



BPD SANITATION SERIES

Sanitation Partnerships: Dar es Salaam Case Study

Introduction

For BPD's Sanitation Partnership Series (SPS) Dar es Salaam is interesting from a number of angles. One is the established and functioning partnership between different sectors that has greatly improved solid waste collection in recent years. A second is the current fragmented nature of the sanitation sector, which both complicates partnership while making it more necessary. A third angle is the city's experience with pit emptying (MAPET and Vacutug as well as private and vibrant market for vacuum tanker emptying) and more recent schemes of social marketing and Ecosan.

This case study however concentrates primarily on one aspect – the emptying of pits, and the transfer and ultimate treatment of the waste therein.

Background

Dar es Salaam is the largest city and commercial centre in Tanzania; administratively it is split into four authorities – the Dar es Salaam City Council and the three municipal councils of Temeke, Ilala and Kinondoni. Of the three, Kinondoni has the largest population of approx. 1.2 million. The three municipalities are divided into a total of 73 wards, a local government structure that builds on the previous socialist leanings of the country, and goes right down to street level or mitaa, where approximately ten streets democratically elect a street cell leader. Kinondoni itself has 27 wards (adapted from Mtani).

The city is located on the east coast of Tanzania, along the Indian Ocean with a population of approx. 3.5 million; a growth rate of 8 to 10%. This accounts for around 25 per cent of the country's urban population. During the last 40 years, the city's growth has been primarily concentrated along the coastline and 4 arterial roads. Between the arterial roads, there are large areas that are not serviced and have developed into unplanned settlements. Many of these areas are located in hazardous lands such as river valleys, flood-prone areas and hill slopes. Servicing these areas is difficult due to the nature of the terrain and the density and layout of the settlements. Unplanned and unserviced areas accommodate about 80 percent of the population of the city. In the late 1990s, there were 55 such informal settlements in these areas (adapted from WaterAid).

Most of the unplanned settlements rely on unimproved or traditional pit latrines for their sanitation needs. These may either be built and maintained by the owner of the house, or alternatively be provided by a landlord (renting is increasingly common in Dar).

Evolution of Dar's urban sanitation in the last decade

As the above suggests, since the early 1990s there have been significant changes in both the physical and institutional context of Dar es Salaam, both of which have important consequences for the state of sanitation in poorer areas.

Evolution of the physical landscape

Over the last decade informal settlements have become increasingly more dense as people have continued to move to Dar es Salaam and have tried to settle in those areas closer to job opportunities (often the older unplanned settlements).

Accompanying this influx into a restricted area of land, people have also been starting to live on land that was previously less attractive. In low lying Dar es Salaam this includes many areas prone to flooding. This, and more formal development, has impacted upon the natural watercourses available and accordingly made flooding more of a problem than in previous years.

Together these have led to both more latrines and more loading on the existing latrines. Higher loading reduces the treatment that takes place in-site in latrines and latrines fill faster. The challenge of emptying latrines has grown. Higher densities also mean more and more settlements where traditional vacuum trucks cannot reach, while increased flooding and lower lying settlements have led to an increased problem of seasonal 'flushing', whereby poor residents use the floodwater to help empty the top part of their latrines (raised perhaps a metre off the ground) during the biannual rains, flushing raw sewage into the immediate environment. See the SPS spoke '*Beyond storage: on-site sanitation as an urban system*' for more on how communities cope with full latrines.

Changes in the institutional landscape

In the Eighties and early Nineties the institutional landscape of on-site sanitation was dominated by the Dar es Salaam Sewerage and Sanitation Department, a public body. Municipal and national reforms in the mid-Nineties saw decentralisation of city government to 3 municipalities and the dissolution of DSSD, with the sewerage component folded into a private contract for water and sewerage. DAWASA, the Dar Water and Sewerage Authority, was thus created and signed a contract with Citiwater (recently terminated). Both these actors are first and foremost concerned with the formal sewerage system, which reaches probably less than 10% of the residents of Dar. Municipalities have a broad responsibility for 'waste management' (both solid and liquid) but tend to focus on solid waste management.

In the process sanitation lost a fair degree of profile and has effectively been reduced to a side-issue of drinking water interventions. Three international NGO's cover each of the three municipalities as key actors in a World Bank programme to serve poorer areas with water and sanitation.

Inter sector coordination within and between municipalities is weak; integrated policy and implementation frameworks lack at all levels. During the period of DSSD, sanitation was recognised and recognisable as a (central) government authority. With the reforms above and decentralisation of government, sanitation as policy topic has all but disappeared from view.

WaterAid (one of the three NGOs mentioned above) has in recent years tried to get a sanitation forum going, but without much success, although renewed effort may accompany recent work to develop a strategic sanitation policy for Dar es Salaam (there is currently neither a city nor national policy for sanitation). This accompanies a World Bank loan aimed at rehabilitating the sewerage system and the treatment ponds that serve it.

Old services delivered in new ways

Solid waste management has seen a radical overhaul in Dar in recent years. This is undertaken jointly by the city authorities, the three municipalities of Ilala, Temeke and

Kinondoni and contracted private franchisees, who include Community Based Organizations (CBOs), Non Governmental Organizations (NGOs) and private companies. Potential waste collectors respond to advertisements placed by the three municipal councils and the city council; and are selected through a participatory tender evaluation process governed by by-laws approved by the Government of Tanzania. Selected franchisees – currently about 50 – are awarded contracts to collect waste and refuse collection fees within a designated area. The municipalities do not pay the franchisees for waste collection (households do), although many franchisees also have contracts for street sweeping for which they are paid directly. Income from street sweeping adds stability to the franchise business model. The approach used provides opportunities for small enterprises and community groups to improve the collection of solid waste as well as create employment opportunities for the poor (adapted from ILO).

Vacuum tanker emptying has undergone a similar revolution. Septic tank and latrine pit emptying used to be the monopoly of two city departments: DSSD (sewerage and sanitation mandate) with World Bank funded tankers and the Health Dept (waste collection mandate) with JICA funded tankers. After the merger of the departments and privatisation of the waste and sewage services, the old tankers were auctioned and the most of them sold to Tanzanian entrepreneurs, many of them (former) government employees. Currently about 40 private tankers are in operation, largely single owned. The largest fleet owner has three tankers.

Emptying fees are negotiable and average TSH 20-25.000 per haul (20-25 \$). The tanker hauling capacities are 5-8 m³. The standard practice during government operation was partial filling in a formal job (stopping with the excuse of ‘hosepipe clogging’) and using the remaining space to undertake an informal job, which generated additional income for the driver and crew. In the private operation setting the incentive for partial filling of the tanker is in economising on the number of trips undertaken (and thus the costs of fuel and discharge at the treatment works).

On the side of building latrines there are pilot programmes exploring the potential of social marketing and Eco-San. Yet these initiatives are currently small-scale and the overarching institutional framework that could hold them together and scale them up is currently weak and fragmented.

The importance of pit-emptying

Pit latrines (the most common infrastructure in poor areas of Dar) generally evolved in a context of physical space. When the pit was full, families would dig another pit, relocate or rebuild the top-structure, and close the old pit. However, thanks to significant densification in urban slums, there are now more people and more dwellings per plot. As settlement densities rise in a finite area, households increasingly share facilities, and loading per latrine climbs. Pits fill faster, while in many areas there is no longer space to dig new pits and build a replacement latrine, nor to bury the contents of a emptied pit on-site. Accordingly latrine waste in urban areas must increasingly be removed and taken away.

Mechanical emptying (often with a ‘vacuum truck’) as described above, is often unaffordable or inappropriate in the poor areas of Dar; trucks cannot gain access to pits in poor communities as alleys have narrowed and the terrain worsened. In such circumstances pit emptying becomes overwhelmingly a manual affair, with informal entrepreneurs relied upon to empty pits by hand.

In Dar such emptying is undertaken traditionally by vyura (meaning frogmen in Swahili). Historically they tended to dig out waste and bury it ‘on-plot’. Today high water tables and a lack of space make this increasingly difficult and in many instances the waste must be

transported and dumped (sometimes into the sewer network, more often in the nearest stream). See Bongi (2005) for a detailed description of manual emptying in Nairobi, which is similar in nature.

As for costs, the average charge for a MAPET tank load (200 litres) in 1992 was \$2.5; the average job normally taking five tank loads. Emptying fees for mechanical emptying are negotiable and today average around TSH 20-25.000 per haul (20-25 \$) and tanker hauling capacities are 5-8 m³. For a full pit then MAPET costs a household more than a tanker (provided the tanker can access the latrine), but it does allow households to limit the expenditure required to get the latrine 'functional' once more.

MAPET: a historical legacy

Recognising the inadequacy of many of the emptying options available to most poor residents of Dar es Salaam, and desiring to offer traditional vyura a safer and more hygienic livelihood opportunity, an NGO called WASTE set out to pilot another way of emptying latrines in the early 1990s.

Typically, a team of MAPET (MANual Pit Emptying Technology) emptiers consisted of three men, each self-employed. Each team was supplied with a small vacuum pump and handcart which they ran as a business, with some support from the then DSSD. Each team then acted as entrepreneurs and were responsible for the continuity of their activities and income as well as finding customers.

Having set a price with a customer, the MAPET team decided where to bury the latrine sludge on-plot (this was the practice where possible, though when there was insufficient space or the groundwater table is high then transfer to another site was necessary). In Dar es Salaam, this practice of burying sludge on-plot proved socially acceptable, providing that the process of emptying and burial is hygienic and the sludge is covered properly.

To cater for these need to occasionally transfer waste off-site, WASTE helped develop a modification to MAPET where emptied sludge was hauled by small tank cart to a transfer station.

At the end of the pilot project in 1992 seven teams were active with equipment in Dar es Salaam, and one team in Morogoro. By March 1994, five teams were still operational and it seems that one team was active as late as 2000/1. However it was apparent during the BPD visit in early 2005 that no MAPET teams remain operational – partly due to a lack of institutional support (DSSD has since been dissolved) and partly due to reliance on one foreign part for the MAPET equipment, which was neither replaced nor substituted with locally available parts once broken (adapted from WASTE, 2005).

It was the opportunity to return to Dar es Salaam and look again at the experience of MAPET and the challenge of pit-emptying especially that drew BPD to Dar es Salaam in 2005. Particularly striking was the clear evidence that on-site sanitation in such dense urban settlements was merely storing human waste - in such contexts emptying, transfer and treatment all have to be part of any solution (see the SPS spoke paper '*Beyond Storage*' for more).

On-site sanitation where in-site treatment is not feasible then becomes a process with four principal steps (the intermediate step here is driven by economies of scale and technical constraints):

1. Storing of waste in a latrine
2. Removal of waste from the latrine and transporting it off site (probably to an interim collection facility)

3. The storing of waste in an interim collection facility and its periodic removal a treatment works
4. The receipt and treatment the waste at the treatment works

Waste Treatment

The discharge of emptied sludge (removed mechanically or transported following manual removal) has to be at one of five sewage treatment ponds with tanker discharge facilities. These are now privately operated by CitiWater. The standard discharge fee is TSH 3.000 per haul, although the bribing of pond supervisors is allegedly common as is discharge at night (when there is no supervision). Illegal disposal of the privately -operated tankers is effectively counteracted by police control and severe fining and thus reduces direct contamination of the environment. Enforcement of these regulations may benefit from the fact that the treatment ponds are currently unfenced and not guarded at night.

The efficacy of treatment has been questioned, hence a World Bank project to rehabilitate treatment facilities. Clearly if waste is to be appropriately disposed of following removal and transfer, these ponds need to become a valued part of a broader solution.

Conclusions

As the discussions above suggest, an effective emptying service, especially in the climate of today's Dar es Salaam, where the density and low-lying location of many informal settlements is a growing challenge, is increasingly necessary.

Solid waste management offers an interesting contrast to, and perhaps inspiration for, the management of liquid human wastes. In the last few years the franchise arrangements mentioned above have made great strides in improving rubbish collection and street sweeping. Sanitation collection systems can learn from such solid-waste management partnerships and Dar may offer a role-model for new sanitation initiatives.

It seems likely that public money will need to be made available to underpin such an approach. The public sector could then play a valuable role in encouraging sanitation provision and in assisting with the removal and transfer of waste. Households can pay for latrines and for some of the emptying cost, while the public sector contributes to the cost of removal and treatment.

Could 'liquid-waste franchisees' be paid for hygienically storing, collecting and removing waste from poor neighbourhoods and delivering it for public sector treatment? The Durban case study suggests that it is feasible.

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