

*Mounir S. Neamatalla*

## Introduction

The challenge of governing Cairo, and especially of providing urban services to all city residents, has increased dramatically in recent years due to an astounding rate of population growth in the city. The staggering growth rate has made it increasingly difficult for the government to meet its commitment to provide comprehensive urban service delivery. By 1980, large areas of Cairo, especially on the periphery, were lacking basic urban services such as sewerage, piped water and regular solid waste collection, and existing services were beginning to deteriorate due to the enormous demographic pressure on the centre of the city. Existing water and sewerage facilities are presently operating at 25-50 per cent beyond their design capabilities, and perhaps half of all households in the city have inadequate solid waste collection service or no service at all. As part of its efforts to remedy these deficiencies in its urban service delivery, the Government of Egypt launched an integrated programme to up-grade its urban services. The programme includes studies of the current water, waste-water and solid waste collection systems operating in the city. The basic studies, which have been completed, have greatly enhanced the Cairo Governorate's ability to make long-term policy decisions and to organise new frameworks for improved urban service delivery in the city.

## The Present Situation

### The Water System

The General Organisation for Greater Cairo Water Supply (GOGCWS) bears responsibility for operating and maintaining Cairo's water system. Approximately 2.4 - 2.6 million cu. m. of water are generated daily from seventeen sites in the Cairo region. Of these, eleven are treatment plants, almost all of which are operating at 25-50 per cent beyond their design capacities. Although 3200 km of pipelines service

Table 1 Water Rates and Revenues

Monthly Water Rates*		GOGCWS Revenue	
Tunis	US\$ 0.35/m <sup>3</sup>	1974	£E 207,000
Algiers	US\$ 0.25/m <sup>3</sup>	1975	£E -1,761,000
Cairo	US\$ 0.02/m <sup>3</sup>	1977	£E -4,173,000

the area, 60 per cent of which were installed prior to 1971, while 12 per cent are over 40 years old, less than 10 per cent of the mains have 600-1200 mm diameter; and the majority of the street pipes, which are 100-150 mm in diameter, are insufficient to cope with current flows.

Due to the fragility of the entire network, water pressure levels are kept low to avoid ruptures and breaks within the system. Even with reduced pressure, however, leakages and pipe-bursts are frequent, causing considerable damage and expense. Reservoirs are rarely filled to capacity resulting in inadequate and sporadic water service to many areas of Cairo.

In addition to frequent pipe-bursts, the absence of accurate metering, and the failure of many consumers to pay their water bills contribute to an estimated 40 per cent loss of revenues in Cairo. In recent years, the revenue from water tariffs has failed to cover even the basic operating expenses, let alone to generate the necessary capital for future water projects (Table 1).

In addition, water rates, which are set at 50 per cent below cost, are among the lowest in the world. The average total cost for water is £E 0.053/m<sup>3</sup> and the actual rate charged is £E 0.012/m<sup>3</sup>. This rate, in conjunction with the intermittent and inadequate supply, has resulted in uneconomical consumer practices.

In areas unserved by piped water, families rely on public taps or water dealers. Carrying water is arduous and time-consuming, and places an additional burden on the women who must often walk long distances to fetch water. Home water



A Sabil (public fountain)

Photo. François Vigier

storage is usually in large containers with a capacity of up to 300 litres. This container is highly susceptible to contamination, for the utensils used to scoop out the water often have multiple functions and may be left lying about exposed to flies. There are indications of an increasing prevalence of water-borne diseases such as para-typhus, typhus, hepatitis, and dysentery, believed to be linked to a lack of a clean and plentiful supply of water.

### The Waste-water System

The three major sewerage networks of Greater Cairo are serviced by six pumping stations, four treatment plants, and 150 subsidiary pumping stations, all of which are currently functioning well beyond their means, and are incapable of handling the present flows.



*Inadequacy of the sewer system an older building affected by the rising water table is leaning to one side*

*Photo. Allam*

The waste-water collection system, which was designed to cope with the demands of a population of two million, now services more than five million in Cairo alone. Undersized laterals and collectors, inadequate lifting and pumping capacities, and insufficient number of forcemains mean that the system is overburdened by current flows. Due to the inability of the treatment plants to handle the waste-water sufficiently, only one half of city sewage receives even partial treatment, while the other half is discharged into the main drains in crude form. The illegal disposal of inappropriate wastes into sewers clogs the system further and contributes to an estimated 500 floodings daily in the Cairo area.

In low-income, predominantly unserved areas, families use vaults or tanks. The cost

of regular vault cleansing is increasingly beyond the means of many families, especially when piped water has been installed. In some areas, service is inadequate so that even where the householders are prepared to pay for pumping charges, vaults may not be emptied on schedule. As a result, there are constant overflows, creating hazardous health conditions in the communities.

By contrast, households connected to the municipal sewerage system pay negligible tariffs. In theory, the waste-water tariffs are attached to the water rates as surcharges, but in practice this seldom occurs. The Government's subsidy policy, designed to benefit lower-income people, has in reality had the opposite effect. Higher-income families are the beneficiaries of rate structures for piped water and sewerage.

### The Waste Collection System

Three thousand tonnes of solid waste are generated daily in Cairo. The current private sector providers remove approximately 1,800 tonnes and the municipality collects 1,200 tonnes. Basic studies of the private and public sector components of the Cairo waste management system have revealed that the current system is essentially sound in conception. However, it is suffering from a number of constraints which have resulted in a drop in service levels in recent years.

The current household waste collection system is entirely in private hands and is partially financed by the recovery of waste materials from the waste stream. The controllers of the waste collection routes, the *wahis*, gain access rights to wastes through contracts with the building owners. The *wahis* subsequently allocate the refuse to individual garbage collectors, or *zabbaleen*, who haul them in donkey carts to one of the six settlements that they inhabit on the outskirts of the city. The wastes are sorted at the settlement and organic materials are used for animal feeding, and the

secondary materials returned to the industrial stream via a network of specialised dealers. The *wahi* receives the fee paid by householders. The *zabbal*, on the other hand, derives his income from recycling the waste.

The system served Cairo very well for many years, providing economical and effective waste collection service and achieving full recovery of system costs. However, like the water and waste-water systems, solid waste collection has not kept pace with the explosive growth of the city, so that today a significant portion of Cairo households are severely underserved. The reasons for this are manifold. Growth in the labour pool of the *zabbaleen* is constrained by a variety of factors, including availability of land. Access to capital by service providers is limited, and has therefore curtailed their ability to up-grade waste collection technology. The fragmented nature of the *zabbaleen* work-force has further constrained its internal capacity to respond effectively as a group to changes in the Cairo waste management needs and demand patterns.

The municipal household sanitation system, which is not responsible for household collection and is chiefly charged with street cleaning, has been adversely affected by the recent inability of the private sector system to provide comprehensive household service. Service deficiency has produced a situation in which large quantities of household waste are thrown into the streets simply because householders have no other alternative. Once in the street, these wastes become the responsibility of the municipal sanitation department. The removal of household solid waste from streets is needlessly expensive and saddles an already overburdened public agency with a wholly unnecessary added task.

## Institutions

### Water and Waste-water Organisations

Due in part to the problems in co-ordinating the large number of national and local authorities involved in water and waste-water management, sector agencies have tended to lack direction and cohesion. In Cairo alone, the CWO, a branch of the Ministry of Development, is involved in the planning and management of all foreign-financed sewerage projects, while the Cairo General Organisation for Sanitary Drainage (CGOSD) actually operates, maintains and expands the existing system. The two organisations operate in these governorates, each with its own sector agencies, but unlike other regional authorities, they are not responsible to larger national organisations. Since the roles of these two agencies tend to overlap and since there is no single authority, the entire sector lacks definition and direction.

Both water and waste-water authorities depend on government funds for all operation and maintenance costs. At present, no sector agency has the authority to raise tariffs, nor to retain revenues. As a result, the ability of sector organisations to provide quality service is often severely constrained. In addition to having no control over their revenues, sector agencies cannot increase personnel wages or offer incentives. The low wages presently offered by the agencies do not attract the qualified personnel needed to service the existing systems adequately.

The Government of Egypt recognises the problems inherent in the systems, and has taken a number of steps designed to strengthen and improve the various national and local agencies. At the national level, the GOE merged with the General Organisation for Sewerage and Sanitary Drainage (GOSSD) with the General Organisation for Potable Water (GOPW) into the National Organisation for Potable Water and Sanitary Drainage (NOPWASD). The GOE and the Cairo Governorate have also granted the Cairo General Organisation of

Sanitary Drainage (CGOSD) and the General Organisation of Cairo Water Supply (GOCWS) greater autonomy to organise their agency. Further plans to increase the autonomy, productivity and efficiency of the sector agencies are being developed.

## Programmes

### Water and Waste-water

Through many detailed analyses of the existing system, the GOE, in co-operation with several international agencies and firms, has designed two master plans to rehabilitate, improve and expand the current water and waste-water system.

In 1979 Cairo Waterworks Master Plan recommended both immediate and long-term project plans. The immediate project plan calls for increasing the reliability of the existing system, while the long-term plan includes the construction of additional waterworks facilities designed to meet the needs of Greater Cairo in the year 2000. Three water treatment plants are currently under construction at Rod al-Farag, Imbaba and Fustat. The Rod al-Farag plant has a present production of 200,000 cmd which will increase to 650,000 cmd at completion. The Imbaba and Fustat plants, currently under construction, will each have a capacity of 600,000 cmd, and should be fully operating by 1988. According to 1978 prices, the total cost of the master plan would be approximately US\$1,600 m.

Extensive plans have been made to reinforce and extend the existing waste-water network in Cairo. GOSSD engaged EGYCON and AMBRIC, a joint venture of British and American consultants, to improve and expand the existing waste-water system. Central to the project are improvements in the secondary sewer collection system, one waste-water treatment plant, and the rehabilitation of the major pumping and ejector stations. The expansion plan calls for a main drainage tunnel 17

feet in diameter to extend across Cairo branching to various laterals. There are no plans as yet to connect the tunnel to presently unserved areas. In 1983, US AID estimated the cost of all planned works would exceed £E1,600 m.

### Solid Waste

The Cairo Governorate has undertaken a number of pilot projects designed to alleviate the problems and inefficiencies inherent in the existing solid waste system. The pilot programme for extending waste collection into presently unserved, low income areas consisted of extending a financial incentive to the *zabbaleen* to compensate for the low value of the wastes. The programme now operates in five lower-income communities with a total population of over 150,000. The costs are borne entirely by the beneficiaries of the system at prices ranging from £E0.20 to £E0.35 per household per month. The recently completed Shubra composting plant will process 160 tonnes a day of street waste collected by the municipal sanitation force. Experimentation with mechanisation is in its infant stages and has yet to be evaluated.

## Recommendations

The subsidy policy has not generated sufficient revenue to maintain the existing urban services let alone to cover the growth needs of a city such as Cairo. The subsidy policy presently benefits those households already connected to water and sewerage systems, while unserved lower-income groups are obliged to pay market rates for sewerage removal and water. An addition of a more substantial waste-water surcharge to water tariffs, which is currently under consideration, would help to cover waste-water costs. If 50 per cent of operation, maintenance and improvement costs could be covered by 1992, Cairo



*Fire-Fighting in Cairo: modern equipment and trained personnel impeded by the obsolete piping systems*

*Photo: Halim Abdelhalim*

would be in a position of being able to meet the demands of her increasing population.

With improved accuracy in the measurement of production and consumption of water, it is conceivable that the amount of unsold water could be reduced from 40 per cent by 1987. The revenue generated through such measures could be rechannelled into further improvement and maintenance within the system.

Providing piped water and water-borne sewerage to presently unserved areas is extremely costly and is often beyond the means of the government. In instances where high costs preclude the connection of unserved communities to main systems, attention should be given to developing effective and alternate solutions suited to specific communities. The development of a routine, systemised and low-cost method to pump the vaults could postpone the need for water-borne sewerage inde-

finitely and reduce infrastructure costs considerably. In addition, every effort must be made to extend solid waste collection services to unserved areas at a price which is affordable to the residents.

There needs to be a purposive effort to bring coherence among all urban service agencies. This will be increasingly essential as the government implements a programme to gain control over patterns of urban growth. One such programme, now in the planning stage, is the Land Assembly Project for servicing and selling public land at reasonable prices and in adequate amounts. With this programme, designed to preserve the precious agricultural land while reducing constraints on the housing supply, the government would be in a position to direct and control urban growth. In the long run, such a policy would eliminate the need for area up-grading as we now know it, since there would no longer be a need for lower-income Cairenes to build on unserved land. Most assuredly, for

both urban up-grading and for the provision of service land, a high degree of co-operation and co-ordination among the respective agencies would be essential.

Moreover, in order to improve quality urban service delivery, sector organisations need to be granted greater autonomy, by giving them the opportunity to adjust tariffs and retain the revenue they generate through tariffs. If present trends continue, sector agencies will become increasingly dependent on the government, a situation which the government can ill afford.