.	Cost	L.E. 6.466 million/yr
	Direct Employees	327
	Indirect Employees	710

Wastewater Small Group Task

In the same technical small groups as in Session II, participants were asked to:

- Identify three problems that are constraining effective and efficient performance of the wastewater sector in Fayoum.
- Identify solutions to the problems.
- Identify and list actions steps needed in the next 3 to 5 years in a project to transform the current situation to a desirable future.

O&M Small Group

Problem: Replacement Works

a. The treatment plant is in bad shape because:
   used beyond design capacity;
   required disinfections, no funds to buy chlorine on a continual basis;
   work force at all levels is inadequate.
b. Forced mains, especially those constructed in 1972. (600mm steel 7kms, 500mm cast iron 6kms)

Solutions: Prepare project designs and construct them.
Upgrade the existing plant.
Accelerate the implementation of the plant under construction with its two phases.
Replace the force mains.

Action: Prepare projects, designs, and construction to:
a. rehabilitate the existing treatment plant.
b. replace the force mains (steel 600mm 7kms, cast iron 500mm 6 kms)

Problem: Operations and Maintenance

a. The work force is not specialized, not trained and not enough.
b. The mechanical equipment is centralized in a city pool.
c. The workshop and warehouse.
d. Nonavailability of spare parts especially for the old pump stations.

Solutions:

a. Same as the water solutions at the engineer, worker, and technician levels.
b. Separate equipment pool for utility.
c. Create a workshop and warehouse.
d. Implement a long range plan to provide the spare parts for at least a five-year period.

Action:

a. Training courses for engineers in and outside of Egypt.
b. Create a training center.
c. Separate the equipment pool to serve wastewater.
d. Separate the workshop warehouse to serve wastewater.

e. Long-range (3-5 years) plan

Problem: Management and follow-up, organizationally, financially, and technically.
Solution:

a. Implement a computerized system.
b. Create an organization for the wastewater utility.
c. Create an operations and maintenance workshop and warehousing department.

Action:

a. Implement a support project to introduce computers to cover and follow all aspects (treatment plants, networks, pumping stations, workshop and warehouses)

Financial and Commercial Small Group

Problems:

a. Nonindependence of financial affairs, because there is no specific wastewater budget.
b. The inadequacy of finances, especially for operations and maintenance and training.
c. The inefficiency in collecting revenues for water, which effects wastewater negatively.
d. Increase in indirect costs in the wastewater utility.

Solutions:

a. Prepare a separate budget for the wastewater or until the creation of a separate entity. Prepare an annexed budget to the governorate right now.
b. Determination of the organizational structure adequate for the volume and type of activity to reduce the indirect cost.
c. Provide adequate fund for connections in the low income areas and collect these costs on installments (mostly with a certain time frame) with the water bill to pressure public health and the environment.
d. Prepare a future plan to generalize wastewater service governorate wide.
e. Investigate new sources of revenue to increase the wastewater revenues (a percentage on connections).
f. In the case of the creation of an independent entity for water to collect revenues, this will reflect positively on the revenues of the wastewater.

Actions:

a. Create an overall commission to oversee the transformation to an independent economic entity. This commission will have specialized subcommittees (technical, financial, managerial, legal).
b. During the transition period it is required to:
    - increase the wastewater revenue
    - utilize the existing resources most efficiently
    - provide adequate finance for the operations and maintenance (different sources)
    - find adequate management, technical, and organizational units.
c. Determine a time frame for each phase.

Management Small Group

Problems:

a. The nonexistence of an officially approved organizational structure for the wastewater department in Fayoum city up until now.
b. The nonexistence of staff training as an activity as well as the inadequacy of the budget for training. Also, the nonexistence of specific training for various technical positions.
c. The quantitative and qualitative unbalanced distribution of the work force, especially after the expansion of service.
d. The shortage of adequate management cadres, both technical and quantitative, as well as the need to develop the capabilities of middle- and senior-level management.
e. The antiquated tools and technologies available for work.

Session IV: Next Steps

Small Group Task Instructions:

1. Use water and wastewater solutions and actions prepared by groups in previous small group activities and identify when the action will take place.
   A = under 12 months
   B = 1-2 years
   C = 3 or more years
2. Determine specific tasks for each action; identify which tasks should be carried out by USAID and which should be carried out by Fayoum.

O&M Small Group

Water

Problem: Shortage of trained staff & training facility
Solution: Create a senior committee led by the governor to execute the construction of a training facility.

Responsibility: Fayoum
Timing: A
Action: Determine number and type of trainees. Determine training topics and schedule.
Timing : B
Action: Determine facility requirements, provide permits, provide land for construction of training facility. Supervise construction. Determine training facility staff.

Responsibility: Others
Timing: A

Action:	Prepare studies, plans, courses & arrange for the financing of training programs.
Timing :	B
Action:	Finance the planning, the design, and construction of facility. Construct facility. Prepare trainers.
Problem:	Water loss and waste
Solution:	Create public awareness & repair existing network
Responsibility:	Fayoum
Timing:	A
Action:	Create Public Affairs organization: select personnel, transfers, plan for campaign. Governorate to contribute to advertising campaign on local radio and TV.
Timing:	C
Action:	Follow-up on public awareness program for waste reduction. Egyptian side can contribute up to 20%. Complete data on existing networks for inclusion in tender offering.
Responsibility:	Others (including NOPWASD)
Timing:	C
Action:	Provide financing for conducting studies and preparing design for tender solicitation to repair existing networks. Oversee construction and repair.
Problem:	O&M
Solution:	Mechanical fleet to support O&M needs
Responsibility:	Fayoum
Timing:	A
Action:	Prepare needs assessment
Timing:	B
Action:	Prepare organization structure for equipment pool and location. Allocate staff and space.
Responsibility:	Others
Timing :	A & B
Action:	Finance needs assessment, finance equipment for water and wastewater pool.

Wastewater

Problem:	Replacement works
Solution:	Prepare project design and construct facility.

Responsibility: Fayoum
Timing: A
Action: Network of force main completed
Timing: C
Action: Rehabilitate the existing treatment plant

Responsibility: Others
Timing: A
Action: Finance, execute, and supervise construction of force mains
Timing: C
Action: Finance, execute, and supervise construction of rehabilitation of treatment plant.

Problem: Lack the ability to monitor finances, O&M, administration, and to follow-up with the appropriate action.
Solution: Computerize system.

Responsibility: Fayoum
Timing: A
Action: Allocate space, people, and define responsibilities.

Responsibility: Others
Timing: A
Action: Finance, provide hardware and software, train staff to use computers.

Financial and Commercial Small Group

Water

1. Creation of an authority with an independent legal identity
Timing: C
Responsibility: GOE
Actions: Government decision to form committee
Coordinate with Authority to issue decree.
Take executive steps following the issuance of decree.

2. Increase allocations for operation & maintenance
Timing: A
Responsibility: GOE
Actions: Contact Ministry of Finance and convince them to increase allocations earmarked for operation and maintenance.

3. Earmark allocations to repair house connections
Timing: B

Responsibility: GOE
Action: Contact Ministry of Health to make finance available.

4. Establish incentive program to increase revenue collection
Timing: B
Responsibility: GOE
Actions: Conduct a joint study between Governorate, El Azab Utility, and City Council. Issue the appropriate executive orders.

Wastewater

1. Prepare independent budget for wastewater utility or budget annexed to governorate budget.

Timing: A
Responsibility: GOE
Action: Create working committee to establish budget based on the studies conducted by the various departments. Personnel, procurement, warehousing, wastewater, organization governorate financial departments

Timing: B
Responsibility: GOE
Action: Separate the allocation belonging to wastewater from the budget (BAB I & BAB II) of local unit for the Markaz for Fayoum, the Housing Directorate, and the Governorate.

2. Determination of adequate structure for the wastewater activity based on size and nature of work.

Timing: A
Responsibility: GOE

3. Allocate adequate resources to construct house connections for low-income consumers on installation.
Timing: B
Responsibility: GOE

4. Establish future plans to provide wastewater service governorate wide.
Timing: A
Responsibility: GOE/foreign assistance donor

5. Identify new revenue sources.
Timing: A
Responsibility: GOE

Management Small Group

Water

Solution

1. Develop the organizational structure for the water utility to coincide with the requirements of an economic unit to achieve efficiency and effectiveness taking into consideration the social diversion.

Timing: A
Responsibility: Governorate
Action: Decision to choose the members of the local team.
Decision to choose adequate structure.
Responsibility: Dutch Technical Assistance
Prepare the study, collect data, and present alternatives.

2. Replace and/or redistribute the workforce to improve quality and quantity of staff.

Timing: A
Responsibility: Same as above
Action: Same as above

3. Develop skills for managers and leaders.

Timing: B
Responsibility: GOE, with USAID & Dutch providing support
Action: Training needs assessment in the various fields: financial, technical, managerial, and real estate. Prepare Training Plan; follow-up implementation.

4. Develop all work systems and procedures

Timing: A
Actions: Tied to the Dutch Plan.

5. Introduce new technology

Timing: A
Responsibility: Commitment from USAID
Actions: Needs analysis and provision of needs.

6. Provision of a headquarters.

Timing: A & B
Roles: USAID to finance

Wastewater

1. Organization Structure

Timing: A

Responsibly: USAID to provide

2. Redistribution of manpower
Timing: A
Action: Establish a task force to perform the study with assistance from USAID

3. Develop skills for managers and leaders.
Timing: A
Responsibility: USAID
Action: Training needs assessment in the various fields: financial, technical, managerial, and real estate. Prepare training plan and follow-up implementation.

4. Introduce new technology
Timing: A
Responsibility: Commitment from USAID
Actions: Needs analysis and provision of needs.

5. Establish headquarters
Timing: A
Responsibility: USAID support

Water & Wastewater

Review Workshop
Fayoum Governorate
June 14 - 15, 1995

Participants List

Governorate of Fayoum

1. H. E. the Governor of Fayoum Governorate
2. Mr. Mohamed Ahmed Abd El Latif, Chief of the Popular Council
3. Mr. Salah Helmy, Secretary General of Fayoum Governorate
4. Mr.Ahmed Abdallah Barakat, Head of Markaz Fayoum and Mayor of Fayoum City
5. Mr. Mohamed Shukry, Head of the Water Sector in Fayoum
6. Mr. Ibrahim Musa, Deputy Mayor of Fayoum City
7. Mr. Eid Rashed Ibrahim, General Manager for Organization and Administration Directorate
9. Mr. Fathy Hashem Ahmed Osman, Chief of the Housing Reconstruction and Public Utilities Committee
10. Mr. Mamdouh Anwar, Chief of the New Kohafa Station
11. Mr. Abdel Aziz Rabeha, Chief of the Old Kohafa Station
12. Mr. Mohamed Farrag, the Deputy of the Financial and Administration of Fayoum City
13. Mr. Ahmed Mohamed, Chief of Contracting and Procurement of Fayoum Governorate
14. Mr.Farag Ali Ahmed, Chief of the Water Network of Fayoum City
15. Mr. Ruby Ramadan, Chief of Wastewater Supply of Fayoum Governorate
16. Mr. Marzouk Fahmy Mohamed, Chief of the Wastewater Network of Fayoum City
17. Mr. Hussien Eid Morsy, Chief of Water Pumping
18. Mr. Mohamed Mohamed Ibrahim, Chief of Water Treatment Plant
19. Mr. Hassan Ali Abdel Tawab, Chief of Wastewater of Fayoum City
20. Mr. Amr El Lethy, Chief of Water Revenue
21. Mr. Mamdouh Abdel Waheb, Chief of Finance of Fayoum City
22. Ms. Fayza Fawzy Hanna, Chief of the Planning of Fayoum City
23. Hussien El Zomor, Chief of Governorate Information Center
24. Mr. Mohamed Morsey, Chief of Housing Reconstruction and Public Utilities Committee
25. Mr. Thabet Mohamed Atwa, Chief of Housing Reconstruction

USAID

25. Mr. Thomas Marr, Project Officer, Provincial Cities Project
26. Eng. Adel Halim
27 Eng. Motafa Dahi

El Azab Waterworks

28. Eng. Emiel Daniel, General Manager

Fayoum Drinking Water and Sanitation Project

29. Mr. Cees Vulto, Project Manager and Institutional Development Expert

Stanley

30. Mr. Carl Schwing, Montgomery
31. Mr. Barry Hess Contracting

Consultant

31. Mr. Mohamed Morsey

Public Information

32. Eid Abdel Tawab

EHP Staff

33. Mr. Dan Edwards
34. Mr. Tarek Selim
35. Mr. David Laredo
36. Mr. Eliane Linn
37. Mr. Mostafa El Tayeb
38. Mr. Mahmoud Bakr
39. Mr. Salah Zaki
40. Ms. Neamat Guenena
41. Ms. Sherin Ezzat

F.2 Beni Suef Workshop Agenda

June 20-21, 1995
Beni Suef Governorate Building

Workshop Objectives

To explore what can be done in the City of Beni Suef to ensure water utilities operation and maintenance.

To share knowledge how this effort can be made part of a governorate-wide institutional development program.

To explore what can be done to improve wastewater in Beni Suef.

Workshop Schedule

Day One

10:00 - 11:30	**Session I: Workshop Opening** - Welcome - Background - Expectations & Outcomes - Schedule & Norms
11:30 - 12:30	**Session II: Defining a Desirable Future for the Water Sector in the City of Beni Suef** - Common Performance Indicators - Data Findings
12:30 - 1:00	Break
1:00 - 2:00	Small Group Discussion
2:00 - 3:00	Small Group Report Outs
3:00 - 3:30	Day One Closing
3:30	Lunch

Day Two

9:30 - 9:45	Day Two Opening

9:45 - 10:30	**Session III: Defining a Desirable Future for Wastewater in Beni Suef** - Common Performance Standards - Presentation of Data Findings
10:30 - 11:30	Small Group Discussion
11:30 - 12:00	Break
12:00 - 1:00	Small Group Report Outs
1:00 - 2:15	**Session IV: Defining the Next Steps** - Small Group Discussion
2:15 - 3:15	Small Group Report Outs
3:15 - 3:30	**Session V: Workshop Conclusions & Closing**
3:30	Lunch

Session II: Defining a Desirable Future for the Water Sector in the City of Beni Suef

Presentation of Common Performance Indicators of a Well-Operated Water Authority:

Commercial :

- Time from billing to collection is 30 to 60 days, including reading meter, issuing a bill to each consumer, and receiving payment. A complete system must be in place.

Financial :

- Percentage of Revenue Collected: 90 -100%
- Amount of water produced compared with amount billed (unaccounted-for water) is 20% or less.

Operational Efficiency & Quality:

- Water delivered per capita
- Service 24 hours a day in sufficient quality
- Water quality is safe for consumption

Technical/Engineering :

- Sufficient technical capacity to produce written annual plans to anticipate future demand.
- Sufficient technical capacity to produce high quality tender documents, supervise constraints, and mange water system.

Consumer :

- Ability to provide consumers with consistent, reliable mechanism to pay for water services, easy to pay bills, minimum of consumer conflict about payments.
- The water utility has a regular program to educate consumers about the use of water and water loss.

Management:

- Staff are able to work together as team.
- Staff are dedicated to the water organization and motivated to perform their jobs.
- Decision making for most work is delegated to responsible managers. Managers can make decisions, and are prepared to do so.

Autonomy:

- The water organization has the authority to hire and dismiss staff as required to.
- Operates with quality and effectiveness.
- The organization is able to operate within an approved budget which they control.
- Tariffs are set at the local organizational levels according to overall national policy.

Water Supply Small Group Task

Participants broke up into three technical groups

- Operations & Maintenance
- Financial and Commercial
- Management

Groups were asked to do the following:

- Describe the two most important problems that are constraining efficient performance of water sector in the City of Beni Suef
- Identify and list the solutions to the problems.
- Identify and list the most important action needed in the next 3 to 5 years in a project to transform the current situation to a desirable future.

Small Group Report Outs

Operations and Maintenance Small Group:

Problem: Shortage of trained staff
Solution:

a. Make available the needed manpower
b. Train manpower
c. Provide necessary guides for a and b

Problem : Waste in water produced (unaccounted-for + leakage)
Solutions:

a. Supervise consumption and install new meters.
b. Increase the average charge
c. O&M (regular)

Problem: Unavailability of spare parts
Solution:

a. Prepare an O&M long-term program with adequate guides.
b. Training the staff of the procurement department

Problem: Lack of O&M funds
Solution: Same as above.

Comments:

- The problems and solutions of the city are applicable to the whole governorate.
- It is important to initiate public awareness campaigns around water-related issues.
- Create a water and wastewater related database.
- Plan for future upgrading projects.

Financial and Commercial Small Group

Problems:

1. Insufficient funds for O&M
2. High production costs
3. Inaccurate system for meter reading and revenue collection

Solutions:

1. Establish an economically or financially autonomous water utility which will depend on governorate support during a transition period to be determined.
2. Establish an independent entity which is affiliated to the governorate.
3. Lower production costs through:
    - reduction of waste
    - save O&M costs
    - implementation of penalty
    - giving incentives for good performance
4. Cancel charges on average basis by resolving meter-related problems.
5. Upgrading of revenue collection system.

Actions:

1. Establish specialized committees for the purpose of institutional transformation.
2. Presentation of the results of these committees' studies and deliberations to the responsible authority.
3. Schedule and timetable for transformation.
4. Until this autonomous water utility is established, it is important to implement the decree related to establishment of the independent unit affiliated with the governorate.
5. Adopt necessary procedures to reduce waste and lower production costs.

Management Small Group

Problems:

1. The nonexistence of management disciplines to cope with quantative and qualitative developments in the water utility, particularly with regard to:
    - ♦ Organizational structure, horizontal and vertical communication, and relationship with others
    - ♦ Functions and responsibilities
    - ♦ Job descriptions and job specifications
    - ♦ Distribution and delegation of authority
2. Rigidity of regulations.
3. Noneffectiveness of appreciation and punishment system
4. Outside interference in the process of decision making
5. Inability of management in charge of water utility to recruit and select suitable manpower. (Both in numbers and quality)
6. The nonexistence of a continuous training program for manpower development.
7. The absence of auxiliary developed tools (computers, meters, etc.)
8. Need for a publicly credible system of billing and accounting.

Solutions:

1. Establishment of an autonomous entity for the water utility.
2. Establishment of an integrated organizational structure for all components of the utility (plants, network, revenues, auxiliary services, etc.) This structure should include functions, tasks, and specific jobs for achieving integration.
3. Establishment of systems and policies of manpower management that are based on job requirements and specifications. In addition, establish policies to maintain and motivate quality manpower.
4. Create an ongoing system for human resources development that provides systematic and organized training based on proper assessment of training needs.
5. Provision of auxiliary tools and developed technology for utility management.

Session III : Defining a Desirable Future for Wastewater in Beni Suef

Wastewater Standards of Performance

Commercial:

- Coordinate the proper posting of surcharge revenue WW service collected by the water billing and collections group.
- Institute a system which assures that surcharge revenue for wastewater service, billed and collected by the water supply entity, is properly credited to wastewater.

Financial:

- Ability to establish a budgeting system which allows setting a proper surcharge % for O&M cost recovery (allowing for proper O&M funding)

O&M:

- Operate all facilities to maximize environmental and public health benefits.
- Incorporate preventive maintenance as a routine program.
- Provide WW effluent at a quality equal or close to standards 95% of the time.

Technical:

- Sufficient technical capacity to produce written annual plans to anticipate future demand.
- Sufficient technical capacity to produce high quality tender documents, supervise constraints, and manage water system.

Consumer:

- Institute education programs for consumers regarding public health issues related to the importance of proper wastewater collection, treatment, and disposal.
- Coordinate the provision of wastewater services to water supply (proper WW service allows higher problem-free water use and maximizes water supply benefits).

Management:

- Staff are able to work together as a team.
- Staff are dedicated to use the water organization and motivated to perform their jobs.
- Decision making for most work is delegated to responsible managers. Managers can make decisions and are prepared to do so.

Autonomy:

- The water organization has the authority to hire and dismiss staff as required.
- Operates with quality and effectiveness.
- The organization is able to operate within an approved budget which it controls.
- Surcharges are set at the local organizational level, according to overall national policy.

Wastewater Small Group Task

In the same technical small groups as in Session II, participants were asked to:

- Identify three problems that are constraining effective and efficient performance of the wastewater sector in Fayoum.
- Identify and list actions steps needed in the next 3 to 5 years in a project to transform the current situation to a desirable future.

O&M Small Group

Problems:

1. The capacity of the actual water plant is not sufficient.
2. The granite networks are dilapidated.
3. Insufficient funds in BAB II.
4. Shortage of manpower, equipment training opportunities.
5. Difficulties in obtaining spare parts produced overseas.
6. Shortage of office space and warehouses.
7. Difficulty of obtaining the permission needed to darn the wastewater in the darns.
8. No independent administrative support is available to the wastewater sector.
9. No maps of the network are available.

Solutions:

1. Expand the actual capacity of the treatment plants.
2. Prepare, design, and construct rehabilitation of sewers and force mains.
3. Allocate funds for 1 & 2.
4. Resolve problems related to manpower (training and incentives).
5. Establish a training center.
6. Provide the sector with appropriate equipment for O&M.

Financial and Commercial Small Group

Problems :

1. Insufficient funds for O&M
2. The treatment plants are overloaded & no funds are available for expanding the capacity.
3. There is no autonomous economic entity for the wastewater sector.
4. The untreated water impacts negatively on the environment.
5. A service fee is added to the water bill despite there being people and areas that are unserved or unconnected.
6. Discrepancy between O&M costs and revenues.

Solutions:

1. Establish an autonomous economic entity for water and wastewater.
2. Establish an independent unit or branch (water and wastewater) affiliated to the governorate.
3. Improve the revenue collection system.
4. Optimize use of available funds.
5. Increase funds or revenues to expand the capacity of existing plants and reduce environmental hazards.
6. Connect unserved or unconnected people in low-income areas on an installment basis.

Actions:

1. Establish specialized committees in preparation for the institutional transformation of the utility into an entity or branch affiliated with the governorate.

2. Present study reports and data to the authorities concerned in preparation for the issuance of the necessary decrees.
3. Program and schedule an implementation plan for this transformation.
4. Implement the decree related to the creation of the unit or branch affiliated with the governorate.

Management Small Group

Problem: Manpower

a. The existence of obvious shortages in manpower, both in numbers and quality. This shortage will increase as a result of future expansion of facilities.
b. Inablity of managers to select the required technical manpower on the basis of job descriptions, specifications, and minimum requirements.
c. Shortage in funds available for allowances.

Problem: Organization

a. Lack of an organizational structure for the utility. Although an organizational structure is proposed, it is not approved by the Central Agency for Organization and Administration (C.A.O.A)
b. Lack of clear organizational channels of communications and relationships outside the utility.
c. Need to provide managers with the ability to take quick actions and contribute effectively to the process of decision making.
d. Nonexistence of job descriptions, specifications, and minimum qualifications required.

Problem: Training

a. The nonexistence of organized and ongoing training to build skills and promote personal efficiency.
b. The nonexistence of a scientific system for assessing utility training needs.
c. Shortage of financial funds available for training.

Problem: Office equipment

a. Need for office equipment and tools to cope with new technology and to facilitate operations and rational decision making.

Solutions:

1. Provide the utility management with the freedom to select the best qualified human resources, based on job specifications and through competitive exams.
2. Study the current manpower structure, in numbers and in kinds. Establish future plans for restructuring manpower, taking into consideration future utility expansions.
3. Require funds in utilities as a precondition for filling jobs.
4. Study the proposed organizational structure and re-evaluate supervisory levels to enable managers to take quick actions and to contribute effectively to the decision-making process.
5. Get the approval of the C.A.O.A. on the utility organizational structure and classification of jobs.

6. Establish staff training plans to correct the existing gaps in staff abilities and improve efficiency on an ongoing basis.
7. Study the feasibility of establishing a specialized training center for utilities to serve water and wastewater activities in the governorate.
8. Provide funds necessary to implement training plans.
9. Provide the auxiliary office with equipment for organizing information and facilitating decision making (computers, faxes, communications network, etc.)

Session IV: Next Steps

Small Group Task Instructions:

1. Use water and wastewater solutions and actions prepared by small groups in previous activities and identify when the actions will take place.
   A = under 12 months
   B = 1-2 years
   C = 3 years or more
2. Determine specific tasks for each action and identify which tasks should be carried out by USAID and which tasks should be carried out by Beni Suef.

O&M Small Group

Water

Problem (1):	Shortage of labor and training
Responsibility:	Governorate, C.A.O.A., F.D., C.C.
Timing:	C
Action:	Allocate Budgets
	Increase manpower
Responsibility:	Governorate
Timing:	A
Action:	(Labor) Short term
Responsibility:	C.A.O.A., Governorate
Timing:	C
Action:	Long term
Responsibility:	City Council, Governorate
Timing:	A
Action:	Long term

Problem (2) :	Water losses (unaccounted-for water)
Responsibility:	City Council, Governorate, Financial Directorate
Timing:	A
Action:	Actual governmental uses (consumptions) flow up raise to the "average base"
Responsibility:	City Council, Foreign donors, Governorate
Timing:	B
Action:	Prepare a program to repair and replace water meters
Responsibility:	City Council
Timing:	A
Action:	Continous water network maintenance
Problems (3 & 4):	O&M works and spare parts
Solution:	Prepare O&M program (Funding and execution)
Responsibility:	City Council, Housing Department
Timing:	A
Action:	Consultant to study program needed
Responsibility:	City Council, Housing Departement, Consultant
Timing:	A
Action:	Bid and prepare the study
Responsibility:	City Council
Timing:	C
Action:	Execution of the program

Wastewater

Problem (1) :	Wastewater treatment plant Irrigation authority permission
Responsibility:	City Council, NOPWASD
Timing:	B
Action:	Hire consultant for study and design of works, preparation of bids and supervision of construction. ♦ Hire consultant to study and design works ♦ Find suitable land and prepare necessary permissions

Responsibility: Foreign donors, Consultant
Timing: C
Action: Construction (tendering, awarding, execution, and supervision)

Financial and Commercial Small Group

Problem (1): A. Establish an autonomous economic entity

Responsibility: Governorate, City Council, Others (GOE)
Timing: B
Action: Form a committee to
- Establish administrative structures and systems
- Establish a budget (BAB I, II) and discuss with financial and other responsible authorities.

Responsibility: Governorate, City Council, Others (GOE)
Timing: A
Action: Form a committee to complete procedures related to BAB II; raise salaries and give incentives and bonuses; remove ceiling on the 10% bonus.

Problem (1): B. Establish an independent branch or unit affiliated with the Governorate

Responsibility: Governorate, City Council, Others (GOE)
Timing: A
Action: Form a committee to complete procedures related to BAB II; raise salaries and give incentives and bonuses; remove ceiling on the 10% bonus.

Problem (2): Reduce production costs

Responsibility: City Council,
Timing: A
Action: Reduce expenditure and optimize on items.
Reduce wasted and unaccounted-for water.

Problem (3): The average shortage

Solution: Cancel the average shortage
Responsibility: City Council, Governorate
Timing: C
Actions: Rapid, universal installment of water meters (focusing on big consumers)
Repair of damaged meters, optimizing use of insurance funds

Problem (4):	Improve the revenue collection system
Responsibility:	Ministry of Finance, governorate
Timimg:	A
Actions:	Increase incentives and bonuses
Responsibilty:	Foreign aid
Timing:	B
Actions:	Computerize the reading and billing system
Responsibility:	City Council, Governorate
Timing:	A
Actions:	Increase the number of collectors
Problem (5):	Allocate funds needed for expanding and upgrading works
Responsibility:	City Council, Ministry of International Cooperation
Timing:	B
Actions:	Estimate the needed funds Contact authorities responsible

Management Small Group

Water and Wastewater

Problem (1):	Need for staffing structure (number and positions),
Solution:	Each utility component to determine the staff required (numbers and positions) to meet current and future needs.
Responsibility:	Managers of water production, water network, and wastewater sectors
Timing:	A
Actions:	Assess needs and present estimates.
Solution:	Get approval of C.A.O.A, Ministry of Finance, and Ministry of Manpower to exempt the utility from the manpower distribution system and allow it to select staff by exams.
Responsibility:	The Mayor and the Governorate
Timing:	A

Actions: The formation of a working group representing city council, organization and administration directorate, manpower directorate, financial directorate, and governorate headquarters to pursue the accomplishment of this issue.

Problem (2): Study and approve the organizational structure
Solution: Review the proposed organizational structure of the utilities. Prepare a final proposal including job-descriptions and specifications.
Present to the governor.
Approval of structure and follow up by C.A.O.A., with governor's assistance.

Responsibility: The Mayor, the local experts, and the governor
Timing: A
Actions: The formation of a working group headed by Deputy Mayor and membership of city personnel affairs manager, organizational and job description officer in directorate of organization and administration, manager of utilities.
Get technical assistance from local experts from provincial universities in job description stage.

Problem (3): Training
Solution: Assess training needs, prepare training plan, implement plan; survey training facilities available locally and study feasibility of establishing training specialized center; establish center.

Responsibility: Governorate in cooperation with the USAID
Timing: A
Actions: Technical assistance from consulting firm

Problem (4): Provision of office equipment
Solution: Provide utility with computers, communications network, and other office equipment

Responsibility: Utility in cooperation with the governorate information center
Timing: A
Actions: Undertake study to assess needs

Solution: Training staff to use equipment

Responsibility: Governorate information center
Timing: B
Actions: Organizing training

Responsibility:	Governorate-local component, USAID, foreign component.
Timing:	A
Actions:	Providing funding

Problem (5):	Strategy Solution
Solution:	EHP prepare option study
Responsibility:	EHP
Timing:	A
Solution:	Present report to the governor, who selects the option
Responsibility:	USAID
Timing:	A
Solution:	Prepare a draft decree
Responsibility:	Legal Department, Governorate
Timing:	A
Solution:	Issue decree
Responsibility:	Concerned authority
Timing:	A

Participant Expectations

Suggest solutions to the financial, technical, and managerial problems facing the sector.

Define the problems facing the sector.

Arrive at the best way to provide service at an affordable cost.

Discuss ways to solve problems related to groundwater.

Review results of the EH mission study.

Define the scope of the EH project, its objectives and possibilities of cooperation with the Finish project.

Ensure that all problems facing the sector are addressed, especially those related to equipment and manpower shortages.

Define priorities.

Reach a decision to not transform the sector into a company.

Outline the pace to develop the institutional groundwork of the sector.

Define institutional problems.

Reach a general idea or view of a self sufficient, sustainable, efficient water and wastewater sector.

Decide on training needs and programs.

Develop study outlines related to wastewater problems in the villages.

Define one problem and suggest solutions.

Discuss ways and possibilities of privatizing the sector.

Water & Wastewater

Review Workshop
Beni Suef Governorate
June 20-21, 1995

Participants List

Governorate of Beni Suef

1. H.E. the Governor of Beni Suef Governorate
2. Mr. Hussien Abdel Kawi, General Secretary of Beni Suef Governorate
3. Mr. Hussien Samy Dawood, General Secretary Assistant of Beni Suef Governorate
4. Mr. Reda Rageb, Chief of Markez and City of Beni Suef
5. Eng. Ramsis Kamel Atalla, Under Secretary, Chief for Central Department Financial Directorate.
6. Eng. Hassen El Bana , Chief of Housing Reconstruction
7. Mr. Salah El Zoghedy, Chief of Finance and Administration
8. Mr. Mohamed Said Salem, Chief of Information Center
9. Ms. Afet El Sagher, Chief of Planning of Beni Suef
10. Mr. Hassen Ahmed, Chief of Contracting and Procurment of Beni Suef
11. Mr. Ahmed Shawki , Deputy of Popular Council
12. Mr. Ibrahim Mostafa, Deputy of Popular Council
13. Eng. Milad Sydehem, Chief of Utilities of Beni Suef City
14. Eng. Salah Ali Hassen, Chief of Water Network Sector of Beni Suef City
15. Mr. Anwar Mohamed, Chief of Wastewater of Beni Suef
16. Eng. Hany Mostafa Kamel, Chief of the American Water Station
17. Mr. Mohamed Ali Aref, Chief of Old Water Station
18. Mr. Hamdi Ali, Chief of Planning in the local units of Beni Suef City
19. Mr. Ahmed Taha, Chief of Revenue in local units of Beni Suef City
20. Mr. Samir Kamel El Shanawi, Chief of Finance in local units of Beni Suef City
21. Mr. Abdel Mohsen Mohamed, Sceretary of Popular Council
22. Ms. Nour Shiek Fathy, Chief of Personnel in local units of Beni Suef City
23. Mr. Helmy Ali Mostafa
24. Mr. Hassen Abdel Atey, Chief of Water Projects in Housing Sector
25. Mr. Abdel Hamid Mohamed, Chief of Wastewater Sector
26. Eng. Mohamed Abdel Moniem, Wastewater Projects Engineer
27. Mr. Hassen Ahmed, Chief of Imports of Beni Suef Governorate

Finland Project

28. Eng. Pentti Ruohonen, Project Coordinator for regional water supply and wastewater
29. Mr. Moasd Radwan, Chief of Finance

30. Ms. Lisa
31. Ms. Reem Ahmed, Translator

USAID

32. Mr. Mostafa El Dahi
33. Mr. Adel Halim

EHP Staff

34. Mr. Dan Edwards
35. Mr. David Laredo
36. Mr. Tarek Selim
37. Ms. Elaine Linn
38. Mr. Mostafa Tayeb
39. Mr. Mahmoud Bakr
40. Mr. Neamat Guenena
41. Mr. Salah Zaki
42. Ms. Sherin Ezzat

F.3 MENYA MEETING

7 August 1995
MENYA GOVERNORATE BUILDING

Meeting Objective

To exchange views about the data collected by the EHP Team on the institutional condition in the water and wastewater sector in Menya.

To explore what can be done in the city of Menya to ensure water supply and wastewater utilities operation and how this effort can be made part of a governorate-wide institutional development program.

To discuss what can be done to improve the wastewater situation in Menya Governorate.

Minutes

The meeting, which started at 12:00 o'clock and lasted until 14:45, was divided into four parts.

During the first half hour the EHP Team presented common performance indicators of a well-operated water authority followed by those for wastewater standard performance. These were the same ones presented in Beni-Suef and Fayoum.

During the next half hour, the participants reviewed the data findings of the EHP Team for both the water supply and wastewater situation.(See appendix D for details of the findings).

The third part of the meeting focused on identifying the most important problems facing the utilities:

Water Utility

- **High percentage of unaccounted-for water**

The following reasons for this problem were advanced by the attendees:

- Network leakage
- Ineffectiveness and inefficiency of the collection system, due to:
  - The quality of the installed meters
  - Shortage and low level of meter-readers
  - Centralization of consumer services in the city
- Problems of collecting government agencies water consumption

- **High operation costs.** The reasons mentioned for the increased cost were:
  - inadequacy of training
  - inadequate staffing
  - unbalanced manpower distribution
  - high costs of imported spare-parts
- **Fees of customer's connections and other services are not reasonable.** The current fees were set a decade or so ago. They do not represent actual costs today.
- **Centralization of authority and decision making.** This inhibits the proper operation of the system.

Wastewater Utility

- **Inadequate capacity of the existing system.**

  Wastewater treatment plant and pumping stations are not able to cope with the flows.

- **High costs for operation and maintenance.**

  Increases are due to inadequate operation as well as the shortage and high prices of imported spare-parts.

- **Inadequacy of current tariffs.**

  Surcharge for wastewater is not sufficient to cope with O&M costs.

- **Lack of consumer awareness,** which results in improper use of the sewage system.

- **Shortage of skilled technical manpower and absence of training.**

The last portion of the meeting participants focused on the proposed solutions to the above problems and suggested the following changes:

1. Computerization and development of revenue collection system and collection staff.
2. Increase the number of collectors, meter readers and clerks. In addition, raise the skill level of all these employees.
3. Decentralization of customer service offices in the city to facilitate consumer relations.

4. Adopt incentive system to motivate employees.

5. Provide an alternative supply of water for uses such as garden irrigation, street washing, car washing, etc.

6. Rationalization of production and O&M costs, including material, labor, power and electricity, sales taxes, and customs for imported materials.

7. Financial and administrative autonomy for water and wastewater utilities to improve the efficiency of the utilities.

WATER & WASTE WATER

REVIEW MEETING

Menya Governorate

August 7, 1995

Participant List

Governorate of Menya

1. General Bahei El Deen Hegab, Gov. Secretary General.
2. General Ahmed Samir El Beblawi, Gov. Assistant Secretary General.
3. Eng. Gomaa Hassan Gad, Under Secretary of Ministry of Housing and Utilities.
4. Mr. Mamdouh Abou Safa, Chief of Minia City & Markaz.
5. Eng. Saroufim Sobhi Girguis, Assistant Dir. of Water Utility.
6. Eng. El Nahhas Ahmed Abdel Hamid, Assistant Dir. of Water Utility.
7. Eng. Fatma Mahmoud Shaban, Assistant Dir. of Water Utility.
8. Eng. Khalil Mohamed Khalil, Waste Water Utility Director.
9. Eng. Hosney Abdel Nabi Abdalla, Assistant Dir. of Waste Water Utility.
10. Mr. Atif Abdalla Mohamed,Revenue Dep. Director in Minia City.
11. Eng. Ismail Hafez Mohamed, Operation Controller for Waste Water.
12. Eng. Ismail Ahmed Mohamed, Chief of Maintenance Section.
13. Eng. Fayez Taha, Mechanical Dep. Director in housing Directorate.
14. Eng. Magda Farah Abdel Sayed, Utility Director in Housing Directorate.
15. Mr. Ghanem Hassan Mohamed, Chief of Water Revenue Sections.

USAID

16. Mr. Adel Halim, Project Engnieer.

EHP Staff

17. Mr. Tarek Selim
18. Mr. Mostafa El Tayeb
19. Mr. Mahmoud Bakr
20. Mr. Salah Zaki

APPENDIX G

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