CURRENCY EQUIVALENTS

Currency Unit = Egyptian Pound (LE)
Calendar 1992: US$1 = LE 3.314

FISCAL YEAR

July 1 - June 30

GLOSSARY OF ACRONYMS

BOT = Build, Operate and Transfer
BTO = Build, Transfer and Operate
DPU = Department of Public Utilities of MHPU
FYP = Five Year Plan
LE = Egyptian Pound
MHPU = Ministry of Housing, New Communities and Public Utilities
MISC = Ministry of International Cooperation
MOF = Ministry of Finance
MOP = Ministry of Planning
NIB = National Investment Bank
NOPWSAD = National Organization for Potable Water and Sanitary Drainage
NRBA = Nile River Basin Agency
NRBC = Nile River Basin Committee
USAID = United States Agency for International Development
WSDA = Water and Wastewater Sector Development Authority
WSIF = Water and Wastewater Sector Investment Facility
This report reflects the findings of two missions which visited Egypt in April and July 1991. The missions were comprised of Messrs. Walter Stottmann (mission leader) and Don Cullivan (consultant, water and wastewater engineer). Mr. Mike Bolanos (consultant, financial/institutional specialist) participated in the first mission.

During these missions the Bank team: (i) reviewed a number of previous assessment and project reports; (ii) interviewed representatives of the main institutions involved in the sector; (iii) held discussions with numerous Egyptian and foreign individuals and agencies with knowledge of the country's water supply and sewerage sector; and (iv) visited agencies operating water supply and sewerage services throughout the country, including Cairo (water), Alexandria (water), Quena (water and wastewater), Damanhour (Beheira Water Company) and several villages in the Beheira and Quena governorates.

During a workshop held in Cairo on May 25-26, 1992, the report was discussed with the Egyptian government represented by individuals from the Ministry of Housing, New Communities and Public Utilities (MHPU), the National Organization of Water Supply and Sanitary Drainage (NOPWASD), and representatives from various water utilities and universities. During the workshop there was wide agreement on the assessment of Egypt's water and wastewater sector and the recommendations for sector restructuring proposed in the report. Since the workshop, representatives of the Egyptian government have, on various occasions, commented favorably on some of the key recommendations of the report.

The Bank team would like to thank MHPU, NOPWASD and many sector officials throughout Egypt for their support and hospitality. Without their willingness to share their experience and opinions with the Bank team, this report would not have been possible. In particular, we would like to thank Mr. Abdel Salam S. Awad, Undersecretary of Public Utilities, MHPU and Mr. Mahmoud Abdel Halim, former Chairman of NOPWASD for their support. Also, we would like to thank the United States Agency for International Development office in Cairo for sharing information with the team.

The report consists of a main body which presents a detailed assessment of sector performance and constraints and elaborates a program of sector reform. An Executive Summary summarizes the main findings, conclusions, and recommendations of the report and includes a matrix of key recommendations and actions.

Most of the report was written by Mr. Stottmann with input from mission members. Mr. A. McKechnie contributed significantly to the conceptualization and editing of the report.

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# ARAB REPUBLIC OF EGYPT
## WATER AND WASTEWATER SECTOR STUDY

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Executive Summary

Present Services

1. Egypt has made great strides towards improving water and wastewater services for its people. Yet still more than 35% of the people lack adequate water supply and only 30 percent of the people have access to a sewerage system. A population growing at a rate of around 2.5 percent p.a., adds another million people every year who will expect service in the future. Service coverage varies widely throughout the country. Alexandria, Cairo and the Suez Canal cities are served reasonably well. The cities of provincial Egypt receive an inferior service and service levels and quality in rural Egypt are still very inadequate. Lack of sewerage systems or effective on-site disposal in many areas remains a serious public health problem, especially in the delta towns and in the poor neighborhoods of the large cities.

Future Resource Needs

2. In the future, even more financial resources than expended in the past will be needed to expand service coverage, improve quality, rehabilitate and replace deteriorated facilities and for operation and maintenance. The level of resources needed will depend on the level of service the government intends to achieve in the future. A rough estimate of the financial resources required through the year 2000 for meeting three service coverage scenarios indicates that just to maintain present levels of service, rehabilitate or replace deteriorated facilities and to operate and maintain systems properly will require almost US$600 million per year (constant 1992 prices). For the medium- and high-growth scenarios these amounts would increase to about US$850 million and US$1200 million, respectively.

Critical Sector Issues and Constraints

3. The Egyptian Government's main objective over the past two decades has been to extend service coverage quickly and indeed much has been achieved. There is wide agreement, however, that the rapid growth in service coverage has not been accompanied by an equal advance in the creation of a strong water supply and sewerage industry. Among the most important constraints to cost-effective sector development are: the inadequate performance of agencies operating water

1/ See Chapter III; Table 3.4
supply and wastewater facilities, particularly their shortcomings in administration and operation and maintenance; the limited capability of national institutions to provide leadership and assistance to operating agencies; severe shortage of experienced and qualified utility managers and administrators, planners, financial experts, engineers and operators; inadequate cost recovery policy characterized by low rates that do not cover operating costs and lead to heavy central government subsidies and reliance on international donor agencies for investment financing; poor policies and practices regarding project selection, design and implementation resulting in many investments projects being neither cost-effective nor technically appropriate; and deficient quality of civil works construction and equipment.

**The Challenge Ahead**

4. The projection of future resource needs indicates that funds must be mobilized on a large scale to consolidate and preserve past achievements, fulfill the aspirations of those who still lack adequate water supply and wastewater services, and to protect the water quality in the Nile River system. These resources may have to be raised under conditions much less favorable than in the past. International financing on concessionary terms is growing scarce and the fiscal constraints on the Government’s budget will not allow continued subsidies at past levels. The Government’s ability to raise these resources will depend largely on its success in removing the constraints to efficient sector development. Drastically improved generation of financial resources from service beneficiaries through tariffs will be imperative. Likewise, improvements in the performance of sector institutions and the way projects are being selected, designed and implemented would make the task ahead much easier and require less resources. Failure to address sector development constraints may eventually erode the support of multi and bilateral funding and aid agencies which have been instrumental in financing sector growth. Conversely, Government commitment to sector reform will most likely encourage funding agencies and the private sector to maintain or increase their support.

**Sector Development Constraints and the Need for Reform**

5. Analysis of sector issues and constraints leads to the conclusion that sector institutions and shortcomings in project finance and execution could be improved through reforms to the sector’s institutional structure and the Government’s sector management policies. Severe limits on management autonomy and the availability of resources are the main reasons why Egypt’s water supply and sewerage service operating agencies have not met their objectives. National institutions (NOPWASD, NIB, MP, MPHU) suffer from many of the same constraints. Neither the financial nor human resources allocated to them are sufficient to enable them to discharge their wide responsibilities. The bureaucratic environment and a fragmented institutional structure are not conducive to development of efficiency, accountability and initiative. The less than
satisfactory performance of the sector is thus essentially the result of deep structural defects caused by a centrally managed and top down system of sector management which does not provide incentives to institutions to perform well. The Government's long-standing policy of heavy subsidies for operation and maintenance and investments has precluded the mobilization of large amounts of resources from service beneficiaries who are generally able to pay for quality service. Financial shortages and institutional weaknesses arising from insufficient revenue generation and dependence on outside subsidies have been among the main reasons why the majority of Egypt's poor still suffer from inadequate service. Correcting these structural deficiencies will require institutional and policy reform. Without reform, there is little chance that sector institutions can hope to attract the numbers of high caliber of personnel that they need to function effectively and it is likely that programs of technical assistance and training will remain largely unsuccessful in building efficient sector institutions.

**Proposal for the Reform of Institutional Arrangements**

6. The main principles considered in developing the recommendations for the reorganization of the sector include:

(i) water supply and sewerage, being essentially local and, at best, regional concerns, are managed best at the lowest appropriate level of government;

(ii) water is primarily a commercial commodity rather than a social good and therefore should be paid for by service beneficiaries through rates covering operating and investment costs. However, the structure of rates should ensure that affordable water for drinking and hygiene is available to low income groups;

(iii) water and sewerage operations can be provided most efficiently by autonomous companies (utilities) managed in accordance with corporate and commercial principles;

(iv) central government involvement in the sector should be restricted to policy guidance and oversight, strategic planning and coordination with other sectors of the economy, standard setting and support to utilities; and

(v) participation of the private sector can be instrumental in facilitating better sector management and growth through its involvement in the management and operation of utilities and by providing investment finance.
Asset Ownership and Management Responsibility

7. Consistent with the Government's economic reform programs, three models for the management and operation of water supply and sewerage services are proposed: (i) asset ownership by local government (Governorate) and management and operation by an autonomous water supply and sewerage utility (ii) asset ownership by a regional utility with local subsidiaries in charge of system management and operation covering several governorates where local capacity is insufficient to allow the creation of a single government arrangement; and (iii) privately owned or managed utilities.

8. Single Governorate Utility. Under this option, local government, as owner of the water supply and sewerage asset, would entrust the management and operation of water supply and sewerage assets to an autonomous public utility that would operate under the policy guidance of an independent Board of Directors. The Board would appoint a management team to be in charge of running the utility. The legal preferred basis for the public utility set-up would be the normal law applicable to commercial companies, e.g. Law of Joint-Stock Companies, Partnership Limited by Shares and Limited Liability Companies, No. 159 of 1981, with majority ownership of shares in the hands of the local government. If this is not possible, appropriate legislation should be passed by the People's Assembly, possibly within the context of a proposed local government reform law, which would provide for the decentralization of municipal services.

9. After a process of initial institutional strengthening, the utility Board of Directors would be accountable to the local government owner to provide quality service to its customers. Each utility should operate under a contract plan covering a period of at least five years agreed to between local government and the Board of Directors which would stipulate performance objectives and targets with respect to service coverage and quality, financial condition, operational efficiency, investment levels and staffing limits which the utility commits itself to achieve and the obligations and the support to be provided by government. The contract plan would also specify base tariffs and a formula to adjust them for general inflation and cost increases for specific inputs. Management would work under an annual business plan as agreed with the Board. These plans, evaluated and revised annually, would establish a record to measure the performance of both Board and management and hold them accountable for their performance. Each utility would also keep and annually publish a full set of audited accounts.

10. To be able to meet their commitments, both the utility Board and management would require wide autonomy. In particular, management would need to be given the freedom to select, remunerate and promote personnel unencumbered by existing civil service regulations and political pressure. The utility also must have the freedom to implement tariff adjustments as specified in the formula in the contract plan and be given independence on procurement, investment and borrowing decisions.
11. **Regional Utilities.** Such utilities would own assets and manage services on behalf of those governorates which do not have the necessary institutional capacity to support their own utility. Such transfer should be transitional, until the governorate has acquired the capacity to form its own utility. The regional utility would operate under the same corporate and commercial principles which apply to the management of the single governorate option described above. The regional utility would establish subsidiary utilities in each governorate which would operate under their full control and supervision. Each subsidiary would be required to attain financial self-sufficiency and also provide funds for financing the costs associated with operation of the regional utility. In other respects regional utilities would be administered under the same framework of policies, obligations and norms as described for the single governorate utility.

12. **Private Sector Participation.** Privately managed utilities can deliver better quality services at an often lower cost than public utilities. In many industrialized countries private companies play a prominent role in the provision of water and wastewater services. Initiatives to introduce private sector participation are under way in Eastern Europe and also in many developing countries. In Egypt, private sector involvement in the water supply and wastewater sector is not new. There are several precedents in Egypt for private management of public services, such as the Cairo Metro, which is competently run by a private operator. Until the sector’s pricing and regulatory framework is strengthened and reforms to the macroeconomic framework take hold, full scale private ownership of water and wastewater facilities is unlikely, except in isolated cases such as tourism development zones. However given the potential efficiency and financial gains which can be achieved through private sector involvement, the role of the private sector should be encouraged to the maximum extent. Several "privatization" models, already being used in many parts of the world, could be readily introduced in Egypt. The service or management type arrangement would seem most suited for present Egyptian conditions, but other options such as concession arrangements or BOT (build, operate and transfer) schemes should be considered. Involving the private sector in the management, operation and financing of water supply and sewerage systems, especially in the larger cities, could be the fastest and surest way of bringing adequate and safe water services at a reasonable cost to Egypt’s population.

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**National Level Institutions**

13. Under the proposed realignment of the sector’s institutional framework three institutions on the national level would share responsibility for sector management and development.

14. **Sector Policy Institution.** The Ministry of Housing, New Communities and Public Utilities (MHPU), through its Department of Public Utilities (DPU), would be the highest Government authority dealing with the water supply and
sewerage sector. MHPU/DPU would focus exclusively on policy and regulatory matters and intergovernmental coordination. Its main responsibilities would include: the formulation of the Government's general sector development and investment strategy; the definition of basic policies (cost recovery and rates, for example); coordination with other Government ministries and agencies with interest in the sector; and oversight of utility performance. Since bankruptcy and liquidation of utilities is not a viable option, MHPU/DPU would intervene in cases of financial insolvency and gross violation of efficiency standards. Such interventions might range from withholding government subsidies to dismissal of utility Board and management as the ultimate sanction.

15. **Sector Assistance and Development Institution.** A water and Wastewater Sector Development Authority (WSDA), as successor of the National Organization for Potable Water and Sanitary Drainage (NOPWASD), would provide sector-wide technical support and coordinating functions. WSDA would have no direct operational functions or executive powers. Its role would be advisory as a facilitator of sector development. WSDA should be an independent corporation outside of the direct control of MHPU and free from the Government's civil service regulations. In addition to budget resources from the Government, WSDA's source of income would be contributions from utilities, the private sector, and fees from providing services.

16. **Sector Investment Facility.** A Water and Wastewater Sector Investment Facility (WSIF) with a grant and credit facility should be established to improve the efficiency of Government funding for public sector utilities presently carried out through the Five Year Plan and Government budget. The main functions of the WSIF would be to: mobilize local and external funds for sector investments; scrutinize proposed investment proposals; disburse funds in accordance with project financing agreements; supervise project implementation to ensure compliance with the provisions of the agreement signed with a loan or grant beneficiary; and collect interest and amortization payments. Several institutional options may be considered, including: (i) one or more private banks contracted to carry the financial intermediary functions under the supervision of economic ministry; (ii) the WSDA as technical agent in conjunction with a commercial bank as a financial appraiser and disbursement channel. Another option which the Government might want to explore is to strengthen and restructure the National Investment Bank to become an infrastructure development bank under the aegis of the financial authorities and subject to supervision by the Central Bank of Egypt.

**Proposed Policy Reform**

**Cost Recovery and Rates**

17. Given limits to both external and Government resources, the financial source for future sector development should shift from service beneficiaries to
utility income. The Government should therefore introduce a new cost recovery policy which, in principle, would require full recovery of all operation and maintenance expenditures and finance a large part of new investments. Exceptions to this policy should be rare but could be considered for special circumstances. However, any subsidies should be given under transparent policies and eligibility criteria, and the magnitude of the subsidy fixed in advance. As a general principle, subsidies should never finance all investment costs, but require some contribution from the beneficiary community. Utilities should adopt tariffs for water supply and sewerage which allow full financial self-sufficiency: i.e. revenues should be sufficient to cover all of the company’s financial needs, including all operating costs, debt service obligations and the generation of an internal contribution towards investments whose size would depend on the utility’s financial circumstances. Rates should be specific for each community and their initial setting should be done through a rate study. The introduction of an appropriate progressive block structure which would allow a lifeline supply at an affordable price and promote water conservation is recommended. The introduction of rates covering costs should proceed gradually. First, all utilities should be required to cover operating costs in the immediate future, within 2 years for example. Thereafter rates should be raised to cover investment costs parallel with improving utility efficiency and service. To induce utilities to introduce adequate rate levels, the Government should gradually cut subsidies in accordance with a transparent and clearly announced plan.

Project Selection and Design

18. To ensure that future project investments are justified, the merits of any major investment decision regarding primary infrastructure expansion should be demonstrated through feasibility studies. Such studies should take a broad view of a utility’s long-, medium- and short-term investment needs and its institutional and financial condition. Feasibility studies should present realistic financial analysis and projections, a tariff and socioeconomic analysis, environmental assessment, and provide an institutional evaluation and development plan. Institutional development should become an integral part of project financing. To reduce investment costs and allow better operation and maintenance, the appropriateness of presently valid planning and design parameters and standards should be examined.

Investment Financing

19. Utilities should have the unrestricted right to raise equity, issue bonds and borrow from the capital markets without government guarantee. Private sector capital should be encouraged to the maximum extent. However, significant non-official sources of finance are unlikely to be available until utilities have demonstrated efficient operations and financial viability. Government, government guaranteed and donor funds should be channelled to the utilities
through the proposed WSIF. WSIF should offer credit and grant facilities. Grants would be made available in the form of direct and transparent budget contributions towards investments and beneficiaries which qualify under the Government's investment subsidy policy. Credit funds from WSIF should be made at a rate at least equal to the marginal cost of funds to the financial intermediary plus administration costs.

20. As a general rule, the decision to finance from the WSIF should be conditioned on the presentation of a feasibility study and design demonstrating that the project meets technical eligibility criteria. Also, the applicant utility should demonstrate that it is operating efficiently and meets acceptable performance criteria, or commits itself to institutional and financial strengthening under the project. The project evaluation criteria and procedures must be set out in operating guidelines. Financing should be made under legally binding agreements between the utility and WSIF which clearly define the project elements to be financed, the conditions of repayment, and stipulations related to institutional and financial performance. To be effective, the sector fund must have the authority to stop disbursements, or, in the extreme, cancel loan funds if credit or grant recipients do not meet the conditions set forth in the financing contract.

21. To make these conditions of financing work, it is desirable that all financing for sector investments, regardless of source, (all credit and grant financing from all local or foreign sources) should be provided under the same basic criteria and conditions regarding project justification, institutional efficiency and financial performance of credit recipients. If there is to be more than one source of official finance, competition should be encouraged by way of better service, but not on conditionality. The conditionality required by the WSIF should also be valid as a minimum baseline for all financing from external bilateral and multilateral funding agencies. International funding agencies should be encouraged to channel their funds through the grant or credit facility. They may continue lending directly to specific utilities as long as the funds are provided under conditions matching at least those required by the sector investment fund, particularly those regarding institutional development and financial performance.

Municipal Wastewater Treatment and Reuse

22. The policies and regulations governing water resources management and pollution control impact on the financial resources and technical capacity of water supply and sanitation agencies. The Bank is assisting the Egyptian government to define appropriate water resources management and environmental protection policies through preparation of an Environmental Action Plan. This review does not intend to preempt the conclusions and recommendations of this work. For the last ten years, MWPU has invested in municipal wastewater treatment plants and plans to invest more. There are several concerns with the
justification and design of these investments: (i) overall justification and priority of such investments in the absence of a comprehensive cost-effective strategy for water pollution control and abatement in the Nile river basin; (ii) use of inappropriate advanced technology (secondary treatment, mechanical sludge disposal); and (iii) inability of operating agencies to maintain and operate treatment plants. In response to these concerns, the Government should establish an appropriate institutional and policy framework for cost-effective water resources management and pollution control and abatement in the Nile river basin.

23. In the absence of such a framework and a comprehensive river basin water quality management plan, the government should reexamine its present policy of giving high priority to the construction of municipal wastewater treatment plants. It is recommended that the construction of costly secondary treatment plants be put on hold until or unless: (i) a Nile river basin water pollution control and abatement plan demonstrates the priority of such plants; (ii) effective regulatory and enforcement mechanisms are in place which, based on the basin plan, clearly define the obligations of water and wastewater utilities with respect to wastewater treatment; and (iii) a financial policy and financing mechanisms have been established regarding the financing of municipal wastewater treatment facilities. Exceptions to these general guidelines should be made where the construction of a plant could be clearly justified, the plant is designed adequately and a utility is in place with the financial and technical capacity to operate and maintain the plant adequately. Special caution is indicated when considering water reuse schemes. Any proposed reuse scheme should be subjected, on a case by case basis, to rigorous financial and economic analysis, as well as a technical and operational assessment.

Strengthening the External Support Environment

24. Effective sector development will depend on the availability of adequate human resources, the development of a strong consulting engineering profession, civil works contractors, and equipment suppliers that are internationally competitive. Specific studies should be undertaken in the context of the Government’s privatization plans to determine strategies for strengthening the role of the private sector in providing these services. Existing public enterprises providing services to the sector should be transferred to the new Public Enterprise Office with a view to privatization. Utilities should adopt efficient, transparent and equitable procurement practices open to all qualifying contractors and suppliers. Given the convertibility of the LE, utilities should be allowed to procure internationally, provided such procurement is competitive and transparent.
Implementing the Proposed Sector Reforms

25. The successful implementation of the proposed reforms depends on the full support and commitment of the Government, the people of Egypt and the international donor community. Once the Government has decided upon a policy for sector adjustment, an action program should be developed which divides the reform process into discrete tasks with a timetable associated with each task. The immediate actions needed to initiate the sector adjustment process include:

(i) design of a comprehensive and consistent framework of laws, policies and institutions culminating in a plan of action for its implementation;

(ii) execution of technical assistance programs to prepare each of the three new national institutions (MHPU/DPU, WSDA, WSIF) for their new responsibilities; and

(iii) design of a plan for transforming the current water supply and sewerage agencies into autonomous utilities through linking the provision of future investment finance to the development of such utilities.

26. The expressed objective of future project financing should be the creation and strengthening of autonomous local water supply and sewerage utilities. Therefore, the Government should encourage donors to support this strategy of implementing institutional change and the investments needed to establish the new utilities and prepare them for their new functions. Private sector operators should be encouraged to take on utilities under any of the arrangements described earlier. For those governorates not having access to international finance, the institutional adjustment could be made attractive by offering finance for special institutional reform projects. Such projects would include financing for institutional development programs for the creation and initial strengthening of autonomous utilities, urgent investments aimed at removing bottlenecks and enhancing system operations, and possibly the preparation of feasibility studies and designs for a follow-up project. Follow-up projects prepared under the institutional reform project could then be financed under the new investment guidelines through the WSIF. To make the institutional adjustment projects as attractive as possible to the governorates, financing should be made available through a special fund, preferably on a grant basis or at least with a sizeable subsidy component.

27. The design and implementation of the sector reform will require the agreement and active support of the international donor community. To this effect, a donors meeting should be scheduled, possibly in the context of the Consultants Group, to discuss and hopefully agree on a common approach and to
solicit assistance for implementing the program. The most immediate need for assistance from the international financing agencies would be:

(i) technical assistance programs for carrying out the three tasks outlined above in para. 25; and

(ii) making available funds for the institutional reform projects mentioned above in para. 26.

28. A summary of the main recommendations of this review is attached in Annex 1 to this Summary.
### Summary of Recommendations for a Program of Sector Reform

<table>
<thead>
<tr>
<th>Objective</th>
<th>Issue/Constraints</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Create efficient framework of sector institutions allowing: (i) the provision of good water supply and wastewater services to all at a reasonable cost; (ii) adequate operation and maintenance of facilities; and (iii) expansion of services to people as yet unserved.</td>
<td>Water supply and wastewater operating agencies are not meeting adequate levels of performance. Insufficient autonomy and financial resources given to local government and operating agency management inhibits a sense of ownership, accountability and initiative. Management's freedom of decision making is severely restricted by: (i) excessive dependence on local and national government agencies; (ii) cumbersome civil service regulations with respect to manpower (poor remuneration, lack of reward for good performance) and administrative procedures; (iii) centrally run system of investment project selection, financing and implementation; and (iv) insufficient resource generation, because of low rates controlled by local and national government.</td>
<td>Creation of decentralized autonomous water supply and wastewater utilities operating under local government control within a framework of national institutions providing policy guidance and support and increased reliance on the private sector for utility management and operation as well as project preparation, design, implementation and financing.</td>
</tr>
<tr>
<td><strong>Autonomous Utilities</strong></td>
<td>Create autonomous utilities operating under corporate and commercial principles which provide both water supply and wastewater services in metropolitan areas of Cairo and Alexandria and in the Suez Canal cities and single or multiple governorate utilities in the remaining governorates. Local government should own assets and appoint a Board of Directors which, through a contract plan agreed to with local government, directs management team in running the utility. Legal basis for the utility should be normal law applicable to commercial companies. Utility management, with policy guidance from the Board, must have autonomy to: (i) select, remunerate and promote personnel on merit unencumbered by existing civil service regulations. (ii) charge agreed rates to meet financial viability; (iii) make investment and borrowing decisions; and (iv) contract for engineering services, civil works and the purchase of equipment and materials.</td>
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<tr>
<td><strong>National Institutions</strong></td>
<td>Each utility should: (i) introduce functional organizational structure and managerial, administrative and operating systems; (ii) hire and retain qualified personnel (iii) maintain a financial performance meeting the government's cost recovery policy; and (iv) publish audited accounts annually.</td>
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<tr>
<td><strong>Ministry of Housing, Public Works and New Communities (MHPW)</strong> to be responsible for sector policy, regulatory principles, inter-sectoral coordination and general oversight of utility performance, including power to intervene in operating agency management in cases of financial insolvency and gross violation of efficiency standards.</td>
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<tr>
<td><strong>Sector Development Authority (SDA)</strong>, as successor institution of MHPW, providing technical support and advice to the Sector in a facilitating role without direct operational functions or executive powers.</td>
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<tr>
<td><strong>Sector Investment Facility (SIF)</strong> to provide government supplied or guaranteed investment finance to public sector utilities under government approved selection criteria. SIF to be administered by private Banks, SDA and USDA in conjunction with private banks or possibly a restructured and strengthened National Investment Bank.</td>
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<td>Objective</td>
<td>Issue/Constraints</td>
<td>Recommendations</td>
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<tr>
<td>(B) Obtain improved efficiencies in the management,</td>
<td>Lack of expertise in the management, administration and operation of operating</td>
<td>Encourage private sector operators and investors to participate in the management and operation of utilities and in the mobilization of investment finance. Promote and create favorable environment for private sector to enter into service, management, “affermage”, concession, BOT or BTO and investor owned arrangements with foreign and local contractors and investors.</td>
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<tr>
<td>administration and operation of utilities and attract</td>
<td>agencies and shortage of investment funds.</td>
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<td>finance for investments.</td>
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<tr>
<td>(C) Improve resource generation capacity of utilities</td>
<td>Deficient cost recovery policy resulting in very low water and sewerage rates</td>
<td>Introduce cost recovery policy requiring utilities to generate internal funds sufficient for full cost recovery of operating costs and of a large share of investment costs. Government may provide limited subsidies for investments on social grounds under transparent policies and eligibility criteria.</td>
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<td>to allow better operation and maintenance of systems</td>
<td>which do not permit coverage of utilities’ operating costs and no contributions to</td>
<td>Rates should allow utilities to meet financial requirements, including operating costs, working capital, debt service and depreciation and an internal cash contribution for investments.</td>
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<td>and the generation of funds for financing system</td>
<td>investment. Insufficient resource generation by utilities leads to neglect of</td>
<td>Rates should be system specific and reflect the cost of services, employ consumption based charges which are adjusted periodically in response to general inflation and unforeseeable changes in cost for main inputs in accordance with adjustment formulas established by the NHPU.</td>
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<tr>
<td>rehabilitation and expansion.</td>
<td>adequate operation and maintenance and complete reliance on government subsidies</td>
<td>Introduce tariff structure with no more than three consumption blocks with unit charges increasing progressively for each block. Rate levels and structure must assure sufficient income for utility, but also be an instrument for promoting the efficient use of water.</td>
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<tr>
<td>(D) Provide incentives for efficient water use.</td>
<td>for investment funds. Growing resource needs for conservation of existing assets</td>
<td>Rate levels and structures must be determined individually for each utility through a rate study based on: (i) the financial requirements of the utility; (ii) the cost structure of the utility; (iii) projections of consumption patterns for different consumer groups; and (iv) the socioeconomic characteristics of the utility’s customer base.</td>
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<tr>
<td>Objective</td>
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<tr>
<td>(E) Improve cost efficiency and technical quality of projects to reduce investment costs</td>
<td>Many investment projects implemented in the past have not been cost effective and technically appropriate because inadequate feasibility studies and project designs. Main cause is unsatisfactory project justification under the centrally controlled process of project selection and design. Insufficient participation of operating agencies in the project selection and preparation process has led to locally unsuitable project choices and designs.</td>
<td>Transfer responsibility for project identification, preparation and implementation to autonomous utilities in parallel with new cost recovery policy requiring utilities to pay for investments. Projects should be justified through feasibility studies taking a broad view of a utility's long, medium and short term investment needs and its institutional and financial condition. Feasibility studies should demonstrate that proposed investments are technically sound (least cost solution to a clearly stated and justified objective), technically sound and appropriate, economically justified, financially viable and environmentally acceptable. Appropriateness of present guidelines regarding choice of planning and design parameters, technology standards should be examined. In selecting investments the following order of priorities is suggested: institutional strengthening and training, facility rehabilitation and upgrading, operational improvements and loss reduction; least cost expansion of water supply and sewerage systems in a coordinated fashion; primary and lagoon type wastewater treatment; and secondary wastewater treatment.</td>
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<td>(F) Create a transparent system of providing investment finance driven by the demand of utilities.</td>
<td>Present financing system of sector investments under Five Year Plan as administered by the National Investment Bank (NIB) does not generally lead to financing being channelled to high priority projects, adequate funding for projects being executed, is excessively centralized and bureaucratic and does not adequately recognize local needs and conditions. The current system lacks transparency in terms of process, eligibility criteria and financing conditions. Utilities should have unrestricted access to raise equity, issue bonds and borrow from the capital markets without government guarantee. Private sector capital should be encouraged to the maximum extent. Government, government guaranteed and donor funds should be channelled to the utilities through WSIF mobilizing resources from local and external sources and channelling them to utilities through separate grant and loan facilities. Grants should be made available in accordance with the government's subsidy policy in a transparent manner as ex ante direct budgetary contributions. Loan funds should be oriented at a rate equal to the marginal cost of funds to the fund plus administrative costs.</td>
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<td>Objective</td>
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<td>(6) Provide adequate incentives for promoting the efficient operation and financial viability of utilities and the implementation of appropriate cost effective investment projects.</td>
<td>Absence of mechanisms which induce operating agencies to improve management, administration and operation, financial performance and the selection, preparation and implementation of cost effective and appropriate investment projects.</td>
<td>Use of investment finance allocation to promote utility efficiency. Operating under a transparent MIPU approved set of criteria applicable for all lending activities the USIF should link financing decisions to the utility's obligation to: presenting acceptable feasibility study and design; committing itself to reaching appropriate efficiency standards through institutional strengthening; and acquiring an acceptable financial performance through the implementation of adequate rate levels and structures. Finance should be provided under legally binding agreements whose compliance must be supervised by USIF with the obligation to stop disbursements or in the extreme, cancel loan funds if credit or grant recipients don't meet the conditions set forth in the financing contract. All financing for sector investments regardless of source (all credit and grant financing from all non-private local or foreign sources) should be provided under the same minimum criteria and conditions employed by the Sector Investment Fund. International funding agencies should be encouraged to channel their funds through the grant or credit facility to ensure consistent conditionality. Contract plans with local government owner would contain performance targets and financial objectives (see A above).</td>
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<td>(II) Create conditions for the development of adequate human resource base.</td>
<td>Lack of sufficient manpower base is a bottleneck for future sector development.</td>
<td>Adopt policies and programs to improve the human resource base available to sector institutions with emphasis on the training in utility management and administration, financial planning and operation and maintenance. Improved employment conditions at autonomous utilities are essential to attract qualified human resources.</td>
</tr>
<tr>
<td>(I) Promote stronger and more efficient support industry for sector utilities.</td>
<td>Insufficient capacity in all areas of engineering and management consulting. Domestic works contractors and manufacturers and suppliers of equipment and materials at times provide inadequate service at high cost.</td>
<td>Promote the development of a strong private sector capacity through the introduction of competitive and transparent procedures in the selection of consulting services, construction services and supply and manufacture of equipment and materials. The public enterprise reform and privatization initiated under the government's restructuring program should be extended to those organizations providing support to the sector. Non-utility enterprises should be transferred to the Public Investment Office. Foreign competition should be allowed to stimulate the performance of local firms. Joint ventures between local and foreign firms should be encouraged.</td>
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<tr>
<td>Objective</td>
<td>Issue/Constraints</td>
<td>Recommendations</td>
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<tr>
<td>(J) Ensure that future investments in municipal wastewater treatment are cost-effective and have priority within the context of an economically justified plan for water pollution control and abatement in the Nile River Basin</td>
<td>The priority and suitability of past investments in municipal wastewater treatment investments is in question, because of: (i) lack of a comprehensive and coordinated pollution control management and investment policy under which investments could be screened for economic justification and priority; (ii) the selection of overly costly and technically inappropriate treatment processes; and (iii) the inability of present water and wastewater operating agencies to operate and maintain plants adequately.</td>
<td>Development and implementation of an appropriate policy and institutional framework for water resources management and pollution control and abatement and the elaboration of a respective comprehensive plan for the Nile River Basin which considers all uses of Nile River waters. In the absence of such policy, institutional framework and plan and because of fiscal constraints and institutional weakness of operating agencies, municipal wastewater treatment investments should focus on inexpensive and easy to operate primary and lagoon type treatment processes. The construction of secondary treatment plants should be discouraged, unless specific justification exists and a utility is in place with the financial and technical capacity to operate and maintain the plant adequately. High-tech package plant technology is discouraged. Because of potentially high costs and operation and maintenance requirements, there should be caution in the pursuit of wastewater reuse schemes. Such schemes should be subjected, on a case by case basis, to rigorous financial and economic analysis and technical and operational assessment.</td>
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I. INTRODUCTION

A. Objectives

1.01 The Government of Egypt is in the process of reassessing its policies for the water and wastewater sector. Wishing to support this process, the Bank, at the request of the Government, has prepared this study. The study is, firstly, designed to assist the Government in its policy deliberations and, secondly, to form a basis for deeper Bank support to Egypt's water supply and wastewater sector should the Government request such assistance. The objectives of this study are to:

- (i) assess the present framework of sector policies and the performance of sector institutions in order to identify the issues and constraints preventing more accelerated and effective sector development; and

- (ii) recommend to the Government a strategy for strengthening sector performance while identifying the nature and extent of adjustments that may be needed for more efficient future sector growth and development.

B. Scope

1.02 In this study, the water supply and sewerage/sanitation sector encompasses the treatment and distribution of water for domestic and commercial/industrial purposes and the collection, treatment and disposal of municipal wastewater. The report concentrates on the urban segment of the sector. In this context, communities with a population in excess of 10,000 are considered urban. This differs from the definition used by the Egyptian Government, which categorizes a community on the basis of its administrative status. According to this definition, a town with more than 30,000 people may be considered rural, even though it has the characteristics of a city so far as the provision of water supply and sewerage services is concerned.

1.03 The study focuses on the technical, financial and institutional performance of water supply and sewerage operating agencies (institutions responsible for maintaining and operating water and wastewater facilities) as well as the framework of policies, government institutions and the external support environment under which these agencies operate. Many of the issues dealt with in this study concern questions of public administration which transcend the confines of the water supply and sanitation sector. In this context, the recommendations developed in this study aim to be consistent with programs for macroeconomic restructuring and public enterprise reform being undertaken by the Egyptian Government. Also treated in some detail in the study are water resources management and water pollution control, as these areas have an important impact on the financial resources and the technical capacity of water supply and sewerage agencies. The study provides input to a separate, ongoing Bank effort to help the Egyptian Government in the
formulation of policies and programs related to environmental protection and water resources management.

C. Organization of the Study

1.04 The report is organized as follows:

- Chapter II presents an overview of present service levels and the quality of water supply and sewerage services and discusses water resources management and pollution control;

- Chapter III discusses past and present sector finances and rates and develops various sector development scenarios in terms of service levels and cost;

- Chapter IV introduces sector issues and the main constraints to more efficient and accelerated sector development;

- Chapter V describes and assesses the present sector organization and the performance of key sector institutions and develops recommendations for the reform of sector organization and institutions;

- Chapter VI stresses the need for getting private enterprise involved in the management and operation of water and wastewater utilities, the provision of finance for investments and the delivery of support services;

- Chapters VII presents recommendations for reform of cost recovery and pricing and rate policies;

- Chapter VIII makes recommendations regarding the selection, preparation and implementation of sector investments;

- Chapter IX discusses investment financing principles and the creation of appropriate instruments for financing sector investments;

- Chapter X presents recommendations for adjustments of the present institutional and policy framework for water management and pollution control;

- Chapter XI makes some suggestions as to how the proposed sector reforms could be implemented.
II. PRESENT WATER SUPPLY AND SEWERAGE SERVICE LEVELS AND QUALITY, WATER RESOURCES AND POLLUTION

A. Water Supply and Sewerage/Sanitation Service Levels and Quality

Water Supply

2.01 Urban Areas. Over the last two decades Egypt has made great strides towards improving water supply services to its people. Service coverage in urban areas is almost 90 percent (Table 2.1) compared to less than 70 percent 20 years ago. With more than 95 percent of the population having access to piped water, Alexandria, Cairo and the Suez Canal cities are well served by any developing country standard. Water of generally adequate quality is provided 24 hours a day, although service irregularities (temporary shutoffs, low pressure) do occur. With 80 percent of the people served by public systems, the cities of provincial Egypt receive a lower quality service. System breakdowns are more frequent, and deficient water quality is a concern. With the rapid population growth in Egypt's cities, operating agencies find it difficult to keep pace with the demand for new connections. Many people, particularly those living in poorer neighborhoods, have to rely on public standpipes or private vendors.

Table 2.1: Present Service Levels for Water Supply and Sewerage

<table>
<thead>
<tr>
<th>Area</th>
<th>Population millions</th>
<th>% of Population Served</th>
<th>Water (a)</th>
<th>Sewerage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cairo</td>
<td>11.1</td>
<td>20.2</td>
<td>95</td>
<td>70</td>
</tr>
<tr>
<td>Alexandria</td>
<td>3.3</td>
<td>6.0</td>
<td>98</td>
<td>40</td>
</tr>
<tr>
<td>Canal Cities</td>
<td>1.1</td>
<td>2.0</td>
<td>96</td>
<td>35</td>
</tr>
<tr>
<td>Other Cities</td>
<td>8.5</td>
<td>15.5</td>
<td>80</td>
<td>30</td>
</tr>
<tr>
<td>Total Urban</td>
<td>24.0</td>
<td>43.6</td>
<td>90</td>
<td>50</td>
</tr>
<tr>
<td>Rural Villages (b)</td>
<td>31.0</td>
<td>56.4</td>
<td>45</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>55.0</td>
<td>100.0</td>
<td>65</td>
<td>24</td>
</tr>
</tbody>
</table>

Notes: (a) People receiving water from a "piped public system," through house connection or public standpipe. (b) The distinction between rural and urban is determined by the administrative status of the community. Densely populated communities with up to 30,000 inhabitants may be classified as rural, although they exhibit few rural characteristics in the traditional sense.

2.02 Rural Areas. The 1986 census reports that 56 percent of the households in rural areas receive water from a piped public system. This includes people who obtain their water from public standpipes or neighbors connected to the public system. Compared to a service coverage of less than 10 percent in 1976, clearly much progress has been made, but service levels and conditions remain deficient. The level and quality of service, however, vary
widely throughout the country. A 1988 study\(^1\) of 36 representative villages in 6 governorates with a total population of over 1 million sheds some light on the diversity of the supply situation in rural areas. According to this study, the population living in these 36 villages obtained water as follows: 30 percent from an in-house or yard connection; 15 percent from a public standpipe; 28 percent from a private handpump; 22 percent from a neighbor's connection; and 5 percent directly from a river or canal. The rate of connection in the governorates studied showed significant regional variations, which ranged from 23 percent in the Governorate of Quena in Upper Egypt to 77 percent in Damietta in the delta. Private handpumps provide an important source of water in Upper Egypt, where relatively low population densities and the availability of groundwater sources of acceptable quality make such solutions possible. Polluted or saline groundwater and higher population densities exclude the handpump option in most areas of the delta.

2.03 Service quality throughout rural Egypt remains a serious problem because of poor operation and maintenance. Systems providing water 24 hours per day are rare. Service is frequently interrupted by power outages or equipment breakdowns. Due to the deficient operation and maintenance of treatment facilities and interrupted service, contaminated groundwater infiltrates pipes. Public standpipes are often poorly designed, especially the drainage system around them, and their number is far too limited to serve those not connected to the public system.

Sewerage and Sanitation

2.04 Coverage rates for sewerage are much less than those for water supply. They are expected to increase rapidly in the medium term, as the Egyptian Government and bilateral financing agencies are increasingly giving priority to the expansion of sewerage networks. With about 77 percent of its population connected, Cairo has the best sewerage service in the country. In the rest of the country, sewerage coverage is much less. Alexandria reportedly has only 40 percent of its present population connected. Works now under construction are expected to increase this coverage to the 65 percent to 75 percent range by the year 1995. Sewerage service rates in smaller towns are much lower. Estimated at less than 5 percent, sewerage service by conventional means in rural areas is very low.

2.05 The population not connected to a sewer system relies on individual means for the disposal of excreta and wastewater (latrines, septic tanks, etc.) No hard consolidated data exist on sanitation, but evidence indicates that on-site solutions are often ill-designed and poorly maintained. Lack of sewerage systems or effective on-site disposal has led to widespread surface ponding of wastewater and the contamination of drainage channels, particularly in those areas where piped water is available through house connections. The situation is especially critical in the delta area where high population densities, impervious soils and high groundwater tables make the application of low-cost, on-site sanitation options difficult. In spite of significant progress in the recent past, improvements in sewerage services and sanitation conditions have

lagged far behind progress in providing water supply services. In many areas without sewerage service, the availability of water through house connections has, in fact, led to a deterioration of overall environmental and public health conditions, particularly in the poor neighborhoods of the large cities and in the densely populated towns and villages in the delta.

B. Water Resources

2.06 Essentially all of Egypt's water resources are provided by the Nile River, including those from groundwater in the river's alluvial plain. Egypt's share of the estimated safe yield of the Nile is 55.5 billion cubic meters per year. At present coverage levels, water extractions for municipal water supply, including commercial and industrial establishments served by municipal water supply systems, amount to some 3 billion m$^3$ per year. About 50 percent of this water, albeit polluted, is returned to the Nile River system. The net withdrawal of Nile water resources for municipal water supply purposes thus amounts to roughly 1.5 billion m$^3$, which is equivalent to about 2.5 percent of available water resources. The bulk of water is claimed by irrigated agriculture (70 percent) and industry (10 percent). The rest must remain in the river to avoid saltwater intrusion into the Nile Delta. Population growth and the expansion of water supply services are expected to increase the volume of water needed for municipal water supply to about 4 billion m$^3$ by the year 2000. Of this volume, roughly half would be consumed and lost, while the other half would reenter the river directly or groundwater in polluted form.

2.07 There is growing concern about the sufficiency of future water resources. The need to conserve and better utilize existing water resources is clearly a high priority issue for Egypt's future economic development. Because of the comparatively small amount of water used, water withdrawals for municipal purposes affect the overall water balance in the Nile River system only marginally. While there is a clear need to use water more efficiently in the municipal water supply sector, the volume relationships in comparison to other uses, primarily agricultural, are such that more efficient water use in the municipal sector cannot be expected to contribute much to the overall water resource situation in the Nile River. This is not to say that municipal water supply agencies should not make an effort to conserve water. Indeed, a great effort is needed for reducing per capita water consumption, but the main justification for such an effort would be the need to reduce operating and investment costs of water supply facilities and not the need to conserve water resources per se.

C. Water Pollution and Wastewater Treatment

2.08 Industrial development and population growth over the last three decades have resulted in ever-increasing pollution loads and subsequent water quality deterioration in the Nile River system. Wastewater entering the system comes primarily from: (i) industry (steel plants, petro-chemical industry) concentrated in the south (Heluan) and north of Cairo and around Alexandria (some of these industries discharge highly toxic substances into the aquatic environment); (ii) domestic sewage, sometimes mixed with industrial wastes originating from smaller-scale commercial enterprises (battery shops, tanneries,
garages, paint shops, etc.), which discharge their liquid waste directly into the municipal sewer system; (iii) agricultural runoff, introducing agroindustrial chemicals (fertilizer, herbicides, pesticides), and saline return flows from irrigation; and (iv) river boats and barges, which discharge human waste, petroleum products and garbage.

2.09 Fragmented and unreliable data do not allow a precise understanding of the present pollution patterns and levels in the Nile River basin, but the following general situation can be inferred. Although there is clear trend of increasing pollution, the quality of Nile River water is generally adequate for most uses upstream of Heluan. Beginning at Heluan and throughout the Delta, however, severe water pollution exists downstream of larger cities and industrial sites. This pollution tends to be concentrated initially in agricultural drains, but it eventually spills over into the Nile River proper. There is heavy pollution in many of the lakes in the delta. The pollution of Lake Mariut near Alexandria has gained international recognition. Although pollution stemming from untreated domestic wastewater fouls many of the Delta’s water courses, the greatest immediate concern, from a public health point of view, appears to be the accumulation of industry-generated, nondegradable toxic and carcinogenic substances (heavy metals, PCBs, etc.) Unless checked, water pollution will worsen with continued industrial development and population growth. There is no doubt that a concerted effort to control water pollution is imperative.

2.10 While very little has been done to curb the discharge of industrial wastewater and to slow down pollution from agricultural runoff, enormous efforts have been made to address pollution from domestic sewage. With financing provided by the Egyptian Government and bilateral financing agencies, primarily USAID, some 50 wastewater treatment plants have been constructed throughout the country. Another 50 are in various stages of completion. Large treatment works are under construction in Cairo and are planned for Alexandria. The Government is considering the construction of an additional 160 plants as a first step towards providing wastewater systems to “all governorates and cities in Egypt.” So far these efforts to treat municipal wastewater have led to little improvement in water quality in the Nile River system. This is partially due to the fact that some of the major plants (Cairo and Alexandria) have not yet been completed; it is also due, however, to the inability of operating agencies to properly operate and maintain existing plants.

2.11 There is concern whether the Government’s ambitious plans for cleaning up pollution from municipal wastewater is the most efficient allocation of scarce resources within the context of a global strategy for combating the country’s environmental problems. If, for example, the improvement of public health is the greatest immediate concern, one could argue that at least some of the enormous resources which are proposed to be spent on dealing with domestic wastewater could be spent more effectively on other measures, such as the provision of safer water, better sanitation or health education. The government’s policies and regulations governing water resources management and pollution control also have a great impact on water and wastewater operating agencies. They determine the financial resources and technical capacity of these agencies that need to: (i) extract and treat raw water for domestic and commercial/industrial use; and (ii) treat municipal wastewater to meet water pollution control standards. Under present circumstances, Egypt’s water and wastewater operating agencies clearly lack the financial and technical capacity to invest in and maintain and operate even moderately complex wastewater treatment plants. Given the far reaching implications the government’s pollution control policies will have on the sector, this report would therefore be
incomplete without at least touching on the issues surrounding municipal wastewater treatment as seen from the perspective of the municipal water and wastewater sector. This is done in Chapter X.

D. Public Health

2.12 Over the last three decades, the health of the Egyptian population has improved substantially. Infant mortality has dropped from 145/1000 births in 1965 to 68/1000 births at present. Similarly, incidences of diarrheal diseases have decreased sharply. These improvements are at least partly attributable to the Government's determined effort to improve water supply and sanitation services throughout the country. Nevertheless, mortality and morbidity rates remain high. Clearly much additional effort is needed to increase water supply and sewerage/sanitation service coverage and quality throughout Egypt. Achieving a better balance between water supply and sewerage/sanitation is of particular importance, as these services have a complementary effect on improving public health conditions. It is well established that improvements in the quality of water and sanitation services alone will not be sufficient to guarantee better public health unless accompanied by parallel efforts for intensifying sanitary education and improving public health delivery services.
III. SECTOR FINANCES, FUTURE SECTOR DEVELOPMENT AND RESOURCE NEEDS

A. Investments: Composition and Origin of Resources

3.01 The rapid growth in service levels for water and sewerage and the construction of wastewater treatment facilities has been made possible through enormous investments over the past 15-20 years. Unfortunately, the absence of a reliable and conveniently organized data base, and complications in adjusting for inflation and exchange rates, makes a precise and detailed analysis of past sector investments very difficult. The following estimates, pieced together from a variety of often inconsistent sources, is believed to represent a fairly accurate account of the level, origin and destination of sector investments.

3.02 Since 1977 the total investment volume from all sources was about LE 10 billion in current terms. Over the past four years, investments amounted to about LE 1 billion per year, or about US$400 million equivalent. Foreign multilateral or bilateral funding agencies provided about 60 percent of all resources, mostly in the form of grants or soft loans. Following the Camp David Accords of 1978, the United States of America, through its Agency for International Development (USAID), has been by far the largest contributor, with about US$2 billion already disbursed and another US$329 million committed. Many other donors, including the United Kingdom, Japan, Germany, the Netherlands, Denmark, Sweden and Finland, as well as the World Bank, contributed lesser, but still significant, investment resources. The Egyptian treasury provided the remaining 40 percent of investments.

3.03 These investments were distributed among subsectors approximately as follows: 50 percent for water supply, 30 percent for sewerage and 20 percent for municipal wastewater treatment. Geographically, about 70 percent of all investments were channelled to Cairo and Alexandria, where about 25 percent of Egypt's population is concentrated, and only about 30 percent to the rest of the country, where some 75 percent of the population resides. Large-scale foreign financing has clearly been a decisive factor in setting priorities for sector development. The USAID decision to concentrate on improving wastewater collection and wastewater treatment in Cairo and Alexandria is largely responsible for the fact that almost half of all investments in recent years went for wastewater collection and treatment in these two cities.

B. Present Pricing and Rate Policy

3.04 Traditionally, the Government's policy has been to provide water and wastewater services at a very low cost to its population. The most recent rate guidelines published by the Ministry of Housing, New Communities and Public Utilities (MHPU) in May 1991 (Annex A) propose extremely low rates. For example, water rates for domestic consumers with meters are only LE 0.10 per m$^3$ (about US$0.03 equivalent). The charge for an unmetered three-room apartment is LE 1.50 per month (about US$0.50 equivalent), which on a volume basis is even less than that for a metered connection. Rate levels for other uses (excluding private
tourist and industrial and commercial establishments) are equally low. The rate guidelines propose no charges for wastewater services.

3.05 Faced with ever-increasing budget deficits and a severe debt burden, the Government has begun to adopt an increasingly more aggressive stance on water rates over the past five years. Although the aforementioned guidelines have not been officially altered, MHPU has encouraged water supply and sewerage agencies to gradually raise rates beyond those published in the guidelines, to levels intended to achieve cost recovery for the operation and maintenance of water supply by mid-1992. MHPU is also promoting the introduction of a 10 percent surcharge on the water price for sewerage services. These recommendations have resulted in moderate increases in rates in Cairo and Alexandria and in some governorates where the basic water rate for domestic consumption has reached LE 0.13/m$^3$ (about US$0.04 equivalent). It appears that the water and sewerage company in the Governorate of Beheira, a current recipient of a credit from the International Development Association (IDA), is the only organization that has, so far, introduced more than minimal rate increases. There the rate for domestic consumption is now LE 0.2/m$^3$ (about US$.07 equivalent) for the first 20m$^3$ of monthly consumption and LE 0.3/m$^3$ (about US$.10 equivalent) for consumption above that level. The monthly rate for an unmetered connection has been raised to LE 5.0 (about US$.17 equivalent). Rate levels in most of provincial Egypt remain far below the targets set in the MHPU guidelines. In comparison with rate levels in similar income countries$^2$, water and sewerage rates are extremely low.

C. Sector Subsidies and Public Finances

3.06 Water supply and sewerage organizations in the large cities (Type I agencies)$^3$ and in the governorates, where the management of water supply is entrusted to semi-autonomous sector agencies (Type II agencies), no longer receive major subsidies for operations from the Government and claim to be able to meet operating costs from rate income alone. These claims, however, tend to be misleading. The poor state of repair of the systems and facilities clearly demonstrates that insufficient resources are devoted to proper operation and maintenance. The water and sewerage organizations (Type IV agencies) throughout provincial Egypt continue to rely heavily on contributions from the Government budget for operation and maintenance. Much of these subsides are disguised, as they form part of the general budget transfers to governorates. There is no cost recovery for capital investments.

3.07 A lack of reliable and consolidated information makes it difficult to obtain a good estimate on the aggregate amount of investment and operational subsidies that flow from national and local budgets to sector organizations. Conservative estimates indicate that operational subsidies were about LE 100 million in 1990 (about US$35 million equivalent), and investment support was on the order of LE 600 million (about US$200 million equivalent). In addition, the Government has incurred a significant debt burden for sector investments. These

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$^2$ For example throughout Latin America, water rates for domestic consumption exceed US$0.15/m$^3$ and tend to be substantially higher in most larger cities; in addition, most countries charge a 50 percent surcharge for sewer services.

$^3$ See para. 5.02 for a description of the setup of water supply and sewerage operating agencies.
subsidies have contributed to the recent decline in Egypt's public finances. By foregoing any financial return on its equity contributions to the sector, the government subsidy is much higher than indicated by the financial flows. In economic terms, however, government subsidies yielded a large, although non-quantifiable return in terms of improved public health and the provision of infrastructure essential for other economic development.

D. Future Sector Development and Resource Needs

3.08 In the future, financial resources will be needed for investing in the expansion of water supply, sewerage and wastewater treatment systems and the rehabilitation, replacement and operation and maintenance of existing facilities. Estimates on the magnitude of resources needed for each of these categories to achieve various different growth scenarios between now and the year 2000 are presented in Table 3.1.

Service Coverage Expansion for Water Supply and Sewerage

3.09 In spite of the rapid progress in service coverage over the past two decades, only about 65 percent of the population (including those served by public standpipes) has access to a public piped supply of water. Only 27.5 percent of the population is served by a sewerage system. At the same time, Egypt's population is growing by about 1 million people a year, assuming a population growth rate of 2.5 percent per year. To illustrate the magnitude of the effort involved in expanding service coverage, Table 3.1 presents projections for the number of additional people who would need to be served by the year 2000 under three coverage growth scenarios: static, medium and high. In setting the coverage targets, emphasis was given to address the imbalance between water supply and sewerage coverage, which as noted in para. 2.05 continues to be a critical public health concern. Just to maintain current coverage levels, an additional 8.8 million people have to be provided with water services and 3.8 million, with sewerage services. Obtaining the high water-supply-service level scenario of 85 percent by 2000 would require the connection of an additional 22.9 million people. Reaching a sewerage coverage of 54 percent would require the connection of an additional 22 million people.
### Table 3.1. Additional People to be Served to Reach Indicated Service Coverage by the Year 2000

<table>
<thead>
<tr>
<th>Serv. Level</th>
<th>STATIC SCENARIO</th>
<th>MEDIUM SCENARIO</th>
<th>HIGH SCENARIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Supply</td>
<td>90.0</td>
<td>90.0</td>
<td>5.4</td>
</tr>
<tr>
<td>Sewerage</td>
<td>50.0</td>
<td>50.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Supply</td>
<td>45.0</td>
<td>45.0</td>
<td>3.5</td>
</tr>
<tr>
<td>Sewerage</td>
<td>3.0</td>
<td>3.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>55.0</td>
<td>68.7</td>
<td></td>
</tr>
<tr>
<td>Water Supply</td>
<td>64.6</td>
<td>64.6</td>
<td>8.8</td>
</tr>
<tr>
<td>Sewerage</td>
<td>23.5</td>
<td>23.5</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Notes: Annual population growth rate 2.5% p.a.; population in millions; service level in % of population.

3.10 A broad estimate of the level of investment required to reach the targets for the three coverage growth scenarios for water supply and sewerage is presented in Table 3.2. These investment requirements are indeed very large: in constant 1992 prices they are US$2.3 billion (US$255 million annually), US$4.3 billion (US$480 million annually) and US$6.3 billion (US$700 million annually) for zero, medium and high growth, respectively. Taking into account inflation, water supply and sewerage investments for the static investment coverage scenario would be about US$2.5 billion; for the medium scenario, US$4.6 billion; and nearly US$6.8 billion for the high scenario. The unit per capita cost assumption employed in the projections is based on international averages. Actual costs could be lower or higher depending on the quality and cost-effectiveness of project formulation and implementation. Actual unit costs for past and present projects executed in Egypt tend to be higher than those used in the projections.
Table 3.2. Projected Investment Needs for the 1992-2000 Period
(US$ million, 1992 prices)

<table>
<thead>
<tr>
<th>Service</th>
<th>Static Scenario</th>
<th>Medium Scenario</th>
<th>High Scenario</th>
<th>Per Capita Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level ** Level Total Annual ** Level Total Annual ** Level Total Annual</td>
<td>1991 (US$ million)</td>
<td>2000 (US$ million)</td>
<td>2000 (US$ million)</td>
<td>2000 (US$ million)</td>
</tr>
<tr>
<td>(% of population)</td>
<td>(% of pop.)</td>
<td>(% of pop.)</td>
<td>(% of pop.)</td>
<td>(% of pop.)</td>
</tr>
</tbody>
</table>

Urban

**Water Supply**

- 1991: 90.0
- 2000: 90.0
- Total: 1206
- Annual: 134
- Total: 332
- Annual: 332
- Cost: 160

**Sewerage**

- 1991: 50.0
- 2000: 50.0
- Total: 419
- Annual: 47
- Total: 96
- Annual: 96
- Cost: 100

**Sewage Treatment**

- 1991: 35.0
- 2000: 35.0
- Total: 234
- Annual: 26
- Total: 39
- Annual: 39
- Cost: 80

Rural

**Water Supply**

- 1991: 45.0
- 2000: 45.0
- Total: 584
- Annual: 65
- Total: 1281
- Annual: 142
- Cost: 120

**Sewerage**

- 1991: 10.0
- 2000: 10.0
- Total: 87
- Annual: 10
- Total: 706
- Annual: 78
- Cost: 80

**Sewage Treatment**

- 1991: 3.0
- 2000: 3.0
- Total: 10
- Annual: 1
- Total: 22.5
- Annual: 26
- Cost: 30

Total

**Water Supply**

- 1991: 1790
- 2000: 199
- Total: 2539
- Annual: 282
- Total: 4891
- Annual: 543
- Cost: 827

**Sewerage**

- 1991: 505
- 2000: 56
- Total: 55
- Annual: 55
- Total: 1574
- Annual: 175
- Cost: 276

**Sewage Treatment**

- 1991: 244
- 2000: 27
- Total: 35
- Annual: 35
- Total: 591
- Annual: 66
- Cost: 129

Municipal Wastewater Treatment

3.11 The resources needed for investing in municipal wastewater treatment plants will depend on the priority given to this area over the next decade. In Chapter X an argument is presented which recommends limiting investments in municipal wastewater treatment until a comprehensive pollution abatement program with clear priorities becomes available, and appropriate institutional and financial policies are adopted. Considering that the wastewater treatment plants in the Cairo area are already under construction and resources for their completion are assured, a realistic goal for urban areas would be to treat the wastewater of 75 percent of the people connected to the sewer system. Likewise, it is assumed that in rural areas primary and lagoon-type treatment options will be provided for 75 percent of the people connected to the sewer system. To reach these target total investments, in 1992 constant prices, about US$590 million (US$66 million annually) and about US$1150 million (US$130 million annually) would be required under the medium- and high-growth scenarios, respectively (see Table 3.2).

Rehabilitation and Replacement

3.12 In addition, major efforts are needed to replace or rehabilitate existing infrastructure. Assuming that one fourth of the existing water and sewerage infrastructure needs to be rehabilitated or replaced by the year 2000, another US$150 million per year must be spent (not included in Table 3.2).
Operation and Maintenance

3.13 Future operation and maintenance costs (O&M) will grow substantially as more infrastructure is constructed; current expenditure levels should, therefore, be increased to bring about adequate O&M. Estimating appropriate O&M costs is difficult, partly because of the paucity and unreliability of existing data and partly because such costs depend very much on local conditions. Table 3.3 presents a rough estimate of the costs of adequately covering O&M. It illustrates how O&M costs increase over time, depending on the growth scenario. For example, annual total O&M costs would increase from US$130 million to US$160.5 million for the static scenario. Under the high-growth scenario, they would increase from US$148.1 million in 1992 to US$253.8 million in 2000. Table 3.3 also illustrates the magnitude of the shortfall between O&M costs and the funds that could be collected under present rate levels. By the year 2000, this deficit would be almost US$150 million per year for the high-growth scenario. Unless rate levels are adjusted, this deficit would have to be made up by the government budget or, as happens frequently today, by foregoing adequate O&M of systems and facilities.

<table>
<thead>
<tr>
<th>Table 3.3: Projection of Operating Costs (1992 US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rates to Cover O&amp;M Cost Needed (US$/m³)</td>
</tr>
<tr>
<td>Need</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Urban Water Supply</td>
</tr>
<tr>
<td>Sewerage/Sanit.</td>
</tr>
<tr>
<td>Sewage Treatment</td>
</tr>
<tr>
<td>Rural Water Supply</td>
</tr>
<tr>
<td>Sewerage/Sanit.</td>
</tr>
<tr>
<td>Sewage Treatment</td>
</tr>
<tr>
<td>Total Water Supply</td>
</tr>
<tr>
<td>Sewerage/Sanitation</td>
</tr>
<tr>
<td>Sewage Treatment</td>
</tr>
</tbody>
</table>

Total Resource Requirements

3.14 Table 3.4 presents a rough estimate of the financial resources, annual and total, for the 1992-2000 period for service expansion, rehabilitation and replacement and operating costs. At 1992 prices, the sector would require an annual resource flow of between US$577 and US$1,177 million, depending on the demand scenario. The total amount of resources needed, even for the medium-growth scenario, far exceeds past sector expenditures. If present rate levels were maintained, only about 15 percent of resource needs would be covered from charges paid by service beneficiaries. The projections in Table 3.4 have been based on a series of assumptions and extrapolations, many of which could be debated. The value of the projections therefore does not lie in the specific
numbers presented, but in the realization that future sector development and growth in Egypt will require an immense resource generation effort which will far exceed past efforts if steady sector growth is to be achieved.

**Table 3.4:** Projection of Total Resource Needs 1992-2000  
(US$ million, 1992 prices)

<table>
<thead>
<tr>
<th>Static</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Annual</td>
<td>Total Annual</td>
</tr>
<tr>
<td>Investments</td>
<td>2539</td>
<td>282</td>
</tr>
<tr>
<td>Water Supply</td>
<td>1790</td>
<td>199</td>
</tr>
<tr>
<td>Sewerage</td>
<td>505</td>
<td>56</td>
</tr>
<tr>
<td>Sew. Treatment</td>
<td>244</td>
<td>27</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>1350</td>
<td>150</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>1305</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>5194</td>
<td>577</td>
</tr>
<tr>
<td>Rate Generation</td>
<td>630</td>
<td>70</td>
</tr>
<tr>
<td>Deficit</td>
<td>4564</td>
<td>507</td>
</tr>
</tbody>
</table>

* At present rate levels and assuming full collection.
IV. CRITICAL ISSUES AND CONSTRAINTS TO EFFICIENT SECTOR DEVELOPMENT
THE CHALLENGE AHEAD

A. Sector Issues and Constraints

4.01 The Egyptian Government's main objective over the past two decades has been to improve service levels quickly. Indeed, much has been achieved through a remarkable local and international cooperation effort. However, as the projections of future resource needs illustrate, an even greater effort will be needed to consolidate past achievements and to continue to expand service to the Egyptian people. There is wide agreement that the rapid growth in service coverage has not been accompanied by an equal advance in the creation of a strong water supply and sewerage industry. In fact, there is a host of issues and constraints that pose serious obstacles to more accelerated and cost-efficient sector development and growth. The most important of these sector issues and constraints are introduced below.

- Overall Institutional Framework: Responsibility within the Government for managing the water and wastewater sector has evolved over the years into a complex and fragmented web of local and national institutions with often overlapping responsibilities. Sector management is essentially centrally planned and controlled, with limited autonomy for operating agencies.

- Performance of Operating Companies: Egyptian water supply and wastewater operating companies suffer, in various degrees, from: weak management; severe overstaffing; a lack of qualified and experienced administrative and technical staff; deficient administrative and control systems; a lack of commercial orientation; inadequate operation and maintenance; excessive water consumption; high water losses and rates for unaccounted-for-water; and poor financial conditions.

- Performance of National Institutions: The ability of national sector institutions is limited with respect to: policy formulation and strategic planning; intersectoral coordination; the collection of sector information; assistance to operating agencies; the promotion of efficiency in investment planning; quality control; standards setting; project design; and implementation.

- Sector Development and Investment Policy: Present sector development does not follow a clearly articulated strategy based on objective needs and priorities. Much of past investment has been driven by political interests and the objectives of multi- and bilateral financing and aid agencies; there is an imbalance between water supply and sewerage/sanitation investments, and the preference given to Cairo and Alexandria at the expense of other areas of the country is an issue.
Human Resources: There is a severe shortage of experienced and qualified utility managers and administrators, planners, financial experts, engineers and operators.

Sector Finances and Cost Recovery: In spite of some recent efforts to increase water and sewerage rates, present rates are insufficient to cover operating costs. There is no cost recovery for investments. Sector financing depends heavily on central government subsidies and contributions from international donor agencies. These subsidies have contributed to the Government’s budget deficits and the economic distortions and inefficiencies permeating the Egyptian economy.

Project Selection, Design and Implementation: Projects (designated under the Government’s Five-Year Plan) are selected and designed without sufficient attention to cost-effectiveness, technical appropriateness or economic justification; project design does not pay sufficient attention to the ability of operating agencies to operate and maintain facilities adequately; and the investment funding process leads to excessively long project implementation periods. The quality of civil works construction and equipment and material is often poor.

Investments in Municipal Wastewater Treatment: In the absence of a comprehensive water pollution control and abatement strategy for the Nile River basin, there is concern about the economic justification and cost-effectiveness of the Government’s ambitious plans for constructing municipal wastewater treatment plants. There is also concern that operating companies may be unable to adequately operate and maintain treatment plants.

B. The Challenge Ahead and Prospects for Future Sector Development

4.02 The projection of future resource needs in Table 3.4 indicates that an enormous amount of funds must be mobilized to consolidate and preserve past achievements, fulfill the aspirations of those Egyptians who still lack adequate water supply and wastewater services, and protect the water quality in the Nile River system. These resources may have to be raised under conditions less favorable than in the past. International financing on concessionary terms is growing scarce. The fiscal constraints on the Government’s budget will not allow continued subsidies at past levels.

4.03 The Government’s ability to raise these resources will depend largely on its success in removing the constraints that are now in the way of efficient sector development. Failure to do so would make sector investments less cost-effective than they could be and would accelerate the deterioration of existing infrastructure. Without major improvements in the performance of sector institutions, and in the way projects are being selected, designed and implemented, the task ahead will be much more difficult and require more resources than would otherwise be necessary. Not addressing sector development constraints may eventually erode the support of multi- and bilateral funding and aid agencies, which in the past have been instrumental in financing sector growth. Conversely, Government commitment to sector reform will most likely encourage funding agencies and the private sector to maintain or increase their support.
V. SECTOR ORGANIZATION AND INSTITUTIONS
AN ASSESSMENT AND RECOMMENDATIONS FOR REFORM

A. Present Sector Institutions and Organization

5.01 The organization of Egypt's water and wastewater sector is quite complex involving a multitude of institutions with often overlapping responsibilities. The following provides a somewhat simplified description of the present institutional setup distinguishing between two categories of institutions - local operating agencies and national institutions - which have an important bearing on the sector.

Operating Agencies

5.02 The management of water supply and wastewater services is entrusted to local institutions (operating agencies) with widely differing levels of capacity and authority. They can be divided into four main types:

(i) separate independent public authorities (general organizations) for water supply and wastewater in greater Cairo and Alexandria (serving about 20 percent of the population);

(ii) governorate water supply and wastewater companies in the governorates of Beheira, Damietta, Kafr-El-Shiekh and Luxor (serving about 3 percent of the population);

(iii) the Suez Canal Company, providing water services in the cities of Suez, Port Said and Ismailia (serving about 2 percent of the population); and

(iv) governorate governments, usually through local housing directorates or municipal departments, providing water supply and wastewater services in all areas other than those listed above (serving about 75 percent of the population).

National Institutions

5.03 On the national level, the following institutions play important roles in the management of the sector:

- the Ministry of Housing, New Communities, and Public Utilities (MHPU), as parent ministry of the sector, has primary responsibility over sector matters; within MHPU, the Central Department of Public
Utilities is in charge of the sector with policy guidelines formulated by the High Policy Committee created by MHPU;

- the National Organization for Potable Water and Sanitary Drainage (NOPWASD), attached to MHPU, is responsible for general sector planning, support and coordination; it also prepares, designs and executes investment projects for all Type II and IV operating agencies;

- the Ministry of Finance (MOF) is the ultimate provider of domestic investment funds and, in the case of Type IV agencies, is the administrator of the budget process;

- the Ministry of Planning (MOP) is responsible for the allocation of domestic resources for sector investments within the context of the government’s five-year planning process for public sector investments;

- the National Investment Bank (NIB), an organization attached to MOP, administers and disburses domestic funds for investment allocated under the five-year plan;

- the Ministry of State for International Cooperation (MISC) coordinates funding from international agencies; and

- the Ministry of Health monitors drinking water quality standards.

Institutional Dependencies

5.04 The legal status of operating agencies differs widely. Type I and II operating agencies possess a corporate structure and legal identity that gives them limited independence. Type III agencies are part of the corporate structure of the Suez Canal Company. Type IV agencies are fully integrated into governorate or municipal administrations and have no institutionally separate identity. Financially these agencies are integrated in the national budget process for funding governorate expenditures. The key characteristic common to all operating agencies is that all important utility functions, apart from operation and maintenance, are controlled directly or indirectly by the national government represented by MHPU/NOPWASD for technical matters and MOF/NIB/MOF/MISC for financial matters.

5.05 All operating agencies and national institutions, with the exception of NIB, are subject to civil service regulations with respect to employment and administrative procedures. In spite of their apparent autonomy, the management of Type I and II agencies is controlled by the national government either directly (Type I agencies are dependent on MHPU) or indirectly (Type II and IV organizations fall under the jurisdiction of governors who are national government appointees). All agencies depend on the national government to finance a part of O&M costs and all investment expenditures. The national government and city councils control the setting of rates. Likewise, the responsibility for the selection, preparation and execution of investment projects is the domain of the national government (NOPWASD for Type II and IV agencies) or foreign financing agencies.
B. Performance of Operating Companies

5.06 The performance of Egyptian Water supply and wastewater operating agencies varies widely. Those operating under their own institutional identity (Cairo, Alexandria, Suez Canal cities, governorate companies) in general perform much better than those operating within governorate administrations (Type IV organizations). The performance of the Alexandria Water Company comes closest to the acceptable performance standards found in middle-income developing countries, while Type IV organizations tend to be extremely weak and deficient.

5.07 The great variation in performance among operating agencies makes a fair and balanced assessment difficult. All of them, however, suffer, although in widely differing degrees, from the same deficiencies that are briefly summarized below.

5.08 Management and Staffing. Management is generally weak and not experienced in modern utility management practices. Many agencies are severely overstaffed, (many organizations have more than 20 employees per 1,000 connections, whereas a range of 6-8 employees would be a more reasonable standard.) Despite this overstaffing, there is an acute shortage of employees with adequate management, administrative and technical skills. Low and middle management appears to be reluctant to assume responsibility and initiative.

5.09 Organization and Administrative Systems. Management's capability for effective decision-making and administration is restricted by dysfunctional organizational structures and the absence of adequate and up-to-date information. Administrative and operational systems (accounting, budgeting, commercial, information, control, etc.) do not generate the flow and type of information that is needed for proper management control and decision-making. A particularly severe shortcoming is the inability of the government-required accounting system to produce timely and adequate information on expenditures. With few exceptions, all administrative and operational systems are kept manually.

5.10 Planning. Management tends to be preoccupied with short-term concerns and daily problems. Little time is spent on longer-term strategic aspects of agency development, as decisions on such aspects (staffing, financial management, investment selection and execution) are largely out of the jurisdiction of management.

5.11 Operation and Maintenance (O&M). Evidence of inadequate O&M of water and wastewater facilities abounds throughout Egypt. Examples include pipe systems that do not work properly because of inoperable valves or pumping stations. Sewer systems have reduced capacity because pipes are clogged. Water treatment plants don't reach production capacity and adequate water quality standards because of run-down and non-functioning equipment and poor process management. Distribution systems are operated inefficiently causing water shortages and low pressure. No wastewater treatment plant reaches design standards for treatment efficiency. Poor O&M practices are always highlighted as one of the most troublesome aspects of sector management in Egypt. Although pervasive throughout the country, there are differences in the quality of O&M. In general, water systems are operated and maintained better than wastewater systems. Companies in large cities perform better than those in smaller cities and villages. In all cases, however, maintenance and operation of water and
wastewater systems is generally inadequate because of a number of interrelated reasons, including: insufficient allocation of resources and management attention; lack of equipment (vehicles, spare parts, tools) and supplies; an almost universal lack of manuals; inadequately trained and motivated staff; deficiencies in the design and construction of facilities; and an absence of outside support. Often poor design and construction contribute to O&M difficulties. Although external donors continue to stress the urgent need for paying adequate attention to O&M problems, progress in this area is very slow; the present system of project selection, the budget allocation policies and practices, management interest and political preferences favor investments in new facilities over O&M. In many cases, new, costly investments would not have been necessary, or could have been postponed, if proper attention had been paid to O&M.

5.12 **Financial Condition.** Low tariff levels combined with poor billing and collection practices do not allow operating companies to generate sufficient revenues to cover basic operating costs. All agencies must perform under chronic cash shortfalls and most of the time are unable to adequately fund even the most urgent O&M expenditures. This is particularly critical for Type IV agencies, which depend totally on the Government’s budgetary allocation for sector expenditures.

5.13 **Water Leakage.** The lack of functioning meters at production sources and customer connections makes it difficult to compute the rate of unaccounted-for-water (UAW), the industry standard traditionally used to characterize water losses stemming from leakage and commercial losses due to illegal or non-registered connections, the underreading of meters or poorly managed commercial systems. There are, however, many indications that physical leakage from the water system is quite high in most systems. The poor administrative and commercial practices of most agencies also point to the possibility of high commercial losses. Conservative estimates are that UAW in most agencies exceeds 50 percent of production.

5.14 **Water Consumption and Waste.** Per capita consumption figures in Egypt point to unusually high water consumption. In Cairo, for instance, estimated average water consumption is about 350 lpd. There is much evidence that the high level of water consumption is caused by leaking fixtures, particularly faulty toilet float-shutoff valves and wasteful water usage. A study of water use and wastage at the Mogaama Building in Cairo, a huge building occupied entirely by government offices, illustrates the seriousness of this problem. A meter was installed to measure the flow on normal work days, and also on a Friday, a day when the building was essentially empty. Flow for the empty building was measured at 95 percent of flow during workdays, proving that a large portion of the water “consumed” is merely running through leaky sanitary fixtures.

5.15 **Commercial Practices and Consumer Relations.** The Government’s previous lack of concern for cost recovery has led most companies to have little sense of commercial orientation. Commercial systems are poorly designed and managed, and the information essential for running a good commercial system is either nonexistent or unreliable. Accounts receivable, often dating back for years, reach levels of more than one half year of billings in some companies. There tends to be little concern for customer satisfaction.

5.16 **Metering.** There is widespread installation of water meters all over Egypt. In many places even one- or two-tap connections in rural areas are equipped with water meters. Closer inspection of the meter operations in some
agencies shows that metering tends to be ineffective. While many systems claim to be 100 percent metered, investigations showed a very high rate of nonfunctioning meters. In some places, less than 10 percent of installed meters are functioning. Meter reading tends to be poor and uncontrolled as evidenced by "fabricated" data in meter-reading books. There is little capacity for meter maintenance and repair. Meters are usually installed without prior testing or calibration. The cost of locally produced meters (LE 100) is high even by international standards. The rationale for the decision for installing meters or not appears rather questionable. It does not seem economical to install such meters in village dwellings where the cost of the meter alone might be equivalent to 5 years of billings, while high water consumption luxury multifamily apartment buildings in Cairo or Alexandria have no meter at all or only one master meter.

5.17 **Investment/Project Preparation, Design and Implementation.** None of the operating entities has any meaningful in-house capacity to prepare, design or execute investment projects. For this, they totally rely on services provided by NOPWASD or, in the case of external financing, on consultants provided by the funding agency.

C. **Performance of National Sector Institutions**

**The Ministry of Housing, New Communities and Public Utilities (MHPU)**

5.18 MHPU effectiveness as the prime policymaker and regulator of the sector has been constrained. Although the Ministry forcefully asserts its authority over sector matters, it has had difficulty in articulating appropriate strategies on how to deal with the large and difficult sector development and policy issues at hand. The direct or indirect control that it exerts over all sector institutions has induced the Ministry to involve itself too much in administrative details, which might be more efficiently dealt with by the lower level institutions directly concerned. The main reason for the shortcomings in MHPU overall performance are the lack of emphasis on its role as policymaker, compared to its other roles as owner and regulator, and an acute shortage of sufficiently experienced staff and financial resources. The Ministry's staff should, however, be commended for its willingness to recognize the sector issues and constraints and its interest in addressing them in a difficult policy and operating environment.

**The National Organization of Potable Water and Sanitary Drainage (NOPWASD)**

5.19 NOPWASD plays a key role in the management of the sector. The agency provides the link between individual operating agencies, the Government and the donor community. Only the operating companies in Cairo and Alexandria are outside the realm of NOPWASD. The governorate companies in Beheira, Kafre-El-Sheik and Damietta, organizationally independent of NOPWASD, still rely heavily on NOPWASD for assistance and advice. NOPWASD responsibilities are very broad and include: (i) the compilation and analysis of sector information; (ii) assistance in overall sector planning and project selection within the context of the five-year planning process; (iii) the preparation and execution of investment projects for Type II and IV operating agencies; (iv) assistance to
operating companies and the training of sector personnel; and (v) the coordination of donor involvement.

5.20 NOPWASD has endeavored to meet its responsibilities, but is clearly overwhelmed by the demand for its services. An insufficient number of experienced staff and a lack of financial resources have made it difficult for NOPWASD to discharge its many responsibilities effectively. Caught in the five-year planning process, the agency has been unable to articulate a coherent sector development plan. In-house engineering capacity is insufficient to meet the expectations of operating companies for project preparation and implementation. There is little capacity to deal with institutional, financial and economic issues. The ability of NOPWASD to coordinate donor involvement is restricted by the absence of an overall sector development and investment strategy which would effectively direct donor resources to priority projects.

The Ministry of Planning (MOP)

5.21 The Ministry of Planning plays an important part in allocating funds for sector investments and in selecting projects within the five-year planning exercise. The Ministry has little technical capacity to judge the necessity for, or, in the absence of an overall sector development strategy, the priority of proposed sector investments. Essentially the Ministry's role is that of a clearinghouse trying to balance a multitude of investment proposals brought forward by public sector entities with predominantly political agendas. The outcome of these decisions, the water and wastewater section of the five-year plan, is a list of often weakly justified projects.

National Investment Bank (NIB)

5.22 The National Investment Bank, an entity subordinate to the Ministry of Planning (MOP), finances sector investments through grants or loans. Essentially the bank acts as the disbursing agency for the funds approved by the People's Assembly for specific projects identified in the annual budget. NIB currently provides annual funding on the order of LE 12 billion to about 6,000 projects distributed among 6 categories. Water and sanitation companies receive grant financing or, in the case of the semi-autonomous governorate companies, some loan financing. NIB resources are provided by the Ministry of Finance as allocated under the general state budget. NIB also mobilizes local resources from the national pension and insurance plans, by floating bonds and loan interest. NIB annual income from these sources is on the order of LE 5 billion.

5.23 NIB powers, functions and responsibilities regarding the water and sewerage sector include: (i) deciding upon the nature and conditions of funding (loans or grants); (ii) setting aside resources for implementing approved projects in accordance with budget provisions; (iii) monitoring progress in project implementation through the review of documentation (certificates of completion by contractors, for example) and field verification; (iv) authorizing the disbursement of funds; and (v) providing of services for and participation in the preparation of project feasibility studies, usually with the assistance of private sector consultants. Judged by results, NIB does very little to ensure acceptable project preparation and execution. The agency's mandate and capacity to appraise and supervise the implementation of investment projects is severely
limited by the constraints imposed by the five year planning process and the短缺 of sufficiently experienced personnel.

D. Constraints to Institutional Effectiveness

5.24 Performance shortfalls of Egypt’s water supply and sewerage institutions are largely explained by the inadequate policy framework and the overly centralized organizational structure in which these institutions operate. The centralized approach to sector management has not allowed the development of accountability, ownership, responsibility and initiative which are all prime elements for fostering efficient performance of operating agencies as well as national institutions.

5.25 Some of the most damaging manifestations of over-centralization in the management and development of water supply and sewerage operating agencies include:

- micro-management of operating agencies by local (governorates, city councils) and national (NOPWASD, MHPU) agencies on matters of daily operations limits management’s freedom to decide on matters that should be management prerogatives;
- civil service manpower regulations make it virtually impossible for operating agencies to attract and retain qualified and experienced management and staff and to motivate employees;
- civil service administrative regulations and practices (company organization, accounting procedures and procurement rules) make company management cumbersome;
- the top-down investment planning, project selection, preparation, financing and execution process is conducted without sufficient involvement of operating agency management;
- restrictive government pricing and tariff policies, which stifle a company’s sense of financial responsibility, make operating agencies dependent on sources of financing largely outside of their control and often leave them without the funds needed for the proper operation and maintenance and expansion of systems and facilities.

5.26 The lack of management autonomy and adequate resources and severe restrictions on remuneration and advancement imposed by civil service regulations discourage top professional and vocational staff from long-term careers in the sector. Consequently, the many costly programs of technical assistance, which have been carried out in the past, have largely been unsuccessful in building efficient sector institutions. Likewise, training programs have had only a limited effect on improving company performance and efficiency. Those who received training, plant operators for example, remain ineffective due to the lack of support and resources, or they are frustrated with their inability to make a difference and leave for other jobs.
5.27 National institutions suffer from many of the same constraints as operating companies. Neither the financial nor the human resources allocated to them are sufficient to allow them to discharge their responsibilities effectively. Again, dependence on civil service regulations makes it difficult for institutions to attract and retain sufficiently experienced and motivated management and staff. Being placed in the midst of a stifling bureaucratic environment and a fragmented and overlapping institutional structure makes efficient work difficult and discourages personal initiative.

E. Towards a More Effective Institutional Structure

5.28 To overcome the overly centralized organization of the sector and to foster accountability, responsibility, initiative and efficiency in the management of Egypt's water supply and wastewater sector, the following three general recommendations are put forward:

- Decentralize the ownership of and responsibility for the management and operation of water supply and wastewater assets to the lowest appropriate level of government;
- Commercialize and corporatize water and wastewater operations; and
- Involve the private sector in the management and operation of water and wastewater operations and the provision of finance for sector investments.

Decentralization

5.28 Decentralizing the management and operation of infrastructure is an issue currently being debated in many countries. The emerging consensus is that the provision of local or regional services such as water, sewerage or solid waste disposal is managed best at the local or regional level of government. The rationale is that local government is closer to the service beneficiaries and therefore tends to develop a higher level of accountability for meeting the requirements of the people than a central authority could. This is particularly true in the case of elected local governments, which seek reelection on the strength of their ability to provide good municipal services. In addition, water and wastewater services are generally not technically linked at the regional level, and economies of scale seldom exist beyond the local level. The management of water supply and sewerage systems, like other municipal services, is essentially a local affair and the interactions between localities are generally not sufficient to justify the management of operations at the national level.

5.29 The principle of organizing the water and wastewater sector on a local or regional basis is widely used in most industrialized countries, and it is being adopted increasingly by developing nations. Decentralizing the responsibility for municipal services is, for example an integral part of the economic and administrative restructuring process in the formerly socialist countries of Central and Eastern Europe. In Egypt the notion of decentralizing some government functions to local jurisdictions is receiving serious attention as part of the ongoing debate on local government reform. One fundamental
principle for reorganizing Egypt’s water and wastewater sector should be for the government to transfer water supply and sewerage assets to the lowest appropriate level of local government. This transfer would go with a mandate to provide efficient and adequate water supply and sewerage service at a reasonable cost under the policy direction and regulatory control of the central government.

**Commercialization/Corporatisation**

5.30 In addition to decentralizing the responsibility for water and sewerage services, experience in both industrialized and developing countries has shown that it is of equal importance to constitute independent water and wastewater companies or utilities which would manage and operate systems in accordance with commercial principles. These companies should be autonomous, i.e., the Government should not interfere in their operations but should restrict itself to broad policy guidance and regulating their performance within the confines of a well-defined legal and regulatory framework designed to prevent these companies from abusing their monopoly position. Also, water and wastewater companies should face the same employment, procurement and tax laws as other industrial enterprises. An important aspect of autonomy is financial self-sufficiency which would require water and wastewater companies to finance their operating and investment costs from the sale of water and wastewater services. The obligation to operate under the principle of financial self-sufficiency would create over time strong incentives for financial discipline, efficient management and operation and the provision of good service. Chapter VII discusses the concept of financial self-sufficiency and related issues of cost recovery in more detail.

**The Role of the Central Government**

5.31 The adoption of a decentralized and commercial mode of sector management would require fundamental adjustments in the relationship between the reconstituted utilities and national institutions. It would require the transformation of the present, centrally controlled system to a system driven more by local communities and autonomous, self-financing water and wastewater utilities. Under the proposed institutional framework, the role of the Government would be focused on: overall sector planning and coordination with other sectors of the economy, policy formulation and guidance, regulations, monitoring, standard setting and support to local utilities. In short, central government institutions would give up any executive functions with respect to the management and operation of water supply and sewerage utilities and would become, instead, facilitators of sector development.

**F. Recommendations for the Reorganization of Operating Agencies**

**General Considerations**

5.32 Once the recommendations regarding decentralization and corporatization have been accepted, the ways in which these principles can be
applied in the Egyptian context must be analyzed. The ability to create and sustain decentralized water and wastewater utilities requires a minimum level of local capacity in terms of financial and human resources. While the necessary capacity no doubt exists or could be developed in the short-term in Egypt's large cities and in some of the more prosperous governorates in the Delta, it is equally clear that some of Egypt's governorates would not be prepared to respond adequately if a decision were made to decentralize municipal services. Therefore a complete decentralization of the ownership and management of water supply and sewerage services immediately in all governorates is not a viable option at this time. For those governorates where decentralization is not a short-term option, the next best option would be the creation of one or more regional water supply and sewerage utilities (possibly as holding companies), which would own and operate water supply and sewerage assets on behalf of governorate administrations. In the following, the principles of decentralized utility management are briefly described for both recommended options: the governorate utility and the regional company with local subsidiaries.

**Governorate Ownership and Responsibility**

5.33 The following paragraphs present recommendations on how an autonomous local utility could be organized, some basic standards of utility management and operation, and the need for autonomy and the regulatory environment in which utilities could operate.

5.34 **Organizational and Legal Setup.** Under this, the preferred option for the country's larger cities and economically more advanced governorates, governorate governments would own water supply and sewerage assets with the responsibility for managing, operating and expanding these assets. Conditions favorable for such a transfer probably exist in Cairo, Alexandria, Luxor, the Suez Canal cities and in some of the delta governorates (Damietta, Beheira, Kafre-al-Shiekh, for example). Shares of the decentralized autonomous utility would be held by local government, but shares may also be held by institutions outside of local government. The shareholders would assign the management and operation of the assets to an autonomous water supply and sewerage utility. The guidance and control of the utility would be entrusted to an independent Board of Directors appointed by the shareholders. The Board would define the policies under which the utility would operate and retain the right to approve major decisions, such as proposals on rates, major investments and important personnel decisions. The Board of Directors should consist mainly of individuals noted for their commercial, financial, technical expertise and community involvement. The Board would appoint a management team, which would run the daily affairs of the utility.

5.35 Present Egyptian Law does not provide explicitly for the establishment of autonomous public utilities. The preferred legal basis for constituting these utilities would be the legal framework governing private sector companies (presently Law 159 of 1989, or the unified companies law expected to be passed in 1993), but with all or most shares in the hands of the local government. This would allow a high level of autonomy, open the door for eventual privatization and encourage operation according to commercial principles. This type of corporatization is the basis of public enterprise reform in countries such as Iran and New Zealand. A further approach would be to establish utilities in the form of a public authority under special
legislation. This is the present status of the water utilities in Cairo and Alexandria. Apart from the difficulties of processing new legislation for particular companies, this form of organization does not seem to promote autonomy and accountability and would make full or partial privatization difficult. For either option, expert interpretation would be necessary to ensure applicability to the institutional framework proposed for the water and wastewater sector. If this is not possible, the only remaining option is for the People’s Assembly to pass appropriate legislation, possibly within the context of a local government reform law, which would provide for the decentralization of municipal services.

5.36 Standards of Utility Management and Operation. After a process of initial institutional development, the Board of Directors of each utility would be accountable to the local government owner for providing quality service to its customers, operating and maintaining systems and facilities adequately and expanding the provision of service at a reasonable price. For this to occur, each utility would have to:

- introduce a functional organizational structure and adequate managerial, administrative and operating systems and procedures;
- attract and retain sufficiently experienced and qualified personnel for all areas of utility management, administration and operation;
- implement rate levels and structures agreed to by the local government owner and collect revenues sufficient to attain an acceptable financial performance; and
- establish the technical capability to direct all facets of the project cycle, including project selection, preparation, design, execution and investment finance.

5.37 Each utility should operate under a contract plan covering a period of at least five years agreed to between the local government and utility Board, which would stipulate performance targets which the utility commits itself to achieve. These targets should include staffing limits, service coverage and quality parameters, financial targets, investment levels, operational efficiency objectives, etc. The contract plan would also specify base tariffs and a formula to adjust them for general inflation, as well as other financial obligations of government (e.g., limited cash subsidies from government).

5.38 Utility management would work under an annual business plan agreed to with the Board, which would clearly delineate the actions management would need to take to comply with contract plan commitments. These plans, evaluated and revised annually, would establish a record to measure the performance of both the Board and management with the objective of making them both accountable for their performance. Each utility would also be required to keep and annually publish a full set of audited accounts which are audited by independent auditors to ensure an accurate picture of the state of the utility.

5.39 Autonomy. To be able to meet their commitments, both the utility Board and management would require wide autonomy. In particular, management would need to be given the freedom to select, remunerate and promote personnel unencumbered by existing civil service regulations and political pressure. As a general principle, decisions related to remuneration and promotion should be based on merit. Management should have the freedom to dismiss non-performing
employees in accordance with prevailing labor laws. To create an environment of incentives, it would be worth considering paying part of the remuneration of management and staff in the form of bonuses from profits, distributed by the Board.

5.40 Financial autonomy is crucial. The utility must have the freedom to implement tariff adjustments as specified in the formula in the contract plan. The utility should also be given independence on investment and borrowing decisions, subject to meeting the requirements of commercial and public sector lenders. It should be empowered to sign contracts for engineering services, civil works and the purchase of equipment and materials, subject to procurement through a transparent, competitive process. Specific investments should be contingent on the assured availability of finance within the context of the utility’s overall prioritized investment needs.

5.41 Government Oversight and Regulation. The proposed move from centrally controlled to locally managed utilities should consider the possibility that local government may not pay sufficient attention to maintaining efficiency in the management of the utility or in the selection and cost-effective implementation of investments. There are a number of mechanisms which could be employed to provide incentives for utility effectiveness:

- making the final transfer of assets to the local government subject to the local government’s having established a satisfactorily performing water and wastewater utility;
- making any subsidy financing for both O&M and investment costs dependent on satisfactory performance, as reported in annual reports and audited financial statements;
- making the provision of government supplied or guaranteed investment finance a condition of satisfactory performance and project justification;
- requiring government approval of any arrangements with the private sector that depend on government guarantees to ensure that arrangements are fair and cost-effective; and
- allowing the central government to dismiss the public utility Board and management and to appoint a caretaker arrangement in the event of gross mismanagement involving financial insolvency, corruption or chronic inability to supply water of minimum quality.

Regional Company Ownership and Management

5.42 In governorates where human resources are most limited and where utilities require major strengthening, the management and operation of water supply and sewerage facilities would be entrusted to a regional utility with responsibility for a number of governorates. Under this scheme the regional utility would receive the water supply and sewerage assets for its member governorates from the central government with the obligation to manage, operate, maintain and expand them in accordance with the same corporate and commercial principles that apply to the management of the single governorate arrangement
described above. The regional utility would establish subsidiary utilities in each governorate which would operate under their full control and supervision. Each subsidiary would be required to attain financial self-sufficiency and also to provide funds for financing the costs associated with the operation of the regional utility. In other respects, regional utilities would be administered under the same framework of policies, obligations and norms as described for the single governorate utility. Boards of regional utilities would operate under consistent contract plan arrangements with each of the governorates being served.

5.43 For reasons of efficiency and regional diversity, the Government may want to consider the creation of two to three such regional utilities: one for Upper Egypt and one or two for the Delta area. Given the apparent difficulties of establishing holding companies for public utilities under Law 203, the legal basis for regional water companies is unclear and might require special legislation. As in the case of the single governorate utility, any such legislation should be based on the law related to commercial enterprises and ensure that government ownership is separated from the government's other roles as policymaker, regulator and financier. As the regional utility concept contradicts the principles of local ownership, the regional utility arrangement should be viewed as transitional, until the governorate has acquired the capacity to form its own utility. The bylaws of a regional utility should specifically provide for the possibility and conditions under which governorates could leave the regional company and set up their own arrangements, following the single governorate utility model described previously.

5.44 National Holding Company. The establishment of a national holding company for the water sector under Law 203 has been proposed and has some apparent attractions. It would provide local companies with much greater autonomy, enable their incorporation as commercial companies and their supervision on the basis of financial performance, create the possibility for eventual privatization, and take them away from the direct supervision of the sector ministry (MHPU would maintain a sector policy role) and place them under the jurisdiction of the Minister of Public Enterprise Sector. However, creating a holding company for the water sector would be inconsistent with the Government's policies for public enterprise reform, which conceives of holding companies as limited in number with diverse portfolios. There is also a danger that the special requirements of public utilities that are monopolies could create precedents, e.g., for price regulation, that could be extended to industrial enterprises or overburden the managements of the holding companies. A national water sector holding company might, furthermore, introduce an even greater degree of centralization into the management of the sector than exists at present, by reducing the local accountability of utilities in Alexandria, Cairo, Beheira, Damietta, Kafr El-Sheikh and the Suez Canal cities. Technical support for the affiliated companies would be more efficiently provided through a rejuvenated, demand-driven NOPWASD (see paras. 5.50-5.53) than through the bureaucracy of a specialized holding company head office. If the holding company model were to be adopted, it would be preferable to allocate water companies to existing holding companies to ensure that adequate priority was given to financial management and that there was no possibility for another overcentralized national water monopoly to emerge.
G. Recommendations for the Reorganization of National Level Institutions

Government Role and Institutional Framework

5.45 Under the proposed realignment of the sector's institutional framework, the national government's role in the sector would change. It would divest itself from all executive and operative functions and focus its involvement on formulating policy, regulating sector performance and assisting in the development of strong governorate or regional utilities. While there are many alternatives to reconstitute sector organizations on the national level, the conceptually clearest and operationally most efficient one would be to have three separate institutions operating on the national level:

- policy formulation, regulation and intersectoral coordination by MHPU through the Department of Public Utilities (DPU);
- technical support for the sector through a Water and Wastewater Sector Development Authority (WSDA), as the successor institution of NOPWASD; and
- government supplied or guaranteed investment finance to public sector utilities through a Water and Wastewater Sector Investment Facility (WSIF).

5.46 The latter two institutions would work under a policy mandate defined by MHPU, but they otherwise would be independent in the discharge of their respective functions. The responsibilities, functions and qualifications of each of these institutions is outlined below.

Policy and Regulatory Institution—MHPU/DPU

5.47 MHPU, through its Department of Public Utilities (DPU), would be the highest authority within the Government dealing with the water supply and sewerage sector. In its proposed role MHPU/DPU would focus exclusively on policy, regulatory principles and intergovernmental coordination. MHPU/DPU would not get involved in functions that are delegated to the other entities comprising the sector's institutional framework. As the success of future sector development will depend to a large extent on the intellectual quality and professional experience of its people, MHPU/DPU the Ministry may want to employ top quality consultants to provide expert advice and delegate some of these functions, such as utility supervision, for example, to the new Water and Wastewater Sector Development Authority (WSDA).

5.48 One of the main responsibilities of MHPU/DPU would be the formulation of policies regarding:

- global sector development strategies, including the definition of general service coverage targets, investment levels and the identification of sources for investment finance;
the principles of cost recovery and rate formulation;

- criteria and conditions to be used in the provision of finance for sector utilities, including selection criteria for subsidy finance; and

- the coordination of sectoral interests and policies with other government ministries and agencies with interest in the sector, such as the ministries of Finance, Development and International Cooperation, Environment, Water Resources, Agriculture, etc.

5.49 Another MHPU/DPU responsibility would be regulatory, including:

- the oversight of utility performance with respect to rates and administrative and operational efficiency, which would involve the critical review of annual performance reports and audited financial statements. Since bankruptcy and the liquidation of utilities is not a viable option given that they are local monopolies, MHPU/DPU would intervene in cases of financial insolvency and the gross violation of efficiency standards, which might range from the withholding of government subsidies to the ultimate sanction - the dismissal, through court action, of utility boards and management; and

- advising the economic ministries on private sector arrangements such as supplier's credits or BOT schemes, which involve government guarantees of finance to ensure that such arrangements are technically and financially sound.

Water and Wastewater Sector Development Authority (WSDA)

5.50 This agency, under the policy guidance of MHPU/DPU, would be the technical lead and support agency for the sector and water supply and sewerage utilities. It would be responsible for:

- monitoring the adherence to the sector policies issued by the Government;

- handling overall specific sector planning, including the definition of targets, identification of investment levels and financing sources;

- maintaining a sector information system; monitoring the performance of utilities; and preparing an annual report on the status of sector development and performance, including a summary of the technical, financial and administrative information of each of the sector utilities;

- developing and setting technical standards and guidelines pertaining to project selection, justification and design;

- promoting the participation of private enterprise in the management and operation of sector utilities;
promoting the development of a local consultant capacity for project preparation and design and institutional strengthening;

- promoting a more responsive and competitive private industry for the supply and manufacture of materials and equipment and construction;

- providing or arranging for the provision of advice to operating agencies on technical, financial and institutional matters;

- directing and coordinating human resource development and training;

- coordinating the activities of external donors;

- promoting the use of technologies appropriate to Egypt’s conditions and needs; and

- coordinating research related to sector issues.

5.51 WSDA should have no direct operational functions or executive powers. Its role would be to advise water and wastewater utilities and the other sector institutions operating on the national level. In this role, it would generally not provide technical assistance or training services but would promote, facilitate and coordinate the development of these services and assist utilities in taking advantage of them. In view of its responsibilities to help create the support environment, which water supply and sewerage operating agencies need to develop into efficient and well-managed utilities, it is essential that WSDA be staffed with capable, experienced and forward-looking professionals. To attract this caliber of management and personnel, the agency must operate outside of civil service regulations and have an assured resource base outside of the government budget.

5.52 WSDA should be an independent corporation outside of MHPU control and free from the Government’s civil service regulations. Further, it must have an assured resource base other than the government budget. The best alternative appears to be to establish WSDA legally as a public, nonprofit corporation owned jointly by the Government, the utilities and the private sector companies involved in the sector. In this scenario the WSDA general manager would operate under a Board of Directors in which representatives of the operating utilities, the Government, the private sector, consumer groups and civic and professional associations would determine policy and carry out supervision functions. In addition to budget resources from the Government, WSDA income would come from contributions from utilities and the private sector and from fees for providing services.

5.53 WSDA staff would initially be selected from members of NOPWASD’s present staff, chosen for their professional qualifications and experience. Promising present staff should be trained for their new responsibilities. Outside staff should be hired to fill positions that cannot be filled from the present NOPWASD pool of staff. The present departments for project design and execution should be spun off, as the responsibility for these functions will be given to the new sector utilities. Personnel from these departments not retained by WSDA should be encouraged to join private engineering firms. An alternative worth considering may be that this staff, in association with WSDA, form an engineering consulting firm, which could bid for contracts from the new utilities.
Water and Wastewater Sector Investment Facility (WSIF)

5.54 As described in Chapter IX, the purpose of this facility would be to mobilize public sector financial resources from internal and external sources and to channel them to public sector water and wastewater utilities that do not have access to commercial sources of financing. Furthermore, this facility would play a key role in ensuring that whatever investments were financed were fully justified and that credit and grant recipients met institutional and financial performance criteria. It should be noted that this facility is designed to improve the efficiency of government funding for public sector utilities presently carried out through the Five-Year Plan and the government budget.

5.55 The specific responsibilities of WSIF would include:

- the mobilization and disbursement of local and external funds for sector investments;
- the administration of grant and loan facilities (paras. 9.04-9.09) in accordance with conditions established by the Government;
- the appraisal of proposed investment projects and the conclusion of project financing agreements with grant or credit recipients;
- the supervision of project implementation to ensure compliance with the provisions of the agreement signed with the loan or grant beneficiary;
- the disbursement of loan and grant funds; and
- the collection of interest and amortization payments.

5.56 There are several options for the administration of WSIF. One would be to contract with one or more private banks to carry out investment analysis, financial appraisal and disbursement operations on behalf of the Government, represented by an economic ministry such as the Ministry of Planning. One could also conceive of using WSDA as technical agent, in conjunction with a commercial bank as financial appraiser and disbursement channel. The Government may also explore the possibility of restructuring the National Investment Bank (NIB) into a public infrastructure and social projects development bank under the aegis of the financial authorities and subject to supervision by the Central Bank of Egypt. The issue of how to finance public sector investments such as water and wastewater is being evaluated in a forthcoming World Bank report on the financial sector in Egypt. The options for financing water and wastewater projects should be evaluated in the context of investment financing in the public sector as a whole. No matter which option is finally chosen, the WSIF must be a strong institution and well shielded from political manipulation, if it is to perform successfully its investment quality control function.
VI. PRIVATE SECTOR PARTICIPATION

Introduction

6.01 Increased involvement of private enterprise is a viable option for the future development of Egypt's water and wastewater sector. A strong private sector could help sector development in two different ways. One is by getting involved directly into the management and operation of water and wastewater utilities and as a provider of investment finance. The other is the provision of support to sector institutions as consultants, contractors and suppliers of equipment and materials.

A. Management and Operation of Utilities and the Provision of Investment Finance

6.02 There are many examples of efficiently operating publicly owned utilities throughout the world. It is, however, not uncommon to find public companies that do not work well. Poor public utility performance is usually caused by civil service remuneration and staffing constraints, and undue politically motivated interference, which curtails the independence of utility Board and management. Typical manifestations of this type of interference are management instability and overstaffing, insufficient rate levels, a lack of discipline in the collection of rates, unjustified investments, and severe environmental degradation. There are also cases of utilities misusing their autonomy by charging high rates to support inefficient operations. In these situations governments are increasingly turning to the private sector for bringing in expertise and experience in utility management and operation, which the public company is unable to provide, and for strengthening the independence of utility management. Also, in the face of scarcity of public investment funds the private sector is seen as source of capital for sector investments.

6.03 Initiatives to introduce private sector participation in the management and operation of water and wastewater companies and to obtain investment resources are underway in the industrialized countries, in the newly emerging countries of Central and Eastern Europe, and in many developing countries. Recently all water and sewerage enterprises in England and Wales were fully turned over to private companies through the sale of sector assets to the public. In the USA and in most Western European countries, private companies play a prominent role in the provision of water and wastewater services and their involvement is increasing. In Egypt, private sector involvement in the water supply and wastewater sector is not new. The water and wastewater companies in Cairo and Alexandria were privately owned and, reportedly, provided good and affordable service. At present, there are several precedents in Egypt for private management of public services. The most prominent is probably the Cairo metro, competently run by a private operator. Also there are numerous examples of solid waste collection being handled by private operators. In the water and sewerage sector, private sector participation is being discussed for Red Sea
tourism areas where private management and ownership of water and wastewater operations is seriously being considered. There are also proposals to contract-out water utility management in other areas.

Ways of Private Sector Participation

6.04 Private sector involvement in water and wastewater utilities can take many different forms. A brief description of the "privatization" models already being used in many parts of the world, which could also be introduced in Egypt, is presented below.

- **Service Contract:** The public utility farms out selected functions to private contractors such as metering, billing, collecting revenue, installing and maintaining connections and maintaining and operating network or treatment facilities; the contractor gets paid for services rendered on a fixed cost, or cost-plus basis, or for services performed (for example, number of meters read).

- **Management (Affermage) Contract:** Local government retains the ownership of system assets and facilities but assigns the management and operation of the entire utility, including the replacement and maintenance of assets, to the private company for an extended period of time (10-15 years); the operator is paid by the local government owner who remains fully responsible for setting rates and for the execution of major capital investments, although the owner may instruct the operator to bill and collect rates on his behalf.

- **Lease (Concession) Contract:** This form of arrangement provides for the private company to not only operate and maintain existing assets, but also to finance capital investments over the concession period (30 years). The private operator has to cover his costs, investments and profits from contractually incentive based set tariffs; after the concession contract, the assets are returned to the public authority.

- **Build, Operate and Transfer (BOT) Arrangements:** A private operator under contract with the local authority constructs, finances and operates specific facilities, such as a water or wastewater treatment. Such contracts are long-term and allow the private operator to recover his investment over time. Once the contract is completed and the investments have been repaid, the facilities are turned over to the local authority; a variant of the BOT scheme is the BTO scheme (build, transfer and operate) under which the private operator constructs the facility, turns it over to the local authority and operates it under an affermage type arrangement.

- **Investor-owned facilities:** Private investors may build and operate systems and facilities; this arrangement is frequently used in support of other private ventures such as new towns, subdivisions, and of particular relevance in Egypt, tourist developments. In this case, the private investor may also be willing to provide water and sewerage services for customers outside of his immediate interest, for example, in towns adjacent to tourist developments.
6.05 Any of these privatization schemes could be combined. It is not uncommon to find affermage and concession-type contracts being in force simultaneously. For example, the private operator can run existing facilities under an affermage type contract and construct new facilities with financing provided by private investors under a concession arrangement. As private sector participation is becoming more and more accepted throughout the world, new forms of involvement are emerging rapidly. In recognition of this fact, the World Bank is developing instruments aimed at increasing the confidence of foreign investors by mitigating the risk of non-repayment of foreign investments which now keeps such investors from seriously considering investments (BOT schemes, for example) in Egypt’s water and wastewater and other sectors.

6.06 Involving the private sector in the management, operation and financing of water supply and sewerage systems in Egypt would probably be the fastest and surest way of bringing adequate and safe water services to the population at a reasonable cost. Service, management and lease contracts would in many cases be a more effective strategy for creating well-managed and well-operated utilities than would the transformation of the present operating agencies into a public utility. Under these arrangements, no technical assistance to build up the capacity of the public utility would be needed because the private operator would undertake the restructuring of the utility with its own personnel and financial resources. One major recommendation in this sector review is therefore that promoting private sector involvement in the management and operation of water supply and wastewater utilities and the attraction of private capital for capital investments should be an integral part of sector reform.

Conditions for Private Sector Participation

6.07 For a private operator or investor to get involved in any of these arrangements, he needs to feel confident that local policies and conditions will permit him to meet the obligations he has assumed under the contract. Likewise he needs to be sure that his contracting partners, local government, for instance, are sufficiently stable to meet their part of the bargain. This need for comfort increases with the amount of financial risk the private operator is asked to assume. An operator entering a limited service contract would obviously run a much lower risk than one who enters into a concession type arrangement. Before entering into a longer term concession arrangement, the operator would have to be given freedom with respect to the selection and remuneration of management and personnel, financial management, the procurement of services, materials and supplies and commercial practices. If the private operator is required to finance its involvement from rate income, he must be permitted to charge and collect appropriate charges for water supply and sewerage services. For foreign operators, the repatriation of some profits would be necessary. In case of a BOT or concession contract which involves the mobilization of capital, the operator/contractor would be most concerned with risks which could jeopardize the recovery of his investments, i.e. political and economic instability which might lead to a breach of the contract.
Prospects for Private Sector Participation

6.08 Until the pricing and regulatory framework is strengthened and reforms to the macroeconomic framework take hold, private ownership of water and wastewater facilities on a large scale is unlikely. The water sector will probably remain for some time in the public domain, except for isolated cases such as the tourism development zones. However, service contract and management type contracts are real options which should be pursued vigorously. Governments on all levels should make a determined effort to create conditions which make Egypt’s water and wastewater sector an attractive place for the private sector.

6.09 It would obviously not be possible to introduce the private operation of water supply and sewerage systems throughout all of Egypt. The obstacle to universal “privatization” of the country’s water and wastewater industry are several, including the fact that many governorates are economically too weak to attract the private sector, political resistance on the part of local government and, probably the most serious, shortage of qualified foreign and local operators. As Egypt’s private sector has little experience in managing and operating water and wastewater utilities, foreign involvement would be necessary, at least initially and for larger operations. As foreign operators tend to enter into a contract with a local partner, foreign involvement would be an effective vehicle for building local capacity in the management of water supply and wastewater operations.

6.10 If provided with the right incentives, foreign private operators might have an interest in getting involved in some of Egypt’s large- and medium-sized cities, including Alexandria, Cairo, the canal cities and Luxor. Local private operators might be willing and capable of working in some of the smaller cities. In any case, involving the private enterprise in sector management and development sector should be an integral part of the restructuring of Egypt’s water and wastewater sector and be pursued vigorously. An all-out effort is encouraged to create the conditions which would attract both local and foreign private operators and investors to get involved.

B. Support and Service Functions

6.11 To develop and function efficiently, water supply and wastewater utilities require access to:

- an adequate human resource base;
- a strong consultant capacity providing engineering services and assistance in utility management and administration and finance;
- services for supplying equipment, materials and civil works construction at a reasonable price and acceptable quality.
6.12 The manpower resources that sector institutions can draw upon are very limited. The creation of new utilities will trigger a high demand in many areas, particularly utility management and administration, planning, financial management, engineering and operation and maintenance. Expertise in these areas has been slow to develop in the past for two main reasons: limited demand for these specialties and unattractive employment conditions. To develop the missing professional expertise will require foremost the establishment of a system of incentives. Creating independent utilities free to establish attractive employment and working conditions with salaries and advancement opportunities will surely motivate many to choose and prepare themselves for a career in the water supply and sewerage industry.

6.13 Parallel to the establishment of these incentives, a concerted effort will be needed to offer appropriate training and education opportunities for those interested in a career in the sector. Training or retraining should be broad based in all disciplines currently in short supply, especially management, administration, finance and engineering. The training of plant operators is of particular importance. University curricula for engineers should be broadened to include education in subjects such as the principles of project planning and evaluation, engineering economics and operation and maintenance, all areas which apparently have been given little emphasis in the past but are essential for engineers working in the utility field.

Consulting Engineering Capacity

6.14 Engineering capacity in both the private and public sector (NOPWASD) is very limited. The quality of work is highly variable. Only a few local firms with sizeable, permanent staff have sufficient experience to turn out reasonably well-designed projects. The requirements for better technical project preparation and design and the increased focus on institutional development and financial matters introduced under the project cycle should serve as a powerful incentive for the private sector to gear up to provide services in these areas. All indications are that a sizeable capacity within the private sector already exists and will come to the fore when there are incentives. Initially, local capacity most probably will have to be augmented by working jointly with foreign consultant firms which should result in a strengthening of the local consulting capacity. The introduction of competitive and transparent procedures in the selection of consulting services should provide a powerful incentive for consulting firms to upgrade their capacity and the quality of their work.

Construction, Equipment and Materials

6.15 Most simple equipment and materials are available on the Egyptian market. Reportedly, the quality of the equipment and materials supplied tends to be below par, and there are occasional problems with timely delivery. Costs tend to be high in comparison with international market prices. There also appear to be serious problems with civil works contractors who occasionally are accused of shoddy construction, delays and elevated prices. The main reason for
these complaints is that many of these services are provided by state enterprises, which enjoy protection from internal and external competition. To promote better services to water supply and sewerage utilities, the state enterprise reform initiated under the Government's restructuring program should be extended to those organizations supporting the sector. Foreign competition should be allowed to stimulate the performance of local firms. Joint ventures between local and foreign firms should be encouraged. For example, allowing international competition in the market for water meters would probably result in a supply of cheaper and higher quality water meters than those purchased from local, protected manufacturers. Given the much improved availability of foreign exchange and the convertibility of the LE, it is recommended that utilities procure civil works contracts and equipment and materials on a transparent, competitive basis (open to all qualified public sector and private companies) and that utilities be allowed to procure internationally, so long as such procurement is competitive and transparent.
VII. COST RECOVERY AND RATES

A. Cost Recovery through Rates - Some Basic Principles

7.01 Considering the ever-growing demand on government resources, the need for fiscal discipline and the limits on grant financing from external donor agencies, the mobilization of resources at the levels needed for the continued sector growth suggested in para. 3.14 is possible only through increased contributions from service beneficiaries. In this Chapter it is strongly recommended that the government, as a general policy introduces the requirement that water and wastewater utilities gradually introduce rates which will allow the full recovery of both operating and capital investment costs. Full cost recovery would make these utilities financially self-sufficient. Reliance on sufficient self-generated resources would be a prerequisite for the corporatization and commercialization of water and wastewater utilities proposed earlier. Without a strong self-generated financial resource base there would be little hope to bring about the level of autonomy which utilities need to perform adequately. Requiring utilities to finance their operations and investments from self-generated resources would also be an essential element for the development of management accountability, responsibility, initiative and financial discipline. The obligation to pay rates based on cost recovery would also have a profound impact on the relationship between local government and sector operating agencies on the one hand and service beneficiaries on the other. Local control and responsibility and higher rates would gradually convert passive service recipients to utility customers interested in the performance of their utility.

Setting Water Supply and Sewerage Rates in Urban Areas

7.02 In an effort to keep water rates down, Egypt, like many other countries has in the past followed a policy of heavily subsidizing water and wastewater services from general budget revenues. The principle justification usually given for such subsidies was that many people were so poor that water rates reflecting full cost recovery would deny them access to a "basic need." Closer analysis of this argument shows that the subsidy policy tends to be contrary to the interests of the unserved poor and could actually be the main reason why they don't gain access to water and wastewater services. The following observations may support this point. First, financing investments exclusively from government subsidies and grants from international aid agencies makes the level of investments and resulting service levels dependent on the ability and willingness of these agencies to invest in water supply and sewerage. A shift in priorities or budget constraints can slow down sector development without any recourse by those remaining unserved. Second, rates not meeting cost recovery levels result in subsidizing the economically better off population, which generally is served well. Third, low rates and excessive reliance on government subsidies provide no incentives for operating agencies to be more efficient or make the most cost-effective use of the resources available. It
invites misuse of scarce resources that could have been employed in expanding services for the poor. Fourth, low rates do not allow for water demand management, a powerful tool to induce water conservation through appropriate tariff levels and structures as incentives. Fifth, poor people without services usually pay the highest unit price for water, which they have to purchase (at often exorbitant prices) from private vendors, and must bear the costs associated with no or poor service (health, inconvenience). In many situations the poor could have much better services by paying full cost, which often would be substantially less than the cost which they now pay for a far inferior service.

**Rural Water Supply and Sanitation**

7.03 Similar principles apply to rural water supply and sanitation. In smaller rural communities with greater facility for direct human interaction (communities with a population of up to 10,000) community participation, commitment and ownership are the forces driving the development of rural water supply and sanitation services and are essential to ensure sustainable operation and maintenance. International experience has demonstrated that communities tend to be willing to take care of their needs if assigned responsibilities for water supply and sanitation and if a framework of outside support is in place to organize and assist the community. The community also must be given the choice on the level of service for which it is willing to pay. Under these circumstances, full, or nearly full, cost recovery for an appropriate quality of service should be possible in most rural communities. Several countries in Latin America, Asia and Africa have had outstanding success in bringing water supply and sanitation services to rural communities through community-based participatory programs.

**Municipal Wastewater Treatment**

7.04 Considerations for the cost recovery of wastewater treatment are different from those for water supply and sewerage. Wastewater treatment investments generate benefits that generally surpass the boundaries of the community installing the plant. With these externalities, the treatment of municipal wastewater requires a concerted regional or watershed-based approach to maximize benefits. Wastewater treatment employing secondary treatment technologies are very expensive for both investment and maintenance and operation costs. Given the large investment needs for improving and expanding water supply and sanitation facilities, the great majority of communities do not have the capacity to pay for secondary-type wastewater treatment plants as well. Experience in other countries demonstrates that under similar circumstances, most communities would be neither able nor willing to pay for such plants. Even if one community did so, chances are that improvements in receiving water quality would be limited as its neighbors would continue to discharge untreated wastewater. At this stage of Egypt's socioeconomic development, requiring local governments to pay for costly wastewater treatment plants from user charges is therefore not a realistic option. Investments in this area clearly will depend on government grant financing for the foreseeable future. The assessment of the Government's current policy on municipal wastewater treatment presented in Chapter X cautions against the implementation of present plans for costly investments in secondary wastewater treatment throughout the country. Rather than investing large sums of money in such facilities, the Government may want
to encourage communities to construct primary or low technology (lagoons) treatment plants with most of the investment costs provided by the Government.

B. **Recommendations for a New Cost Recovery and Rate Policy**

**Setting and Structuring Water Rates**

7.05 **Rate Level.** The introduction of rate levels to allow full recovery of operation and maintenance expenditures and capital investment costs (except for wastewater treatment) should become a guiding principle for future sector development. This principle should be valid for the governorate utilities as well as for each of the subsidiaries of the regional utilities previously proposed. In order to achieve an efficient use of resources within the water sector, the structure and level of rates should ultimately be set in relation to the marginal costs of supply, i.e., the costs of expanding the water supply or sewerage systems to supply or treat additional $m^3$, or to connect another consumer, plus additional operating and maintenance costs. The ability of households to pay for basic requirements for drinking water, personal hygiene and sanitation should also must be taken into account. In addition, rates need to be set to enable utilities to cover their financial costs. Because existing accounting records may be inadequate, financial statements not adjusted for inflation, and capital charges understated\(^5\), financial data are likely to imply levels of cost recovery below marginal costs.

7.06 Since present rate levels are generally below either financial or economic cost levels, a rate strategy is proposed that would first increase rates to financial and later towards economic cost recovery levels. Financial cost recovery in this context means that water and sewerage utilities would generate income from user fees sufficient to cover operation, maintenance and administrative costs, any debt service obligations and an internal cash generation to finance major repairs, system rehabilitation and some contribution for participating in the financing new investments. To finance capital investments utilities would obtain loans.

7.07 Requiring financial cost recovery would provide utility managers with clear incentives for efficiency, since they would be expected to at least break-even without ex post subsidies. A key element of any rate policy must be the existence of provisions that permit rate adjustments in response to increases in the costs of operating the utility outside of the control of its management. To this effect, the utility and local government should agree on a rate adjustment formula in accordance with guidelines issued by the national government. The pricing formula should distinguish between the need to increase rates in response to general inflation and any specific price increases outside of the control of the utilities (e.g., for large items such as fuel and electricity). There would be an adjustment to reduce the rate of increase in prices below the inflation implied in the adjustment formula to allow for productivity increases, including reductions of unaccounted for water. Agreement between local government, as responsible owner of the assets, and utility Board and management on the financial objectives to be achieved from rate income and

\(^5\) Investment has been financed mainly by government equity, and the government has received no financial returns on this equity.
an automatic mechanism for rate adjustments are key to a utility's sustained successful financial performance. The great advantage of such an agreement based on local government approving pricing policy rather than specific prices would be that it lowers the political profile of tariff adjustments.

7.08 Rate Structure. In addition to providing financial revenues for operating agencies, rate structures can be used to influence water demand and consumption. In countries all over the world progressive consumption based rate structures are used successfully to provide an affordable lifeline supply of water for low income people and to promote water conservation. Appropriately designed consumption based rate structures can achieve these objectives for two reasons. One reason is the fact that water consumption is related to the income of the consumer. Consumers with higher incomes tend to use more water as they own more water consuming appliances, such as washing machines, and have the need to wash a car, etc. while consumers with lower income use a smaller amount of water for essential purposes only, principally hygiene, drinking and food preparation. The second reason is the price elasticity of water, i.e. the fact that higher water prices will lead people to consume less. As both objectives of a progressive rate structure, providing an affordable supply to the poor and water conservation, are of prime importance for the future development of Egypt's water and wastewater sector, such structures should be employed wherever possible. As the application of a progressive rate structure will require metering and relatively advanced billing systems, such structures are efficiently applied only in Egypt's larger urban areas, say towns with more than 50,000 people. In smaller towns the effort and cost involved in introducing and maintaining a metered system, may speak against a progressive structure. In small towns and in rural areas it may be advantageous to stay with a flat rate system with non directly consumption related differentiation among water users. Here it may be sufficient to make flat rates dependent on factors such as number and/or diameter of faucets.

Elimination of Subsidies

7.09 The most crucial element on the road to introducing full cost recovery rates is the government's commitment to eliminating present direct or direct subsidies provided by the national and local governments. Interrupting the flow of easy money from the government forces local governments and utilities to improve the efficiency and cost effectiveness of their water and wastewater operations and investments and to adopt the corporatization/commercialization mode of utility management proposed earlier. The elimination of subsidies obviously must be gradually phased in and may proceed at different speeds in different parts of the country. Government commitment to a clear and transparent plan for subsidy elimination is important so that local governments can take measures to prepare for decreasing subsidies by increasing rates gradually and building more efficient water and wastewater institutions.

7.10 As a first immediate step, subsidies for operation and maintenance expenditures should be eliminated. As most operating agencies have rates close to meeting maintenance and operating costs already, this first step should not be too difficult to achieve at least for the great majority of water and wastewater operating agencies. A timeframe of two or three years over which subsidies for operating costs would be eliminated appears to be reasonable. Eliminating subsidies for capital investment costs will take more time and should
proceed selectively depending on the socioeconomic capacity of the population and the time required to build better operating institutions. A reasonable target would be to eliminate subsidies for capital investments for the great majority of investment projects in the medium-term, say by the year 1998.

7.11 Even beyond this timeframe, the government may decide to continue subsidizing investments for specific targeted purposes. Providing grant finance for the construction of municipal wastewater treatment plants was already mentioned as a case for continued subsidy finance. The Government may also decide to provide subsidies for water supply and sewerage investments for social reasons in especially poor areas of the country. Such subsidies should be given, however, under pre-established transparent policies and eligibility criteria. Such criteria may define geographic location or the socioeconomic characteristics of the beneficiary population. The purpose for providing the subsidies, and the transfer mechanisms, must be clearly defined. Subsidies should not be a substitute for a reasonable effort by the subsidy beneficiaries. As a general principle, subsidy resources should never finance all investment costs, but should require a contribution from the beneficiary. Subsidies should be given in direct cash contributions set at least one year in advance. To provide the strongest incentive for efficiency, predetermined subsidy amounts should not be increased to meet financial shortfalls.

C. Implementation of the Proposed Rate Policy

7.12 **Magnitude of Future Rates.** The absence of appropriate data makes it very difficult to project the level of rates which will have to introduced in Egyptian cities and towns to allow cost recovery. Therefore the values given here cannot be more than very rough indicative estimates. Analysis of past cost records from a number of different size operating agencies suggests that rate levels required for full recovery of operating costs (for water, sewerage and wastewater treatment) would range from about LE \(0.05/m^3\) for simple rural systems to LE \(0.30/m^3\) for complex urban systems (1992 prices). Projecting investment costs for system expansion and rehabilitation is much more difficult than for operating costs. These costs depend very much on local conditions, present service levels and expansion targets and conditions of financing. For the high-growth scenario, and assuming long-term financing at commercial rates, a rough estimate indicates that rate levels for recovering investment costs for water and sewerage, but excluding wastewater treatment would range from a low LE \(0.05/m^3\) for rural systems to about LE \(0.40/m^3\) for urban areas with a large service backlog. Rate levels providing recovery for both operating and investment costs would thus range from a low of LE \(0.10/m^3\) (about US$ 0.03/m\(^3\) equivalent) for simple systems in rural areas to a high of around LE \(0.70/m^3\) (about US$ 0.25 equivalent) in urban areas.

7.13 **Progressive Block Rate - an Example.** Appropriately structured consumption based rates should be introduced aimed at providing an affordable service available to the poor and to promote water conservation. The progressive element of the tariff structure currently being recommended by the Government is insufficient to induce water conservation. The first consumption block (30m\(^3\)/per connection/month) approximating average consumption in urban areas is too high and the price increase from the first to the second block (>30m\(^3\)/connection/month) is insufficient. A more differentiated and more progressive structure is needed. The following purely hypothetical example may demonstrate
the principles of a progressive rate and its effect on revenues and monthly household bills (Table 7.1). The structure incorporates three consumption blocks: the first block for a consumption of up to 15 m$^3$/month, which is assumed to meet all essential water needs for a poor family of five; the second block from 15 m$^3$/month to about 30 m$^3$/month, which would be appropriate for meeting the needs of most middle income households; and a third block, consumption above 30 m$^3$/month for luxury use. Assume a rate of LE 0.20/m$^3$ for the first block and progressive increases for each of the following blocks to LE 0.90/m$^3$ for the second and LE 1.50/m$^3$ for the third block. Assuming further that 30 percent of the population is poor, consuming 12 m$^3$ of water a month, a medium-level income segment representing 40 percent of the population consuming 25 m$^3$/month and 30 percent of households consuming 40 m$^3$/month, the monthly bill for poor-, medium- and high-income households would be LE 2.40, LE 12.0 and LE 31.50, respectively. The average bill per household would be about LE 15 per month and the average price for a m$^3$ of water about LE 0.50. This is about four times the price now charged in Cairo and Alexandria. This increase would not significantly change what the poor are currently paying, but would increase prices for the higher income segment of the population.

Table 7.1 Monthly Household Payments for Water and Sewerage Services
Under a Progressive Rate Structure (Hypothetical Example)

<table>
<thead>
<tr>
<th>Block Range</th>
<th>Customer Distribution</th>
<th>Rate ( \text{LE}/m^3 )</th>
<th>Aver. Consumpt. ( m^3/\text{month} )</th>
<th>Monthly Bill ( \text{LE} )</th>
<th>( \text{LE}/m^3 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 0-15</td>
<td>30</td>
<td>0.2</td>
<td>12.0</td>
<td>2.40</td>
<td>0.20</td>
</tr>
<tr>
<td>II 15-30</td>
<td>40</td>
<td>0.9</td>
<td>25.0</td>
<td>12.00</td>
<td>0.48</td>
</tr>
<tr>
<td>III &lt;30</td>
<td>30</td>
<td>1.5</td>
<td>40.0</td>
<td>31.50</td>
<td>0.79</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>25.6</td>
<td>14.97</td>
<td>0.49</td>
</tr>
</tbody>
</table>

7.14 A rate scenario of the nature shown in Table 7.1 above would have several beneficial features. It would allow the introduction of full cost-recovery rates without undue hardship to the poor. The effect of rate adjustments on the poor would be minimal provided they do not use more than the first block allotment. There would actually be a cross subsidy from the richer to the poorer segments of the population, which would allow the richer segment to return some of the subsidies it has enjoyed in the past. Given the present low rate levels, higher income families using more water should accept the new levels, since even a five fold increase in tariff levels would still be small in comparison to their income level. Secondly, if tariff levels in the second and third block are set appropriately high, they will provide incentives for families to repair leaking sanitary in-house fixtures and adopt more careful water use habits.

**Household Income and Ability to Pay**

7.15 Surveys of household income suggest that 90 percent of Egyptian families have monthly household incomes in excess of LE 80 in rural areas and of
More than 50 percent of households have monthly incomes of at least LE 200 in urban or LE 150 in rural areas. Experience in other countries indicates that poor families appear to be willing to pay up to 3 percent of total household income for water and wastewater services, if provided with good services. By this indication, the great majority of Egyptians would be able to pay for water and sewerage services in full. Certainly most Egyptians in the medium- and high-income groups are aware of the fact that they pay very little for water and sewerage in comparison to their income. With the introduction of well-structured rate schedules, it thus appears that, contrary to widespread local beliefs, the people of Egypt would be able to support their water and wastewater utilities, even to the extent of full cost recovery.

**Defining Appropriate Rates through Rate Studies**

7.16 While the general principles of determining rate levels and structures as explained above are universally applicable, specifics will vary from community to community and must be determined through rate studies. Input required for the rate study include: (i) the marginal cost structure of the utility; (ii) the financial requirements of the utility; (iii) projections of consumption patterns for different socioeconomic groups; and (iv) the socioeconomic characteristics of the utility’s customer base. The rate studies would determine rate levels, structures, and adjustment formulas following the policy guidelines issued by MRPD. Since rate income will eventually be the only source of income for most utilities, the rate projections are a necessary input to the financial analysis required to validate the financial viability of the utility and its planned investment program. While rate studies should be updated periodically, the initial study will be the most important as it would be the vehicle for introducing the new structure. It would not only deal with the topics listed above but also be the vehicle for defining the rate policy agreement between local government and the utility.

**Metering**

7.17 The introduction of demand management and progressive rate levels based on water consumption requires the accurate metering of water and the existence of a commercial system capable of meter upkeep, reading, billing and collection. Meters should only be installed where the cost of metering is less than the economic benefits of reduced consumption. Experience in other countries shows reductions in consumption on the order of 15 percent to 30 percent between unmetered and metered consumers. First priority should be given to metering high consumption connections, such as houses in affluent neighborhoods, commercial establishments using high amounts of water (restaurants, hotels, etc), industry and public establishments. Often up to 80 percent of water consumption can be attributed to no more than 20 percent of the total connections. A particular issue will be the treatment for multi-family apartment buildings, which today have only one master meter. Installing meters in individual apartments may be an expensive undertaking. In this case, the solution may be to prorate the progressive tariff structure over the number of apartment units. In any case, newly built complexes should include the installation of a separate metered connection for each unit.
7.18 In poor urban neighborhoods and rural areas, especially those without sewerage, metering might be unnecessary as water consumption in such neighborhoods tends to be quite low. Consumption in unmetered areas should be monitored carefully through district metering. Public standpipes should be metered carefully. Given the complexity and local nature of metering, each utility should undertake, as part of the rate study, a metering study to determine a cost-effective metering strategy. The primary purpose of such a study would be to determine where and in what sequence meters should be installed. Finally the success of any rate system will depend on the existence of a well-designed commercial system, which is managed and operated by well-trained and motivated staff.

Introducing Rate Increases

7.19 The affordability analysis demonstrated that most people in Egypt have the capacity to pay the full cost of water and sewerage services under a progressive rate structure. Nevertheless, the introduction of the new tariff policy will require a major adjustment of the Egyptian people’s attitudes towards paying for water supply and sewerage services. There is no doubt that the new rate levels must be phased in gradually in the sequence proposed in paras. 7.09-7.11. Ultimately, however, people’s willingness to accept higher rates will depend on the quality of the service and the confidence they have in their water and wastewater institutions. Therefore, the large scale rate increases needed for introducing full cost recovery must be accompanied by the development of water and wastewater companies that are perceived by the public as efficient institutions capable of providing good service at reasonable cost. People must be convinced that the companies are managed by respected professionals trying to do their best and that they are treated fairly. Public relations campaign will be necessary to inform people of the need for higher rates and their rights to demand a good service from an accountable utility. There must be initiatives to encourage water demand conservation along with programs to install meters and repair leaky fixtures.

7.20 As outlined before, a condition essential to the success of the rate policies proposed above is the Government’s resolve to cut the flow of budget resources to the sector. This should be done in a gradual, clear and transparent fashion, within a set time period, in parallel with the transformation of the sector’s institutional structure as proposed in the previous chapter. Experience has shown that local governments will resist increasing rates, as long as there is the expectation of continued government subsidies. To begin the process towards financial self-sufficiency of water and sewerage enterprises, it is recommended that the government adopt and publish a schedule for gradually eliminating all budget subsidies to water supply and sewerage enterprises in accordance with the following schedule: (i) for operating costs in the short-term, say by the end of 1994; and (ii) for capital investment costs in the medium-term, say by the end of 1998.
VIII. SELECTION, DESIGN AND IMPLEMENTATION OF INVESTMENT PROJECTS

A. Current Policies and Practices

The Five-Year Planning Process

8.01 The present vehicle for investment planning and project selection for both locally and externally financed investments is the Five-Year Plan (FYP) which governs all of Egypt's public investment decisions. Only projects contained in this plan can be funded. The complex process of including a project into the FYP begins with governorate planning offices supported by MOP and sectoral agencies (NOPWASD and MHPU for the water sector) collecting ideas on perceived project needs. These project ideas eventually enter a large pool of proposed investment proposals which is consolidated at MOP. After several rounds of consultations involving MHPU or NOPWASD on sectoral interests, and MOP, NIB and MOF on overall fiscal and overall economic development issues, a consolidated list of project proposals is eventually approved by the cabinet. After approval by the People's Assembly the list of projects becomes a legally binding instrument, the FYP. Once included in the FYP, allocations for specific investments can be included in annual budgets, and NIB assumes responsibility for mobilizing and disbursing investment resources.

Domestically Funded Projects

8.02 Projects included in the FYP tend to be general descriptions of works usually not substantiated by technical or economic justification. More projects are included in the FYP than resources can accommodate. As a result, many projects are entered with insufficient budget allocations. Project preparation is generally restricted to the elaboration of technical designs for the project ideas included in the FYP. Feasibility studies to justify proposed investments generally are not prepared. The practice of concentrating on isolated system components, without evaluating their justification and appropriateness within the context of a least-cost and system-wide plan for expansion and operational improvements, often leads to the over design of facilities and investments larger than needed. Investment options designed to better utilize existing systems and facilities through rehabilitation and to improve operations or reduce the need for water production and transmission by reducing water losses or to discourage wasteful water consumption through demand management are generally not considered. There seems to be a tendency to choose high-technology solutions where lower-technology solutions would have been less costly and worked better. The construction of secondary (trickling filter) wastewater treatment plants in the desert in Quena and Luxor are examples. The quality of project design varies widely, but more intensive engineering would usually lead to greater cost-effectiveness. More attention could be given to aspects of cost and considerations for future operation and maintenance. Far too often the same solutions are applied for a broadly varying range of project needs. As a result, many of the projects do not constitute optimal investments for the local
conditions of a particular utility in terms of cost-effectiveness and technical appropriateness.

8.03 As a consequence of the lack of realistic project funding in the FYP, a great many projects are started, but the shortage of funding leads to very long execution periods. It is not uncommon for projects that could be completed technically in 2 years to take 10 years to finish, or, even worse, to not be completed due to lack of resources. For example, projects started, but not completed, under the past two FYPs have resulted in a current unfunded liability of LE 1.74 billion. The quality of civil works construction is often poor, although not all fault should be attributed to the contractor. The on and off nature of construction caused by the irregularity of budget disbursements is not conducive to the efficient use of resources and good construction practices. Operating agencies have little recourse against shoddy contractual work. A distinct problem is the absence of adequate construction supervision. Another problem is the practice of tendering construction works on the basis of outline plans and specifications, with the contractor being required to provide the detailed designs after contract award. Most common equipment and materials are available on the Egyptian market from state enterprises. Often the quality of the equipment or materials is below par. Timely delivery of the equipment is occasionally a problem. Also, costs tend to be high in comparison with international market prices. Because of faulty designs, poor construction and equipment, many installations do not function properly and are difficult to operate and maintain.

Externally Funded Projects

8.04 International funding agencies tend to select projects and have them included in the FYP in accordance with their own perception of investment needs and their general sector development philosophy and project selection and justification criteria. Objectives of funding agencies do not always coincide with those of the Egyptian Government. Because of the large amount of financing provided by such agencies, the course of sector development is, to a large extent, influenced by foreign views and interests. External financing agencies usually apply their own standards regarding project preparation and design. Exhaustive feasibility studies are prepared by or under the leadership of external consultants. While these studies and designs tend to be technically well prepared, they often present overly costly and ambitious solutions and propose high level technologies inappropriate for local conditions. Proper operation and maintenance of these facilities may later be beyond the financial and manpower resources available to the agency taking over the facilities. A case in point are the mechanical sludge dewatering processes planned for Cairo and the large Zenia wastewater treatment, also in Cairo, where future operation and maintenance are of great concern. Another is the selection of package plants for water and wastewater treatment, which have been introduced by various donor agencies. Many of these plants stand idle for lack of local expertise and the resources to run them.
B. Selecting, Designing and Executing Cost-effective and Technically Appropriate Projects

Basic Elements of the Proposed Reform

8.05 This review concludes that most of the weaknesses in the project generation, financing, and implementation cycle can be traced to the imperfections inherent in the FYP process. The bureaucratic, top-down, centrally planned and politically vulnerable approach to project selection and implementation suffers from the same systemic problems that were found to be at the root of the poor performance of the local water supply and sewerage operating agencies: lack of accountability, ownership and responsibility. The proposed solution is, therefore, the creation of an environment in which the responsibilities for selecting, preparing, financing and executing capital investments are clearly defined and apportioned to those most closely connected and accountable to the beneficiaries of these investments, i.e., local governments and their water supply and sewerage utilities. Transferring these responsibilities to local government and utilities, together with the obligation to fund them from their own resources, borrowing or cash-limited subsidies, as proposed in the previous chapter, would create strong incentives for frugal and responsible decision-making.

C. Principles of Project Identification and Preparation

Feasibility Study

8.06 To ensure that future project investments are justified, the merits of any major investment decision regarding primary infrastructure expansion should be demonstrated through feasibility studies. Such studies should take a broad view of a utility's long-, medium- and short-term investment needs and its institutional and financial condition. Their specific purpose would be to demonstrate that proposed investments are:

- technically sound, i.e., constitute a least-cost solution to a clearly stated and justified objective; are based on realistic demand projections and design parameters; take into consideration the priority of investments to rehabilitate and improve the operation of existing systems; reduce water losses and rationalize water consumption through demand management; and propose technically appropriate solutions that are within the utility's ability to operate and maintain;

- economically justified, i.e., the project represents the least-cost solution and yields a minimum rate of return; and

- environmentally acceptable, i.e., undesirable environmental effects are mitigated through appropriate remedial action.
Institutional and Financial Studies

8.07 In parallel, or as part of the feasibility study, an institutional assessment and performance audit should be undertaken. If necessary, a detailed institutional strengthening plan should be developed to outline technical assistance and training and equipment needs (office, computer). Institutional analysis and strengthening should become an integral part of any project formulation. Likewise, there must be an in-depth analysis of the utility’s finances, including financial projections and a rate study, to assure that the proposed investments can be financed in a timely fashion and that the utility’s financial performance will meet acceptable cost-recovery criteria.

Design Standards and Technology

8.08 To reduce investment costs and allow better operation and maintenance, the appropriateness of presently valid planning and design parameters and standards should be examined. Significant cost savings could, for instance, be obtained by reducing per capita consumption standards, which would be possible with proper attention to water loss reduction and demand management. The use of shorter planning horizons through more cost-effective staging of investments could help reduce costs as well.

8.09 The selection of more appropriate and less costly technologies, with special consideration given to future maintenance and operation requirements, is another area of key importance. While an exhaustive treatment of appropriate solutions is beyond the scope of this review, a few examples may indicate the type of technology options that might be considered to reduce costs and ease operation and maintenance.

- The use of groundwater, if available in sufficient quantity and acceptable quality, should be given preference wherever possible. Water treatment plants should use simple and proven technologies. Slow sand filtration, for instance, appears to be a desirable option for smaller systems. Compact treatment plants, often touted as quick and easy solutions, should be avoided for cost and operation and maintenance considerations. As a general rule, the use of sophisticated controls and electronic devices should be avoided.

- Service standards for water supply and sanitation should be tailored to the beneficiary’s capacity and willingness to pay. Yard taps rather than house connections may be the indicated solution in rural areas, as they are less costly, require less water production and ease the problem of wastewater evacuation. In rural areas, conventional sewerage should be avoided for cost reasons, wherever possible. Individual solutions should be preferred (latrines, soak aways), or where these solutions are not technically feasible because of high groundwater tables or impermeable soil conditions, low-cost sewerage designs, for example, (small bore sewers, condominium layout, etc.) may be more cost-effective solutions.

- High technology options for municipal wastewater treatment (for example secondary treatment and mechanical sludge de-watering)
should be avoided as they are very costly, and their operation and maintenance are generally beyond the technical and financial capacity of current utilities. Whenever possible, lagoon technology is preferable.

**Priority Focus for Future Investments**

8.10 When defining future investment projects, consideration should be given to the following order of priorities:

- Institutional strengthening and training, including the introduction of appropriate computer-based systems and applications for accounting and budgeting; management information; store management; personnel; operation and maintenance; and commercial management;
- Facility rehabilitation and upgrading, operational improvements and loss reduction;
- The least-cost expansion of water supply and sewerage systems in a coordinated fashion; no water systems should be expanded without a workable plan for the safe evacuation of wastewater;
- Municipal wastewater treatment through primary and lagoon-type treatment processes; and

**D. Conditions Necessary for Better Project Preparation and Implementation**

8.11 For local governments and water utilities to be able to assume project identification, preparation, financing, and implementation responsibilities, they would need support in the form of:

- Clear guidelines, standards and norms regulating the selection, design and implementation of investment projects and assistance;
- A convenient source of investment finance;
- Access to engineering and other consultants who can provide quality service in project preparation and design, the supervision of construction, and technical assistance in institutional and financial matters; and
- Access to civil works contractors, equipment manufacturers and materials suppliers capable of providing good services at reasonable costs.

8.12 Quality control is key in ensuring that acceptable standards are employed in the formulation of investment projects. Quality control can be achieved most conveniently by linking the provision of investment funds to the compliance with preestablished investment eligibility criteria. As explained in Chapter V, this function would be the responsibility of the Water Sector Investment Facility (paras. 5.54–5.56).
IX. FINANCING INVESTMENTS - PRINCIPLES AND INSTRUMENTS

A. Sources of Investment Finance

9.01 Investment finance for the water supply and wastewater sector could come from five possible sources:

- loans from private commercial sources;
- loans or grants from official bilateral or multilateral international financing agencies;
- loans or grants from government agencies; and
- internal cash generation by utilities.

Internal Generation by Utilities

9.02 As a general principle, sector utilities should be expected to participate in the financing of investment projects by providing cash contributions from their internal generation of funds. The size of these contributions will depend on the financial capacity of the utility. Large urban utilities may be required to finance up to 20 percent of their investment needs; smaller utilities may not be able to contribute more than 5 percent. What is of importance, however, is that a utility’s financial capacity is such that it generates some surplus to contribute to its own investments. Such contributions should be given in the form of direct cofinancing of contracts to ensure that the contribution is actually made. Requiring utilities to contribute to investments would enhance their sense of ownership and responsibility in the investment and would prepare them financially for meeting later debt obligations.

Investment Finance from Commercial Sources

9.03 Any system for channelling investment finance to water supply and sewerage utilities should be grounded firmly in the country’s emerging overall financial system. Distortions for the purpose of accommodating the water and wastewater sector should be avoided. As a general principle, utilities should have free access to the Egyptian financial markets or external financing and should be encouraged to use these sources. These capital contributions by the private sector may take a variety of forms: loans from commercial banks; supplier’s credit for the purchase of specific equipment or services; floating bonds; or the financing of investments under BOT or concession-type schemes. In

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5/ Many large city utilities in Latin America and Asia contribute sizeable amounts, up to 30 percent of the total cost of their investment programs.
these cases, the provider of credit will use its own criteria for ensuring that investments are sufficiently protected and that the borrowing agency has the institutional maturity and financial capacity to meet its debt-service obligations. Before getting into such a deal, however, the borrowing utility must make sure that any such arrangements are fair. This can best be achieved by insisting on competition and expert advice. As a general principle, the Government should encourage the flow of such private investment capital for sector investments, minimizing the provision of guarantees.

B. Sector Investment Financing Facility

Justification and Purpose

9.04 At present, the great majority of Egyptian water supply and sewerage utilities are too weak to qualify for private sector credit and will remain so for some time. Unless these companies resolve management and efficiency problems and attain financial viability, they will not have access to private capital. Also, commercial financial institutions in Egypt do not offer investment instruments suitable for water utilities. Until utilities can gain access to commercial sources of finance, the Government has no choice but to arrange for a government-supported and run facility for financing sector investments. The purpose of this facility would be to mobilize public sector financial resources from internal and external sources and to channel them to public sector water and wastewater utilities that do not have access to commercial sources of financing. The creation of the Water Sector Investment Facility introduced in Chapter V was proposed with that purpose in mind.

Credit and Grant Facilities

9.05 Under the principles of full cost recovery, investment finance to sector utilities should be made available under commercial lending conditions. Investment subsidies from the Government and from external sources for specific social and environmental policy objectives will continue to be necessary until the sector is strong enough to operate under full cost-recovery principles. For this purpose the investment facility should open two separate financing channels: a loan facility and a grant facility. Both facilities would mobilize resources from local and external sources and onlend them at a rate equal to the marginal cost of funds to the financial intermediary plus administration costs. The loan facility would also replenish itself through the repayment of loan funds. Grants should be made available in the form of direct and transparent budget contributions towards qualifying investments and beneficiaries, but they should carry a fee for covering administrative costs.

C. Using Investment Finance as a Vehicle for Sector Reform

9.06 Promoting the creation and development of autonomous companies, enforcing the new cost-recovery policies and ensuring that only properly justified and well-designed projects are financed should be primary sector development priorities. These could be achieved by linking the provision of
investment finance from both the grant and the loan channel to pre-established performance targets regarding institutional and financial improvements and to the quality of proposed investment projects. Local governments and utilities seeking finance from the facilities should, therefore, be required - as a condition for receiving finance - to:

- present a feasibility study and design that demonstrates that the project has met pre-defined technical eligibility criteria;
- commit itself to institutional strengthening to meet pre-defined institutional efficiency criteria;
- attain an acceptable financial performance, which might require the implementation of appropriate tariff levels and structures to meet pre-defined financial viability criteria.

9.07 The facility should operate under a transparent, clearly defined and government approved set of criteria applicable for all lending activities. These criteria and the procedures that the fund will apply in the evaluation and supervision of projects should be set out in operating guidelines. The provision of finance, under credit or grant conditions, should be made under legally binding agreements, which clearly define the project elements to be financed, the conditions of repayment and any stipulations related to institutional and financial performance. To be effective, the sector fund should have the right and obligation to stop disbursements or, in the extreme, cancel loan funds if credit or grant recipients do not meet the conditions set forth in the financing contract.

9.08 To make these conditions of financing work, all financing for sector investments, regardless of source (all credit and grant financing from all local or foreign sources), should be provided under the same basic criteria and conditions regarding the institutional efficiency and financial performance of credit recipients and the justification of the proposed investment projects. If there is to be more than one source of finance, all financing must be provided or on-lent under identical minimum conditions so as not to favor one credit source over another. Credit sources may, however, compete by way of the level of service, assistance provided to credit applicants, and the efficiency in handling credit evaluation and disbursement.

9.09 The proposed financing mechanism can work only with the cooperation of the international donor community. The conditionality required by the facility should also be a minimum requirement for financing from external bilateral and multilateral funding agencies. The current practice of donors providing assistance under vastly different, and at times contradictory, conditions and objectives should be discouraged. International funding agencies should be encouraged to channel their funds through the grant or credit facility. They may be permitted to continue lending directly to specific utilities as long as the proposed investments: (i) have priority in the Government's overall sector development plan; and (ii) are provided under conditions matching at least those required by the Sector Investment Fund, particularly those regarding institutional development and financial performance.
X. MUNICIPAL WASTEWATER TREATMENT

10.01 At the beginning of the report, in Chapter II the concern was raised that the ambitious water pollution control policies pursued by the government may be difficult to justify. One could argue that the resources proposed to be spent on municipal wastewater treatment are placing an unjustifiably large burden on the government’s budget and on the water and wastewater utilities, in terms of financial commitment and technical capacity. The purpose of this chapter is to briefly examine Egypt’s water management policies and practices as seen from the perspective of the municipal water supply and sewerage sector. Some general recommendations are presented for the strengthening of the country’s policy and institutional framework for water management. As already stated in the Introduction, these recommendations do not intend to preempt the conclusions and recommendations of the Bank work on an Environmental Action Plan for Egypt, but rather provide a different perspective from the point of view of the municipal water and wastewater sector.

A. Regulatory and Institutional Environment

10.02 The basis for water pollution control in the Nile River basin is Law 48 of 1982. Law 48 prohibits the discharge of any pollutants into the Nile River proper. Discharges are allowed only into agricultural drains, if proper treatment is provided. For the discharge of domestic wastewater, Law 48 mandates secondary treatment.

10.03 There is a plethora of institutions that, in one way or another, play a role in water resources management and pollution control. They include, inter alia: The Ministry of Industry and the General Organization for Industry, in control of industrial wastewater discharges and pre-treatment; The Ministry of Public Works and Water Resources with major legal power to enforce a water pollution control program; the Ministry of Health, responsible for sampling and analyzing wastewater discharges to any watercourse; the newly established Egyptian Environmental Agency, an arm of the Ministry of Cabinet Affairs, Administrative Development and Environmental Protection, with as yet unclear responsibility for the control of pollution in Egypt; and the Irrigation Department of MPWW, which issues (and revokes) licenses to permit the discharge of wastewater into the watercourses it controls.

10.04 In spite of the relatively large investments in municipal wastewater treatment, there is little evidence that much headway is being made in slowing down the rate at which water courses are being polluted. The reason for this lack of success is that Egypt’s water pollution control policies and legal/regulatory framework are wholly inadequate. In addition, unclear institutional mandates and authority and the weaknesses of the institutions concerned with water pollution so far have precluded the development of an effective and coordinated approach to pollution control and abatement.
10.05 One major problem is that very little is known about water pollution in the Nile River basin. Although much data are known to have been collected by a number of different agencies, the data collection effort is too dispersed and uncoordinated to allow the development of a realistic assessment of the present state of pollution in the basin. No model exists to describe pollution in the river or to test the river's response to various clean up scenarios. There is no coordinated pollution control management and investment policy under which investments could be screened for priority and ensuring optimal use of scarce investment resources. Rather, pollution control investments are an uncoordinated, subsector-specific effort. Without providing the means and assistance needed by polluters to treat wastewater, Law 48 is widely acknowledged as being impossible to comply with.

B. Past and Planned Investments - Achievements

10.06 The Government, through MHPG and foreign aid agencies, particularly USAID, has taken the initiative to invest heavily in the construction of municipal wastewater treatment plants. So far these efforts have included the construction of some 50 wastewater treatment plants, mostly secondary treatment plants, throughout the country. Another 49 wastewater treatment plants initiated during the 1987-1992 five-year plan are in various stages of completion. USAID is currently completing major wastewater treatment works in Cairo on the river's west bank and is supporting wastewater treatment schemes for Alexandria. The Government, with large suppliers' credits from several European countries, is constructing major wastewater treatment facilities on Cairo's east bank of the river. MHPG plans the establishment of 160 wastewater plants throughout the country in order to complete the first stage of a plan to provide wastewater systems in "all governorates and cities in Egypt."

C. Justification and Priority of Investments

10.07 In terms of resources invested, the municipal water and wastewater sector has contributed substantially to its wastewater treatment and plans to contribute even more in the future. There are three areas of concerns regarding the justification and suitability of investments: (i) overall justification and priority; (ii) technology; and (iii) operation and maintenance.

Justification and Priority

10.08 There is concern as to whether or not past and planned investments in municipal wastewater treatment plants are justified on priority grounds within the context of Egypt's overall environmental protection needs. Certainly one could argue that the resources spent on the construction of wastewater treatment could have a more beneficial effect if they were spent on other environmental priorities, air pollution, hazardous waste, industrial pollution, health care, etc. Giving higher priority to investments providing safer water supply and better sanitation services to more people or addressing toxic industrial wastes may yield more benefits in terms of public health than building costly wastewater treatment plants. Also, the priority of investments in wastewater treatment
plants in specific locations can not be validated, as there is no water management and pollution control and abatement plan for the Nile River Basin which could direct wastewater treatment investments.

**Technology Choices**

10.09 A careful review of the subject indicates that costly, secondary treatment plants or package plants have often been built where other technology choices would have been better. A few examples may illustrate the point. In Quena and Luxor in Upper Egypt, municipal wastewater is pumped out of the Nile Valley onto the desert plateau and subjected to secondary treatment (trickling filter). Given the large volume of flow, the regeneration of the river in the Quena/Luxor area and the comparatively low sewage flows generated in these two cities, discharging the wastewater into the Nile River after primary treatment would probably have been an environmentally safe, and certainly the least-cost, solution. Lagoon treatment would clearly have been the second-best solution, as the desert environment provides unlimited amounts of the two inputs necessary for effective lagoon treatment: space and sunshine. The selected option, secondary treatment in the desert, is certainly the most costly and technically most inappropriate choice. Compared to lagoon treatment, it is several times more costly in terms of initial investment. Another glaring example of poor investment choice is the selection of mechanical sludge de-watering in Cairo, which is an extremely costly undertaking and could have been accomplished far more economically by lagoon treatment and burial in the desert land surrounding Cairo.

**Operation and Maintenance**

10.10 There is wide evidence that hardly any of the existing secondary treatment plants are being operated and maintained adequately due to insufficient financial resources and a lack of technical expertise. Again, the treatment plants in Quena and Luxor are a case in point. In Quena, the plant did not work at all, and the treatment achieved in the Luxor plant is far from meeting design standards. The Egyptian Government, with the help of USAID, is constructing large-scale treatment works on Cairo’s west bank; there is wide concern that local financial resources and technical expertise will not be sufficient to allow these plants to be operated adequately after completion; USAID is contemplating providing contract maintenance by a US firm to ensure the operation of these plants.
D. Towards a More Appropriate Institutional and Policy Framework for Water Resources Management and Pollution Control

Principles of Water Management

10.11 Efficient water resource management is based on the following basic guiding principles, as expressed in the recent Dublin Statement on Water and Sustainable Development:

- Water is a finite and vulnerable resource, essential to sustain life, development and the environment; effective management of water resources demands a holistic approach, linking social and economic development with the protection of natural ecosystems; effective management links land and water uses across the whole of a catchment area or groundwater aquifer; it integrates both water quantity and quality aspects.

- Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels; the participatory approach involves raising awareness of the importance of water among policymakers and the general public; it means that decisions are taken at the lowest appropriate level, with public consultation and the involvement of users in the planning and implementation of water projects.

- Water has an economic value in all its competing uses and should be recognized as an economic good; within this principle it is vital to recognize the basic right of all human beings to have access to clean water and sanitation at an affordable price; past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of resources; managing water as an economic good is an important way to achieve efficient and equitable use and to encourage conservation and the protection of water resources.

10.12 Any alterations to a river's natural regime, be it the construction of a water storage or flow regulating structure, water abstractions or the discharge of wastewater have cumulative impacts on the water regime downstream. Any such alterations, in turn, have a direct effect on the value of the water to users (industries, agriculture and municipalities) and on the health of the water ecosystem. In this context both ground and surface water, where connected hydraulically, have to be considered as one physical unit. Any investments in water resource development and pollution control, therefore, are associated with externalities that surpass the concerns of specific water users, such as a community or industry installing a plant. It follows that effective water management and the selection of investments related to water management require a concerted, objective-based watershed approach, which considers, in an integrated, manner all relevant physical (water quality and quantity), economic

and financial aspects associated with the resource and the uses it is to satisfy. The present state of water management in Egypt's Nile River basin is far from these principles.

Proposed Policy Framework

10.13 Egypt's water management policies could be strengthened by adherence to the principles expressed in the Dublin Statement and by a multi-disciplinary and multi-purpose approach to water management in the Nile River basin. In formulating a coherent and comprehensive policy framework for the efficient management of water resources and pollution control, the Government should clearly articulate its position on a number of issues:

- the principles for allocating water resources among competing users (municipal water supply, industry, irrigation, etc.) based on technical, financial, economic and social considerations;
- replacement of the unrealistic and unenforceable requirements of Law 48 with ambient water quality standards for all water resources (surface and groundwater) with short-, medium- and long-term improvement targets;
- the pricing of water-resource use, including the abstraction of water as well as the discharge of wastewater;
- cost-recovery principles for investments in water resource development and wastewater treatment;
- the regulation of water use through a permit system, which would establish the conditions, including a system of fines and fees, under which major water users would abstract from or discharge water into the Nile River and connected water courses; and
- the institutional set-up and regulatory framework, with a clear definition of the responsibilities and obligations attributable to each type of institution.

Institutional Framework

10.14 Over time, several successful institutional models for managing water resources and pollution control have evolved. The basic principle of all of these models is that there is a clear division of responsibilities regarding: (i) policy-making at the government level; (ii) policy implementation and planning (management, monitoring, financing and regulating) by an independent agency on the river basin or regional level; (iii) enforcement agencies and mechanisms; and (iv) sectoral institutions (municipal water supply, agriculture, industry, river transport, tourism, etc.) that use (and pollute) water resources under the regulatory control of the basin agency. In addition, successful water resources management and pollution control depend on a clear mechanism for providing investment finance.
10.15 **Policy Institution.** The most urgent task in the reform of Egypt's water management is to clarify and streamline institutional responsibilities. The power and responsibility to develop, prepare and promote legislation, and monitor and enforce the water resources and pollution control management policy of the Government should be concentrated into one national government-level agency. To be effective, this agency must have the status and power to integrate the interests of water users, including both abstractors of raw water and polluters discharging wastewater, and to develop a policy that balances the interests of all parties involved. Considering that appropriate water management is of paramount importance for Egypt's future economic development and well-being, the creation of a National Water Policy Authority (NWPA) directly responsible to the Prime Minister may be the answer. For this unit to be able to exercise its policy functions effectively, it is essential that all other institutions and agencies now dealing with water resources and pollution control management are given the opportunity to present their interests to NWPU; however, they must no longer make global policy decisions regarding water management in the Nile River basin.

10.16 **Nile River Basin Agency (NRBA).** Water resources planning should be transferred to a Nile River Basin Agency which could be modelled after the "agence du bassin" concept developed in France. Under the policy guidance of NWPA, the main responsibility of the River Basin Agency would be to prepare, monitor and implement a comprehensive River Basin Development Plan. NRBA would be a public corporation controlled by the River Basin Committee in which all important public and private interests in the Nile River's water should be represented (Industry, Agriculture, Water Utilities, etc.) The main purpose of the committee would be to provide an umbrella for promoting consensus in the decision-making process and to resolve conflicts, all with the purpose of defining an efficient and enforceable water policy for the river basin that is acceptable to all resource users. The preparation of the plan requires the development of a mathematical model that can simulate flow and water quality parameters. Such a model is an indispensable tool for analyzing the response of the water resource to water abstractions or pollutant discharges.

10.17 NRBA should not have direct operational or executive responsibilities; the maintenance and operation of hydraulic structures should be the responsibility of other entities established for that purpose. The agency should also not be involved in regulation and enforcement. NRBA should be financially autonomous, financing itself from the fees paid by water users. Its specific responsibilities would include:

- the preparation of the river basin management and action (investment) plans, in accordance with the policies issued by NWPU and approved by the Nile River Basin Committee (NRBC). The action plan would be updated and adjusted periodically by the NRBC;
- the setting of fees to be paid by all water users in the basin: one fee based on the level of water consumption; the other based on the level of pollution at each point source; and
- the operation and maintenance of a monitoring network of hydrologic and water quality information in support of a better understanding of the hydrologic, hydraulic and water quality processes in the basin, as needed for simulating river basin behavior.
10.18 NRBA would need a highly experienced staff in the areas of planning and macro water management. It could be assembled from the various organizations now involved in such work. The number of staff should be restricted to a core of high caliber specialists. To the extent desirable, much of the routine technical work, including the monitoring function, should be contracted out to the private sector.

10.19 Regulation and Enforcement. The main regulatory instrument would be permits under which major water abstractors and polluters would be entitled to make use of Nile River water resource. The specifications of the permits (water abstraction levels, pollution emission concentrations and volumes, fee structure) would be prepared by the NRBA in function of ambient water quality standards determined by the policy agency. They would have to be approved by the River Basin Committee. Enforcement of compliance with permit conditions should be transferred to the lowest appropriate level of Government, ideally the governorates. Given that most governorates at present would not have the capacity to assume this responsibility, enforcement responsibility for the time being should managed by a central government. The Egyptian Environmental Affairs Agency may be the most strategically placed agency to assume this responsibility, although the agency would need considerable institutional strengthening and refocussing of its mandate to perform this function well.

10.20 Operating Entities. These entities comprise all those that make use of water resources, as abstractors and/or polluters. In Egypt this would include, primarily, irrigated agriculture, industry, the municipal water supply and sewerage and river transport. These entities would be responsible for complying with the permit conditions under which they are allowed to operate. They should have autonomy in selecting the most appropriate and cost-effective means to meet permit conditions. For example, the permit may specify certain effluent water quality parameters for the discharge of municipal wastewater, but it would be the prerogative of the water and wastewater utility to choose which measures to take to comply with the conditions stipulated in the permit.

10.21 Financial Mechanism. The ready availability of finance for pollution control investments is crucial for effective pollution control abatement. As in the case of the water supply and sanitation sector, it may be most advisable to create a water management or environmental fund, possibly administered by NRBA, from which operating entities could obtain investment funds under clearly defined conditions and purposes. Again, such a fund could include a grant and a loan facility. It would obtain its resources from external and local government contributions and from fees and fines collected from water users.

E. Interim Policy for Municipal Wastewater Treatment

10.22 In the absence of an appropriate policy and institutional framework for water management in general and pollution control and abatement in particular and the lack of a comprehensive, river-basin, water-quality management plan, the Government should reexamine its present high priority for constructing municipal wastewater treatment plants in all cities and governorates. This may be a desirable objective for the longer term. However, given the present fiscal constraints and institutional weaknesses, and the lack of knowledge about the most cost-effective strategy for cleaning up water pollution in the Nile River Basin, a more modest approach appears to be indicated. While the construction
of low technology and comparatively inexpensive plants (infiltration, lagoons, etc.) should be encouraged, the construction of secondary treatment plants, including the completion of such plants already under construction should be discouraged, until or unless:

- a Nile River Basin water management plan demonstrates the need and priority for secondary municipal wastewater treatment in a specific location, within the context of a comprehensive river basin plan elaborated on the basis of acceptable technical and economic analyses;

- effective regulatory and enforcement mechanisms are in place, which based on the basin plan clearly define the obligations of municipalities with respect to wastewater treatment; and

- a financial policy and financing mechanisms have been established regarding municipal wastewater treatment facilities.

10.23 Exceptions to these general guidelines should be allowed to deal with specific situations where the construction of secondary wastewater treatment would respond to a clearly justified need. Any such project, however, should be justified through a feasibility study that demonstrates that:

- the technology chosen is the most appropriate;

- the sizing of the plant is in harmony with the existing water supply and sewerage system;

- appropriate pre-treatment for commercial and industrial waste is assured, if such pollution is of concern;

- a utility is in place, with the financial and technical capacity to operate and maintain the plant adequately.

10.24 Specifically, it is recommended that the Government’s plan for the construction of the aforementioned 160 waste treatment "plants" be reviewed. These "plants" appear to be imported package, secondary wastewater treatment plants with an average capacity of 5,500 CMD and an average cost of LE 14 million each. The average capacity, assuming per capita wastewater flows of 250 lpcd, would serve about 20,000 people, which is equivalent to a medium-sized village. The average cost for the units amounts to LE 700 (US$200) per person. Furthermore, past experience with package plants in many countries for both water and sewage treatment has not been good. Many of these plants have been abandoned after a short time, as local expertise was insufficient to operate and maintain them adequately. Instead, utilities should be encouraged to construct cheap and easy-to-operate primary mechanical or lagoon-type plants, wherever space and financial considerations allow.

F. General Guidelines for Wastewater Reuse

10.25 The reuse of municipal wastewater for land reclamation is widely promoted as a means of stretching the amount of water resources available from the Nile River system. A previous analysis of the use of Nile River water (para. 2.06) indicates that municipal water supply and sewerage agencies release some
1.5 billion $m^3$ of mostly untreated wastewater back into the Nile River. This volume may approach 2 billion $m^3$ by the year 2000. In terms of total water use, released wastewater accounts for less than 4 percent of the total water available and only about 5 percent of the water used by irrigated agriculture.

10.26 Wastewater reuse for irrigation purposes usually requires some treatment and pumping to the irrigation site. Both processes are costly and require intensive operation and maintenance efforts, which Egyptian water and wastewater companies have been unable to deliver under the present form of sector management. Under these constraints, the reuse of municipal wastewater in all cases might not be a practical or cost-effective approach for increasing water availability for irrigation purposes. In many cases the costs and risks associated with wastewater reclamation and reuse may turn out to be larger than those associated with providing an equivalent amount of water through relatively modest increases in the efficiency of irrigation practices. This is not to discourage the reuse of wastewater, but to caution that any proposed reuse scheme be subjected, on a case-by-case basis, to rigorous financial and economic analysis and technical and operational assessment. In financing water reuse, attention must also be given to the fair allocation of costs among beneficiaries. For example, agricultural enterprises using municipal wastewater should share in the cost of constructing, operating and maintaining such schemes, in relation to the benefits derived by each of the parties involved.
XI. IMPROVING SECTOR PERFORMANCE AND DEVELOPMENT THROUGH THE IMPLEMENTATION OF A SECTOR REFORM PROGRAM

A. Main Elements of the Sector Reform Program

11.01 Taken together, the recommendations presented in the previous chapters make up a program of sector reform consisting of the following seven key elements:

(a) decentralizing the ownership of sector assets to governorate or regional companies;

(b) promoting the corporatization and commercialization of sector management and operation, based on constituting utilities as companies, preferably under normal companies law;

(c) redefining the framework and responsibilities of national sector institutions and placing relations between utilities and local and central institutions on a more contractual basis;

(d) implementing the principle of cost-recovery for operation, and maintenance expenditures and investment costs for water supply and sewerage services through contractual arrangements between utility companies and local government owners and regulators;

(e) conditioning the provision of investment finance on the presentation of an acceptable feasibility study and utility commitment to financial viability and institutional strengthening;

(f) introducing policies and programs to attract private enterprise to participate in the management and operation of water and wastewater utilities, to provide financing for sector investments and to provide services (consulting, construction, supply of materials and equipment) to utilities; and

(g) introducing policies and programs to strengthen the human resource base for sector utilities with utility management and administration and O&M the main areas of concentration.

11.02 Given the sector's present condition, fundamental reforms are essential for bringing adequate water and sanitation services to the Egyptian people by the end of the century. The proposed sector reform program would complement and be consistent with other ongoing government efforts for macroeconomic and public enterprise reform supported by the IMF, donors and the Bank. The water sector reforms transcend sectoral boundaries and would be facilitated by parallel measures under consideration affecting public enterprise reform, the unification of companies law, the financing of public sector investment and, in particular, the reform of local government. Given the urgency of rejuvenating the water sector, it is recommended that the process of reform proceed without delay in parallel with the Government's overall adjustment program.
11.03 The success of the changes proposed depends on the full support and commitment of local communities, the Government and the donor community. The first step towards sector adjustment, therefore, requires the Government to refine the proposed adjustment program and encourage an open debate among those concerned with the future of Egypt’s water supply and wastewater sector. Once a consensus is reached, the Government should publish a sector adjustment policy, which could be presented to a donor consultative group.

B. Action Program for Implementing the Proposed Sector Adjustments

11.04 Once the Government has decided on a policy for sector adjustment, an action program should be adopted that specifies the implementation of the proposed sector adjustment program. An institution should be given the mandate, resources and personnel capacity to direct the implementation of the action program. The Water and Wastewater Sector Development Authority (WSDA), as the successor institution of NOPWASD, is proposed to undertake this responsibility with the help of consultants. The actions needed to complete the sector adjustment process fall into four main categories described below.

Design and Implementation of the New Sector Policy Framework

11.05 Specialist assistance will be needed to determine the legal actions necessary to implement the new institutional policies. Although care should be taken to avoid the need for new laws, particularly through the use of the existing companies law, new legal instruments may have to be proposed and approved by the People’s Assembly. Part of the development of the new policy framework would be the creation of an environment which would attract private enterprise to participate in the sector’s future development in the various areas identified earlier.

Design and Implementation of National Institutions

11.06 The adjustment of the national institutional framework, as proposed in Chapter V will require a detailed design of the new institutional structure with a clear definition of the mandate, responsibilities and authority for each of the new institutions and a definition of their interdependencies. As the redefinition of the institutional setup and of the policy framework described are closely interlinked, both tasks should be undertaken simultaneously by the same group of consultants. Once the new institutional framework has been defined and approved by the Government, technical assistance would be needed to prepare each of the institutions (MHFU/DPU, NSDA, NSDF) for their new responsibilities. For each of the three institutions, it will be necessary to design bylaws, an organizational chart, staffing requirements, administrative systems and operating manuals. In addition, each of the new organizations will need technical assistance to develop specific systems for carrying out their operational work. For example, a sector monitoring system for NSDA or guidelines for project appraisal and supervision must be designed for WSDA. Simultaneously to this preparatory work, management and staff must be hired and trained, and computer and office equipment must be acquired.
Creation of Governorate or Regional Utilities

11.07 The creation of new autonomous water and wastewater utilities would be facilitated by using project financing from local sources or international agencies as an incentive. Therefore, the Government should ensure that project financing supports the creation and development of autonomous utilities and gives priority in allocating finance to those areas where the local governments are supportive of institutional reform. Project financing should cover all investments needed to establish the new utility and prepare it for its new functions.

11.08 For those governorates that wish to reform the sector but do not have access to international finance, the institutional adjustment could be made attractive through the provision of finance for an Institutional Reform Project. Such a project would include financing for:

- a full-fledged institutional development program, including technical assistance, training, the acquisition of materials and equipment (office furniture, computers, etc.);
- assistance to interested governorates in the preparation and implementation of schemes involving any of the privatization options described previously;
- initial working capital and part of the operating costs in a descending fashion for the first two years of company operation, and any costs related to any personnel adjustments that may be required;
- urgent, emergency-type investments aimed at removing bottlenecks, facilitating metering, improving leak detection and control, improving operations and rehabilitating existing facilities; and
- the preparation of a follow-up project, if necessary, including the elaboration of feasibility studies and designs for future investment needs (e.g., major system expansions).

11.09 For such projects to be successful, it is essential that any financing for follow-up investments be contingent on the successful completion of the institutional adjustment project, i.e., the new utility is autonomous, well managed and able to operate and maintain systems adequately from rate income. Follow-up projects prepared under the institutional adjustment project would be financed through WSDF under the new investment mechanism and guidelines. Such follow-up projects should only be approved if the utility can demonstrate that it meets acceptable administrative and operational performance standards and that its financial condition and rate levels meet the cost-recovery principles established by the Government. To make the institutional adjustment projects as attractive as possible to the governorates, financing should be made available through a special fund, preferably on a grant basis or at least with a sizeable subsidy component. Financing for institutional adjustment projects should be provided to any governorate that comes forward.
C. Technical Assistance Needs

11.10 The reform process will require a large-scale technical assistance effort. It may be broken down into the following major groupings:

- consultants to WSDA assisting in the definition and management of the reform process. These consultants should assist in: (i) the design of the overall new policy and institutional framework; (ii) the transformation of NOPWASD into WSDA; (iii) the formulation of a detailed action plan for the implementation of the sector reforms; and (iv) the coordination of other consultancies contributing to the reform process.

- technical assistance for the strengthening of MHPU and WSDF;

- technical assistance to local government to enable it to fulfil its new responsibilities in the sector;

- technical assistance to define and implement institutional development programs for as many as 30 new utilities that have to be created over the next 5 years or so, and consultants to prepare feasibility studies and rate studies; and

- consultants to prepare strategies and provide technical assistance in the development and implementation of programs to strengthen: (i) the human resource base for the sector; (ii) consulting engineering capacity; (iii) contractors and materials and equipment manufacturers and suppliers; and (iv) private sector participation.

- several consultant engagements to deal with the reformulation and strengthening of the institutional and policy framework for water resources management and pollution control and with the preparation of a comprehensive Nile River basin water resources management and pollution control and abatement plan.

D. Immediate Steps

11.11 After the government decision to initiate sector reform, the following immediate steps are suggested to define, design and initiate the implementation of the sector reform program:

- after Government internal discussions and favorable decision on sector reform, preparation of a specific action plan for proceeding with sector reform;

- hold a donor’s meeting to discuss government’s program for sector reform and to solicit support from donor agencies for a common approach and assistance in the design and execution of the program;

- elaborate a detailed design of reform program regarding policies, laws and institutions;
creation and strengthening of institutions on the national level with financial assistance from foreign donor agencies; and

initiate demonstration projects aimed at creating autonomous governorate and regional utilities and engaging the private sector in the management and operation of such utilities.
### NATIONAL GUIDELINES FOR WATER RATES FOR 1991/1992

<table>
<thead>
<tr>
<th>Category of User</th>
<th>Charge per m³</th>
<th>Piastres</th>
<th>US$</th>
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<td>o Domestic, 0-30 m³</td>
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1/ Issued by the High Committee for Policy of the Ministry of Housing, New Communities and Public Utilities.