

Understanding Small Scale Providers of Sanitation Services: A Case Study of Kibera

Little is understood of the work of Small Scale Providers of Sanitation Services and their central role in sanitation provision but now researchers and urban planners are starting to pay attention. Focusing on sanitation providers in the informal settlement of Kibera in Nairobi, this field note provides better understanding of who the SSPSS are, the range of services they offer, and recommends options for improving the quality and efficiency of their services.



Introduction

Throughout the developing world many of the urban poor depend on informal, private small-scale providers for sanitation services. These entrepreneurs receive no government resources but survive by offering services that the consumers want and are willing to pay for. Until fairly recently Small Scale Providers (SSPs) were thought to offer only temporary, short-term solutions to the increasing and unmet demand for sanitation services and were often ignored by government policy makers and donors.

But there is growing recognition that a meaningful response to the needs of low-income and informal areas must involve partnerships between small entrepreneurs and formal utilities. One of the reasons for this change in attitude is the persistent failure by municipalities and public utilities to meet service demands in slum settlements that develop on the outskirts of cities and towns. This gap can be filled by SSPs who have shown remarkable resourcefulness in finding simple, but effective, solutions often under the most adverse operating conditions.

Kibera a sprawling informal settlement in Nairobi, Kenya, is home to half a million people. Here, Small Scale Providers of Sanitation Services (SSPSS) play a central role in sanitation provision, including the management of public toilet blocks, the construction of latrines, and the removal of sludge.

Until now, little work has been done to understand and evaluate the work of SSPs, but their importance in the

sector is increasingly attracting the attention of researchers and planners in non-governmental organizations (NGOs), and development agencies. This field note is based on a preliminary study carried out during 2003–04, and builds on the work carried out by the Water and Sanitation Program-Africa (WSP-AF) since 1997.

The field research is based on interviews conducted in Kibera with 51 service providers (14 groups or individual manual pit emptiers, 15 truck emptier employees, 12 builders and unskilled workers, and 10 public toilet employees or volunteer managers), 49 households, seven community-based organizations (CBOs), six NGOs, four international organizations, two Nairobi City Council officials, one consultant company and a Ministry of Health official. The purpose of the study is to provide a better understanding of who the SSPSS are, and the range of services they offer, with a view to identifying and recommending improvements to the environment within which they operate,

and the quality and efficiency of the services they offer.

Kibera's sanitation nightmare

Kibera is composed of nine villages of different sizes and population. Strategically placed to provide labor to the industrial area and neighboring residential areas, it is the largest informal settlement in Nairobi and home to more than a quarter of Nairobi's estimated total population of 2.3 million. It is the most densely populated area in sub-Saharan Africa with 2,000 inhabitants per hectare. It is estimated that on average, 3.4 people occupy 10m² single-room structures built from mud, timber and corrugated iron sheets.

The high population density, unplanned and crowded housing, and lack of infrastructure have resulted in poor provision of environmental and social services. Most roads in Kibera are inaccessible to vehicles, drainage



Kibera's streets are characterized by uncollected garbage and clogged drainage channels

channels on the sides of the roads are often blocked, pit latrines overflow (especially in the rainy season) and heaps of uncollected garbage are everywhere.

Kibera is gazetted as government land, much of which has been allocated informally to 'structure owners' (because they do not own the land but only the structures they have built. This field note refers to them as 'owners').

The temporary shelters that the owners erect are let to the vast number of laborers seeking daily employment in Nairobi. These structures have been subject to constant threats of demolition by the City Council, and this insecurity of tenure has affected the level of investment that structure owners and residents are willing to risk. Long-term improvement projects are also hampered by the fact that 90 percent of Kibera's inhabitants are tenants and the owners, who live elsewhere, have little incentive to provide services or improve living conditions in the settlement.

Nairobi City Council does not provide sanitation services to Kibera. Although two sewer lines cross the settlement, most people rely on on-site sanitation. One latrine is often used by several households or even several plots (a 'plot' refers to a group of rooms either belonging to the same owner or placed side by side), which means up to 150 people may be sharing a single latrine. In many cases the latrines lack privacy and security, are unhygienic and in poor condition with gaping holes in the walls, broken doors and filled pits.

Where neither private nor public latrines are available, many residents have had to resort to using plastic bags that are then dumped in alleys and ditches – a practice called "flying toilets". In the already overcrowded slums lack of adequate water supply, solid waste management, excreta disposal, drainage and wastewater management impact severely on public health. Of the ten most widespread diseases in Kibera, five are linked directly to inadequate water and sanitation provision (diarrhoea, skin diseases, typhoid, tuberculosis, malaria).

Small scale providers of sanitation services

There is a range of different private enterprises in Kibera each offering specific service skills:

- Latrine management;
- Latrine construction; and
- Latrine emptying.

These services are mostly offered by independent SSPs who are resident in the settlement and can deliver what public services are unable or unwilling to provide. Alternative providers

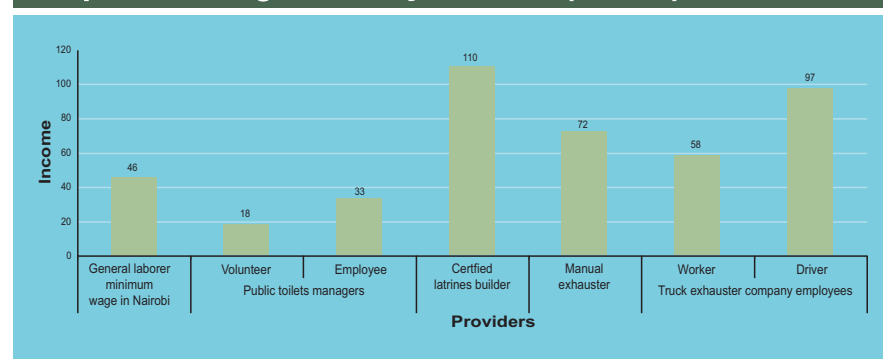


A typical pit latrine in Kibera

understand the financial situation of households served, can offer credit facilities and respond quickly to consumer preferences. With the exception of public latrine management, all the service providers are men.

There is a great disparity in their revenues (see Graph 1) but they compare favorably to the minimum wage for general laborers in Nairobi. These figures highlight the important

Graph 1: Average monthly revenue (in US\$)



commercial potential of this sector, and the need for government to recognize and support the business opportunities as well as the contributions made by these providers in extending services to the poor.

SSPSS do not keep account of their expenses, and cannot therefore estimate their income relative to their revenue. They have a broad idea of their revenue range, which can be compared to the general laborer minimum wage in Nairobi.

The business of operating and managing latrines

There are six different models of sanitation systems in Kibera, each differing in ownership, access and management system (see Tables 1 and 3). For pit latrines, the two main types in Kibera are either lined or unlined.

Public latrine blocks

As Table 1 illustrates, municipal authorities neither own nor manage public latrines in Kibera. All but one of the 20 toilet blocks have been constructed using donor or NGO



A public latrine funded by an NGO

funding. The latrines are managed by CBOs on a commercial or volunteer basis (volunteers often receive some compensation). Operation and maintenance costs are recovered by levying a user service charge.

The financial viability of the different models of public toilet blocks has been compared on the basis of their annual running costs in Table 2.

While unsecured land tenure does not appear to hinder development organizations from funding public latrines, entrepreneurs appear

reluctant to invest in local infrastructure because the infrastructure (investment) may be demolished at any time. This may explain why Kibera has only one privately-operated public latrine, which was financed by a micro-credit loan for 35 percent (US\$260) of the total investment. The structure of this public latrine is largely made from removable materials such as timber and iron roofing sheets.

Two externally funded pilot projects have introduced bio-digestion technology into a public latrine block. This transforms the lined pit into a digestion reactor producing biogas which can be used as an energy source. If this proves to be a viable technology, the biogas could be used to produce electricity and heat water for showers. It should also help to tackle the problem of sludge disposal since the process reduces the volume of excreta, and the resultant waste material is less pathogenic.

An analysis of the three models of public latrines shows that:

- Voluntary maintenance does not deliver an effective and efficient

Table 1: Characteristics of public latrines

Model	Owner of facility	Management mode	Investment funding sources	Number of latrines	Excreta disposal method	Technology	Price (in US\$)		Services and maintenance quality
							Per use	Per month	
1	CBO	Volunteer	Grant	105	Pit or bio-digester toilets	Pit latrines or pour flush	0.025 to 0.064	1.3	Poor
2	CBO	Employee	Grant	24	Pit or bio-digester	Pit latrines	0.025	-	Good
3	Private operator	Employee	Private sector and micro finance institution	6	Sewer connection	Pour flush toilets	0.038	-	Good

Table 2: Public latrine annual operation costs (in US\$)

Model	1	2	3
Owner of facility	CBO	CBO	Private
Management mode	Volunteer	Employee	Employee
Investment funding sources	Subsidies	Subsidies	Private sector
Excreta disposal method	Pit	Pit	Sewer connection
Characteristics	8 latrines, 4 showers	4 latrines, 2 ablution block	6 latrines, 1 ablution blocks
	Water connection with tank	Water connection with tank	Water kiosk with tank
Technology	Pour flush	Pit latrines	Pour flush
Village	Kianda	Soweto	Laini Saba
Investments (US\$)			
Sanitation block construction	10,390	15,974	519
Sewer connection	0	0	32
Land purchase	Community contribution	Community contribution	130
Bribes	0	0	97
Total investments (US\$)	10,390	15,974	778
Annual running costs (US\$)			
Staff income			
Employees/volunteers	234	564	623
Functioning			
Water	779	31	312
Electricity	No electricity connection	47	47
Miscellaneous (toilet paper, soap, cleaning products, stationery)	450	468	545
Emptying	2,026	405	Sewage fee included in water tariff
Capital allowance/provision for depreciation (5 years)			
Sanitation block construction	2,078 (10,390 in total)	3,195 (15,974 in total)	104 (519 in total)
Total annual running costs (US\$)	5,567	4,710	1,631
Number of users per day	Visitors	219	489
	Subscribers ¹	242	0
Average cost per user	0.033	0.026	0.022
Annual revenues (from user charges) (US\$)	4,548	4,636	2,844
Annual margin (including depreciation)	-1018	-74	1,109
Annual margin (without depreciation)	1,059	3,121	1,213

Table 3: Characteristics of private latrines

Model	Owner of facility	Management mode	Investment funding sources	Number of latrines	Excreta disposal method	Technology	Price per month (in US\$)	Services and facilities quality
4	CBO	CBO member and users	Grant	298	Pit	Pit latrines	2.6 to 5.2	Fair
5	Owner	Owner	Owner and grant	60	Pit	Pit latrines	-	Good
6	Owner	Owner	Owner	(Data not available)	Pit	Pit latrines	-	Very poor

¹ Subscribers pay per month

service. On the contrary, commercial management leads to a quality service and well-maintained facilities, irrespective of whether the block is owned by a private operator or a CBO. Customers appreciate a flexible service adapted to their demands, which include lending soap and sandals for use in the ablution block.

- Private owner management is financially viable, mainly because investment costs are 13 times cheaper than those for donor funded blocks (see Table 2). This is due to a 'cost hunting' approach, the use of cheap materials and a sewer connection that is less expensive than pit emptying. Nevertheless private facilities provide a similar level of comfort and hygiene to expensive donor-funded blocks (though this conclusion is based on a sample of one, it is a clear demonstration of the achievement of the private sector).
- The CBO blocks are not financially viable if the costs of capital depreciation are included in the annual running costs (see Table 2).

Private household latrines

Private latrines are only available to members of the same household or plot. In the case of Model 4, the construction was wholly funded by an external aid agency and the management entrusted to a CBO. The CBO rents each latrine to a different user group, and provides operation and maintenance services, including emptying. These models have increased the number of decent latrines available in Kibera but a number of difficulties have been reported, notably poor quality of construction, ownership claims from influential people and low cleanliness levels by latrine users.

The construction of Model 5 is partially funded by an NGO with the owner financing the balance. This approach has yielded positive results but NGO funding of this nature is not likely to be sustainable. In this specific case the NGO worked closely with the provincial administration, which has sometimes played a crucial role in encouraging prospective owners to demolish a room in order to build latrines.

In Model 6, the construction is financed entirely by the owner. These latrines tend to be poorly constructed with unsatisfactory standards of maintenance unless the owner is resident on the plot. Self-financing owners favor the unlined pit because of its low cost, which works out at around US\$100, including labor and building materials. Most externally funded projects opt for the lined pit.

Lack of coordination between development organizations

Various development organizations (including CBOs, NGOs and United Nations agencies) have financed latrines in villages in Kibera. The levels of external funding range from 75 to 100 percent. Table 4 highlights huge disparities in the numbers and distribution of such latrines which are partly the result of poor coordination between the agencies involved. There is a tendency for these externally financed latrines to be constructed in villages where access may be relatively easy, but the needs are less urgent

Table 4: Presence of externally funded latrines

Village	Population	% of total population	Total externally funded latrines
Gatwikira	52,234	11.1	1
Kianda	71,366	15.3	136
Kisumu Ndogo	48,340	10.3	34
Laini Saba	27,340	5.9	156
Lindi	57,715	12.3	30
Makina	95,636	20.5	96
Mashimoni	23,437	5.0	0
Siranga	53,850	11.5	30
Soweto	37,949	8.1	4
Total	467,867	100	487



Construction of a partially funded private latrine

than in more remote and equally overcrowded areas.

While current planning for sanitation services by municipalities, utilities and the donors who support them recognizes the urgent need for more and better latrines in Kibera, and for an improved emptying service, SSPs are largely excluded from the planning process. They are simply used as manpower to construct the facilities. Government should recognize the importance of the SSPs in the sector and the contributions their successful operations could make in extending sanitation services to more poor households.

The business of building latrines

Latrines in Kibera are normally simple constructions of mud, wood and sheets of corrugated iron erected by unskilled workers, so there is little demand for builders with specialized

masonry skills. As a result, the quality of construction varies a great deal and depends primarily on the level of funds available.

In Model 5 (see Table 3), the owner received a grant of 75 percent of the construction cost, and he provided the land and paid the wages. To qualify for the subsidy, the owner must employ certified builders trained to a high standard by the NGO providing the grant. This training has introduced a capacity building opportunity for local

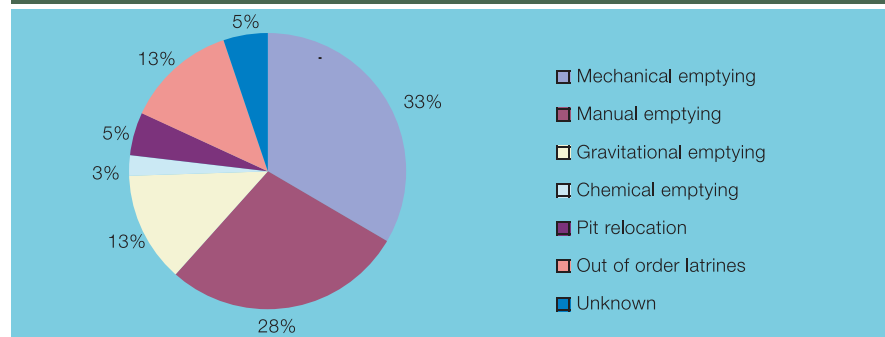
entrepreneurs and these specialist latrine constructors now earn the highest wages of all workers in the sanitation sector (see Graph 1).

Individuals and small-scale builders need to invest, on average, about US\$45 to buy tools and equipment. There is no public subsidy for this investment, which is often done gradually over time. There is also evidence of mutual cooperation among workers to facilitate borrowing or hiring tools.

The business of human waste management

Sludge emptying is a key activity for SSPSS since pits need to be emptied every 10 months. In Kibera 13 percent of pits are currently unusable because they are full (See Graph 2). Consumer demand for pit emptying is particularly high during the rainy season when blocked drainage channels and overflowing latrines create acute sanitation problems. Sludge disposal into the local river, the Mbagathi, then becomes convenient but also pollutes water for washing and bathing.

Graph 2: Household options when a latrine fills up



The three main emptying techniques employed in Kibera are manual, mechanical, and gravitational.

Manual emptying: an irreplaceable activity

Manual emptying of pit latrines is the method of choice for 28 percent of households in Kibera (see Graph 2). It is well suited to slum conditions such as chronic overcrowding, poor vehicular access and heavy sludge, which is difficult to pump up into trucks.

This sector comprises small groups of people working together on a regular basis, and some individual operators who work on an occasional basis. Since manual emptying is largely a seasonal activity it is not necessarily the main source of income for either group.

Estimates suggest there are between 50 - 100 manual emptiers working in Kibera, resulting in competition around service quality and features such as the use of a handcart, wheelbarrow or buckets for transport.

The use of 0.2m³ (200 liters) capacity drums does not allow the workers to fully empty a pit in one trip as pit capacity ranges from 2m³ to 3m³. When working as a group, people pool together and use personal savings (US\$39-US\$104) to buy equipment, but individuals working alone are usually not able to afford this type of investment. Incomes are irregular and modest, but still above the minimum wage for a general laborer in Nairobi (see Graph 1).

Box 1: The manual pit emptiers' burden

Few manual emptiers can afford basic protective gear such as gloves and boots for their work. Lack of equipment exposes them to infections and diseases, especially when working directly in the pit, which they commonly refer to as the 'kitchen'. Here, the manual pit emptiers are in direct contact with excreta, broken glass, and other discarded waste thrown in the pits and, as a result, are likely to suffer from many health problems.

In addition to being difficult and unhealthy, the work has a very negative social image and they are often obliged to work at night. Frequently excluded and stigmatized, these workers express frustration and would like the importance of their work to be recognized. Moreover, manual emptiers are ignored by public authorities, despite the role they play in the domestic pit emptying market. They are often harassed by youth groups who use violence to extort bribes from them. There is a mistaken perception that manual emptying is illegal.

Manual emptying will remain as a necessary method for exhausting pit latrines for as long as vehicle access is limited in Kibera.



Manual pit emptiers at work

Limited access hinders real competition in mechanical emptying services

Mechanical emptying is the first choice of households (See Graph 2), as it is the cheapest, most hygienic and fastest method. Nevertheless, the presence of sludge and solid waste in the pit hampers the process. Accessibility is also a huge problem for mechanical emptiers and is the greatest deterrent to real competition in Kibera. Run by CBOs, the only two trucks based in the slum are subsidized and are smaller than most private trucks. Beyond Kibera, the Nairobi City Council Water and Sewerage Department (NCCWSD) provides truck emptying services in the capital city, but, at the time of writing, they had only two fully operational trucks². Because the NCCWSD has struggled to provide reliable services, it has increasingly allowed the private sector to get involved in this activity.

Since 1998 licences have been issued to private operators (see Table 5) allowing them to carry out mechanical emptying and discharge the sludge into the city's sewerage network since the treatment plants are far from the city center. In 1999, only three private providers were operating in Nairobi. Five years later, there are about 30 operators, of which 10 are licensed. These private operators compete with five mechanical emptiers subsidized by the municipality or development organizations. This practice of issuing licenses, combined with the lack of a reliable public service, has confirmed the role that the private sector has been able to play in service provision.



A food kiosk located next to a sewer manhole, rendering it inaccessible

Gravitational emptying

Gravitational emptying is used by 13 percent of households but is generally only possible when the pit is next to a river or a drain as the contents flow directly into the water. The process is usually facilitated either by manual emptiers at a cost of US\$22 or by the owner of the latrine.

Few accessible authorized and environmentally-friendly sites for disposal

Kibera has no dedicated disposal site and human waste disposal is a major problem. While mechanical emptiers mainly discharge sludge through the sewers, manual emptiers have to employ different options. They can dig

a pit to bury the sludge, dump it almost anywhere when it is dry, or pour it into drains, streams or sewer manholes when it is liquid. The choice primarily depends on the distance of the disposal site from the worksite, as sludge transport is difficult since it is done either by handcart in the best case scenario or carried in buckets. Accessibility of sewer manholes is also a problem, as other structures have frequently been built on top of them or are too close by to allow access. In addition, residents can hamper access to manholes, as they fear the resulting disturbance and inconvenience.

In practice, manual emptiers normally dispose of their waste in streams. This is one of the reasons why manual

Table 5: Annual licence fees for private truck operators

Truck capacity (m ³)	Licence fee (US\$)
0 to 3	260
3 to 7	520
> 7	780

² Truck emptying services were taken over by the newly-formed Nairobi Water and Sewerage Company in May 2004

emptying is a seasonal activity with peak periods corresponding to rainy seasons, when the sludge is washed away by rainwater. Manual and gravitational emptying are compromise solutions to the sanitation problems of Kibera. They enable the residents to clear their latrines but with adverse consequences for health and the environment. Improper excreta disposal is a major health risk and contaminates the river water. Blocked drains and heaps of uncollected garbage are unsightly, unpleasant and provide breeding sites for mosquitoes and flies.



Gravitational emptying is common where a pit latrine is located next to river

Emptying tariffs

Mechanical emptying tariffs are lowest per trip for services funded by development organizations, but these are equal to or more expensive than private sector services when calculated per quantity exhausted (see Table 6). Manual emptying services have the lowest minimum price, which suits customers with limited financial means who only want to reduce the pit latrine's contents as opposed to emptying it completely. However, when the cost is based on the quantity

removed, this works out as the most expensive method. Complete emptying of a 2.5m³ - the average pit size - costs US\$100. But if the result is the same, the nature of the work is totally different and accessibility constraints often make this option the only one possible. It is interesting to note that many slum dwellers are convinced that manual emptying is the cheapest option. The poorest people living in the least accessible places have no other option but to pay almost seven times more than those in serviced settlements.

Conclusion

This preliminary research has shown that SSPSS are delivering essential services to low-income areas, and that their operations form the basis of a real business that is responsive to consumer demand. Despite the vital service they provide in insecure and often 'risky' slum areas, SSPSS have no formal stake in the sanitation sector nor do they influence sector decisions. These small providers have the potential to improve sanitation services in Kibera at comparatively low investment costs. But to achieve this potential the following steps need to be taken.

1. The SSPs are poorly organized at present, have no formal service associations and very little contact with other stakeholders. Better coordination would increase their bargaining power and help them to gain proper recognition for the contribution they make in the

Table 6: Comparison of tariffs for emptying services (in US\$)

Investments sources	Type of provider	Emptying site	Tariffs	
			Per trip	Per 1m ³
Private sector	Manual emptiers (0,2m ³ drum)	Kibera	8	40
	Truck emptiers (3 to 22m ³ tank)	Nairobi	57	6
Development organizations	Vacu-tug (0,5m ³ tank)	Kibera	9	18
	Truck exhauster (3m ³ tank)	Kibera	196	6
		Nairobi	36	12
NCCWSD	City council trucks (3 to 8m ³ tank)	Nairobi		
		Pit latrines	26	
		Septic tank in areas not sewered	32	
		Septic tank in areas sewered	45	

The Vacu-tug is a small mechanical exhauster designed to be used in informal settlements.

sector. In a situation where 'informal' is sometimes interpreted (wrongly) as 'illegal', a regulatory framework needs to be developed which is adapted to local circumstances, fosters and supports existing arrangements which work, and provides enforceable consumer protection for vulnerable groups. NGOs and external aid agencies also need to coordinate their activities through closer dialogue with all stakeholders and more effective

2. There is need for a concerted effort to improve the working environment of SSPs, the most critical of which is to enable better use of existing sewers for sludge disposal. There is an urgent need for the construction of new facilities and better regulation of sewer manholes.
3. Maintenance of sanitation facilities could be improved through commercially-managed public toilet blocks. Construction standards

would benefit from a training course tailored for latrine masons. The proposals which have emerged from this study are summarised in Box 2, but any proposals regarding SSPSS should be part of a bigger strategy to improve living conditions in the slums of Africa. These improvements would include the development of basic infrastructure such as roads, drainage, waste disposal, and the provision of power. It is however clear that such strategies would need to first address the fundamental issue of land tenure.

Box 2: Recommendations for improving Sanitation Services in Kibera

I. Stakeholder cooperation

- 1. Support private service providers' coordination**
SSPSS coordination through formal associations would help transform them into real partners in the sanitation sector. Regulating mechanisms need to be developed to avoid the formation of cartels.
- 2. Promote a stakeholders' dialogue**
Dialogue between the various stakeholders (SSPSS, public authorities, utilities, development organizations) would help to clarify issues and obstacles, to better articulate activities of the various actors, and to make better use of the skills and know-how of the local private sector.
- 3. Promote coordination between NGOs**
Better coordination between NGOs, who are often project pioneers who link donors with communities, would greatly improve the efficiency of assistance to the sector.
- 4. Create an enabling framework for SSPSS**
Start discussion between public sanitation authorities and SSPSS to develop agreements, and good professional practices especially with regard to sludge disposal. This framework should not restrain SSPSS, but rather take advantage of their flexibility.

II. SSPSS working environment

- 5. Develop and implement a sludge disposal policy and the construction of facilities**
A stakeholders' consultation needs to be conducted on sludge disposal options, which would lead to the development of a sludge disposal policy that would specify accountable roles and enable the construction of appropriate facilities.
- 6. Facilitate and regulate the use of sewer manholes**
Where technically possible, the use of sewer manholes in Kibera as a solution to liquid sludge disposal should be encouraged and regulated through a licence issued to all manual and mechanical emptiers.

III. Latrine quality and coverage

- 7. Support private investment into public latrines**
Public authorities should support and encourage private sector investment in the building of public latrine blocks. This would include assurance of investment durability through property titles, and discounted rates for water supply. Commercial management of latrine blocks needs to be encouraged and regulated.
- 8. Train masons for latrine construction**
Government and NGOs should support the training of masons to promote quality improvements in the construction of sanitation facilities.

Serving the Urban Poor

This series of field notes on *Serving the Urban Poor* aims to provide lessons to public sector decision-makers, managers and implementers, and their private partners, to tackle the challenges of service delivery to the urban poor. The series is concerned with the key issues and actions necessary to improve the scale and rate of progress towards the MDGs in urban areas: making utility reform work for the poor; enhancing the role of local private providers; promoting incentive-driven, predictable enabling environments; and strengthening consumer voice and mechanisms to improve the accountability of service providers.

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