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Report

Design of a Revolving Loan Fund

for Local Capital Investments

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Preface

The Government of Egypt and USAID are providing substantial financial resources for rural development throughout Egypt. These funds are currently provided by USAID through the Local Development II (Provincial) Project in the form of block grants. The funds have a multiplicity of purposes, each providing a needed component for Egypt's most pressing rural development needs. Two of the major components of this assistance are water supply and wastewater collection and treatment. However, neither these LD II grants nor central government capital transfers are sufficient to satisfy the heavy financial requirements in the wastewater sector.

The scope of this assignment was to study the financing requirements of wastewater treatment and distribution systems and to analyze financing alternatives, including revolving loan funds, which could be employed to enhance the resources available to the Government of Egypt for increasing wastewater sector development activities.

Summary

Untreated wastewater is a serious health threat to rural Egyptians. Too few facilities have been constructed and operation and maintenance (O&M) of existing facilities is less than adequate. Furthermore, the rural wastewater sector is underfunded and underdeveloped. This report presents alternative mechanisms which can be employed to increase financial resources, build more projects, and significantly improve O&M.

The report focuses primarily on the need for a revolving loan fund and a capital cost recovery system in the wastewater sector. Our objective is to demonstrate how capital cost recovery and revolving loan funds can be used to obtain expanded financial resources for this sector.

The *Introduction* establishes the need for such systems by briefly characterizing the magnitude of the sewage treatment problem in rural Egypt and describing the existing costs and financing of wastewater projects.

Section 2 discusses the issues that must be addressed in developing a conceptual model for cost recovery and revolving loan fund systems. These include determining the costs that will be recovered, who will administer the fund, the major economic and financial issues that will affect the system, the mechanism that will be used to recover costs, and what the benefits of the systems. The concept of project equity is also addressed in this section.

Section 3 shows how these systems can be integrated into the existing system of wastewater project development, and discusses existing legal, financial, and user-related issues that need to be considered in the design and implementation of this financing mechanism.

Throughout the report the need for programmed operation and maintenance (O&M) of wastewater systems and the integration of O&M cost recovery with capital cost recovery is emphasized. The attitudes of users toward cost recovery, and their financial capability are also stressed.

Section 4 provides specific recommendations for the introduction and implementation of a capital cost

recovery system and a revolving loan fund for the wastewater sector into the rural Egyptian context. Additional suggestions discuss how cost recovery might be incorporated into other important sectors of local government.

An *Appendix* describes the economic situation in Egypt and explains our reasoning behind the economic data we chose for our model.

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Introduction

STATEMENT OF PROBLEM

Untreated wastewater is a very serious health threat to rural Egyptians. Much of the wastewater from residential and commercial buildings is presently discharged into irrigation canals or allowed to infiltrate into aquifers. Operation and maintenance of existing wastewater treatment facilities is less than adequate, and effluent often does not meet acceptable health standards. Effluent from untreated or improperly treated wastewater poses a growing threat to the welfare of rural residents. Should untreated wastewater infiltrate into the water supply, health consequences could be devastating.

However, the treatment of wastewater is an expensive undertaking, and present funding resources are not adequate to the task. The wastewater sector must locate a source of new, substantial funds. We propose that cost recovery can provide this new source of funds.

STUDY CONCLUSIONS

This report recommends that the Government of Egypt (GOE) seriously consider establishing a *revolving loan fund* for capital development projects and implementing a *cost recovery system*. Our conclusions are that such actions are *feasible* and *warranted*.

Although implementing these systems involves clearing a number of legal, regulatory, institutional, and financial hurdles, success can be achieved. A well-managed cost recovery effort can provide significant new resources for the wastewater sector over a 40-year period. These resources can have a dramatic impact in the amelioration of potential health threats.

A cost recovery system should be designed so that funds made available for a project through a revolving loan fund will be repaid over a period of 40 years. The loan repayment should be structured as a variable-rate user fee, where a standard uniform payment set by each governorate is paid to a fund managed by a designated financial depository (for example, the Bank for Housing and Reconstruction). Each governorate

should have its own fund, established and managed by the designated depository. Project decisions should be made by the governorate, and all funds derived from cost recovery should be reloaned within the same governorate.

User fees should be established at a level that is affordable to the average household, and should be increased on a periodic basis (once a year) to ensure that cost recovery is maximized and project subsidization by the central government is minimized. Governorates will have the incentive to increase rates in accordance with economic conditions since fees collected for cost recovery will be returned to the individual governorates for future projects. A financial incentive fee structure should be developed for employees involved in both project development and O&M. Incentives will give workers greater motivation to successfully complete job related tasks.

Section 1

Background: Wastewater Treatment in Rural Egypt

THE GROWING PROBLEM OF WASTEWATER DISPOSAL

Only about three percent of the wastewater in rural Egypt was undergoing treatment at the end of 1990, according to a recent estimate.¹ As population continues to grow at an alarming rate (over two percent annually)², the wastewater problem will be compounded, especially in those areas where the treatment and disposal problems are already severe. The population increase alone offsets the benefits that accrue from the limited resources provided to the wastewater sector every year.

Ineffective wastewater disposal is also a contributing factor to higher groundwater levels in the delta area, particularly near concentrated residential areas. High groundwater levels and increased water usage have complicated the process of sanitary drainage and rendered many sanitary drainage technologies ineffective. Groundwater problems have increased as a result of seepage from sewage vaults into aquifers. Because many of the villages in Egypt have a high proportion of adobe houses, high groundwater levels have resulted in widespread deterioration of home foundations.

The GOE has enacted Law 48 (1982), which forbids the disposal of untreated wastewater into environmentally sensitive waters. The purpose of this act was to protect the Nile River and its tributaries from further contamination. The GOE has not been able to provide the resources needed to develop wastewater treatment facilities; thus the enforcement of this law has not been particularly effective, and contaminated wastewater continues to flow.

¹ This information was derived from a concept paper prepared by Chemonics, Inc. entitled Rural Wastewater Financing: Egypt 1990

² World Bank, World Development Report 1991

The financial resources needed to alleviate the wastewater problem are extensive. The funds required to construct sewerage systems for 60 percent of Egypt's rural population have been roughly estimated at \$2,000,000,000 in 1990 dollars.³ This represents a vast sum for the GOE, even considering the substantial funds now provided by USAID and other international donor agencies.

Existing funding mechanisms are inadequate for this task. The GOE must actively explore alternative methods of revenue generation to locate additional resources for resolving the rural wastewater problem.

This report discusses capital cost recovery, revolving loan funds, and the financing of operating and maintenance components for wastewater systems. Cost recovery can provide significant new resources, which, if properly employed, would have a major impact in resolving long-term sewage disposal problems.

Survey of Current Conditions for Wastewater Financing

Funding for rural wastewater projects is now provided by the GOE, through its Ministry of Finance, to the National Organization for Potable Water, Sanitation, and Drainage (NOPWASD). NOPWASD is the government agency responsible for planning, developing, financing, and operating most wastewater treatment systems. With a few notable exceptions, NOPWASD provides funds in the form of grants to the 22 rural governorates. The governorates then allocate these funds to selected projects, usually in accordance with the approved plan for wastewater project development.

The GOE presently allocates approximately LE 80,000,000 per year for the construction of new rural wastewater facilities.⁴ This is sufficient only for about 53 average-sized projects per year, which will serve approximately 130,000 households or 650,000 residents.⁵

³ From Rural Wastewater Financing: Egypt 1990

⁴ This is a rough estimate.

⁵ For this report, we have assumed that the average project costs LE 1,500,000. This figure is based on project costs from a limited 1988 sampling and has not been adjusted to current values.

The environmental benefits derived from this funding level are not adequate to mitigate the wastewater problem, especially when one factors in a large annual population growth. One has to question whether this level of funding will even begin to alleviate the present and potential health problems associated with untreated or improperly treated discharge.

Wastewater Project Costs

The following project cost information has been developed to provide a basis for comparing the alternative financing mechanisms discussed throughout this report. Project cost information will be used to provide a graphic demonstration of the benefits that can be achieved in the wastewater sector through capital cost recovery.

Table 1 provides information on the cost of installing components of wastewater systems in 17 villages in Damietta Governorate. The data, which cover projects built during the past seven years, include component costs for collection and distribution systems, pump stations, access roads, and primary treatment plants, and demonstrate the wide variance in component costs that can occur with various projects.⁶ Costs do not wholly reflect the net present value construction costs for these projects.

An analysis of the data presented in Table 1 reveals that the average cost of the 17 surveyed projects is approximately LE 600 per household. However, development costs vary widely and are dependent on the demographic, geographic, and technical requirements of each project.

⁶ The information contained in Table 1 was obtained from the Chemonics LD II-P Environmental Engineering Section, and represents projects started and completed in the 1980s.

Table 1: Wastewater Project Costs In Damietta Governorate (1991)

Location	Pop.	Collection System	Pump Station	Access Road	Treatment Plant	Total Cost	Cost per Person	Cost per House
Meit El Kholy	11,900	536,500	116,796	57,000	547,300	1,257,596	106	528
El Serw	16,200	708,706	111,527	29,813	677,697	1,527,743	94	472
Sharabas	9,400	416,898	87,473	30,326	542,074	1,076,771	115	573
El Westany	20,300	820,119	85,366	11,248	629,852	1,546,585	76	381
Kafr El Ghab	8,700	371,370	106,441	36,151	543,649	1,057,611	122	608
El Rodah	15,700	633,500	116,000	72,530	701,280	1,523,310	97	485
El Gheinemeya	6,400	307,909	130,458	79,656	308,344	826,367	129	646
Meit Abu Ghal	11,100	531,622	124,020	43,292	579,708	1,278,642	115	576
Kafr El Batik	31,400	1,316,000	306,049	21,700	1,651,000	3,294,749	105	525
Kafr Soliman	11,100	551,144	224,871	35,420	825,766	1,637,201	147	737
El Rahmaneya	11,900	541,500	186,202	10,526	924,746	1,662,974	140	699
El Khayata	13,200	577,000	192,504	43,839	878,650	1,691,993	128	641
Kafr El Ghab	20,000	1,035,385	377,309	145,320	1,007,905	2,565,919	128	641
Kafr Saad	13,000	599,500	222,948	24,400	462,893	1,309,741	101	504
El Barasheen	5,600	316,000	161,380	5,983	450,347	933,710	167	834
Dakahla	8,600	537,565	266,270	32,125	267,507	1,103,467	128	642
El Edeleya	3,900	350,081	340,696	49,322	432,484	1,172,583	301	1503
TOTAL (000)	218,400	101,508	31,563	7,287	114,312	254,670		
Total/Person		46	14	3	52	117		
Total/Hsehold	43,680	232	72	17	262	583		583

Figure 1, on the following page, illustrates the lack of uniformity for project costs on a per household basis. El Edeleya, which had excessively high costs of LE 1,503 per household, was not included in this figure.

Costs range from LE 381 to LE 834 per household, a wide variation. If every village household were required to pay for capital costs on the basis of actual, per unit costs, the repayment costs would vary widely from village to village. Thus, a standard loan mechanism would require a variety of monthly payments from users, and would necessitate the installation of a complicated and highly individualized system for rate setting, financial management, and fee collection.⁷

⁷ The wide range of per household project costs shown in Figure 1 also emphasizes the desirability of a formula mechanism for giving added priority to wastewater projects with the lowest cost per household.

Such a system is not practical in rural Egypt. Instead, we will develop a *simplified* system that can be readily understood and employed throughout rural Egypt.

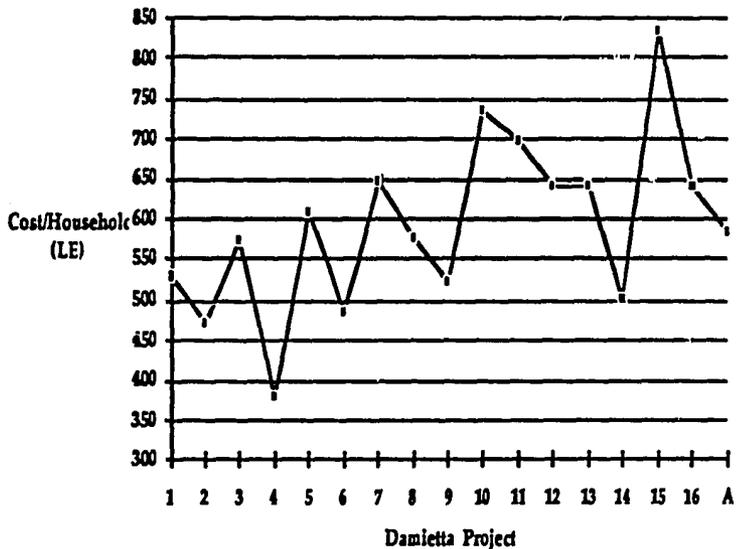


Figure 1: Costs Per Household for Wastewater Treatment Systems, Damietta Governorate⁸

⁸ Project "A" in Figure 1 is the average cost of the 16 projects surveyed in Damietta Governorate.

Section 2

Developing a Cost Recovery Model

This section defines the basic terminology we will use to discuss cost recovery. It also responds to five basic concerns that any cost recovery model must address:

- What costs will be recovered and over what time frame?
- Who will receive and manage the funds, and how will the funds be used?
- What are the economic and financial factors that affect the model?
- Which mechanism is most effective for recovering costs?
- What are the tangible long-range benefits of a cost recovery system?

The answers to some of these questions are straightforward. Others require more in-depth discussion and a comparison of alternatives. With our responses to these questions, we hope to define a cost recovery model that can be used in rural Egypt for the wastewater sector, as well as for development in other sectors.

A brief discussion of project equity, which can be an important component of project financing, is included at the end of this section.

DEFINITION OF TERMS

For the purposes of our discussion, we will define the terms *capital cost recovery*, *revolving loan funds*, *project loans*, and *user fees* as follows:

Capital Cost Recovery:

is the recapture of funds used to finance *capital* intensive projects.

Funds provided for capital cost projects are derived from various sources and include loans, bonds, grants, equity, and in-kind contributions. The recapture of funds comes mainly from the repayment of loans, the sale of services, and the collection of user fees. We will discuss various methods of cost recovery and demonstrate how cost recovery can result in increased resources for sector development.

Revolving Loan Funds:

are accounts from which funds are borrowed, repaid, and then reloaned for new projects.

Revolving loan funds are established to make loan funds available for specific kinds of projects. Typically, they have explicit criteria concerning the types of projects that can be funded, including maximum loan amounts. Revolving funds are loaned to projects and repaid with interest to the loan pool. Proceeds from loan repayments are reloaned to new projects that adhere to the restrictions imposed on the fund.

Project Loans:

provide funds for the purposes of developing a wastewater (or other capital-intensive) project.

Project loan funds must be repaid over a predefined period of time, in accordance with a strict set of conditions. They must be used solely to pay for project construction and development costs. The amount of loan repayment is calculated only after establishing the loan interest rate (or repayment formula), the term of the loan, the payment schedule, and the grace periods (if any). Loan repayments are usually made on a monthly or quarterly basis, exclusive of any grace periods. Many capital development projects undertaken by governments are financed with fixed interest rate loans for periods of 10 to 40 years.

User Fees:

are payments collected from individuals, households, and businesses who are receiving a service provided by a governmental or private entity.

In this report, user fees are defined as monthly payments made in return for both the connection to a wastewater distribution and treatment facility (capital cost recovery) and for the operation and maintenance (O&M) of that facility (operations and maintenance cost recovery). A portion of the user fee will be

allocated to repayment of the loan made for the construction of the sewage treatment and distribution system. The other portion of the user fee will be used to pay for operation and maintenance of the facility, as well as to provide a small administrative fee to those responsible for collecting the user fee.

We will also refer to *variable rate user fees*, which are a type of user fee in which the fee amount can be changed periodically. In the revolving fund loan model we recommend, variable rate user fees are specified, with the rate for both capital cost and O&M increasing on a yearly basis.

WHAT COSTS WILL BE RECOVERED, AND OVER WHAT TIME FRAME?

Our primary goal is to provide a simple, workable model for recovering the capital costs of developing wastewater treatment systems in rural Egypt. As discussed in *Section 1*, the financial requirements in this sector are much greater than can be provided for with current and anticipated future funding sources. Recovery of these costs would be spread over a 40-year period, the typical life of a sewerage system.

Our model will also address O&M cost recovery, a separate but important issue. Presently, many wastewater projects are not properly operated or maintained. Inadequate O&M can result in serious problems and may essentially negate the efforts and scarce resources that have been deployed for sector development. We are concerned that the level of O&M service will deteriorate unless alternative methods of O&M service delivery are instituted to ensure that professional O&M is performed. This is a matter of urgency, as the potential health consequences are serious.

Strict operational, personnel, financial, and engineering guidelines should be established to ensure professional O&M. The contracting of O&M activities to private entities should be considered. However, provisions should be made to regulate private corporations and to monitor O&M activities through the employment of outside consultants. Such efforts could result in better management of O&M responsibilities and provide users with confidence that their hard-earned money is not being wasted.

WHO WILL RECEIVE AND MANAGE THE FUNDS, AND HOW WILL THE FUNDS BE USED?

Funds derived from cost recovery should be received and managed at the governorate level. The governorate should place funds in a designated depository, which will be used as a revolving fund to provide funds for the development of additional wastewater projects within the governorate.

WHAT ARE THE ECONOMIC AND FINANCIAL FACTORS THAT AFFECT THE MODEL?

A wide range of economic and financial issues are vital to the development of effective cost recovery mechanisms. These include inflationary impacts, interest rates, fluctuating foreign exchange rates, cultural impacts, and current economic conditions.

The Egyptian Economy

Economic issues are extremely important in the design of a cost recovery system. Prevailing economic conditions in Egypt—high interest rates, unstable inflation rates, fluctuating foreign exchange rates, and the absence of medium- and long-term financial instruments for market rate loans—impose a demanding and delicate process of financial engineering in the design of a capital cost recovery scheme. Capital cost recovery systems require long-range financial analysis, which is also difficult under the current economic conditions.

An expanded discussion of economic assumptions and variables specific to Egypt, which were used in preparing the model presented in this report, are provided in the Appendix.

Economic Assumptions Used for the Model

To provide a workable model for capital cost recovery, we have made certain assumptions, some of which may appear to be inconsistent with existing economic circumstances in Egypt.

There are two reasons for this inconsistency. First, we are dealing with financial issues that cover a 40-year period (the approximate life of a sewerage system). Assumptions must be made about future economic

trends, some of which may be at odds with current conditions (see Appendix). Second, for illustrative purposes we chose to use simplified (stable) conditions that will allow for easy comparison of various options. We will, however, note throughout the body of this report the alternative actions that could be undertaken to promote effective cost recovery during less stable economic environments, a valuable consideration.

Although the assumptions we have used may not match the present situation, they are adequate for developing a workable model for cost recovery based on revolving loans. The information in this analysis is generally reliable as an indicator of the real issues that will be faced by those who implement cost recovery systems, and of the benefits that will be derived from such systems, regardless of future economic events.

Baseline Financial Data Used for Model

For analytical purposes, we have established economic and statistical data parameters regarding wastewater treatment projects, costs, and economic factors. These factors, shown below, will be used in our comparative analysis of alternative cost recovery mechanisms:

Standard Project Cost	LE 1,500,000
Cost Per Household	LE 600
O&M Cost	LE 2.00 per Month ⁹
No. of Benefitting Households	2,500
No. of Benefitting Persons	12,500
Inflation and Discount Rates	10% Per Year ¹⁰
Interest Rate	10% Per Year
GOE contribution	LE 80,000,000 in 1991, with compounded annual increases of 10 percent

⁹ Operating costs vary throughout governorates. This general estimate is based on conversations with governorate officials.

¹⁰ The discount and interest rates used here are inconsistent with current Egyptian rates; this does not affect the comparative analysis of alternative financing mechanisms, or the benefits derived thereof.

WHAT MECHANISM WILL BE USED TO RECOVER COSTS?

For many, this is the key question in determining whether a cost recovery mechanism is viable or not. The mechanism chosen for cost recovery will determine how much users will be expected to pay. Will they be able to afford it? How will they feel about it? Will the mechanism be able to recover the full cost of the system? How will collection be enforced? Which mechanism will recover the most costs?

We will attempt to answer these questions as we examine the various mechanisms that can be used to recover costs—the repayment of loans and the collection of user fees.

Standard Project Loans

Project loans are usually made on a project by project basis. Project financing includes equity, loans, in-kind contributions, and any grants from governmental or other sources. In theory, loan payments are directly proportional to the development cost and project users pay a prorated share of the loan payment, O&M costs, and profit.

For example, a wastewater project with a development cost of LE 350 per household, and a 30- or 40-year fixed-rate loan at 10 percent interest would require a loan repayment fee of approximately LE 3.25 per month per household. This fee would be affordable to most rural Egyptian households. However, if the project cost were LE 750 per household, the monthly fee would increase to approximately LE 7, a much less affordable sum.

In addition to the loan repayment, funds must also be collected to pay for ongoing operations and maintenance. In the wastewater sector, operation and maintenance requires an additional user payment of approximately LE 2 per month per household.¹¹

Therefore, for a project costing LE 750 per household, the total monthly payment required of each household to repay a project loan and to fund O&M would be LE 9. This amount represents a large household expense, and may not be affordable to many rural residents. The lower project cost of LE 350 would result in a

¹¹ Operating costs vary throughout governorates. This general estimate is based on conversations with governorate officials.

combined monthly fee of LE 5.25, a more affordable amount. Thus, the higher the cost of the project, the less affordable the user fee, and the less viable the pure loan option becomes.

Figure 2, below, illustrates how monthly loan repayment charges would be calculated if a project costing LE 600 were financed with a *fixed rate loan* at 10 percent annual interest.

The cost of the loan payment, shown by the middle line on the graph, would be set at LE 5.25 per household and would not change for the entire 40-year life of the loan. The O&M fee, shown by the bottom line, would be set initially at LE 2 per month and would increase yearly in proportion with the cost of operating and maintaining the project. For this example, we assume that O&M costs will increase by 10 percent each year.¹² The top line shows the combined cost—the sum of the loan payment and the O&M fee.

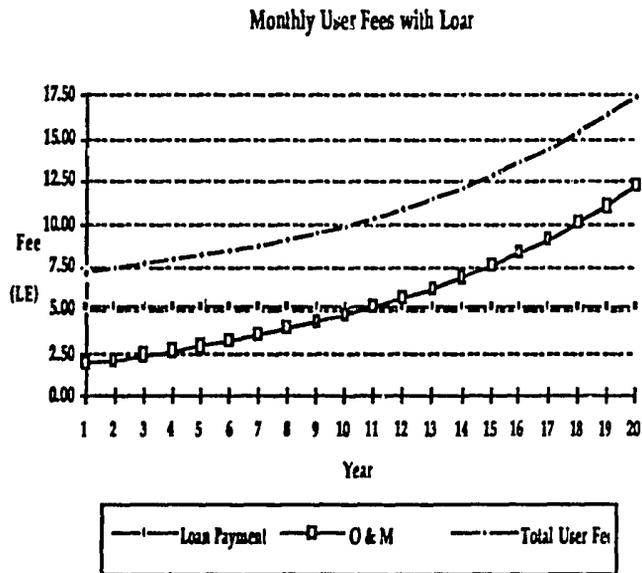


Figure 2: Monthly Cost per Household for Wastewater Treatment Using Fixed-Loan Payments

¹² This is in concert with our inflation rate of 10%.

In reviewing this information, we see that project loans become more affordable each year. This is because monthly loan payments, which do not change throughout the life of the loan, make up a lower percentage of the household income, which is increasing with the rate of inflation.

The *major* problem with fixed-interest rate project loans is their lack of affordability during the early years of the project. At this time, especially in Egypt, loan repayments are usually high in proportion to users' income and ability to pay.

An additional problem with fixed-rate loans that limits their acceptance among users arises from their direct correlation to project costs. Project costs, calculated on a per household basis, differ greatly from project to project, as was discussed in *Section 1*. Because fixed-rate loans assume that user fees are calculated on the basis of actual per-household costs, users of different projects would pay different rates.

Most rural Egyptians would perceive this fee inequity as unfair and would not be able to understand or accept the concept of paying for government services on a per project basis. In addition, since full costs cannot be recovered in early years, payment of differing amounts would not be realistic, since users theoretically would be paying the maximum they can afford. It might be a source of confusion for rural residents and officials in adjacent areas of a governorate served by different wastewater systems. Also, because long-term capital markets do not exist in Egypt, it may confuse the bankers and governmental officials who would disburse and manage the loan funds.

User Fees

A second option for cost recovery is the establishment of user fees in lieu of a loan repayment.¹³ User fees can be designed so that each governorate sets a uniform user rate to be paid by all households in that governorate. Fees would be set at the highest reasonable rate affordable to the average village household. The fees would be collected and placed into a central revolving fund, administered by the designated depository, as discussed earlier.

¹³ Loan repayments are usually included in user fees; for our discussions this is not the case.

Governorates with severe wastewater disposal problems would thus be provided with an incentive to set the highest rates possible, because this would provide more funds for the revolving loan account. A rapidly growing revolving fund will provide more funds for developing additional projects.

Because user fees in this context are not conventional loan paybacks, interest is not paid by the user. However, the governorate should employ a concept similar to *wage indexing* in order to reevaluate user fee structures annually—that is, to establish new fees commensurate with the ability of the village residents to pay for wastewater services. Also, the governorate should set criteria to ensure that wastewater projects with the lowest cost per household be given priority.¹⁴

Any usable cost recovery system must reconcile loan repayment and cost recovery with affordability, so the wastewater financing system can provide expanded sector resources while remaining acceptable to users. One mechanism for accomplishing this is rate-setting at the governorate level, as discussed above. This encourages the setting of affordable rates that can be changed periodically, unlike standard long-term, fixed-rate loans for which interest rates and loan repayments are set at the closing of the loan and remain constant for the life of the loan.

Another method for establishing affordable fees, in the context of this report, is the *variable rate user fee system*¹⁵. Initially, the variable rate user fee would be less than the fee required with a conventional fixed interest rate loan. However, annual increases would ultimately raise the fee, usually over a period of two to ten years, above the level of the fixed interest rate loan payment. Thereafter, the variable-rate payment could generate revenue, on a net present value basis, beyond that obtained with a 40-year loan repayment. This concept would allow the user cost to be set at an affordable level in the early years of the project without compromising cost recovery.

¹⁴ High cost projects will result in reduced funds being collected from user fees. This means the revolving loan fund will be recapitalized at a lower rate.

¹⁵ We have used the term 'variable rate user fees' in order to distinguish between user fees which have fixed cost capital components and those which do not. Most user fees are based on long-term fixed rate financing and are fixed for the life of the loan or bond. The financing mechanism which we are proposing adjusts the periodic capital cost payment upward on an annual basis, a most unusual feature.

Figure 3 illustrates the principle of variable rate fees. In this example, the initial monthly rate for capital cost recovery is set at LE 4 per household, and increases by 10 percent per year thereafter.

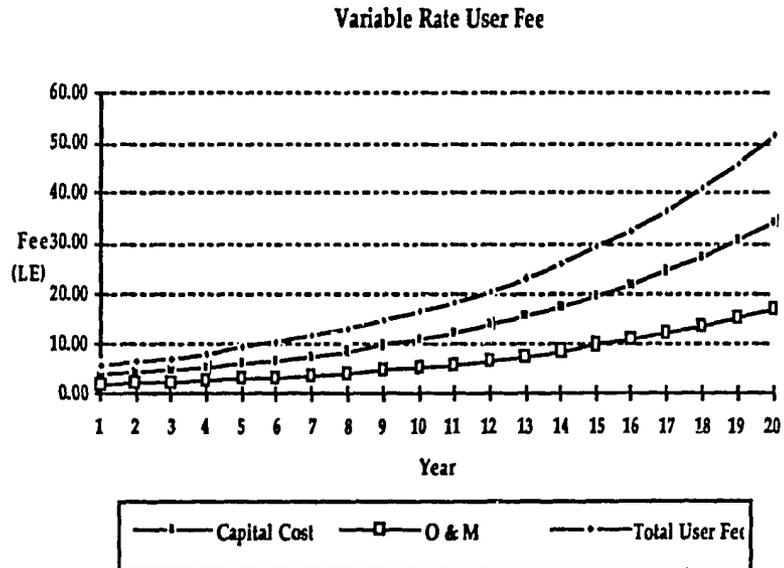


Figure 3: Monthly Cost per Household for Wastewater Treatment Using Variable-Rate Fees

One advantage of a variable rate user fee system is the flexibility that can be employed to deal with unusual economic events. For instance, if inflation were to increase dramatically for a year, the rate could be adjusted upward by an amount equal to or somewhat less than the inflation rate, thus preserving the cost-adjusted recovery of capital during inflationary climates.

This is not possible for loans with fixed-interest rates. Loan payments with fixed-interest rates would remain the same during inflationary periods, and the corresponding devaluation of capital would reduce or negate project cost recovery efforts.

Comparison of Fixed-Rate Loan Payments and Variable-Rate Fees

To determine the most appropriate type of recovery mechanism for our model, we can compare how each

would work over a period of time. Figure 5 shows capital loan repayment for both fixed-interest and variable-rate systems for the first 20 years of a project. Using the baseline data presented on page 12, the capital loan repayment cost for users would be LE 5.25 per month under the fixed-interest system. Using an initial variable rate capital cost fee of LE 4, the initial capital cost fee for users under the variable rate scenario would be LE 4 per month, and would increase on an annual basis over the 40-year life of the fund.

For the purpose of demonstrating how payments compare for varying project costs, we have also inserted a second project, whose cost per household is LE 1000 instead of LE 600. Under the fixed-rate system, the monthly cost would be approximately LE 8.80 (the variable rate would remain the same). Here the variable rate user fee would be lower than the loan repayment until the ninth year.

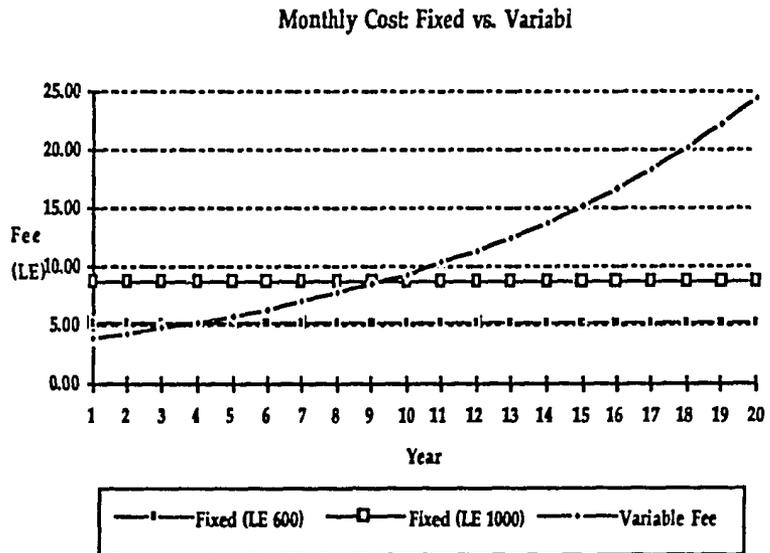


Figure 5: Comparison of Monthly Fixed-Rate and Variable-Rate Fees

If we add an assumed O&M cost of LE 2 per month, we see that the initial monthly payment rate of LE 6 under the variable-rate system is more reasonable than the LE 7.25 required under the fixed-rate system. For many households, this amount would be partially offset by the savings of the septic tank cleaning fee they now

pay, which is usually set at around LE 4. Thus, under the variable-rate scenario, an additional outlay of only LE 2 per month during the first year would be required from many households.

A more affordable fee, especially in the early project years, has a better chance of being perceived as fair, equitable, and affordable by users. Therefore, a cost recovery system employing this concept has a higher probability of being successfully implemented than does the fixed-rate loan payment concept. If annual rate increases are managed carefully, they should coincide with increasing affordability. Users will more readily accept small annual increases as long as the percentage of increase does not exceed wage inflation. If users feel the system is unfair, it will be difficult to obtain cooperation and compliance with fee collection, and the capital cost recovery system may not work effectively.

The variable-rate system, as illustrated in Figure 5, has the added advantage of recapturing a higher (50 percent higher, using our assumptions) net present value of funds over the 40-year period. In the event of inflation higher than we assumed for our scenario, the net present value amounts would be considerably greater.¹⁶

The major concern with user fees that are set initially at subsidized levels¹⁷ is the ability to recover full capital costs over the life of the loan. If rates are not set high enough to recover costs, only a portion of the original capital (on a net present basis) is returned. Thus, the project is effectively subsidized by the central government. Figure 5 illustrates that capital costs can be recovered even with low initial rates, as long as there are adequate annual increases to recover initial shortfalls.¹⁸

Figure 6 further illustrates the effectiveness of cost recovery for fund generation. It compares the number of projects that could be constructed over a 40-year

¹⁶ Periods of high inflation devalue money rapidly. If payments of fees are fixed, then any payments after periods of high inflation will be greatly reduced on a net present value basis.

¹⁷ These levels do not allow for the full recovery of capital costs.

¹⁸ Note that user fees increase so that at some point in time future annual revenues from fees are higher than revenues from loans. Once user fees are higher than loan payments, net present value capital cost recovery is occurring at a higher level under the user fee concept.

period using the existing funding mechanism¹⁹ versus the fixed-rate loan mechanism previously described. The first scenario, depicted by the shaded bars, shows the number of projects that could be constructed if the existing grant mechanism is continued. The second scenario assumes a 10 percent loan with level amortizing payments of LE 5.25 per month, and is represented by the line.

This figure clearly shows that the fixed-rate loan concept, using a 10 percent annual increase in fees, would fund more projects than the grant concept. In fact, nearly three times as many projects would be funded.

New Projects: Loans vs. Grant

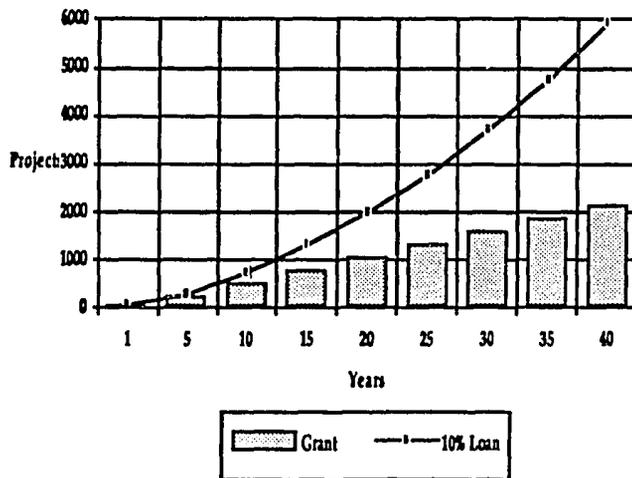


Figure 6: Number of New Projects Funded Using Cost Recovery Versus Using Grants

¹⁹ The wastewater sector is presently funded by grants from the GOE and donor agencies as well as some local contributions.

WHAT ARE THE TANGIBLE, LONG-RANGE BENEFITS OF A COST RECOVERY SYSTEM?

Capital cost recovery will provide substantial additional resources for the wastewater sector. Using the baseline data presented on page 12, Figure 7 compares the number of projects that could be developed, over a 40-year period, with an efficient cost recovery program (both loans and user fees) to the number of projects that could be funded with only a 10 percent annual increase in the GOE contribution of LE 80,000,000 and no cost recovery.²⁰

This comparative analysis demonstrates that cost recovery has the potential to result in a large increase in the number of completed projects (in our model, the increase is from approximately 2,000 projects using GOE contributions only, to 10,000 with the implementation of variable rate user fees). The advantages of cost recovery in the wastewater sector are undeniable.

Projects: Grants vs. Loans vs. User Fee

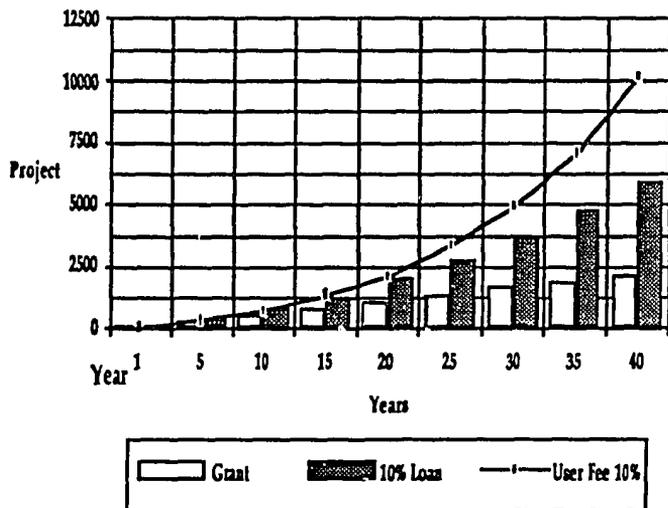


Figure 7: Comparison of the Number of New Projects Using Grants, Loans, and User Fees

²⁰ A 10 percent interest rate is assumed for loan repayments.

PROJECT EQUITY

Project equity is an up-front payment usually required for project financing. Equity is combined with debt financing (loans) to complete the project financing package and to assure that funds needed for project development will be available.

Project recipients can be required to pay equity in the form of a sewage connection fee or through some other form of contribution. Equity payments reduce the cost of the project to the government and reduce the need for loan funds from the revolving fund, thereby providing more funds for additional wastewater projects. Over a 30-40 year period, reduced loan requirements can have a significant impact on funding more projects.

Requiring users to pay up-front equity would heighten their awareness of and responsibility for the development process. It should also engender greater local participation in the development process and result in local government officials being held more accountable for successful project implementation and O&M.

In fairness to users, however, governorates should institute a policy whereby user fees would be proportionally reduced if equity payments exceed the standard payment set by the governorate. Thus, project recipients who chose to contribute more toward project equity would be charged a lower user fee.

Section 3

Integrating the Model into Wastewater Project Development

In the previous section, we determined the conceptual framework for a workable cost recovery model in rural Egypt. For this model to work, it must be integrated into the existing framework of wastewater project development and into the Egyptian legal and financial systems.

This section discusses the major processes involved in project development and shows how these relate to funding (using revolving loans) and cost recovery systems. Legal and financial factors specific to Egypt that will affect the integration of these systems, and the ability and willingness of users to support cost recovery are also reviewed.

PROJECT DEVELOPMENT

As shown in Figure 8, wastewater project development includes comprises four basic phases:

- Project identification and selection
- Project approval and financing
- Project development and construction
- Project completion and operation

For our model to work properly, these phases should integrate with the revolving loan and cost recovery systems (see Figure 8). The revolving loan fund, held by a designated depository at the governorate level, is fed by grants from the GOE, USAID, and other donor agencies. It is used in conjunction with other funds including project equity payments, grants and in-kind contributions to finance new projects, as shown in Figure 9.

As projects are completed and brought into operation, both capital cost and O&M fees are collected. The capital cost user fees are channeled back into the revolving fund, as mentioned above. User fees collected for O&M are earmarked for covering costs associated with project O&M.

Capital Cost Recovery System

Wastewater Sector—Governorate Level

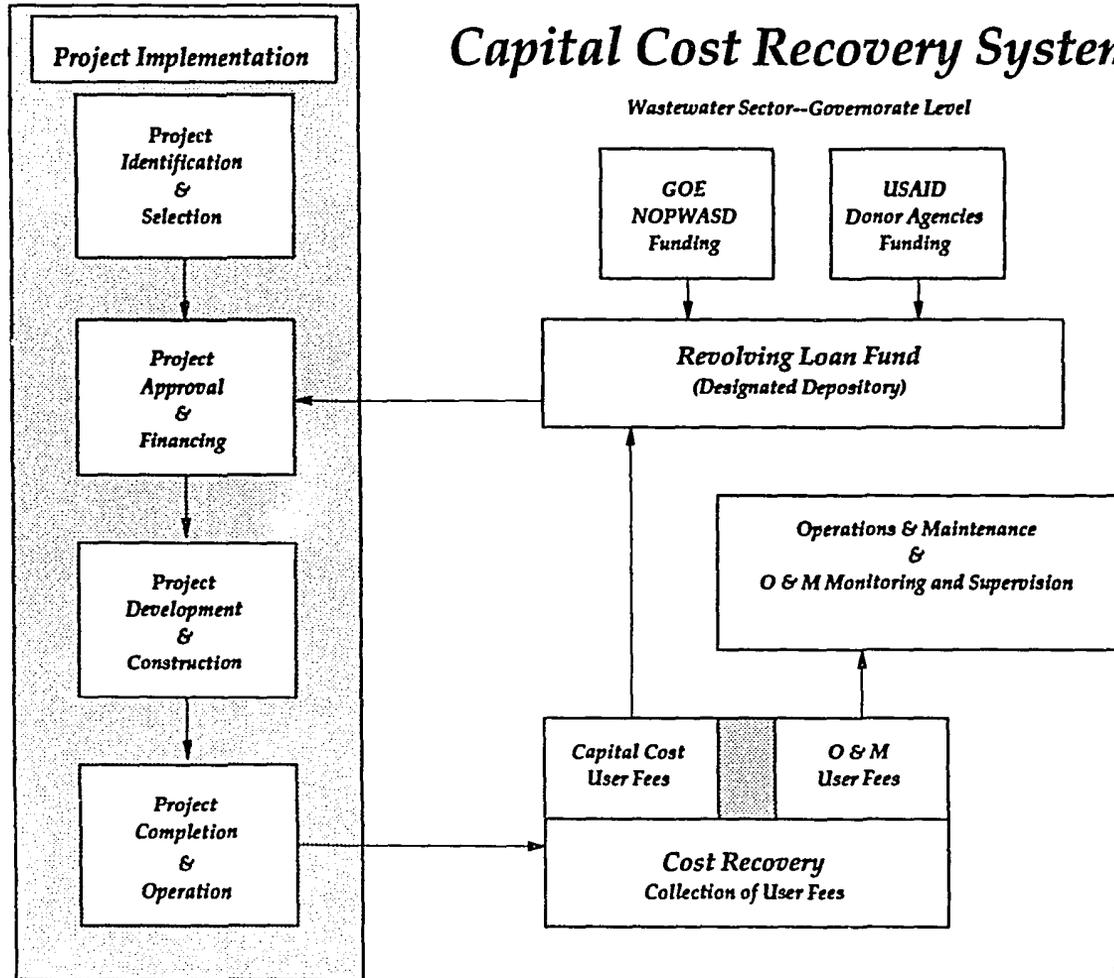


Figure 8

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Project Financing System

Wastewater Sector--Governorate Level

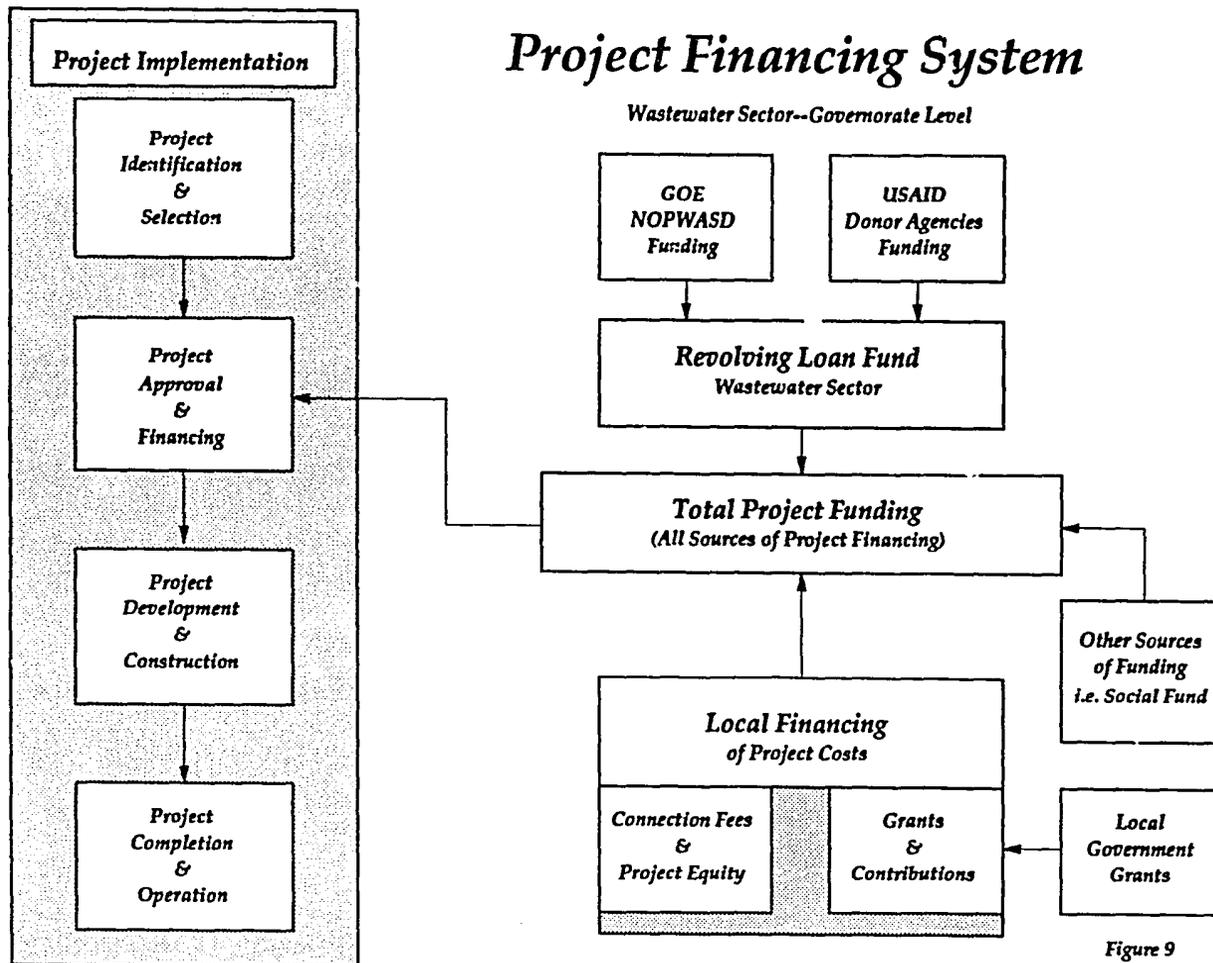


Figure 9

50

The individual components of each system involved in this process of project development, financing, and cost recovery are shown in Figure 10. Although Figure 10 is not all encompassing, it gives a good accounting of the project development cycle. The following discussion highlights the major components of the project development cycle.

Project Identification and Selection

Project Identification

Projects should be identified on the basis of need, cost efficiency, affordability, and environmental impact. Projects that can demonstrate the lowest cost per household should be given highest priority when other considerations such as health and environmental factors are not immediately urgent. The efficient, cost-effective use of available funds will benefit a wide range of users and will enhance sector resources obtained from cost recovery.

Participants: Village Councils and Village Chiefs
Markaz Councils and Markaz Chiefs
Governorate Engineering Department

Feasibility Study

An engineering firm with experience in the wastewater sector should prepare a detailed engineering study to determine project feasibility. The study should integrate groundwater engineering, project design, financial, and project cost information, along with demographic data, including the number of households served. The report should provide conclusions pertaining to the technical and financial feasibility of the proposed project. It should also include an operating and maintenance plan prepared by the proposed contractor for project operation and maintenance.

Participants: Governorate Engineering Department
Markaz Councils and Markaz Chiefs
Governorate Engineering Department
Private Engineering Firm

Project Approval and Financing

Loan Application

A formal application for a wastewater project loan should be developed and employed in a standardized format for all projects. The loan application should provide important project information, yet be simple to prepare and evaluate. Each application should

Project Development & Financing System

Wastewater Sector—Governorate Level

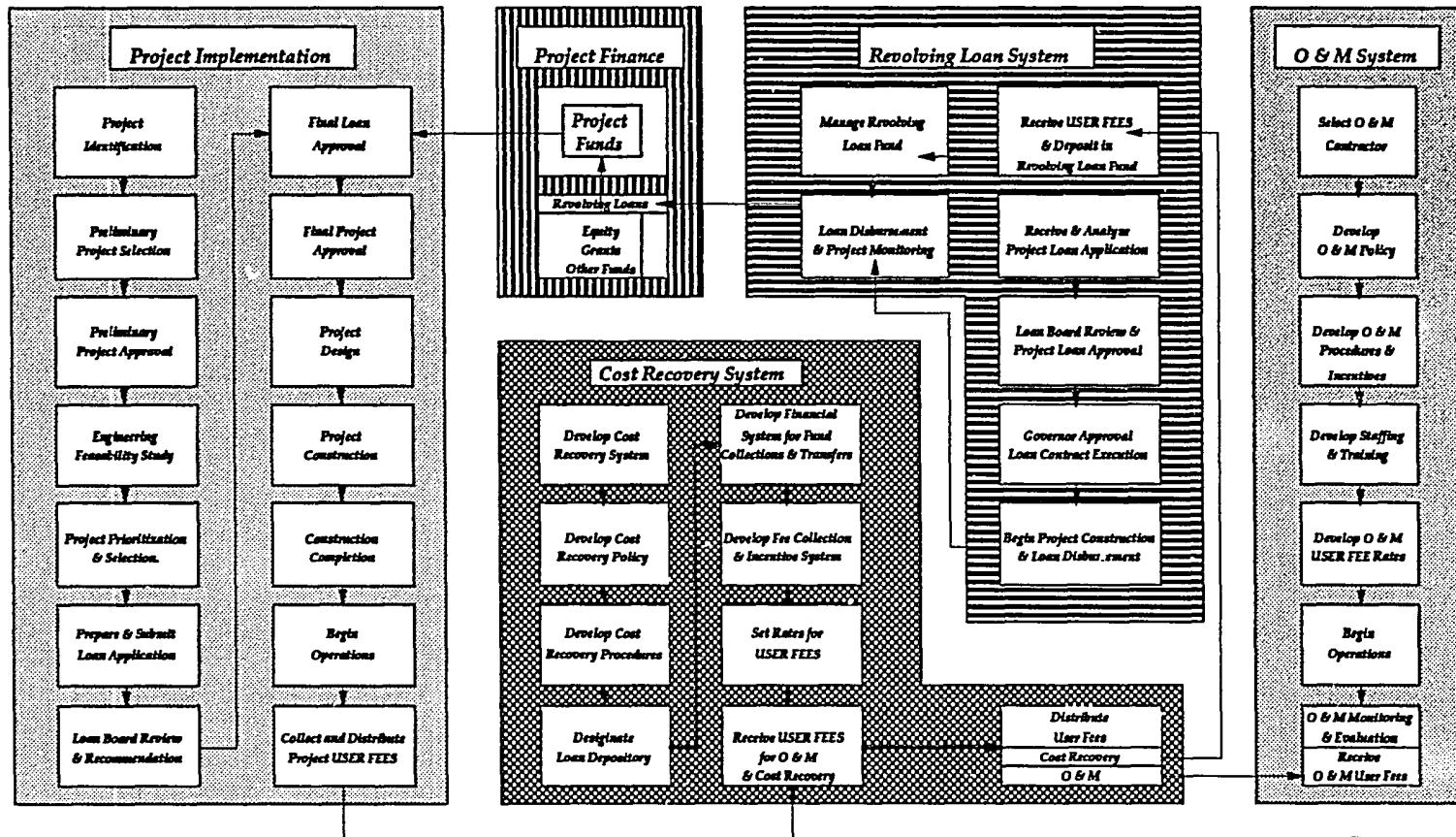


Figure 10

contain a consistent matrix of data in order that each project can be evaluated with a uniform set of criteria.

Financial information should be reported in summarized form on the application so that total project costs, as well as per household costs and other financial information, can be determined readily. The application should also be accompanied by a detailed engineering study with preliminary project designs, cost estimates, timetables, O&M plan, demographic characteristics, and project recommendations.

Participants: Village Councils and Village Chiefs
 Markaz Councils and Markaz Chiefs
 Governorate Engineering Department
 Governorate Housing Department
 Governorate Development Department

Project Approval

The governorate should develop a project approval system which incorporates data from the project loan application, the engineering feasibility study, and an analysis of available financial resources. The applications should be reviewed by a committee of officials (a loan board) from the governorate, which will develop a list of recommendations for projects that meet the standards for approval. Projects recommended for approval will be prioritized so that the most needed and cost-efficient projects will be recommended. The recommendations should be submitted for concurrence and approval to the secretary general and the governor, who will be responsible for contacting the GOE and NOPWASD for additional clearances needed for final project approval.

Participants: Village Councils and Village Chiefs
 Markaz Councils and Markaz Chiefs
 Governorate Engineering Department
 Loan Board
 Governor and Secretary General

Loan Approval (Loan Board)

A loan board should be established to process requests for project loans. The loan board should consist of governorate, markaz, and village officials, appointed by the governor, who have the authority to make recommendations for project approvals and the capability and experience to make appropriate choices. The secretary general and the governor should be responsible for making the final decision for project loans.

Participants: Governorate Officials
 Loan Board
 Secretary General and the Governor

Project Construction

Once project and loan approvals are formalized and completed, project design and construction can commence and project loan funds can be withdrawn from the revolving loan fund. Loan funds must be expended in accordance with all laws of the GOE, and all expenditures must be documented in accordance with required procedures. Expenditures of revolving loan funds will be audited in accordance with government requirements. In addition, revolving loan funds obtained from other sources, such as donor agencies and other governments, will have additional restrictions and requirements which must be followed.

Participants: Village Councils and Village Chiefs
 Markaz Councils and Markaz Chiefs
 Governorate Engineering Department
 Governorate Housing Department
 Governorate Finance Department

Project Operation and Completion

Project Operation

Projects constructed with funds from the revolving loan fund should be operated and maintained by private firms. The company selected to manage project operations begins also should be involved in the discussions of the final project design to ensure that adequate coordination exists between all parties responsible for development of the project. A supervisory engineering firm should be employed to monitor and evaluate activities of the O&M contractor.

Participants: Village Councils and Village Chiefs
 Markaz Councils and Markaz Chiefs
 Governorate Engineering Department
 Private Engineering Firm
 Supervisory Engineering Firm

Loan Repayment

The governorate is responsible for developing and implementing a plan for collection of user fees. We recommend that wastewater user fees for both capital cost and operations be collected as part of the water bill. The governorate should be responsible for determining the amount of the fees and the method of collection. Fees for operation and maintenance should be sufficient to pay for all normal project operation and maintenance. Funds collected for capital cost recovery should be deposited in the revolving loan fund account in the financial institution designated for this purpose.

Participants: Village Councils and Village Chiefs
Markaz Councils and Markaz Chiefs
Governorate Finance Department

**Loan
Management**

Loan management can be defined as the policies and procedures which are instituted to set user fee rates for both capital and O&M cost recovery. Governorates should be responsible for developing detailed policies and operating procedures to ensure that the management of the revolving loan is adequate for proper repayment and refunding. Policies should also be developed on actions to be taken if system users refuse to pay fees or are unable to pay because of unusual circumstances.

Participants: Governorate Officials
Loan Board
Secretary General and the Governor

MAJOR LEGAL, FINANCIAL, AND USER-RELATED ISSUES

Prior to undertaking a wastewater development project and receiving approval for a project loan, the following major issues must be identified and resolved.

- Legal authority and rights of all parties
- Loan repayment issues
- Financial management and fee collection
- Ability and willingness of users to pay

Some of these issues were discussed briefly in *Section 2*, when we considered factors involved in developing a cost recovery model. Below we provide a more expanded discussion of these issues and their impacts.

Legal and Institutional Issues

The complex Egyptian bureaucracy has a maze of laws and regulations covering local government expenditures and financing authority. We believe that significant legal issues and obstacles can be uncovered during a small pilot study. If the results of a pilot study convince Egyptian government officials to implement the revolving fund system on a national basis, a plan for legal approval could be developed. The plan would provide suggestions for changes to the existing law that could be developed by the Ministry of Local

Administration and enacted by the Egyptian Peoples Assembly.

The institutional issues relative to various ministerial and agency roles in this process present a difficult and complex obstacle to successful implementation on a national basis. Although central government responsibilities for oversight and monitoring are reasonable and necessary, there are normalative concerns with reactions of lower level ministerial officials, who may feel that their area of responsibility is being subjudicated by officials of local government. Officials in the central government often resist decentralization and devolution of their authority. Every effort should be made to ensure that local government autonomy is maintained with minimal interference from the central government.

Government Funding Requirements

Government funding in the wastewater sector should be maintained on a consistent basis in order that financial resources can be invested in project development with capital cost recovery components. Adequate and sustained government contributions will result in the development of a self-funding cost recovery mechanism. This will provide a basis for reducing long-range financial commitments in the wastewater sector beginning in 20 or 30 years, so that scarce financial resources could be employed to meet urgent needs in other sectors.

Loan Prioritizing

Project loans should be prioritized on the basis of economic feasibility, need, health factors, environmental impacts, and special circumstances that may arise. It is very important that scarce financial resources be used as efficiently and effectively as possible.

Figure 1 (Section 1) demonstrated the wide variance of project costs. To employ resources most effectively, projects with the lowest cost per household should be given priority. Uniform user fees can be misused if high cost projects are selected over lower cost projects. Since revenues are collected from users through fees, improper project selection results in lowered revenues and unfavorable economic consequences for future projects. Thus, this consideration is crucially important for this sector.

Interest Rates

It is impossible to set interest rates for a revolving loan because of the lack of long-term, capital-market financial instruments within Egypt. Economic data sufficient to make informed choices is not available. Because unstable inflation conditions presently exist, the setting of fixed interest rates is risky and unwarranted. (Floating rate instruments are not practical or useful.) Furthermore, most potential users probably could not afford the monthly per household cost that would be needed for an amortizing loan at market interest rates.

Loan Term

Loan terms should be extended to the end of the useful life of the project, normally 30-40 years. Loan terms of less than 30 years unfairly require present users to subsidize systems that benefit future users; as a result future users would not be required to pay full marginal cost for the use of the facility. Because user fees for capital cost recovery need to be set at subsidized rates, capital cost recovery must be extended as far into the future as possible to ensure that cost recovery on a net present value basis is maximized to the fullest extent possible.

Up-Front User Equity Payments

A policy requiring the payment of an up-front financial contribution should be designed and implemented in each governorate. It is important that each household have a vested financial interest in the project. This will increase the probability of local government officials being held accountable for project implementation and O&M.

Ability and Willingness to Pay

The ability and willingness of users to pay for both capital cost recovery and ongoing operation and maintenance is one of the most crucial issues of the revolving loan concept. Without a programmed and systematic procedure for timely collection of user fee payments, the revolving loan fund concept will not work. The following items should be considered in this analysis.

- Level of income

- Existing septic cleaning costs
- Default remedies

Each governorate is responsible for developing and instituting a policy that assures the collection of fees. Policies must be designed so that requirements for fee setting and collection are perceived as being fair and reasonable.

Many factors must be accounted for in the design of a policy for the installation of fees. The central prerequisite of this policy should be fairness. The level of income of the average household should be evaluated to ensure there is a reasonable ability to pay both capital and O&M costs.

It is not necessary that every household be able to afford the monthly payment. This would result in setting low fees and needlessly burden future projects with less resources. Instead, the policy should contain criteria which provides guidance for those households which cannot afford to pay.²¹

The existing payments for septic removal should also be incorporated into this analysis since septic payments will cease once the sewage system is installed. In some cases, the cost for septic removal may be nearly the same the portion of the fee for capital cost recovery.

Reasonable default remedies should be developed to ensure that all users are paying their fair share of the cost. If some users fail to pay for services, they will provide a precedent for justification of nonpayment by other users. Enforceable penalties for non-payers will demonstrate that payment is mandatory and compliance with user fee payments should be high as a result.

Rate Setting

The process of setting rates for both capital cost recovery and operations and maintenance is very important. O&M rates must be set at levels that provide sufficient funding to meet ongoing quality operating standards. Capital cost recovery fees must be set so that the loan is repaid to recover the original

²¹ It is not unusual in more developed countries to charge market rates for services to most users while developing parallel policies to subsidize users who lack the financial resources to pay due to health problems or other legitimate circumstances.

project costs (in terms of highest net present value) and to ensure that replenishment of the revolving loan fund is maximized in order to increase available funding for new projects.

Two problems arise in setting rates for capital cost recovery. One is the lack of existing market interest rates that can be used to determine the cost of capital and the net present value of funds used over long periods of time (30-40 years). The other problem is the ability of users to pay for the full cost of services and facilities that are being provided.

Since Egyptian capital markets are not well developed and long term market-rate financial instruments do not exist, effective yet flexible loan repayment policies must be developed to ensure that cost recovery, in net present value terms, is maximized and that fees can be readily adjusted to accommodate rapidly changing economic environments.

A policy in which the user fee is set by the governorate should be implemented. Rates should be reevaluated on an annual basis by the governorate to determine the ability of households to afford the capital cost fee. Since the initial fee will almost assuredly be set far below the true cost of the project, it should not seem unfair to increase rates on at least a yearly basis in accordance with wage inflation, existing interest rates, and affordability. The governorate will have an incentive to set rates at higher levels to ensure that funds for new projects are being deposited into the revolving fund at the highest possible level.

If economic circumstances deteriorate in the future, the governorate may decide to reevaluate fees on a more frequent basis to ensure that repayment is fair and in accordance with users ability to pay. This is the major benefit of the policy of setting rates on a periodic basis. If rates are fixed on a long-term basis and economic events deteriorate for a period of time, then funds derived from payment of up-front, fixed user fees may be devalued far below the replacement cost of the project. Under these circumstances, funds obtained from user fees will have minimal value on a net present value basis, and the revolving loan fund will fund far fewer projects. The effect of an up-front, rate-fixing policy in such situations would be to increase the amount of funds subsidized by the government, thus greatly reducing future resources in this sector.

Collection Mechanisms (added to water bill)

The mechanics of collecting user fees are an important feature in the revolving loan concept. An ineffective collection system results in mismanagement, improperly funded operations and maintenance, and reduced funding amounts in the revolving loan account. If collection is not handled properly or efficiently, the entire revolving loan concept will not work properly. Existing facilities will not be properly maintained and funds will not be available to complete important future projects.

Timing is also an important consideration in the collection of fees. Although monthly or quarterly collections by a bill collector (with a proper incentive structure) are the most logical and timely forms of payment, creative plans that account for unique localized circumstances may be more effective. For instance, collection from farmers at harvest time may be more appropriate than collection on a monthly basis, since more funds are available to farmers at this time and payment could be more readily obtained.

Withholding both water and sewer services to households who refuse to pay for services, provided they have the financial ability to pay, should not be considered unreasonable.

Operation and Maintenance: Relevant Issues

The O&M of existing wastewater facilities appears to be inefficient and ineffective. Private firms should be selected to manage projects financed with the revolving loan fund once operation begins. A program of monitoring and evaluation should be employed to ensure that private firms are in compliance with procedures and requirements for proper operation and maintenance.

Section 4

Conclusions and Recommendations

CONCLUSIONS

Our study and analysis of the financial alternatives for cost recovery in the wastewater sector have brought us to the following conclusions.

- The establishment of a revolving loan fund and a capital cost recovery system for the wastewater sector is both necessary and feasible.
- It is not prudent to establish a long-term, fixed interest rate for project loans. Variable rate user fees should be established in lieu of interest rates.

RECOMMENDATIONS

Based on these conclusions, and the discussions presented earlier in this document, we feel confident in making the following recommendations:

- A uniform user fee should be established within each governorate in lieu of a loan repayment. This fee should be the highest rate affordable to the majority of users, and should be increased every year on par with wage inflation.
- The repayment period should be established at 40 years to maximize net present value cost recovery.
- Each user should pay an additional fee for operations and maintenance, which shall be equal to the cost necessary to adequately operate and maintain the project.
- A private corporation should be retained for each project for the purpose of operating and maintaining the wastewater treatment project. The corporation can be financed with proceeds from the O&M user fee and will be operated by a private sector engineering firm. A comprehensive schedule for operation and maintenance should be developed and implemented, and O&M activities

should be subject to supervision and oversight by an independent firm for the purposes of monitoring and evaluation.

- A loan board should be established within each governorate to review loan requests and to make recommendations to the governor and to the secretary general.
- A pilot study should be implemented and information collected in order to further test the feasibility of a revolving loan fund and cost recovery model on a national basis.
- It is extremely important to establish a system of incentives for government employees who will be involved with project development and operation. We believe that small portion of the funds from project equity (not the revolving loan fund) could be used for this. In addition, a small portion of the user fee should be allocated to workers who are involved in development activities as well as those who are responsible for operations and maintenance. The incentive payments derived from user fees should be reduced by one half when O & M oversight monitoring and testing show that management has been deficient or water quality does not meet approved levels.

FURTHER SUGGESTIONS

Pilot Study

We feel that a small pilot project can be developed where management and direction can be provided by expert consultants. Local officials will be trained in revolving loan systems as a result of this process and will increase their level of understanding of the problems and development issues associated with this process. Experts will be able to more accurately assess the legal, institutional, development, and cultural issues associated with this entirely new financing mechanism. This information will be important to any effort to expand this mechanism to the national level.

Officials at the governorate, markaz, and village council level who participate in the pilot study should be requested to present their experiences and thoughts about revolving loans and capital recovery during workshops prior to implementation of this concept on a nationwide basis. Local government officials who have on-the-job experience with this model are the best suited to train potential users in other

governorates, as they are aware of the multiplicity of issues which are inevitably brought forth when implementing a new and confusing process.

If this project is implemented on a nationwide basis, we recommend the preparation of a handbook that draws heavily on the experiences observed during the pilot stage. Information contained in this report, and other relevant information and documentation should be incorporated into a handbook.

Operations and Maintenance

The issue of operation and maintenance of wastewater facilities is, as stated previously, of paramount importance. It is not prudent to expend large sums of money for wastewater improvements without *intensive efforts being directed to professional operation and maintenance*. The existing experience with operation and maintenance is somewhat unsatisfactory and must be corrected if O&M in this sector is to be effective.

With the large population increases continuing in Egypt, additional demands will be placed upon the natural resources. Without adequate management of resources, overuse will exceed the natural capacity to deal effectively with wastewater and water supply, and adverse impacts of health could increase precipitously.

Cost Recovery in Other Sectors

The cost recovery model presented in this report represents a fundamental concept which has wide applicability within Egypt. This model, if successfully implemented in the wastewater sector, could be reworked and adapted to other sectors of local government.

For instance, cost recovery and associated revolving loan fund components could be used to build and operate schools, hospitals, libraries, and public amenities. Cost recovery could be readily adapted into other sectors such as water, roads, irrigation, and transportation.

We believe this model could represent a particularly unique opportunity for the housing sector. Housing is urgently needed in Egypt, however, few funds are

being made available for long-term housing loans.²² Private ownership of housing usually occurs only when buyers have substantial equity for purchasing new housing units, leaving many middle and lower middle income Egyptians out of the home ownership market. Typically, loans are only for a period of two to four years. This is similar to housing finance in the United States prior to 1930²³, when home ownership was unavailable to most Americans who could not afford to pay off a loan in 36 months.

A revolving loan fund built around a cost recovery mechanism modeled on the same concepts outlined in this report could result in development of a capital market for housing finance. New buyers could purchase a housing unit with a lower amount of equity and pay a monthly user fee for 40 years. The monthly fee would be adjusted on a yearly basis on par with wage inflation.

Buyers could buy and sell homes in the market, but new owners would be required to maintain monthly payments for the life of the loan. User fee rates (occupant-owner rates) could be based on unit size, location, and cost. This would be somewhat similar to the graduated mortgage payment mechanism now used in the United States for first-time homeowners. Successful implementation of a housing program would be a great boon to Egypt's economy.

Cost Recovery, Decentralization & Democratization

We believe that a long-range program of cost recovery and self-funding revolving loan funds, accompanied by local decision-making authority, and implemented in a wide range of sectors throughout the country would contribute to a de facto decentralization and devolution of central government authority to the local units of government.

We believe that these efforts should be planned and implemented over a ten- to fifteen-year period. True decentralization and democratization of a centrally planned economy, as we see here in Egypt, would require much time, effort, and a great deal of planning

²² Funding for this program is limited, interest rates are very low, and the recovery of capital is inadequate to fund additional sector development.

²³ The Housing Act of 1930 provided government guarantees for 30 year loans, thereby reducing the equity and monthly payment requirements by substantial margins. This action opened the market for home-ownership to millions of Americans, and has resulted in Americans having the highest percentage of home ownership in the world.

and training. The cost in terms of human and financial resources will be great. We are confident, however, that if a concerted effort is made, success can be attained. Our discussions with Egyptian people at all levels of the political and economic structure, and our experiences make us believe that Egyptians would rise to the occasion if given the opportunity.

APPENDIX

Economic Factors

The following factors were considered in the formulation of a capital cost recovery model for the wastewater sector. Economic factors are important in any long-term financing program, and an in-depth review and analysis of all relevant economic considerations must be completed prior to development of long-term financial strategies or financing mechanisms. The major areas of interest during the formulation of this report were inflation, capital markets, long-term interest rates, foreign exchange rates and economic stability.

INFLATION FACTORS AND INFLATIONARY IMPACTS OF COST RECOVERY

The rate of inflation in Egypt in 1990 was 7.2 percent, according to official government statistics. In 1989, the inflation rate was 28.5 percent, although privately some economists argued that inflation was closer to 35 percent. So far in 1991, there have been large price increases in food and energy. The Government of Egypt has also imposed a 5 percent sales tax on most consumer goods and the foreign exchange rate has been devalued by over 25 percent. With these recent changes, we expect inflation to jump again in 1991. Such unstable conditions create difficulty in undertaking long-range financial analysis and planning.

For this study, we attempted to obtain component inflation rates for the construction sector in order to develop a more accurate means of projecting annual cost increases for wastewater projects. However, the information we obtained is limited and inconsistent, and therefore was not included in this report.

Since this report will extend financial analysis for a 40-year period, we feel that a reasonably stable inflation rate of 10 percent per annum should be used for analysis in lieu of the present rate. Our reasons are as follows:

- We assume (for discussion purposes only) that inflation will be brought under control within

five years to a range of 5-7 percent. This rate, factored in with high initial rates of 20-30 percent provides a reasonable basis for using a 30-year estimate of 10 percent per annum.

- It would be unrealistic to assume long-term inflation rates of 20-30 percent due to the economic instability that would result from this event.
- The Egyptian foreign exchange rate has recently been allowed to float in the world currency market. This policy resulted in an immediate jump in the foreign exchange rate from LE 2.50 per \$ 1.00 US to LE 3.33 per \$1.00 US, a devaluation of 25 percent. The cost of imports has increased substantially as a result of this new policy.
- The construction component cost inflator does not appear to have been impacted as severely as food, energy, and some other commodities. Therefore, we will infer in this report that the inflation rate of this sector is somewhat less than the national rate, although *no* real proof exists to back up this assumption.

The inflation rate has been severely impacted by the recent changes in government policy, which resulted in a substantial increases to food and energy prices as well as other commodities. Presently, these commodities are priced well below market costs due large government subsidies, even after recent large price increases. The GOE and the International Monetary Fund (IMF) have been negotiating an agreement for two years which will gradually allow prices to float to market pricing levels. Since food and energy constitute a substantial portion of individual expenditures, food and energy prices will impact significantly on the inflation rate.

Wage inflation is also difficult to ascertain since the primary employer is the government. Government salaries, which are notoriously low, have been rising only slightly, while private sector wage rates have been increasing at a higher rate. For this analysis, it is not possible to determine the inflationary impact on informal sector wage rates, although it is doubtful that this sector has maintained a pace equal to the real inflation rate. It appears that inflation will remain high in the short run and will be subjected to large fluctuations.

Economic conditions have been changing over the past few years, partly as a result of negotiations between the GOE, the World Bank, and the IMF over economic policy. The recent reductions in foreign debt by the United States and the Paris Club will aid in reducing Egypt's budget deficit and induce greater economic stabilization. However, the Iraq war and subsequent repatriation of expatriate workers in Kuwait and Iraq have created a serious economic problem through the reduction of worker remittances back to the Egypt. This situation may be improved as Kuwait begins to normalize in 1992. It is hoped that the policy changes will stabilize Egypt's economy and bring sustainable inflation down to a manageable level of 5-7 percent or lower by the mid 1990's.

LOAN INTEREST RATES & FACTORS INFLUENCING LONG-TERM INTEREST RATES

Egyptian banks are currently paying between 10 percent and 18 percent for short- and medium-term bank deposits. The interest rates on loans are somewhat higher, depending on the term of the loan. At present, the Egyptian financial system does not have efficient capital markets that perform well, and long-term market rate debt instruments are not available. In addition, the high rate of inflation and the current economic uncertainties do not provide a good climate in the near future for the development of long-range capital markets.

One of the factors which must be considered in cost recovery is the interest rate which will be charged for a long-term loan. In setting interest rates, it is important to use market interest rates; otherwise capital recovery will not be complete. If below-market interest rates are used, only a portion of the project capital will be recaptured and the government would be, in essence, providing "back door" grant subsidies. In this case, capital recovery will be only partially effective, and some planned future development projects will not be constructed because of lack of funding.

It is impossible to project a viable long-term interest rate under current economic conditions. The alternative financial mechanism would be to set a floating rate which would be adjusted periodically to changing market conditions. The problem with this mechanism is that large spikes in inflation would necessitate a dramatic increase in user fees which are allocated to loan repayments. These increases could double or triple the monthly user fees so that they

would no longer be affordable to the average household. Collection would be a problem, and the concept of cost recovery could be seriously jeopardized.

FOREIGN EXCHANGE RATES

Prior to 1990, the GOE employed a policy whereby its foreign exchange rate was fixed by government decree. Since the various rates set by the government were not market rates, Egypt's foreign currency was not traded in world currency markets. Egypt was totally dependent on export revenues, foreign loans, and large donations for foreign currency and consumer goods vital to its economic well-being. Its products were priced higher in foreign markets because of the imbalanced and overvalued exchange rate, thus foreign trade and investment were inhibited.

The recent change in government policy which freed the foreign exchange to float in the international currency markets has made Egypt a somewhat more viable candidate for foreign investment and has reduced the cost of its free market products in the international marketplace. This policy change has also impacted on the import prices of foreign goods, resulting in large increases in the price of foreign products for sale in Egypt. The success of this policy will only be determined by future analysis.

These price increases will impact the cost of wastewater treatment projects by increasing the cost of imported parts used in the treatment plants and the pump stations. Any further devaluation in the Egyptian Pound will further increase these costs. The Egyptian government should take note of this problem, as the relatively higher prices of foreign sources products may have created a climate where local production and sourcing of some component parts might now be economically viable and less costly than foreign sourcing.