

## **POLICY NOTE 3**

# **Cost-effectiveness and equity in Egypt's water sector**

Egypt Public Expenditure Review  
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## **About this Policy Note**

This Policy Note is part of the analytical work supporting the Public Expenditure Review (PER) in Egypt, a collaborative effort between the Government of Egypt and the World Bank. The PER is led by Richard Allen, Lead Public Sector Specialist, MNSED.

This Note is the third in a series being prepared during 2005 and 2006. It analyzes expenditure patterns in the water sector and investigates how the sector can contribute to the overall requirement for fiscal adjustment in Egypt. And it suggests how to rationalize water-related expenditures, create incentives for enhanced revenues, and attract private financing. The long-term outcome is to reduce the sector's overall dependence on the public budget.

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For a list of other Policy Notes in this series, see [http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/EGYPTEXTN/0,,contentMDK: 20601542~pagePK:141137~piPK:141127~theSitePK:256307,00.html](http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/EGYPTEXTN/0,,contentMDK:20601542~pagePK:141137~piPK:141127~theSitePK:256307,00.html).

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# Abbreviations and acronyms

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<b>AGOSD</b>	Alexandria General Organization for Sanitary Drainage
<b>AWGA</b>	Alexandria Water General Authority
<b>EEAA</b>	Egyptian Environmental Affairs Agency
<b>GDP</b>	gross domestic product
<b>GOGCWS</b>	General Organization for Greater Cairo Water Supply
<b>IIIMP</b>	Integrated Irrigation Improvement and Management Project
<b>IWMD</b>	Integrated Water Resources Management District
<b>IWRM</b>	Integrated Water Resources Management
<b>MALR</b>	Ministry of Agriculture and Land Reclamation
<b>MDG</b>	Millennium Development Goal
<b>MHUNC</b>	Ministry of Housing, Utilities, and New Communities
<b>MoEE</b>	Ministry of Electricity and Energy
<b>MoF</b>	Ministry of Finance
<b>MoHP</b>	Ministry of Health and Population
<b>MoI</b>	Ministry of Industry
<b>MoLD</b>	Ministry of Local Development
<b>MoSEA</b>	Ministry of State for Environmental Affairs
<b>MoT</b>	Ministry of Transportation
<b>MWRI</b>	Ministry of Water Resources and Irrigation
<b>NGO</b>	nongovernmental organization
<b>NIA</b>	National Irrigation Administration
<b>NOPWASD</b>	National Organization for Potable Water and Sanitary Drainage
<b>O&amp;M</b>	operation and maintenance
<b>PER</b>	Public Expenditure Review
<b>SWAP</b>	sector-wide approach
<b>UFW</b>	unaccounted-for water
<b>WS&amp;S</b>	water supply and sanitation
<b>WUA</b>	water users association



# Summary

In 2003–2004, LE 4.087 billion was spent on water infrastructure by the irrigation and agriculture subsectors, and LE 6.697 billion by the water supply and sanitation (WS&S) subsector from the Egyptian government budget. Of this, about 79 percent and 61 percent respectively were allocated for new investments, with the balances for recurrent costs. The outcomes of such significant public outlays have been mixed. There have been impressive gains in agricultural productivity and in WS&S coverage. However, fiscal dependence on the Government continues, and a new concern, requiring significant public finance, needs immediate policy attention: pollution externalities in the lower Nile delta. These externalities are exacting a heavy toll in terms of public health and environmental degradation. A recent World Bank study on the costs of environmental degradation estimates the damages at 1.6 to 3.2 percent of gross domestic product.

This note assesses the recent trends of public expenditures in the water sector with a particular focus on the irrigation and WS&S subsectors—the two major recipients of public financing in the water sector. This note also investigates different sources of fiscal stress and finance, and explores efficiency and equity implications of the current arrangements. The key findings:

*Finding 1:* Most investment and operation and maintenance (O&M)<sup>1</sup> costs of water services in Egypt are funded from the national budget. However, cost recovery levels are still below international comparators and as a consequence sectoral debt is a contingent liability for the Egyptian Government.

*Finding 2:* During the last two decades the composition of water-related public expenditures has changed, with a higher proportion being allocated to new investments at the expense of recurrent expenditures and debt repayments, thereby increasing the long-term contingent liabilities.

*Finding 3:* Water service coverage (in relation to both drinking water and irrigation) is adequate in terms of coverage in the Nile delta area and is generally lacking in the rural or southern areas, where the water services are particularly inequitable for low-income communities.

*Finding 5:* Reallocating budget appropriations through different budget chapters of water agencies, departments within agencies, and water user groups requires a fundamental rearrangement from current practices of budget planning and management processes.

*Finding 6:* The irrigation and WS&S subsectors have three options for financing future O&M and investment costs, identified in the World Bank–supported Integrated Water Resources Management (IWRM) Action Plan:

1. Increase contributions from users—this requires changes in legislation. A key area for further investigation includes self-financing of recurrent costs of existing and new works.

2. Decrease transaction costs and overhead expenditures by decentralizing and improving efficiency in service delivery. The main sources of avoidable transaction costs are overstaffing, duplication of responsibilities in sectors, oversized designs of water-related facilities, suboptimal technology selection, and procurement inefficiencies.
3. Facilitate private sector participation in financing, developing, and operating irrigation systems in response to user preferences and willingness to pay.

*Finding 7:* The WS&S subsector, in moving toward corporatization, needs to urgently address the debt overhang caused by past policies

of financing service expansion. But the WS&S subsector is doing so without ensuring adequate cost recovery from users. Under the present circumstances:

- In order for the holding company to fulfill its mandate of reforming the sector, restructuring or writing off existing debt is inevitable (as of end 2005 the Government agreed to write off this debt).
- Any debt write-off needs to be contingent on achieving monitorable financial and operational performance outcomes.
- Future donor financing could be structured around assisting the holding company to achieve the above outcomes in the medium term, perhaps through a sector-wide approach (SWAP).



# Key policy recommendations

## General recommendations

- Focus on cost-effective public expenditure interventions.
- Revisit national policies toward recurrent costs.
- Use a part of recurrent cost savings to leverage investments focusing on low-income communities and urgent environmental expenditures.
- Establish criteria for ensuring that new public investments are not substituting for the maintenance of existing hydraulic infrastructure assets.
- Operationalize national policies that encourage full cost recovery for irrigation infrastructure to support reclamation of new agricultural lands.

## Policy measures that require immediate government actions

- Expedite the amendment of Law 12/1984.
- Institute a SWAP that helps manage services at appropriate levels and provides services that users want and are willing to pay for.

## Policy measures that require longer term government actions

- Eventually, finance part of the capital investments in the water sector through user fees, in which tariff increases match user expectations.
- Beyond the adoption of holding companies, pilot more advanced public-private partnership models in irrigation and WS&S.
- Increase decentralization of governmental responsibilities as well as community participation in service planning and delivery.
- Curb avoidable overhead expenditures.
- Choose technology based on comprehensive (multiagency) and cost-effective plans rather than unilaterally imposed by one agency solely to meet engineering and technical criteria.
- Change accounting practices so that all water-related costs can be posted under one account within the general state budget.



# 1

## Sector background

Egypt is an arid country with very limited rainfall. The Nile–Lake Nasser system is one of the largest hydraulic infrastructure complexes in the world and consists of large barrages, canals, pumping stations, water and sewage treatment plants, and water supply and sewerage networks. This system is the only renewable supply source for surface water and provides 95 percent of Egypt’s total water resources. The rest of Egypt’s water resources, mainly fossil (nonrenewable) groundwater found in the coastal zones, deserts, and Sinai, are estimated at 3–4 billion cubic meters per year.

*Egypt’s water requirements are increasing as a result of population increase, rising living standards, and the needs of industries and agriculture (particularly in the reclaimed new lands).* In terms of subsectoral shares, agriculture (including fisheries) is the major user, consuming about 70 percent of the water. Municipal/potable and industrial subsectors consume only 3.5 percent and 1.5 percent, respectively. The balance—estimated at roughly one-quarter of the overall water stock—is lost through evaporation (5 percent) and also contributes more significantly to drainage water (20 percent) discharged into the desert fringes of the Nile system and the Mediterranean Sea. The latter is not really considered a loss, as it largely maintains the salt balance in the irrigated land and the ecosystem/habitats of the northern Delta/Lakes.

### Sectoral challenges

*A major challenge that Egypt faces is to close the gap between the limited water resources available and competing users’ escalating demand for water.* Available water per capita per annum amounts to some 900 cubic meters (m<sup>3</sup>), already below the “water poverty” index of 1,000 m<sup>3</sup> per capita per annum. This figure

is expected to fall to 670 m<sup>3</sup> by 2017 unless the Government implements policies to manage growing demand sustainably. This requires developing appropriate pricing and financing rules along with an institutional framework that encourages sustainable usage practices.

Until the early 1990s the Government focused on balancing water supply and demand by augmenting supply. The result? Significant investments in water supply, drainage, and rehabilitation of irrigation infrastructure—from the national budget and from donor support. By the mid- to late nineties, the need for a more comprehensive or integrated approach became apparent because of the following factors:

- Continued deterioration of water quality.
- A growing demand–supply gap.
- Intensification of intersectoral and inter-regional water allocation and water quality problems.
- Inadequacy of government funds for sustaining new investments and O&M at current levels of engagement.
- Poor operational performance by water agencies.

Since then the government policy has shifted to integrated water quality and quantity management. The Integrated Water Resources Management (IWRM) approach seeks to address

sectoral concerns through a mix of institutional reforms, changes in incentive structures, and technical innovations.

### **The “public good” perspective on water services**

*Because Egypt is so reliant on the Nile river system for sustaining the national economy, water resource management has been a cornerstone of national security.*<sup>2</sup> A significant part of the hydraulic infrastructure is therefore regarded as a public good and receives financing through the national budget. This includes not only the trunk system—consisting of the production, treatment, and distribution of water to various users and subsectors from a system of dams, barrages, and main canals—but also the recipient or feeder subsectors, which include irrigation, municipal, industrial, navigation, and hydropower users. The feeder system has both a public and a private good dimension because those users obtain privately appropriate benefits through either consuming water or using water as an input in production.

Past policies have not distinguished these two aspects clearly. For example:

- An Egyptian farmer in the Nile delta pays for the incremental cost of water delivered at the farm level but pays none of the conveyance (and lifting) costs from the river system.
- A water supply consumer pays a tariff that is only about 20 percent of the delivery costs (including treatment and delivery costs).

The rest of the feeder costs get picked up in the public good account. One could argue that apportioning the public and private costs in this large, integrated hydraulic system is complex; however, there are significant potential opportunities to increase user contributions for water usage that yields private benefits. Whether the private contributor is a farmer growing crops in the Nile delta or a user of water services in urban areas, the O&M costs of providing the services should at least benchmark favorably with other comparable lower middle income countries (where these costs are recovered through user fees or tariffs).

Currently the three principal sources of finance for all the water sectors implicitly support the premise that water is a public good. Financing from sovereign sources and subventions from general tax revenues carry more weight than agricultural user fees and municipal/industrial user fees. But changing cost recovery practices toward greater user financing of water services requires a fundamental reorganization of Egyptian water delivery systems—from sectors and departments that rely on budgetary subventions to service-oriented utilities that respond to user preferences and willingness to pay. For example, in Egypt’s WS&S subsector users receive subsidized but poor-quality services from utilities; these consumers are unwilling to pay higher tariffs because expectations of service improvements from these providers are low. However, unless higher tariffs are paid, the utility will never be in a position to reduce its dependence on the national budget.

*This vicious cycle of poor performance, debt overhang, and lack of interest from the private sector needs to be broken.* The current attention on public expenditures provides one such opportunity.

### **Consequent institutional challenges**

*Centralized but fragmented management and inadequate mechanisms for ensuring accountability to service users thus affect sectors’ financial and operational performance.* For example, sectors carry out various responsibilities (planning, design, construction, operation, research, monitoring, and regulation) through multiple agencies and departments within these agencies, each with parallel budget lines. These line agencies resemble “budget-maximizing” bureaucracies and have very little incentive to be accountable to the service users (whether those users are farmers or WS&S consumers).

*The Egyptian Government has recently begun moving toward addressing these concerns.* On the institutional side, holding companies have been established—for irrigation services in the new lands outside the Nile delta and for WS&S

services—which will eventually be converted to off-budget entities that attract private sector participation. The objective is to reduce the government's recurrent fiscal burden while improving the efficiency and sustainability of O&M services.

For the irrigation subsector, two holding companies have been established for the South Valley/West Delta and for Northern Sinai. For the WS&S subsector, a holding company—subsuming 14 subsidiary companies nationwide—has been established. But these holding companies face two major challenges before they can be effective:

- There is still no suitable regulatory framework that enables tariff setting to respond to user demand.
- There is no strategy for how to write off or restructure the debt overhang or how to create organizational structures that can respond to user demand and attract private sector participation.

In the Nile delta, the IWORM action plan has already instituted measures that enhance

user voice in the operations and maintenance of services. The Ministry of Water Resources and Irrigation (MWRI) has successfully delegated O&M responsibilities to water users associations (WUAs) at the tertiary-canal (mesqa) level and is now embarking on an action plan to empower Water Boards to manage irrigation and drainage O&M at the secondary-canal branch level. The key measure required is an amendment to Law 12/1984 (to empower WUAs), which is expected to be enacted by the end of 2005.

*Apart from the institutional challenges developing the infrastructure to improve water quality requires significant increases and reforms in public financing.* Concerns with water quality permeate urban and rural water users in the Nile delta and require actions on several fronts—from technological innovations with greater user feedback and participation to improved coordination within and across several water agencies.

# 2

## Assessment of expenditure trends

*The total water investments implemented between 1981 and 2000 reached LE 23 billion, which also led to increased recurrent expenditures. The notable trend has been variability in WS&S project investments during the past five years (figure 1). This trend marks the end of an expansion phase that began two decades ago—and led to an increase in water supply from 5.8 million m<sup>3</sup> per day in 1982 to 18.2 million m<sup>3</sup> per day in 2000. Coverage figures achieved in this period are impressive in terms of Millennium Development Goals (MDGs): potable water supply coverage for urban and rural populations is almost 100 percent and 95 percent, respectively. In per capita terms, potable water use increased from 130 liters per day in 1981 to 275 liters per day in 2000. The sewerage and sanitation coverage also increased substantially, with wastewater collection increasing eight-fold between 1982 and 2000. On the MWRI side the trend line has been steadier, perhaps reflecting the ministry’s regular appropriations to maintain the trunk hydraulic infrastructure.*

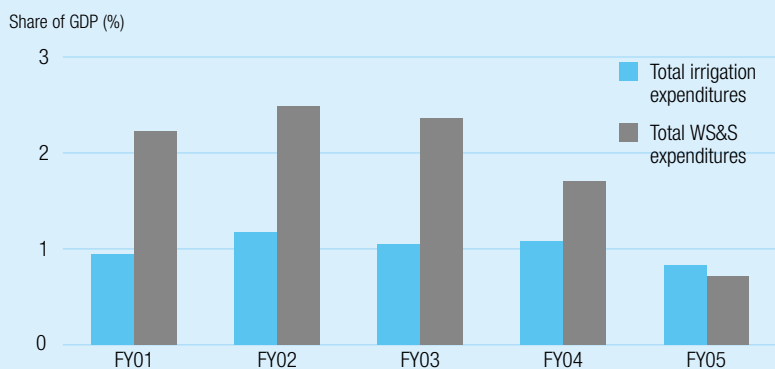
### New investments vs. maintenance expenditures

*Unlike other sectors, investment spending by water utilities has been a relatively high*

*proportion of total expenditures (figures 2, 3, 4, and 5), largely because of the significant increase in investments supporting the expansion of water supply coverage.*

*Within the overall water sector the investment–recurrent spending ratio has ranged between 200 percent and 300 percent since FY01. Investment spending has averaged only 20 percent of recurrent expenditures in other sectors. Within the water subsectors there is a declining trend in recurrent expenditures and debt repayments, while investment expenditures have remained relatively steady. This suggests that new investments may be getting higher priority than existing assets and repayments of debts. These practices could be signaling significant opportunity costs in the future, in terms of deferred maintenance, and need to be investigated further.*

**Figure 1** Irrigation and WS&S expenditures



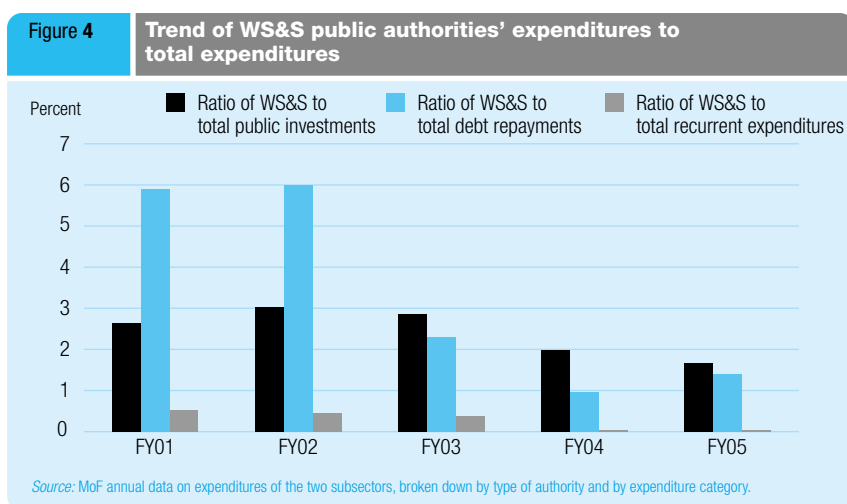
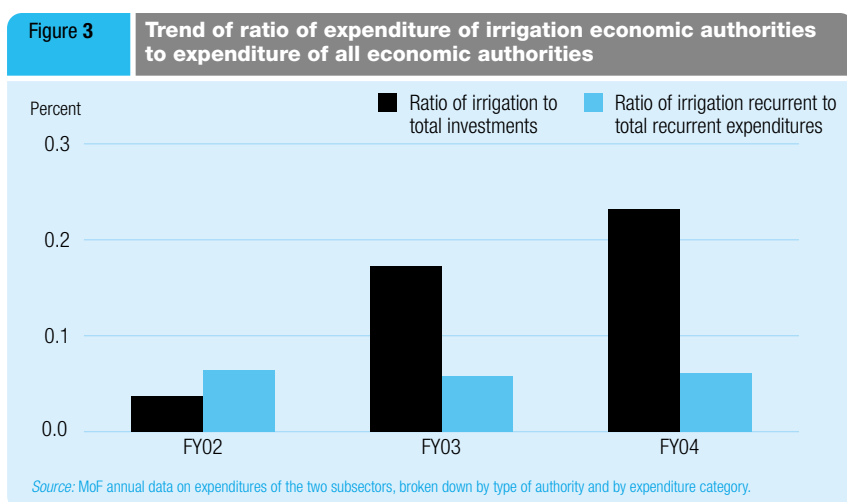
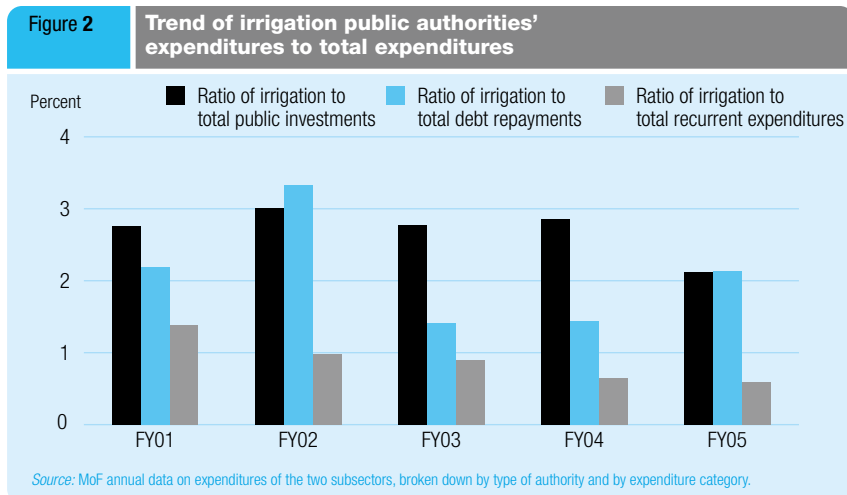
Source: MoF annual data on expenditures of the two subsectors.

## The water resources and irrigation subsector

For the MWRI, which is responsible for water resources and irrigation activities, Sovereign Services Aid and Domestic Loans cover (on average) about 75 percent of the revenues (table 1). But an analysis on the expenditures side indicates that domestic loans resemble long-term subsidies because they are (i) not repaid (the MWRI's National Water Resources Center) or (ii) only partly repaid (the MWRI's Egyptian Public Authorities for Drainage Projects, which repays about 28 percent), or (iii) expected to be repaid by holding companies that do not have a requisite cash flow of revenues. In general, user/service fees represent only a few percentage points for most departments (see figures 7 and 8) compared with the overall size of recurrent public expenditures of LE 6 billion per annum.

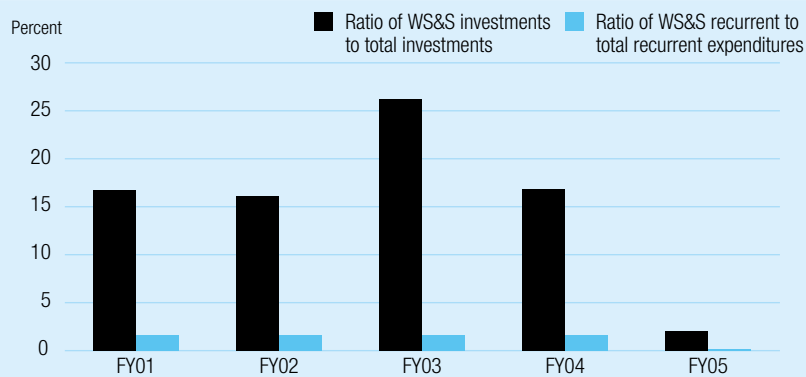
In aggregate terms, since 2000 the Government has spent approximately LE 12 billion on national irrigation infrastructure and water resource-related programs. This translates to an average annual rate of 15 percent of the total Egyptian public investments since 2000.

*Farmer contribution to costs.* Farmers merely incur part of the full investment cost of on-farm sub-surface drainage and tertiary canals. Investments at these levels are financed by GOE on concessional interest-free terms. The public subsidy/cost corresponding to the waiving of the interest is estimated at 57 percent in financial terms and 87 percent in economic terms. Thus, farmers effectively incur only a proportion of improvement costs, although this part of the infrastructural system is deemed a private good. As for O&M costs, in some cases (the World Bank-supported IIP), farmers are responsible for O&M of the improvements provided by MWRI at the tertiary-canal level. But the prevalent case is one in which MWRI is entrusted with the O&M; thereupon, land taxes are levied at LE 30 per feddan per year (on average), which accrue to local governments at a collection efficiency of 60–75 percent. The collected taxes amount to only 20 percent and 6 percent of the recurrent and total budget appropriations, respectively,



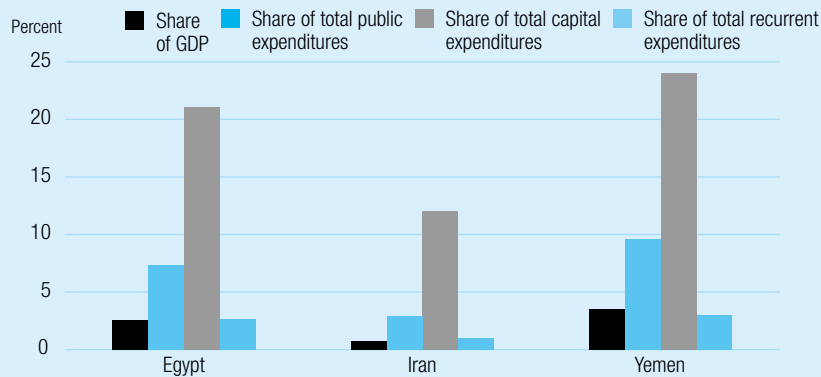
channeled by the Ministry of Finance (MoF) to the MWRI. If land taxes are collected and administered at the most decentralized level, these taxes would have considerably covered the actual off-farm O&M costs per year.

**Figure 5** Trend of ratio of expenditures of WS&S economic authorities to expenditures of all economic authorities



Source: MoF annual data on expenditures of the two subsectors, broken down by type of authority and by expenditure category.

**Figure 6** Water public expenditures in Egypt, Iran, and Yemen



Source: Working drafts and supporting documents of two World Bank studies on Yemen and Iran and data from MoF of Egypt. The Yemen study is an unpublished 2004 PER of the water sector. The Iran study is a forthcoming Country Water Resources Assistance Strategy.

**Table 1** Financial resources of irrigation subsector: Irrigation Department, MWRI

LE thousands	2000/01	2001/2002	2002/2003	2003/2004	2004/2005
Sovereign services aid	315,547	297,609	307,801	356,829	401,912
Domestic loans	206,220	390,101	437,008	486,770	544,700
Foreign loans	58,232	177,392	175,069	219,988	205,587
Grants	67,241	91,443	93,274	93,150	30,720
Internal finance	10,102	4,587	530	800	701
Services fees	40,243	38,644	36,730	40,799	35,325
Change in credit	71,813	45,252	25,514	0	0
Other sources	45,231	13,300	11,946	0	0
<b>Total</b>	<b>814,629</b>	<b>1,058,328</b>	<b>1,087,872</b>	<b>1,198,336</b>	<b>1,218,945</b>

*There are two means of financing the rising O&M and investment costs: either increase user contributions by reforming the pricing system or reduce costs by improving the efficiency of service delivery.* The MWRI is

testing—through the IIIMP financing—new institutional options for enhancing cost recovery from water users in the Nile delta. By contrast, the proposed (World Bank–supported) West Delta irrigation project will test a full cost recovery scheme producing high-value agricultural products in the new lands being reclaimed from the desert. Both models offer institutional options that could reduce the Government’s O&M burden. For holding companies the challenge of cost recovery remains.

### The WS&S subsector

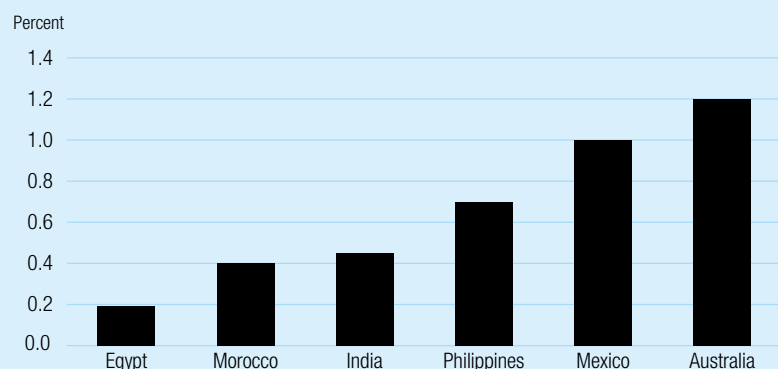
*The WS&S utilities—which manage water supply and sewerage networks serving domestic, institutional, and industrial users of water—typically should recover at least all the O&M costs.* The PER data indicate a continued reliance on the public budget—perhaps because these utilities have been caught in a vicious circle of low tariffs, poor services, and low consumer expectations of service improvements (which thus increase consumer resistance to price increases). Cairo’s water tariffs, for example, are among the lowest of all developing country megacities, and these tariffs pay for only 25 percent and 10 percent of the actual costs of water supply and sanitation, respectively (table 2). Cost recovery in secondary cities and towns is better in terms of water supply (with Alexandria as high as 50 percent) although equally poor (as low as 10 percent) in terms of sanitation.

*Recent attempts to increase the tariffs for Cairo are awaiting concurrence from the local councils and the national Parliament.* Low tariffs not only impose a heavy recurrent fiscal burden on the national budget but also generate disincentives for operational efficiency and responsiveness to consumers. Until recently (before establishing the WS&S holding company), governors had the authority to set water prices up to a ceiling of LE 0.23 per cubic meter. Although this ceiling is below actual production costs by a factor of 3 to 4, not many governors used even this authorization (table 3).

The outcome: domestic loans and sovereign services aid become the financing sources

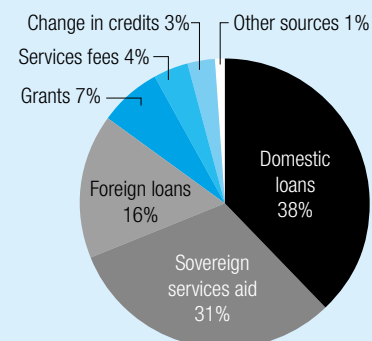


**Figure 7** Irrigation O&M cost recovery ratio



Note: Ratios greater than 1 indicate user repayment not only for O&M but also for capital/replacement costs.  
Source: World Bank 2003.

**Figure 8** Sources of financing in MWRI-Irrigation Department budget



Source: MoF annual data on sources of financing for the irrigation subsector, broken down by agency and by source type.

for even routine O&M (figures 9 and 10). The O&M subsidies to the subsector are estimated at LE 3–4 billion per annum, or 2–2.5 percent of total public recurrent expenditures. *The debt overhang of the WS&S subsector has therefore reached LE 14 billion and remains a significant—and avoidable—financial liability of the Government.*

### Discrepancies between planned and actual expenditures

For the irrigation and WS&S subsectors, there is a frequent pattern of discrepancies between the planned–annual and actual–annual expenditure (recurrent or capital). There is also a pattern of unplanned subventions that target certain agencies and regions. For instance, because water supply user fees in Alexandria are higher than in Cairo, there would be high unplanned “sovereign services aid” and “domestic loans” to Cairo, that bail out the Cairo utilities from the need to raise tariffs and need to peg user fees to improved services.

**Table 2** Financial resources of the WS&S subsector, Cairo

LE thousands	2000/01	2001/02	2002/03	2003/04	2004/05
Sovereign services aid	553,932	527,485	623,159	493,234	468,500
Domestic loans	104,925	114,599	74,962	174,000	229,000
Foreign loans	3,189	796	1,164	4,000	4,000
Grants	2,662	210	42	0	0
Internal finance	130,693	167,402	153,183	559,818	494,068
Services fees	347,544	387,433	411,030	515,500	576,645
Change in credit	285,848	125,089	0	285,847	285,847
Other sources	201,720	220,242	458,536	0	0
Total	1,630,513	1,543,256	1,722,076	2,032,399	2,058,060

**Table 3** Recurrent unit costs and associated subsidies in WS&S

LE per m <sup>3</sup>	NOPWASD <sup>a</sup> Municipalities	GOGCWS <sup>b</sup> Cairo	AWGA <sup>c</sup> Alexandria
Estimated capital, O&M costs	1.0	1.1	N/A
Subsidy	0.8	0.9	N/A
Average user fee <sup>e</sup>	0.2	0.2	0.3
Rate: piaster per cubic meter <sup>d, e</sup>	15–25	15–25	25–35

a. National Organization for Potable Water and Sanitary Drainage.

b. General Organization for Greater Cairo Water Supply.

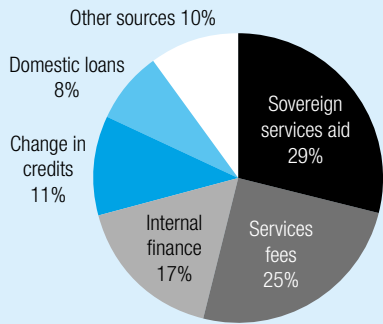
c. Alexandria Water General Authority.

d. Wastewater tariff is 20 percent of water tariff for Cairo and 35 percent for Alexandria.

e. These are applicable to the residential units, which have water meters. Units that do not have meters or that have broken meters pay a fixed monthly charge for water consumption (LE 5–20 monthly per unit). The charge changes with the house area.

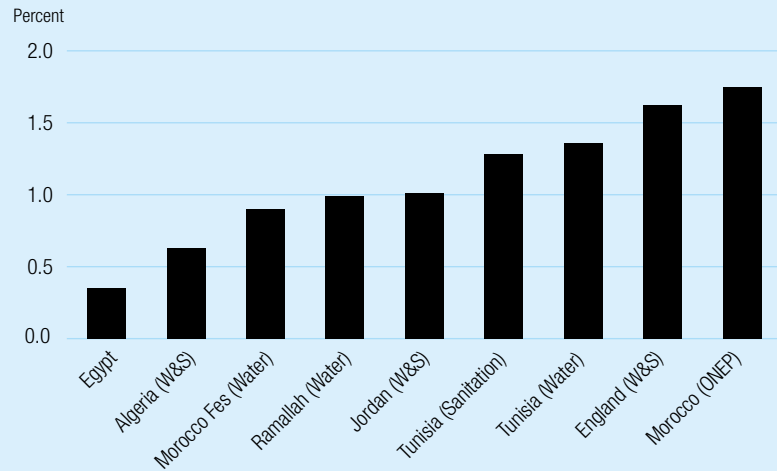
Source: Questionnaires to line agencies in Egypt, as part of preparing World Bank (2005).

**Figure 9** Sources of financing Cairo Potable Water Authority budget



Source: MoF annual data on sources of financing for the WS&S subsector, broken down by agency and by source type.

**Figure 10** International comparison of cost recovery for WS&S services



Note: A ratio of greater than 1 indicates user repayment not only for recurrent costs but also for capital costs.  
Source: World Bank cross-country data (2003/2004).

# 3

## Responding to challenges

### *Government policy actions already taken*

The Government's vision for fiscal sustainability for the water sector includes (a) exploring alternative cost-sharing arrangements with decentralized service delivery institutions; (b) implementing a progressive turnover of O&M financial liabilities to water utilities or water user organizations; and (c) establishing full cost recovery arrangements between the Government and farmers or other private investors in the new lands.

*The Government proposes to encourage public-private partnerships in the financing, operating, and managing irrigation and water supply infrastructure.* Recently established holding companies are being encouraged to seek private partners that can share capital and O&M costs for the expanded irrigation network in Toshka and El-Salam canals and for the WS&S subsectors.

*On the irrigation side, the Water Boards Project is testing ways to transfer water management responsibilities at the secondary level of the irrigation system from the MWRI to user organizations.* This would reduce the government's contribution to O&M costs by about 50 percent. The extra burden on farmers is expected to be partly compensated by exempting them from paying land taxes to local governments. The IIIMP will be testing new organizational arrangements that fuse investment and operational functions managed by MWRI agencies with user organizations that operate and maintain the irrigation network below the secondary-canal level.

*On the WS&S side, the government's efforts to decentralize WS&S have focused on changing the institutional arrangements, but these*

*efforts have not yet adequately addressed concerns about service efficiency.* Consider the following examples:

- Increased WS&S tariff collection responsibilities at the governorate level could very well top up employee wages. Such wage increases need to be made contingent on either increased labor productivity or improved O&M services.
- There are no policies for penalizing non-paying customers; government and public sector institutions are often exempted from paying their water bills.
- The cost of water treatment and distribution has not been fully borne by industrial users because government subsidies supporting O&M costs benefit all users (for water and wastewater treatment). For example, on average industries are billed LE 1 per m<sup>3</sup> for water—often substantially below the costs of delivering the service.
- There is a pronounced regional bias in WS&S services, favoring major cities in the Nile delta and along the Suez Canal. There is almost no sewerage in Upper Egypt or in rural areas in general, although rural population densities are high in the Nile delta. Sanitation has been defined as an urban public service, and no institutions

or agencies have adopted sanitation in the rural areas (figure 11).

### Sources of debt

*In Egypt the WS&S debt overhang has escalated for two reasons.* First, WS&S economic authorities (overseen by governorates) are expected to pay for their O&M costs through user fees. However, a wide gap remains between the actual cost of water supply that they incur (LE 0.8–1.00 per cubic meter) and user tariffs that accrue to them (LE 0.15 per cubic meter, on average). The consequence? Since establishing the National Organization for Potable Water and Sanitary Drainage (NOPWASD) (annex 1) in 1981, and the advent of the economic authorities in 1995, these entities have been regularly bailed out through the sovereign aid and domestic loans—which rarely get repaid. Second, in the absence of adequate cash flow

from service users, these agencies fully depend on O&M budget transfers from the Government. Because these transfers are often based on historical precedents, they often lean toward paying wages rather than working toward an effective O&M. Or they are biased toward existing assets (water and wastewater plants, and distribution networks) rather than new ones. The result is deferred maintenance, which leads to unnecessary deterioration of assets and (eventually) costly rehabilitation that could have been avoided by less costly routine and preventive maintenance.

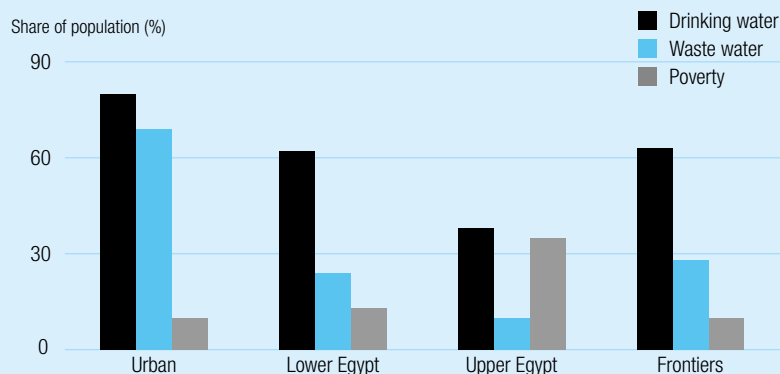
*The rehabilitation of the WS&S infrastructure triggers cycles of debt because the utilities and NOPWASD are forced to borrow from the National Investment Bank or seek (often off-budget) subventions to meet their pressing rehabilitation needs.* Under these circumstances passing the debt to the newly created holding company does not resolve the problem—it simply passes the problem to a new organization without the capacity to manage it.

*A similar analogy can also be applied to the MWRI's holding companies for new lands;* however, the Government has not been so worried about the debt of the irrigation subsector, as compared with that of WS&S. The reasons are twofold. First, the irrigation debt has not reached an unwieldy level, as it has for WS&S (figure 12). Second, much of the irrigation debt has financed trunk infrastructure investments of public goods, which can be deemed sunk costs.

### Domestic debt: A long-term liability for the Government

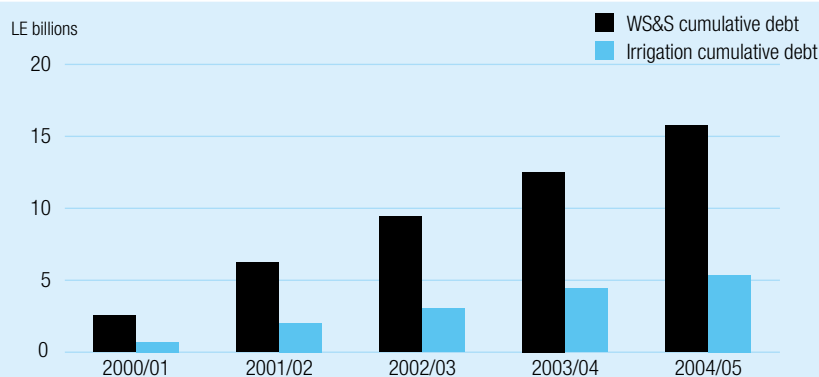
*Most of the debts above are domestic debts with short maturity and are therefore not appropriate instruments to finance the type of long-term investments required for water infrastructure.* Further, because the domestic debt is not actually repaid through revenues from water tariffs, its write-off becomes inevitable—and a significant contingent liability for the Government.

Figure 11 Poverty and access to water and wastewater



Source: World Bank (2005).

Figure 12 Cumulative debts of WS&S and irrigation subsectors



Source: MoF annual data on the debt repayment by, versus loans to, the irrigation and WS&S subsectors (reference year is 2000).

For example, the WS&S holding company is currently proposing to raise the tariff from LE 0.12 to LE 0.28 per cubic meter—an increase that will barely cover one-third of the actual water production costs. Even if these efforts succeed, about half the tariff increase could be allocated for servicing the WS&S debt (which now amounts to LE 14 billion) (figure 12), amortized over about 50 years.<sup>3</sup>

***There is clearly a need to evaluate the options for extending the debt relief period, tariff options, and service performance improvements.*** One possible solution is to link debt relief with the accomplishment of key milestones for improving financial and operational efficiency—milestones that accompany institutional reforms.

***The Philippine approach*** (box 1) ***could apply to both the irrigation and WS&S subsectors in Egypt, where the long-term success of decentralization requires the resolution of debt overhang.*** For example, the WS&S holding company's debts could be written off upon accomplishment of milestones linked to financial and operational efficiency and the 2015 MDGs.<sup>4</sup> Achieving the milestones could be monitored through a few key performance indicators such as debt service ratio; unaccounted-for water<sup>5</sup> (UFW) percentage; number of staff per 1,000 connections; total number of connections; and 100 percent metering of all water connections and subscriptions. Investment support through a SWAP operation could simultaneously help improve service performance.

Box 1

#### **Water management in the Philippines**

In the Philippines, local governments and communities have been reluctant to take over the O&M of communal irrigation systems, after the law devolved O&M responsibilities from the National Irrigation Administration (NIA) to the local governments and communities. The reason for the reluctance (besides lack of capacity at the local level) was the debt overhang that was also to be passed from NIA to the local governments and communities. Eventually, national legislation was necessary in order to write off most of the debt. NIA also offered a pilot program where by a considerable part of the debt is waived if local governments and communities contributed immediate equity (through fostering local private investment in irrigation, and raising user fees).

# 4 Promoting efficiency and equity: Why and how?

*One of the foremost challenges for Egypt's water sector policy is to address the debt overhang in the water holding companies while supporting the ongoing institutional reforms in the water sector.* It is critical that the Government institute cost-recovery mechanisms that enhance cash flow from user contributions. Managing these changes is a complex economic and political task.

*The negotiations between the Government and the WS&S and new lands holding companies appear to be heading toward the government's writing off of past debt.* But the challenge lies beyond that—institutions and incentive structures need to be reconfigured so that these agencies can generate increased revenues from users of their services. The Government needs to undertake a thorough institutional and financial analysis of the options for supporting future investment requirements—an analysis that provides answers to the following questions:

- To attract private sector interest in the water business, what are the minimum tariff, organizational, and regulatory reforms that will be required?
- Can the utilities within the holding companies be spun off into autonomous profit centers?
- Can the irrigation subsector also move toward a utility model, one in which service providers respond to user preferences and consumers' willingness to pay?
- What are the options for extending coverage of sewerage and sanitation while minimizing government liabilities? How can water quality concerns in the Nile delta be mitigated?
- What are the options for enhancing regional equity in water and sanitation service coverage?

## Ensuring cost effectiveness

To answer these questions the policy analysis could focus first on the “low-hanging fruit” of organizational reforms. *The analysis could address (in increasing order of difficulty): reforming procurement processes, avoiding oversized designs and suboptimal technology choices, and handling organizational over-heads and overstaffing concerns.*

*Procurement inefficiencies.* One glaring example of procurement inefficiencies is the lack of transparency in the public procurement process. This is a prevalent practice, as in many countries. Inappropriate procurement practices can be controlled if oversight of the tendering process explicitly involves beneficiary communities.

*Design of water facilities and choice of technologies.* The technologies selected for providing water services are often oversized, are not cost effective, and increase users' O&M costs. An example from the irrigation subsector at the tertiary-canal level is the use of oversized pumping facilities (pump set and pump house) and pipelines to guarantee reliable irrigation deliveries. A cost-effective alternative would be to involve the Ministry of Agriculture and Land Reclamation (MALR) in improving extension services and the MWRI in improving a farmer's ability to receive water on demand (through continuous

flow). These concepts are being tested in the IIIMP project.

*Avoidable organizational overheads.* Costs can be saved by reducing overhead. The WS&S sub-sector has recently started to address this issue (by establishing the holding company). In the irrigation subsector, the MWRI is piloting programs to reduce overhead within the governorate level (namely, at the Water Directorate and Water District levels). Supported by a U.S. Agency for International Development (USAID) project and IIIMP, the MWRI is piloting Integrated Water Management Districts (IWMDs) that assume the O&M roles. These IWMDs are integrated entities at the district level based on hydrological (versus administrative) boundaries and have all MWRI departments represented in one organization (rather than following the current fragmented structure). This form is expected to reduce O&M transaction costs as well as improve O&M at the district level. The next step is to pilot Integrated Water Management Directorates that assume roles in design and construction. The lessons from these pilots will be used to scale up the concept throughout Egypt.

### Ensuring equity in service provisioning

The following points summarize the equity impacts of the existing sectoral arrangements:

- For WS&S, secondary cities and rural areas incur service costs higher than major cities. In many rural and periurban areas, water vendors supply potable water to households that have standpipes, at prices more than 10 times higher than piped water prices. As for sanitation, poor farmers already pay as much as 10 percent of their income for wastewater removal from cesspools, an action that suggests their willingness to pay for better service provision.
- WS&S tariffs are heavily subsidized, and increasing block tariff structures end up targeting cross-subsidies on the nonpoor and not penalizing wasteful users.
- There is a regressive correlation between poverty in the Upper Egypt communities and availability of WS&S services (see figure 11).

- The cost currently incurred by farmers for irrigation (pump rental, tertiary-canal O&M) is 5–10 percent of the farm budget (reaching 15 percent for farmers growing sugarcane). A fee of LE 70–100 per feddan per year is estimated to be adequate to meet the full O&M costs for irrigation services (a reduction in farm incomes by 5 percent, on average, is likely to be viewed as affordable by large and medium holders). In the absence of targeting, subsidies are benefiting most those farmers who have better access to irrigated water.

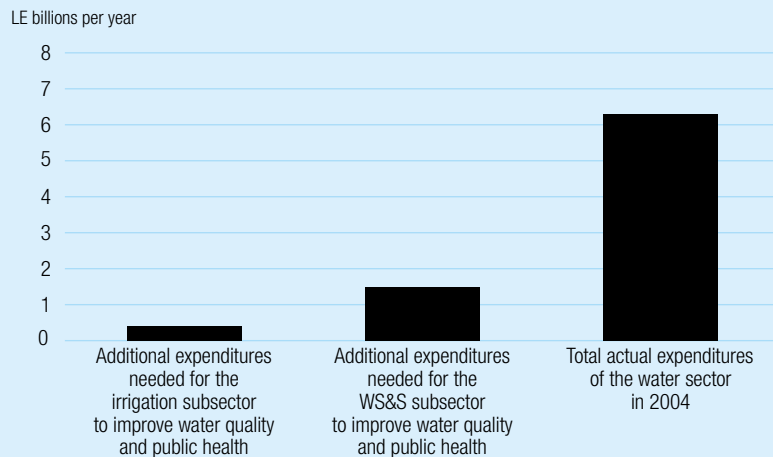
### Linking water quantity and quality management to the macroeconomy

A recent report<sup>6</sup> of the European Union–supported Egypt Water Sector Reform Program stated, “Egypt has yet to reach the point in its socioeconomic development that allows it to combine its water with other factors of production so as to achieve vigorous economic diversification and growth. *In our view, it is not water that constrains economic growth; it is a sluggish economy that constrains what is possible in water.*” The report also stated, “[T]he strategic issue of water for food can in the end only be addressed outside the water sector in the economy as a whole. A misleading starting point is to assume that solutions lie only, or even mainly, within the water sector itself.”

But these arguments relate mainly to the management of irrigation water and to the spatial allocation of water quantity. As for improving sanitation services and managing water quality, a recent World Bank study<sup>7</sup> indicated that *the socioeconomic cost of water pollution in Egypt can be as high as 3 percent of GDP.* The study arrived at this figure by monetizing the corollaries of inferior water quality, including agricultural and aquacultural production losses, and health damages or forgone benefits (by monetizing only morbidity incidences, thus excluding even mortality incidences).

*The study’s findings alarmed the pertinent line agencies and stakeholders in Egypt.* Some responded by suggesting that water pollution

**Figure 13** Annualized investments needed to improve water quality and public health (compared with the sector's total expenditures in 2004)



Source: MoF (2004) data and World Bank (2005).

should then be the first item on the government's agenda for sustainable development (as opposed to air pollution, which until recently used to be perceived by politicians and by the public as the priority item). The study findings perhaps concur with the potent messages relayed by a recent publication of the Water and Sanitation Program: "Improvements in WS&S figured prominently in the recent Copenhagen Consensus, at which a panel of leading economists ranked (community-managed) WS&S projects among the top 10 most cost-effective ways

to advance global welfare."<sup>8</sup> This publication asserted that the literature and country experiences made the case that WS&S improvements provide substantial socioeconomic benefits in terms of (1) improving health, and therefore worker productivity; (2) extending life expectancy and thus lifetime earnings; (3) ensuring children's attendance at school; (4) facilitating small industry and market gardening; (5) reducing people's spending to cope with inadequate WS&S facilities; and (6) offering dignity, privacy, and social status.

*In comparison with total public spending in the water sector, additional (annualized<sup>9</sup>) expenditures are needed to improve water quality* (figure 13). These expenditures include additional investments for treatment of effluents from public industries to waterways and groundwater; coverage of agricultural drains passing through residential areas; expansion of urban sewerage, particularly in Upper Egypt; and most important, development of unconventional, low-cost sanitation in rural areas countrywide. But the latter type of investments should be overseen and the costs shared by stakeholder groups (namely, WUAs) that subsume beneficiaries and polluters within boundaries of the same water "command area."



# 5

## Policy recommendations

Policy recommendations that have emerged as a result of this policy note are divided into three main categories: general recommendations, policy measures that require immediate government actions, and policy measures that require longer-term government actions.

### General recommendations

The following paragraphs discuss five general policy recommendations for developing and maintaining water infrastructure.

***Focus on cost-effective public expenditure interventions.*** Two obvious areas for reform are streamlining sectoral procurement procedures and reducing overstaffing in the water agencies. Current procurement practices are designed to safeguard the integrity of public spending but often end up creating the exactly opposite effect. Delays in awarding contracts and in honoring government payment commitments to contractors result in a lack of interest among highly competent Egyptian companies in bidding for government contracts. Overstaffing has resulted in unnecessary procedures and paperwork, often as “make-work” assignments for government staff. For example, the number of WS&S employees per 1,000 connections ranges from 5 to 15, but international good practice recommends not exceeding 5 employees per 1,000 connections. Further, the practice of retaining retirees as senior management advisers and consultants demotivates middle-level staff.

***Revisit national policies toward recurrent costs.*** Egypt’s hydraulic infrastructure has been constructed over several millennia and depends on a storage, distribution, and collection system around a single river.

Although a significant part of MWRI expenditures (headworks and main canal systems) will always remain a public good, significant budgetary savings could be accomplished by devolving irrigation and WS&S service functions to locally accountable institutions. The Government is moving toward establishing an IWRM action plan but this movement needs to be mainstreamed. The medium-term policy for WS&S should focus on recovering O&M and amortization costs from users. Private sector interest to participate in the financing and service operation will increase only when there is clear evidence of reliable cash flows from users.

***Use a part of recurrent cost savings to leverage investments focusing on low-income communities and urgent environmental expenditures.*** The recurrent cost savings could be used to leverage donor financing for supporting a nationwide targeted program aimed at improving WS&S services in low-income communities. For water supply the focus could be on the low-income communities of Upper Egypt, through national budgetary finance. In terms of water quality, one subregion’s untreated wastewater becomes the downstream community’s pollution problem. The enormous financing requirements to tackle the costs of environmental degradation need donor and government commitments for long-term concessional undertakings on a significant scale.

*Establish criteria for ensuring that new public investments are not substituting for the maintenance of existing hydraulic infrastructure assets.* Until reforms are instituted, public expenditures will continue to be the main sources for maintaining existing assets. Developing new assets financed through public appropriations (chapters 3 and 4 of the budget) should not substitute for continuing public appropriations to maintain existing assets (mainly chapter 2 of the budget for routine and preventive maintenance, and partly chapter 3 for occasional or major rehabilitation). The MoF could develop performance-based budgeting criteria that ensure capital appropriations based on monitorable targets of the previous year. These criteria could also include service contracts with the private sector for parts of the trunk system, such as the large pumping stations managed by the MWRI.

*Operationalize national policies that encourage full cost recovery for irrigation infrastructure to support reclamation of new agricultural lands.* During the past several decades public finance of irrigation expansion in the new lands have taken place over vast expanses of the desert around the Nile river system. Megaprojects such as the Toshka project (in Southwest Egypt) and El-Salam Canal (east of the Nile delta and Sinai) have been implemented. These decisions have been based on economic, social, and political considerations that include developing agroindustrial communities and investment zones outside the Nile Valley as a means of decongesting the valley system, which already has the highest population density in the world. But there are significant opportunity costs associated with these investments; these costs have absorbed billions of dollars of scarce public resources. Future investments could follow two criteria:

- Maximizing crop value per drop, meaning that the revenues generated from irrigated agriculture focus on high-value crops that generate income and employment opportunities.<sup>10</sup>
- Serving users through volumetric pricing of water services so that private sector par-

ticipation supports the creation of modern irrigation utilities that survive on user fees rather than on public subventions.

### **Policy measures that require immediate government actions**

Two short-term policy recommendations emerged from the PER analysis:

- *Expedite the amendment of Law 12/1984.* Transferring irrigation management to WUAs is expected to reduce the fiscal burden on the Government while improving irrigation services at the local level. These groups could be empowered to collect, retain, and administer user fees to operate and manage local irrigation infrastructure. There is an enforceable legal basis for WUAs to raise water fees toward recovering O&M costs of tertiary-level canals (because these canals are privately owned by farmers). However, secondary-level canals are public assets, and there is currently no legal basis for WUAs and Water Boards to recover O&M costs for them. Unless Law 12/1984 is amended, the suggested reforms cannot be implemented.
- *Institute a SWAP that helps manage services at appropriate levels and provides services that users want and are willing to pay for.* With the two recently enacted presidential decrees, a legal basis has been initiated for the WS&S holding company and its affiliated companies to raise tariffs and achieve financial autonomy. However, these utilities face a difficult organizational challenge: basic infrastructure such as universal metering is not yet in place; users are skeptical of their capacity to improve services; the debt overhang reduces the degrees of freedom in financial management (as of end 2005 the Government agreed to write off this debt); and the organizations are heavily overstaffed. Under these circumstances, issuing bylaws and presidential decrees is not enough; what is needed is a much more wide-ranging SWAP that could accomplish both objectives—managing services at the most appropriate level and providing ser-

vices that users want and are willing to pay for. This could be the focus of the next set of PER notes.

### **Policy measures that require longer term government actions**

Several medium- to long-term policy recommendations can be drawn from the immediate policy recommendations:

- ***Eventually, finance part of the capital investments in the water sector through user fees, in which tariff increases match user expectations.*** This will free more sovereign resources to serve the south and rural areas and to address environmental concerns. To this end, holding companies should be vested with wider authority for raising tariffs and recruiting employees, and should be entrusted with more proactive roles (beyond O&M) to undertake new investments.
- ***Beyond the adoption of holding companies, pilot more advanced public-private partnership models in irrigation and WS&S.*** These models should fulfill standard appraisal criteria for financial and economic projects.
- ***Increase decentralization of governmental responsibilities as well as community participation in service planning and delivery.*** Decentralizing water management, including participatory irrigation management, has been identified as a key tool for achieving more efficient and equitable water management, especially in water-scarce regions. This decentralization requires the participation of thousands of water user groups in the planning, design, implementation, and O&M of water works; the setting and administration of tariffs; and supervision and quality control. Decentralization also aims to eliminate government involvement in routine O&M and rehabilitation of irrigation systems. In the WS&S sector utilities need to be accountable to local users and elected bodies, such as municipal councils. Meaningful participation cannot be achieved unless there is greater transfer of responsibility, authority, and resources to grassroots user groups.
- ***Curb avoidable overhead expenditures—*** for example, procurement inefficiencies, employment redundancies created by recruiting additional civil servants and retirees, and fragmented departments (within the same line agency) that can be united under one entity.
- ***Choose technology based on comprehensive (multiagency) and cost-effective plans rather than unilaterally imposed by one agency solely to meet engineering and technical criteria.*** The comprehensive plans should be coordinated by the MoF, Ministry of Planning, NOPWASD, Egyptian Environmental Affairs Agency, MWRI, Ministry of Health and Population, and Ministry of Local Development. Sequential and prioritized spatial coverage of services and adoption of low-cost technologies should therefore be sought.
- ***Change accounting practices so that all water-related costs can be posted under one account within the general state budget.*** This could counteract the present fragmentation among institutions and could be addressed under the reforms being supported by the International Monetary Fund (such as the establishment of a Treasury Single Account).

## Current institutional arrangements

### Ministry of Housing, Utilities, and New Communities (MHUNC)

Under MHUNC, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and its affiliated agencies are responsible for planning, designing, and overseeing construction of municipal drinking water purification plants, distribution systems, sewage collection systems, and municipal wastewater treatment plants all over Egypt. NOPWASD is responsible outside Cairo, Alexandria, and the Suez Canal cities. For these three areas, the onus is on the General Organization for Sanitary Drainage in Cairo (GOSDC), the General Organization for Greater Cairo Water Supply (GOGCWS), the Alexandria General Organization for Sanitary Drainage (AGOSD), the Alexandria Water General Authority (AWGA), and the Suez Canal Authority.

Once the facilities are installed, the responsibility for O&M is delegated to the local governments that oversee local agencies in charge of O&M. The latter are classified into economic or general authorities and public or private companies or utilities in nine governorates (with private companies for wastewater treatment in Damietta, Kafr El Sheikh, and Beheira). The General Authority for Potable Water and Sanitary Drainage is the central body subsuming these governorate entities. Under the privatization process, seven of the water companies have been transferred to semiautonomous entities. NOPWASD has an independent annual budget that comprises all investments in potable water and sanitation at the national level, excluding those appropriations of economic and public authorities. The MHUNC/NOPWASD has an official national strategy to expand water

supply and sanitation, but implementation is constrained by lack of finance.

In 2004, two presidential decrees were issued, regulating the water supply and sanitation (WS&S) subsector under the responsibility of the MHUNC. The first decree (135 for 2004) is concerned with creating a holding company for drinking water and sanitation and its affiliated companies, which include the General Economic Authority for Drinking Water and Sanitation, operating in the governorates. The company will seek new financial resources to sustain the O&M budget and relieve the burden on the Government. The Government's role will be limited to setting national policies for improving municipal water and wastewater services and expanding the coverage of these services. The bylaws for the holding company and its affiliates will be governed by the legislation of the public business sector and issued by the minister following approval by the board of the respective company. The mandate of the holding company and its affiliates covers purifying, transporting, distributing, and selling drinking water as well as collecting, treating, and safely disposing of sewage. Under the new decree, the current General Water and Sanitation Authority and the General Economic Authority for Drinking Water and Sanitation—both of which operate in the governorates or within public sector companies—become affiliated with the holding company. These governorates and companies include Alexandria, Aswan, the Beheira Water Company, Beni Suef, Cairo, Dakahlia, the Damietta Water Company, El Minia, Fayoum, Gharbia, Kafr El-Sheikh, and Sharkia.

The second presidential decree (136 for 2004) covers the creation of the Central Authority for the Drinking Water and Sanitation Sector, and consumer protection. This decree

focuses on regulation and monitoring for quality control and consumer-price control. It reports to the MHUNC and will be the liaison between the Government, the public, and the holding company—to ensure that the holding company follows national policies and regulations. The Minister of Housing heads the governing board, which includes members from outside the subsector—namely, two technical experts and a representative of the consumers, seconded by the Minister of Housing. The ministries of Finance, Health and Population, and Environment are represented on the governing board. NOPWASD will act as technical adviser. As of end 2005, NOPWASD would shoulder the new investments in the Suez cities; whereas GOSDC, GOGCWS, AGOSD, and AWGA will all be integrated under the Executive Office for Potable Water and Sanitation in Greater Cairo and Alexandria.

### **Ministry of Water Resources and Irrigation (MWRI)**

The MWRI is charged with developing, distributing, and managing water resources, and developing and implementing O&M of the associated waterworks. It is also responsible for collecting and disposing of agricultural drainage water, monitoring and assessing the quality of water sources, and protecting the coastal lakes and the shoreline. The major departments and four main authorities are responsible for the day-to-day operation of the water resources system, irrigation water delivery, and drainage water disposal. Each entity has wide coverage along the Nile irrigation network, and several entities within each administrative governorate carry out all activities related to water distribution and drainage.

### **Ministry of Agriculture and Land Reclamation (MALR)**

Without interfering in farmers' selection of crop type, for most farm inputs and outputs priced at market prices, the MALR conducts research and extension toward improving farm output per unit of water and land. Extension and research for

improving on-farm water management thereby comes under MALR (rather than MWRI) jurisdiction. The MALR also sets land reclamation and horizontal expansion policies, aligned with the water resources plans set by the MWRI.

### **Ministry of State for Environmental Affairs (MoSEA)**

The Minister of State for Environmental Affairs presides over the Egyptian Environmental Affairs Agency (EEAA), which is the executive entity of MoSEA and has an advisory task before the cabinet. The EEAA has a water quality department.

### **Ministry of Health and Population (MoHP)**

The MoHP is in charge of public and environmental health and thus plays a central role in managing water quality, particularly in setting standards for:

- quality of potable water sources (the Nile and various canals);
- drainage water that can be mixed with fresh water;
- industrial and sewage treatment plant discharges; and
- waste discharged from river cargo and tourism vessels.

### **Ministry of Industry (MoI)**

The General Organization for Industrialization of the MoI oversees the activities of public industries relating to water use and water pollution control.

### **Ministry of Local Development (MoLD)**

The MoLD coordinates all activities of the government's line agencies at the governorate and local community levels. It identifies the programs needed to improve services at these levels, including drinking water, sanitation, and environmental protection. The required funds are shared between the government budget, the local public, concerned communities, and donors.

### **Ministry of Electricity and Energy (MoEE)**

The MoEE is responsible for power generation; therefore, it coordinates with MWRI hydropower generation. The MoEE also operates thermal powerplants that draw water from the Nile for cooling purposes.

### **Ministry of Transportation (MoT)**

The River Transport Authority of the MoT manages navigation activities along the course of the Nile and main canals downstream of the Aswan Dam, in coordination with the MWRI. The activities include dredging, because there are navigational bottlenecks in the shallow sections of the Nile and the main canals.

### **Ministry of Tourism**

The Ministry of Tourism requires that the MWRI maintain a depth of water in the Nile and main canals that is sufficient for commercial and recreational navigation (floating hotels and tourist vessels), as well as for aesthetic purposes. The same applies for the coastal tourist areas on the north coast and the Red Sea.

### **Ministry of Interior**

In coordination with the line agencies, the Ministry of Interior is in charge of enforcing the water-related laws and collecting fines, including those relating to water extraction, pollution, or other effects. The Surface Water Police are responsible for enforcement.

### **Water Users Associations (WUAs), private sector companies, and nongovernmental organizations (NGOs)**

Other stakeholders are involved in water services and management:

- Farmers (tenants/owners) and farmer organizations—namely WUAs and Water Boards—participate in O&M of the irrigation system at the tertiary (mesqa) and secondary (branch canal) levels.
- Private sector companies (contractors, suppliers, and Egyptian and international consulting firms) carry out services under contracts with the MWRI.
- Public sector companies (or holding companies) are owned by the Government but operate as in the private sector (for example, the two holding companies set up for the management of megaprojects in Toshka and the El-Salam Canal).
- Several other holding companies are owned by the MWRI and MALR for constructing irrigation systems, drilling groundwater wells, reclaiming land, and other activities. Ownership is now being transferred to investors and private sector companies.

The NGOs form an integral part of local communities' development programs in the rural areas (for example, Shorouq programs overseen by the MoLD). Nongovernmental organization roles include hygiene promotion and protection of public health and the environment, improved water supply intake and sanitation conditions, manual channel maintenance, and drinking water saving campaigns, and public awareness.

# Notes

1. O&M costs pertain to the following items in the budget chapters of the water-related ministries:
  - Parts of chapter 1: Wages that relate to O&M, as opposed to tasks of planning and other central administration.
  - Chapter 2: Goods and services for O&M.
  - Parts of chapter 3: Only regular or preventive rehabilitation investments (versus occasional or major rehabilitation investments).
2. In fact, the World Bank Policy Paper “Water Resources Management” (1993) introduced a more complex and detailed typology of water services from a resource-economics perspective. As a result of the permutations of consumers’ “subtractability” and “excludability,” the paper classified the various types of water services into four categories: private goods, public goods, toll goods, and common pool resources.
3. This figure is based on the estimate of the total metered water supply, which is about 4 billion m<sup>3</sup> per annum.
4. These goals include health (combating waterborne diseases, especially for reducing child mortality and improving maternal health) and environmental sustainability (reducing the proportion of people who do not have sustainable access to safe drinking water).
5. UFW refers to unaccounted-for water—including leaks—and water supplied to illegal connections.
6. Submitted to the Government of Egypt in mid-March 2005.
7. World Bank (2005.)
8. Brocklehurst (2004).
9. Assuming an amortization period of 10 years.
10. The old lands in the Nile Valley are restricted by heavy soils, very small tenures, and traditional farming systems that date back thousands of years—none of which ease fostering a cropping pattern that maximizes net exports.
11. Law 12/1984 relates to irrigation and drainage and licensing of groundwater wells. After extensive discussions with stakeholders, an amendment to the law has been drafted. The draft amendment seeks to (1) establish a legal basis for proactive involvement of various levels of user organizations, in all land and waterway categories; (2) address the role of the private sector in water management; and (3) include other unconventional water sources such as treated wastewater. The enactment of the amendment awaits an inter-ministerial revision.

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