



## East Africa Practitioners Workshop on Pro Poor Urban Sanitation and Hygiene LAICO Umubano Hotel, Kigali, Rwanda, March 29th-31st 2011

### **Costs of Sanitation for the Urban Poor - Dar es Salaam perspective** eng Mussa B Natty, Dar es Salaam City Council, City Engineer

#### **1.0 INTRODUCTION**

Dar es Salaam is Tanzania's largest and most important industrial and commercial centre with an estimated population of about 4 million in 2010 which is approximately ten percent of the country's total population. With a population growth of 4.3 percent per year, Dar es Salaam has become the third fastest growing city in Africa. The land locked countries of Malawi, Zambia, Burundi, Rwanda and Uganda as well as large parts of Eastern Democratic Republic of Congo depend on the port of Dar es Salaam for their import and export requirements. This makes the city of strategic importance not just for Tanzania but for large parts of Sub-Saharan Africa as well.

**Challenges:** The city has a large infrastructure backlog causing shortfalls in service delivery and does not have the capacity to effectively cope with its rapid growth. Most of the developed areas in Dar es Salaam are unplanned, with insecure tenure and poorly provided with basic infrastructure services. These areas (where more than 70 percent of the residents live) are irregularly developed with high densities, overcrowding and little or no land for roads, drains, schools, health centers, or open spaces. Access is a major problem, sprawling unplanned areas are exposed to frequent flooding, and waste is disposed of informally if at all. Access to safe drinking water is limited and sanitation is mostly through low quality pit latrines. Specific

challenges for public service delivery include: (i) continued growth of dense unplanned settlements; (ii) increased traffic congestion; (iii) lack of a supportive road network; insufficient drainage systems; (iv) increased volumes of uncollected solid waste; (v) increasing informal sector activities as well as increasing urban poverty and inequality; (vi) growing insecurity; and (vii) a strained capacity by the city to effectively manage the growth due to shortfalls in financial resources, skilled manpower, and equipment. In addition, land management is a serious concern.

The Dar es salaam Region has an area of 1,400km<sup>2</sup>, and out of this 440 square kilometers are rural area and this has expanded tremendously with the current population approaching four million people. All this population uses either pit latrines, septic tanks or water borne sewerage. It is estimated that, 90% of residents in the City of Dar es Salaam use onsite sanitation facilities. 60% of the residents use pit latrines, 30% septic tanks, 7% are served by water borne sewerage while it is estimated that, 3% do not have any form of sanitation facilities at all.

The septic tank / pit latrine waste emptying has for many years been a common way of disposing sewage from septic tanks and pit latrines in the City of Dar es Salaam.

The soils in old developed areas with high water table and in congested unplanned areas are saturated / clogged in such a way that soaking of sewage is no longer at optimum rates. The outcome is quick filling of septic tanks, soak ways and pit latrines resulting in the need to frequently empty the facilities which is quite an expensive undertaking.

## **2.0 SANITATION CHALLENGES IN DAR ES SALAAM**

Sanitation problems in Dar es Salaam city arise from the various traditional practices (many residents are migrants from up-country), poor sanitation record keeping, and fragmentation of sanitation activities among various subsectors. Other challenges are inadequate infrastructure facilities to cope with the population growth and poverty for many city dwellers. Furthermore, people build their houses haphazardly, and use a wide range of excreta and waste water disposal facilities and designs. Additionally, 45% of the city area has a high water table and floods are frequent in the rainy season. Together with the lack of adequate technical advice for assisting pit-latrines users, there are not enough resources both human and financial for fecal sludge management.

According to various studies, of the toilet pits that are full and cannot be used, about half fill up because of the high water table; whereas the remaining half are filled by many users. Solid wastes are dumped into the pit (latrines) on some occasions.

The city did have public toilets in the 1960s, which fell into disuse by 1990. Currently, there are quite a number of privately managed public toilets in different locations of the city.

## **3.0 MODES OF WASTE WATER COLLECTION, TRANSPORT AND DISPOSAL.**

### **3.1 Sewerage system**

The first Dar es Salaam sewerage system was constructed in the mid-1940s, major rehabilitation is currently in progress by Dar es Salaam Water and Sewerage Authority (DAWASA) under Dar es Salaam

Water Supply and Sanitation Project (DWSSP). There about 181 km of sewer systems built to date And about 7% of the population is served by sewers.

The sewerage system of Dar es Salaam, is a collection of small independent drainage areas rather than a fully integrated network. The system is based on a separate systems with a combination of gravity and pumped flows, comprised of 100 to 1000 mm diameter pipes covering a total area of almost 1700 ha. with adequate access manholes, these Sewers discharge their effluent into oxidation ponds, streams and directly into the sea.

Almost all sewage systems, mainly constructed between 1945 – 1948 were meant to serve the then existing Government institutions, Central Business Districts (CBD) and to a lesser extent the industrial and residential areas. The most favored institutions were Defense and Security.

### **3.2 Cesspit-emptiers.**

Vacuum trucks with tankers of 3m<sup>3</sup> – 12m<sup>3</sup> capacities are used to collect, transport and dispose waste water from septic tanks and pit latrines. There are 82 privately owned cesspit emptiers and 6 Municipals emptiers. There are also 5 emptiers owned by state corporations and departments including the Bank of Tanzania, Tanzania Harbours, National Housing Corporation and Police., These collect waste water from estates and houses belonging to the respective corporation.

### **3.3 Manual emptying by Gulper method.**

This is a technology where by the pit is emptied by gulping. The contents are then collected in 200 liter containers which are fitted on a motorcycle or pushcart and then transported to the waste stabilization ponds. This mode is mainly used in unplanned settlements and areas with difficult terrain where vacuum trucks can hardly access. This is a very important system for poor communities.

### **3.4 Vomiting Method**

Pit latrines are also emptied by vomiting method (that is, digging a hole adjacent to the pit and allowing the sludge from the pit latrine to flow into the new pit; then the pit is covered). This is possible in areas where a landlord has enough space for a new pit.

### **3.5 Mini cesspit - emptiers**

There is only one group with this system in the City, using something like a Vacutug. Previously mini tankers were used; however this option does not operate consistently and the operations are not sustainable.

### **3.6 Haphazard emptying and disposal**

Some pits are emptied haphazardly either in the rainy season by leading excreta into running rainwater or connecting pipes to any nearby river. This is also done in areas where the majority are of low income.

According to survey data about options for handling when pits are full, 72% of people desludged them, 23% expect to build a new one and 5% do not know what to do. This means that there is a need to provide guidance on the proper way to handle the sludge in order not to jeopardize the health of the people.

#### 4.0 EMPTYING COSTS

Cesspit emptying cost ranged from a minimum of Tsh 30,000 (about US\$ 20) to a maximum of Tsh150,000 (about US\$ 100) per trip, depending on the volume of the emptier and distance to the disposal site from the residential area (average radius of 15 km). Fifteen years ago, before trade liberalization, this service was provided only by the government under Dar es Salaam City Council and the former Dar es Salaam Sewerage and Sanitation Department (DSSD). A subsidized price used to be set by the authorities; nowadays, it is a free market activity.

All of mini cesspit systems introduced in Dar es Salaam failed because of lack of availability of spare parts. All systems were donor funded and donors provided backup spare parts and subsidy only during the project phase.

Gulper technology is used in areas not accessible by cesspit emptier trucks. The cost is about Tsh 15,000 (about US\$ 10) for a tank of 200 liters. Waste water is transported to the waste stabilization ponds. Prices are set for the Gulper depending on the job to be done and the bargaining made (or not) on the cost per cubic meter. In some cases, homeowners pay directly for the service, while in others, where they live with tenants the cost is shared between owners and tenants.

Manual pit emptying by vomiting methods costs Tsh100,000 (US\$ 66) to Tshs150,000 (US\$100) per latrine depending on the size of the latrine, soil texture and bargaining power. The amount include labor for digging the adjacent pit and repairing of the emptied pit.

#### ***Comparison: costs for waste water collection for each mode.***

- Piped sewerage: For every cubic meter ( $m^3$ ) of clean water used the consumer is charged Tshs 227. It is assumed that 80% of water received is discharged as waste water. The cost per  $m^3$  of waste water payable to the Dar es Salaam Water and Sewerage Company (DAWASCO) for clients connected to the sewerage system is Tshs  $(227 \times 0.8) = 181.60$  (US\$0.12), no matter the distance to the disposal sites.
- Vacuum truck for pit emptying: The cost per  $m^3$  per kilometer is about Tsh1700 (US\$ 1.12) as judged from money paid by vacuum truck users. Out of this Tsh 200 goes to DAWASCO as dumping fees. It is claimed that these dumping fees are for the rehabilitation of the waste stabilization pond infrastructures.
- Gulper method of manual pit emptying: The cost per  $m^3$  per kilometer is about Tsh37500 (almost US\$ 25) when using Gulper method, which is about 22 times more than cesspit emptier truck users and 206. times more than sewerage connected clients. Out this Tsh3000 goes to DAWASCO as dumping fees.
- Vomiting method of manual pit emptying: Cost per cubic meter ( $m^3$ ) for the vomiting method is Tshs33,000 (about US\$22) to Tshs 50,000 (US\$ 33), making it the most expensive of all methods of waste sludge/waste water disposal.

## 5.0 REGULATION

A portion of the cost for sanitation for the urban poor includes dumping fees which are charged by Dar es Salaam Water and Sewerage Company (DAWASCO). Are they justifiable? Are they fair? Who is the regulator? Do the poor know that there is a regulator? Does the regulator give priority to sanitation? Do the institutions responsible for water and sanitation give priority to sanitation? Does the government care?

Price regulation on energy, water and sanitation is the responsibility of the Energy and Water Utilities Regulatory Authority (EWURA). In all 221 complains from individuals in the country reported to and attended by EWURA from October 2007 to December 2010, 71 complains concerned power, 86 complains were about water, 61 were petroleum complains and only 3 complains related to sanitation. None of the 3 sanitation complains came from the urban poor: all cases were from planned and developed areas complaining about blockages of the sewer line and sewerage charges.

There has never been any meeting, forum, summit, conference or seminar organized by EWURA to discuss sanitation per se.

Regulation of the cost of sanitation could also theoretically be done by extending the sewerage systems to areas where the urban poor live. The DAWASA budget for infrastructure improvement under Dar es Salaam Water Supply and Sanitation project (DWSSP) was US\$ 101.03 million. Of this, US\$ 83.58 million were apportioned for water works while the budget for sanitation was US\$ 17.45 million, this money for sanitation was meant for upgrading of existing sewerage infrastructure and not to serve the poor urban areas. Most activities in the project are funded by IDA of the World Bank. The priority given to sanitation is 17.272%.

Within the same project there is a component for rural community water supply and sanitation where water works were allocated US\$ 1.87m and sanitation was allocated nothing.

It was observed that,

- The poor pay more money for waste water disposal than the rich.
- The regulator does not give sanitation for the urban poor its required priority
- When water supply and sanitation are the responsibility of one organisation, sanitation is at a disadvantage as water supply dominates.
- The private sector is doing a commendable job in providing the cesspit emptier services and other sanitary innovations though its prices are sometimes very inflated and depend on the bargaining power of the service provider and the client.
- 95% of all cholera cases in the City occur in areas where poor people resides and in areas are served only by onsite sanitation. Medical costs and deaths occurring during cholera outbreaks are not recognized when computing costs of sanitation for the urban poor.

## 6.0 RECOMMENDATIONS

- Establish a special fund for sewerage infrastructure development in which the privileged who are enjoying the use sewerage system built by public funds should also contribute by raising the tariff they currently pay.
- The sanitation department within the City should be independent, as it was before merging with water supply department.

- Governments, development partners and the public at large should put more emphasis and inject more funding into urban sanitation for the poor to reduce the hardship the poor currently endure and in the long run to achieve a just society.

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