



Sanitation Partnerships Series:

Bringing pit emptying out of the darkness: A comparison of approaches in Durban, South Africa, and Kibera, Kenya

Kathy Eales, April 2005

Much attention has been focussed in recent years on partnerships in the water and sanitation sector. However, as is often the case when sanitation is bundled with water, much of the spotlight has been on water. Consequently, while we increasingly understand the circumstances in which partnerships to provide drinking water are successful, much less is really known about sanitation. One often encounters the false assumption that what applies to 'water' partnerships (or solid waste partnerships) will hold true for those catering specifically for sanitation.

In order to gain a better understanding of where partnerships fit in the debates around sanitation, BPD set out in 2004 to work with a series of sanitation-specific case studies. The first challenge was to find such partnerships, less easy than first supposed; eventually Dar es Salaam, Durban, Maputo, Maseru and Nairobi were chosen.

This paper is one of a series that look sanitation partnerships in poor urban communities, that questions when and why partnership may be appropriate or inappropriate to the delivery of on-site sanitation services.¹

The considerable challenge of pit emptying

Sooner or later, any toilet pit will fill. Where is no space to dig a replacement pit, the old pit must be emptied. Yet pit emptying is the dark under-belly of on-site sanitation – neglected, stigmatised, and inadequately acknowledged as an essential component of sustainable sanitation, especially for the poor. Where pit emptying is ignored, pits become unusable, waste spills and people's health and living environments are compromised; but what is needed to make pit emptying itself safer for those who do this work?

Mechanical desludging is usually the safest and most efficient means of emptying a pit, as large volumes of waste can be removed fairly quickly, with limited exposure to the waste for sanitary workers. But mechanical desludging equipment is expensive, vulnerable to failure, often cannot access the site and frequently cannot cope with the heavy sludge and solid matter found in pit toilets. The alternative is manual pit emptying, where people dig excreta and solid waste out of the pit, using shovels, buckets and other implements. This work can be deeply unpleasant, and poses a number of health risks if not managed carefully.

This case study presents two approaches to manual pit emptying to highlight some problems and possibilities in this badly neglected area of service provision. In Kibera, a vast informal settlement in Kenya's capital city, Nairobi, manual pit emptiers work inside pits at night by torch-light, without protective clothing, using

¹ BPD is a not-for-profit organisation that promotes, supports and researches partnerships between different sectors (public, civil society and private) to provide water and sanitation to poor communities worldwide. It has been active since 1998 and has good experience in its specialist niche of how best to structure, manage and evaluate collaborative relationships (partnerships) that provide services to poor communities (in both urban and rural settings).

rented basic equipment, subject to abuse and stigmatization, and dependent for jobs on agents of the landlords; the waste is commonly disposed of by dumping it into the settlement's streams. By contrast, city management in Durban, South Africa, is experimenting with a small contractor development-cum -franchise model for manual pit emptying: sub-contractors will employ teams of wage labourers who enjoy the protection of the law, and who work in daylight with long-handled shovels, heavy gloves and gumboots, transferring pit waste from drums to specially modified waste skips, where it is screened before being disposed of safely.

Unpacking a 'household sanitation service'

In looking at sanitation partnerships BPD has sought to unpack the often complex relationships between different stakeholders - the goal being to better understand the underlying dynamics and incentives that drive them. In this way we generate a better understanding of what specific challenges sanitation poses to partnerships and when partnership is or is not helpful in delivering a 'sanitation service'.

In the adjoining triangle we have looked to understand who really sits at each corner; as well as how, when and why they relate to each other. What resources do each contribute to the 'service', how does money flow in the system and who communicates with whom and why?

This case study looks at pit emptying specifically – others look at the provision or improvement of pits, or at the linkages between providing a pit and emptying it.

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    graph TD
      P[Policymakers] <-.-> Pr[Providers]
      P <-.-> PH[Poor households]
      Pr <-.-> PH
      CS([Any community level structures?])
      CS -.-> P
      CS -.-> Pr
      CS -.-> PH
  
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Simplified 'service' triangle

What the Kibera workers we spoke to want above all is public acknowledgement of the value of their work, and acknowledgement of its hazards. They say they feel invisible, yet are vulnerable to attack because of the work they do. This paper attempts to highlight some aspects of their work, while contrasting it with the very different approach being taken in Durban.

MANUAL PIT EMPTYING IN KIBEIRA

With over 500,000 residents, Kibera houses a fifth of Nairobi's people on less than 4% of its surface area. It is said to be the most densely populated settlement on the continent, with most residents living in rows of single-room wattle-and-daub, timber or corrugated iron structures. The land is publicly owned, and an estimated 90% of residents rent their room from a landlord or 'structure owner'.

Kibera has evolved since the 1930s with little formal planning and fewer services. There is very little internal road access, and most public thoroughfares are impassable for vehicles; dwellings are linked by narrow alleys. There are said to be more churches and more CBOs in Kibera than toilets. Two sewer lines pass through the settlement, but the vast majority of residents use simple pit toilets which could be shared by as many as twenty or more households. A few public toilets-cum-ablution blocks have been constructed recently by NGOs, but conditions within the settlements are generally grim.

Regular pit emptying assumes critical importance in this context of high residential density and extreme loading on individual toilets. There are a number of mechanical emptying services, but many parts of the settlement are simply inaccessible to desludging vehicles, even where long extension hoses are used. Given that there is simply no space to relocate a full pit toilet, manual pit emptying is an essential service in Kibera. Yet this work is harshly stigmatised and poorly paid, and those who do this dirty work are vulnerable to attack, disease and extortion.

Emptying pits

In Kibera, manual pit emptiers work at night, by torchlight, sometimes standing waste-deep in human excrement. The three men interviewed for this study had no protective clothing, gloves, boots or face-masks. They sometimes use plastic bags over their hands instead of gloves and shovels. One man showed us the cuts on his hands and feet from glass and metal in the sludge.

The job is generally done by men, working in teams of two to four people. Sometimes they begin by pouring paraffin into the pit to override the smell of the excreta. The waste is removed using a bucket on a rope, and the contents are then transferred to a 100 litre drum. Depending on the nature of the access path, the drum might have to be carried 50 or 100 metres to a handcart, which is used to wheel the waste to a disposal site. The waste is disposed of by emptying it into the sewer system (where there is no structure obstructing the manhole cover), dumping it in a stream, or transferring it to a mechanical desludger for disposal elsewhere. Some spillage is inevitable, and it is the combination of smell and spillage which can prompt assault by local residents.

Where the pit waste has solidified, it can be liquefied and stirred and then removed with a bucket. Where it has hardened ("it gets like concrete," said one pit emptier) it must be dug out with a shovel. Here the pit emptier stands inside the pit, filling a bucket on a rope which then gets hauled up and emptied into the drum.

Payment

The pit emptiers charge by volume: 200 shillings (US\$2.60) for the team per foot of depth, from pits that are usually three feet by four feetⁱⁱ. This generally fills a 100 litre drum. Pits can be as much as fifteen feet deep (over four metres), and in a good night, the men can remove up to seven feet of depth (over two metres). The key bottleneck that determines how many feet of pit waste can be emptied in a night is the time taken to empty the 100 litre drum, as manoeuvring a heavy drum and hand cart through steep uneven alleys takes time. Consequently the pit emptiers prefer working on a toilet that is close to a road or a river, as this allows for quicker disposal of the waste.

The men are paid in cash at the end of their work, and their income is shared between them. Expenses that must be deducted include the cost of a permit for manual desludgingⁱⁱⁱ, hire of shovels, drums and a hand-cart, a small fee for dumping into the sewer system^{iv}, and the cost of a shower - 5 shillings - at a public ablution facility where the men can also wash their clothes and shoes. They are often charged double at the showers because they are so filthy. Depending what volume of sludge they remove and how many people are working in the team, each person could earn the equivalent of one to four US dollars a night.

One man estimated he would need 10 000 shillings (roughly US\$130) to be self-sufficient with his own shovel, drum and cart - a figure he believed was completely beyond his reach.

Seasonal work

Manual emptying is largely seasonal, because of far higher demand for servicing in the rainy seasons. Stormwater ingress results in the toilet pits filling rapidly or

ⁱⁱ 30 cm depth, in a pit approximately 90 cm wide by 120 cm across.

ⁱⁱⁱ Manual pit emptying is regulated by permits. The approval of the local administration – in the person of the Chief or Assistant Chief - is needed to confirm that a given pit cannot be emptied mechanically. Without this permission, the pit emptier can be arrested.

^{iv} It is not clear to us currently to whom this is paid.

overflowing; equally, the greater volume of water flowing in Kibera's polluted streams allows for easy disposal of the pit sludge – "just like a flush", said one pit emptier.

Outside of the rainy season, the work is erratic, and they are obliged to supplement their income with odd jobs, collecting garbage or working as porters at the market.

'But we are praying for the rains to begin – then there will be more work, and the work will be easier.'

Stigma

There is a perception among local residents that manual emptying is illegal, and that it is therefore legitimate to assault those who haul stinking buckets and drums through Kibera's narrow alleys. The settlement is not electrified, and so the pit emptiers work under cover of darkness late at night when most people are indoors and there is less risk of being seen, and robbed or beaten. "During the day," said one man, "we could get killed, because of the smell, and because people are drunk. But it is still dangerous at night."

The men take a grim pride in their work, and see themselves as providing an essential service which keeps the settlement hygienic and habitable. Yet the job carries social stigma which exacts its own costs.

One of the men described his hurt when his sister asked how he could choose this kind of work. He explained very simply to her, and to us: 'Because I don't have another job to do.' Another said that it is very hard work, and that he would do other work if he could find it – but this work allowed him to feed his family and put his children through school.

Finding work

The men are well known locally as pit emptiers, and are recruited for each job by the structure owner who controls the property where the toilet is full. Sometimes it is that same landlord who hires them the equipment they need - spades, drums, and the hand cart needed to wheel the full drum of waste through the narrow alleys to the nearest sewer manhole, stream or tanker; whoever they hire their equipment from, they pay a premium, because it is known it will be used for handling excreta.

"We have nowhere to go to complain," said one man. "You just have to complain to your stomach."

Concluding comments

What these Kibera workers wanted above all was public acknowledgement of the value of their work, and acknowledgement of its hazards. Their expectations of improvement are modest, yet they are keen to learn about other approaches to manual pit emptying, and how to improve their working conditions.

City officials seem far removed from the realities of everyday life in Kibera, and are unlikely to offer relief in the short term. Perhaps a starting point would be for local NGOs and CBOs to educate and sensitise Kibera's residents to the perspectives of the pit emptiers, so that at least the pit workers would no longer have to work under cover of darkness.

Open question

Could such pit emptying ever be 'regularised'? If so who could assist these 'entrepreneurs'? Would a 'business model' be able to cope with such seasonal demand?

^v Understanding small scale providers of sanitation services: a case study of Kibera; Sabine Bongji, WSP (2005) p. 8.

MANUAL PIT EMPTYING IN DURBAN

The eThekweni Municipality, centred on the South African coastal city of Durban, has a population of approximately 3-million people. The city has embarked on an extensive sanitation improvement programme, and is well on track to provide every household with at least a basic acceptable toilet by 2010, in line with national targets, and by 2020 aims to have upgraded a considerable number of these to fully reticulated flush toilets.^{vi}

There are currently an estimated 100 000 pit latrines within the municipality's boundaries. A growing number of existing toilet pits are full, and constitute a significant risk to ground and surface water and to public health.

In stark contrast to Kibera, and reflecting South Africa's very different political and economic context, eThekweni has recently committed itself to emptying every pit toilet in the city once every five years, free of charge. This is premised on the assumption that the number of pit toilets will diminish rapidly as services are upgraded.

Honouring this commitment means emptying at least 20 000 pit toilets a year. Even in a city with the resources that Durban has, this presents an enormous challenge.

The municipality has been providing a municipal desludging service where possible in areas accessible to suction tankers, at a fee to households of R81 (US\$ 13) per emptying; the real cost ranges from R450 (US\$73) to over R1500 (US\$246), with the average cost around R600 (US\$90). But many of the areas most urgently in need of servicing are in low income settlements not accessible to suction tankers, because of bad roads, high settlement densities, steep slopes and so on. No small-scale service providers have emerged to provide an alternative service, perhaps because the municipally-subsidised price offers little incentive to them to compete, and because the capital and operating costs of conventional suction tankers are prohibitively expensive.

In late 2003, the municipal water and sanitation utility, eThekweni Municipality Water & Waste (EMWW) embarked on a pilot programme to test approaches to pit emptying which could be scaled up to service all pit toilets until such time as they are replaced.

Following extensive testing of a number of technologies in different terrains and settlement types, eThekweni Municipality has opted for manual pit emptying throughout the city as the default for pit latrines. This may seem surprising to some, given the excellent technical resources and comparative affluence of this municipality. Should Durban not be exploring more innovative technologies, or is Durban's approach instructive for less-well resourced cities which have limited capacity to address the operational and maintenance problems associated with unproven pit emptying technologies?

It seems the key driver is pragmatism: a relatively high proportion of pit sites is in hilly, densely settled areas which are inaccessible to vacuum tankers, and which have a history of poor solid waste removal and thus carry a high risk of blockages which cause delays and raise costs. Given that the city has committed itself to emptying at least 20,000 pits a year for at least the next fifteen years, at no direct cost to the beneficiaries, it has opted for a standardised approach which carries the least risk of mechanical failure, and which offers significant job creation and small

^{vi} In low income peri-urban areas 'beyond the water borne edge', the city has installed more than 20 000 double chamber urine diversion toilets so as to provide households with a technology they can manage themselves or can afford to have serviced themselves without municipal intervention.*

business development opportunities in a context of high unemployment. Thus its resourcefulness is being applied not to a mechanical system but to an organizational model which will generate its own performance incentives to address pit emptying effectively, while creating jobs and growing skills.

The proposed approach seeks to develop and extend some key features of the 2003-2004 pilot pit emptying programme. Key features of the pilot programme are reviewed below, before turning to the expanded programme itself.

The 2003-2004 pilot pit emptying project

For the pilot project, EMWW put out a tender for a service provider with the experience, plant and financial standing to set up work teams which would then recruit local labourers. In parallel, a separate social facilitation consultancy was recruited to address community liaison, recruitment of labourers, pit identification and data collection in the field, and related tasks. A firm of consulting engineers oversaw the programme, and worked closely with a senior manager from EMWW. Ethewini Municipality (EM) funded all costs.

The project team paid particular attention to building strong linkages with local representative structures to facilitate communication and co-ordination with residents in targeted settlements. In each settlement, an Area Working Group was established between the local municipal councillor, EMWW representative and EMWW project team; in addition, a Project Liaison Committee (PLC) was established, comprising an elected municipal councillor for the area, up to seven community representatives and a member of the project team.

Each PLC identified 500 households with full pits, and assisted with the recruitment of local residents to work as labourers on the project. Women were employed wherever possible, except where steep terrain called for particular physical strength for some tasks. Labourers were paid R60 (US\$10) for a nine hour day. The project team had anticipated some resistance among the workers to handling human faeces, but did not experience this^{vii}; employment opportunities in the area are limited, and the project offered jobs.

Each PLC also selected a Community Liaison Officer, who worked closely with EMWW's consultants to inform community members about the project and visit each household ahead of the pit-emptying team to gather some basic data and inform them when the team would visit. On completion of the pit emptying, the CLO would fill in a Completion Certificate, which the householder would sign-off, after being given an opportunity to comment on the process. Any problems would be reported and attended to. For example, if sludge was accidentally spilled outside a house, the CLO would allegedly liaise with the household, apologise on behalf of the team, and ensure the mess was cleaned up.^{viii}

In each of the three pilot sites, three evacuation technologies were used: suction tankers, small diaphragm handpumps and manual emptying using long-shaft shovels and hay rakes. For a number of reasons, the project team concluded that manual desludging was the most practical and cost-effective approach, taking into account the terrain, access to sites and cost, and proposed that this should be the default in future.

***Open question**
Here the community has been galvanised to come together, providing a liaison point for the municipality. How could such 'partnership' be replicated in an environment of few municipal resources?*

***Open question**
Did the aggregation of demand into 500 households, dealt with concurrently, make it easier for the community liaison officer to create this relationship between municipality and householder?*

^{vii} 'Ethekwini Municipality Water and Sanitation Unit Pit Latrine Evacuation Study', unpublished Completion Report, UWP Consulting & Njabulo Consulting, May 2004, p. 25.

^{viii} Ibid., pp. 10-11.

Various waste removal options were tested – waste was either collected directly into a suction tanker; or pumped from the handpump or shovelled manually into 100 litre drums and trolleyed to a modified collecting skip, where it was screened to remove solid waste. The solid waste was then bagged and disposed of as hazardous waste at a solid waste dumpsite. The remaining excreta was then taken by suction tanker to the waste treatment works, or drained directly into a sewer.

Various treatment options were considered: burial, composting, burning, or blending with water-borne sewage. For a variety of reasons, only treatment at the waste treatment works was seen as acceptable.

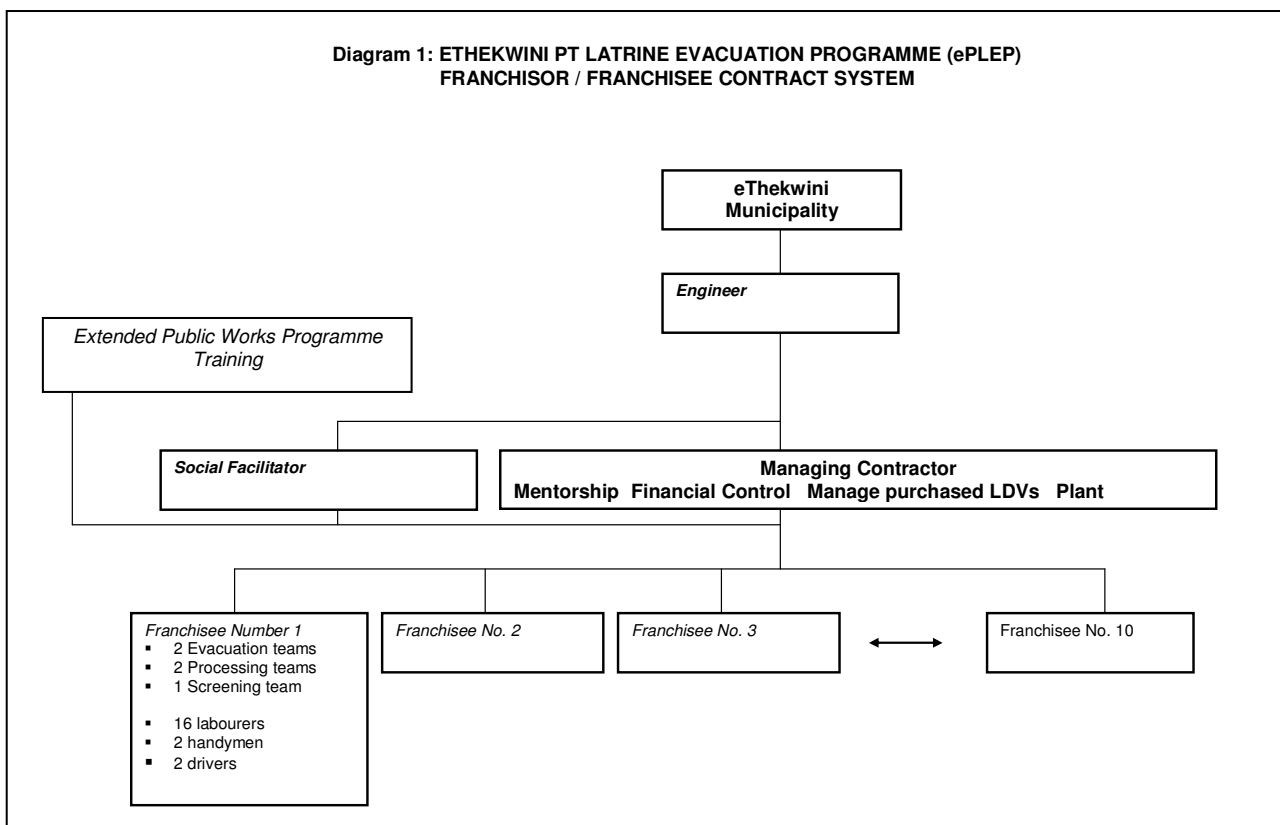
The proposed eThekwini Pit Latrine Evacuation Programme (ePLEP)

Many of the elements of the pilot project have been retained and developed in the ePLEP, with a major emphasis on mentoring small contractors, or franchisees, to manage teams of labourers who will undertake the work of pit-emptying, waste processing and sludge disposal.

The model that follows describes the *intentions* of the city. It has not yet been operationalised, and no appointments will be made before mid-2005. Nonetheless EMWW has every intention of implementing this model, and, indeed, sees this approach as the most effective way of addressing the vast pit-emptying backlogs in the city.

Diagram 1 (next page) provides an organogram for the proposed ePLEP. The pivotal function will be the Managing Contractor, or Franchisor. The role will be put out to tender, and it is likely that a consortium will be required to address the competencies required. These include:

- *Mentorship:* On-the-job training, financial control, site safety, assistance with site administration, ongoing mentorship
- *Financial control:* setting up small enterprises, managing their financial



systems, paying taxes and levies, doing monthly and daily costing, making payments and so on

- *Manage purchase of LDVs^{ix}*: arrange vehicle finance for the purchase of two LDVs per franchisee, oversee vehicle maintenance contracts etc.
- *Plant management*: purchase sludge screens, supply additional plant as required, assist with hire of water bowsers for screening sludge, etc.

Working alongside the Managing Contractor will be a Social Facilitator. Responsibilities here include devising a fair selection process for small contractors; liaising with community representatives; setting up project liaison committees, to recruit labourers from within the targeted settlement, manage interactions with the community and locate pits; notifying residents of the pit emptying schedule and liaise with individual households; liaison with councillors; providing on-site training; and so on.

The Managing Contractor and Social Facilitator functions will work closely with ten carefully selected small contractors, or Franchisees. Each contractor will run five teams of workers, totalling 20 people, who will address pit emptying, waste processing and waste screening.

Workers will be recruited through the Project Liaison Committee. A limited number of residents in an area targeted for pit-emptying will be given an opportunity to find work on the project on a short-term basis, and will receive some basic work-related training as well as some life skills training, through the national Extended Public Works Programme. Wages will be stipulated by EMWW, and are likely to be comparable to those paid on the pilot project.

The pit emptying technique will be largely the same as in the pilot phase, as described above. Workers, wearing appropriate protective clothing, will remove the waste with shovels and hay rakes and transfer it to 100 litre drums, which will then be trollyed to shuttle truck and dumped into a modified collecting skip. Here the sludge will be diluted, screened and cleared of debris; debris will be retained in the skip and ultimately taken to a dump site, while the diluted sludge will be drained away through the nearest sewer manhole.

The programme will be aligned closely with the national Extended Public Works Programme, an initiative designed both to create short-term jobs and improve the long-term employment prospects of participants through providing life skills and job training. Pit-emptying and other labourers will receive both on-the-job training and life skills training, funded through the Department of Labour, while the franchisees will benefit from a learnership programme run by the Managing Contractor, which will focus on developing their small business skills.

Comments on the business model

The EMWW model is premised on growing a pool of service providers able to address the city's pit-emptying needs, while creating jobs and developing a number of small businesses. Once the two-year contract has been completed, the franchisee

Disposing of liquid waste

The transfer between the drums and the sewer (via the collecting skip) is a crucial part of the equation. In other settings the BPD has looked at, for instance Maputo or Dar es Salaam, this link has not been as straightforward. In Maputo a CBO called ADASBU has been running a localised pit emptying service in a poor neighbourhood called Urbanisacao. However its service is not financially viable due to the need to transport the waste over long distances, on public roads, in order to transfer it to the waste treatment plant. ADASBU had approached the public authorities to ask for permission to dump the waste in the municipal sewer (which runs past the border of the community) but have been turned down (for health and safety reasons as well as concerns about the clogging and the design load of the sewer in question). In Dar es Salaam, an NGO called WASTE, attempted to establish a waste transfer station, where liquid waste could be stored and transferred by vacuum truck to the treatment plant (no sewer ran nearby). However this ran into problems with both local planning officials and the church who granted the use of the land (and then revoked it). As a result the transfer 'link in the chain' proved the undoing of that particular project.

^{ix} A retail bank will finance the purchase of two light duty vehicles (LDVs) on behalf of each franchisee. A small contractor with a new business would not ordinarily qualify for vehicle finance, so ownership will initially be vested with the Managing Contractor. As the business matures, ownership will steadily be transferred to the franchisee.

Open question
Could pit emptying teams be 'aggregated' similarly in other circumstances or does this rely on a centralised supply-driven 'emptying schedule'?

could go into business independently, offering pit-emptying or some other service such as general cartage or refuse removal. The intention is to build the business skills of a small contractor, and provide them with the assets needed to undertake the business.

EMWW needs the model to work, so has devised an approach designed to assist small contractors succeed, through built-in incentives to encourage productivity and profitability, and close hands-on support from the Managing Contractor. EMWW will set the pricing structure, and the franchisees will be recruited on the basis of capability and competence, not price-competitiveness.

The intention is to define fair minimum productivity requirements for each contractor, with incentives to reward those who do more work with additional payment. For example, each pit emptying team will be set a minimum target of pits per day, with some flexibility around targets to accommodate the level of difficulty of the work (shaped by different ground conditions, state of pit contents, etc). A weighting system will be used to grade the level of difficulty.

EMWW feels the enterprise model is ideally suited to manual pit emptying, as the business risks are relatively low – particularly when compared with mechanical desludging, which has high entry barriers for small contractors because of the high cost of a vacuum tanker.

It is early days still for the Durban model, and many of the ideas must still be tested. But it does provide an unusual example of innovative thinking around partnership in the sanitation sector – one that seeks to balance entrepreneurial risk taking with the incentives needed to get an essential job done properly.

Concluding comments

In Kibera, manual pit emptiers are paid poorly, treated badly by residents and are exposed to the risk of injury, disease and physical assault. The majority of beneficiaries have no direct relationship with the manual pit emptiers – barring hostile encounters – as the transaction is between the pit emptier and the structure owner/ landlord or his or her agent. Pit-emptying is paid for by the structure owners, and financed indirectly by household beneficiaries from a portion of their rent. Despite its importance, little value is attached to this service – hence the dreadful working conditions and low payment of the pit emptiers. Government – whether at local or national level - plays no role in supporting or over-seeing safe manual pit-emptying.

Conversely, in Durban, beneficiaries and pit emptiers interact in broad daylight. Residents might resent the smell of a waste skip in their neighbourhood, but the physical safety of the workers is not at risk – they receive the protective clothing they need, and they are recognized as local residents themselves, drawn directly from the beneficiary community through an open and transparent process of recruitment that aims to provide short-term jobs.

Open question
Can the sheer cost of organised pit emptying be lowered, and if so, how? How often is this cost (usually to residents) factored into programmes of latrine construction?

EThekweni Municipality acknowledges the value and importance of regular pit emptying, and is allocating substantial funds to ensure that a good service is provided at no cost to households through a model that will safeguard the rights of the pit emptiers themselves. The cost for the first five years is estimated at R70-million (US\$11.5-m). Ironically, given the strengths of the model, this puts its replicability and sustainability at risk, because EMW&W sees no scope for funding it from its own resources, let alone from residents'. The programme is dependent on funding transfers from national government, and there are no guarantees that funds will be secured for the programme's necessary lifespan, let alone for replication to other settlements where pit emptying is needed.