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DISCUSSION PAPER

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Sanitation surcharges collected through water bills: a way forward for financing pro-poor sanitation?

Market-driven models for sanitation in low-income areas are of unquestionable importance, but there is broad consensus that the market needs to be supported by some sort of public revenue stream. One approach to revenue generation is to include a sanitation surcharge within water bills.

This Discussion Paper is a situation review of sanitation surcharge systems in African cities, focusing on systems designed to raise revenues for improving sanitation in low-income districts. The review considers existing pro-poor surcharge systems in Lusaka and Ouagadougou; systems that cannot currently be considered pro-poor, in Dakar, Beira and Antananarivo; and the special case of Maputo, where there is ongoing debate about how a surcharge might be introduced. Lusaka's model is of particular interest. Customers of Lusaka Water and Sewerage Company (LWSC) who have a sewer connection pay a sewerage charge but, on top of this, all LWSC customers also pay a *sanitation levy* that is ring-fenced for expenditure on sanitation improvements in low-income communities.

We suggest that Lusaka's model offers a very promising way forward for sanitation in low-income urban areas. We consider the potential advantages of systems of this type, but also explore difficulties that have arisen in practice. We suggest that the most appropriate *expenditure* for sanitation funds raised in this way is on *recurrent* costs of slum sanitation services, for example to pay for onward tankering of faecal sludge from neighbourhood holding tanks. We suggest that systems of this type can only be expected to work well where there is a strong regulator who can ensure appropriate expenditure.

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Abbreviations

AdeM	Mozambique Water [*Aguas de Moçambique*, the national water utility] (Mozambique)
AIAS	Water Supply and Sanitation Infrastructure Board [*Administracão de Infra-Estruturas de Agua e Saneamento*] (Mozambique)
CFA	West African franc
CMM	Maputo City Council [*Conselho Municipal de Maputo*] (Mozambique)
CRA	Water Regulatory Council [*Conselho de Regulaçao de Águas*, the national regulator] (Mozambique)
CUA	Antananarivo City Council [*Commune Urbaine d'Antananarivo*] (Madagascar)
DAS	Water and Sanitation Department, CMM [*Departamento de Água e Saneamento*] (Mozambique)
DEA	Directorate of Water and Sanitation, Ministry of Energy & Mines [*Département de l'Eau et l'Assainissement*] (Madagascar)
DGRE	General Directorate of Water Resources [*Direction Générale des Ressources en Eau*] (Burkina Faso)
DGAEUE	General Directorate for Wastewater and Excreta Sanitation [*Direction Générale de l'Assainissement des Eaux Usées et Excréta*] (Burkina Faso)
DNA	National Water Directorate [*Direcção Nacional de Àguas*] (Mozambique)
FIPAG	Water Supply Investment and Assets Fund [*Fundo de Investimento e Património do Abastecimento de Água*] (Mozambique)
FSM	faecal sludge management (i.e. removal, transport and treatment/disposal of sludges from latrines and septic tanks)
GTZ	Agency for Technical Cooperation [*Gesellschaft für Technische Zusammenarbeit*] (Germany) [now GIZ]
GIZ	Agency for International Cooperation [*Gesellschaft für Internationale Zusammenarbeit*] (Germany) [was GTZ]
JIRAMA	Madagascar Water and Electricity [*Jiro sy Rano Malagasy*, the national water and electricity utility] (Madagascar)
LIC	low-income community
LWSC	Lusaka Water and Sewerage Company (Zambia)
MEM	Ministry of Energy and Mines [*Ministère de l'Energie et des Mines*] (Madagascar)
NWASCO	National Water and Sanitation Council [the national regulator] (Zambia)
PSNA	National Sanitation Policy and Strategy [*Politique et Stratégie Nationale de l'Assainissement*] (Madagascar)
ONAS	Senegal National Sanitation Agency [*Office National de l'Assainissement du Sénégal*] (Senegal)
ONEA	National Water and Sanitation Utility [*Office National de l'Eau et de l'Assainissement*] (Burkina Faso)
PAQPUD	Peri-Urban District Sanitation Programme [*Project d'Assainissement dans les Quartiers Périurbains*] (Senegal)
PUA	Peri-Urban Area [in Zambia a specific administrative term]
PUD	Peri-Urban Department, LWSC [the pro-poor unit of LWSC] (Zambia)
SAMVA	Antananarivo Municipal Maintenance Service, CUA [*Service Autonome de Maintenance de la Ville d'Antananarivo*] (Madagascar)
SASB	Beira Sanitation Service [*Serviço Autonómo de Saneamento da Cidade da Beira*] (Mozambique)
SDE	Senegal Water [*Sénégalaise des Eaux*, the national water utility] (Senegal)
WSP	Water and Sanitation Program [of the World Bank]
WUA	Water User Association [Madagascar, *Association des Usagers de l'Eau*]
VIP	ventilated improved pit (latrine)
ZMK	kwacha (Zambian currency)

Exchange rates (March 2012)

US Dollar (USD)	West African Franc (CFA)	Zambian Kwacha (ZMK)
1	495.18	5,335

Introduction

There are continuing and very necessary efforts to develop market-driven models for slum sanitation: models in which user tariffs and revenues from reuse (in agriculture and in energy generation) are sufficient to drive genuine and sustainable sanitation improvements. In part this reflects a recognition of the widespread failure of public service models to achieve effective slum sanitation to date. These efforts to develop market-driven approaches not dependent on subsidy are of clear value, and are beginning to identify improved technologies and service delivery models. It surely makes sense to develop high-quality sanitation solutions that have low capital and operating costs, so that there is less of a gap between what poor householders are willing and able to pay, and what service providers need to charge in order to achieve financial viability. It likewise surely makes sense to explore ways in which revenues from excreta and wastewater reuse may be able to reduce this financing gap.

Nonetheless, there is broad consensus that it is not going to be possible to eliminate this financing gap entirely. So in order to achieve improved sanitation for low-income communities, there is a need for some sort of ongoing public revenue stream. Indeed, the widespread absence of public support for slum sanitation contrasts with the commonly seen public subsidy of sewerage systems that serve mainly non-poor households.

One possible revenue generation mechanism is to include a *pro-poor sanitation surcharge* on water bills. In cities in which water and sanitation services are provided by a single utility, this seems to make good sense. Even when the water utility does not provide sanitation services, there are good arguments in favour of this mechanism:

- water utilities already have a customer database and billing system in place
- the per-household cost of sanitation services (including greywater drainage) can be considered broadly proportional to that household's water use
- it is intuitive and logical –for consumers, service providers and governing institutions– to bundle charging for water and sanitation services

The precise nature of sanitation surcharging systems varies, and the differences between the different possible systems are somewhat complex. A *pro-poor sanitation surcharge* as defined in the present paper is not the same as a *sewerage charge*. This is best illustrated with examples from Lusaka (Zambia) and Ouagadougou (Burkina Faso).

In Lusaka, the central area of the city is served by Lusaka Water and Sewerage Company (LWSC). All LWSC customers with a sewer connection pay a *sewerage charge*; but independently of this, all LWSC customers also pay a surcharge (called a *sanitation levy*) that is ring-fenced for expenditure on sanitation improvements in low-income communities (see Section 2.1).[1] The sewerage charge is therefore a charge for services, whereas the sanitation levy is a form of redistributive taxation (see also Section 1.1).

In Ougadougou, customers of the water and sanitation utility ONEA pay a sewerage charge if they are connected to the sewer network, or an onsite sanitation services charge if they are not connected to the sewer network.

This report therefore considers these two types of sanitation surcharge model (*sanitation levy* as in Lusaka, or *onsite sanitation services charge* as in Ouagadougou), both of which are at least potentially pro-poor. As far as we know, sanitation surcharge systems of this type exist only in these two African cities, Lusaka and Ouagadougou. Somewhat related systems exist in a few other cities, including Dakar (Senegal), Antananarivo (Madagascar) and Beira (Mozambique): however, these do not appear to be currently classifiable as pro-poor systems.[2] Some other cities, including Maputo (Mozambique), are seriously exploring the possibility of introducing a sanitation levy system.

[1] Although we here distinguish between sewerage charges and sanitation levies, it is certainly possible that a citywide sanitation levy as defined might be spent on construction and/or operation of sewerage for low-income communities, and indeed this is the situation currently seen in Lusaka. In some low-income districts of some cities, sewerage *may* be an appropriate sanitation solution.

[2] However, two points need to be made. First, the pro-poor targeting of the existing systems in Lusaka and Ouagadougou is not without problems: in both cases we might query whether the current collection and disbursement policy is unequivocally pro-poor. Second, in the other 3 cities cited (Dakar, Antananarivo, Beira), some stakeholders are thinking seriously about how the existing sanitation surcharge system might be made more effective and more pro-poor.

An excellent Water and Sanitation Program (WSP) report on the Ouagadougou system was published in 2004 (WSP 2004), but more recent performance of this system has not been documented. The Lusaka system has not been widely documented to date, and there is no existing overview of pro-poor sanitation surcharge systems in African cities. This paper is a situation review of the existing or proposed systems in Lusaka, Ouagadougou, Dakar, Antananarivo, Beira and Maputo. We consider the clear potential advantages of pro-poor sanitation surcharge systems, but also explore difficulties that have arisen in implementation. We discuss how these difficulties might be overcome. We also discuss the preconditions and steps needed to introduce systems of this type in cities where there is currently no such system; Maputo is a particularly interesting case in this regard. We argue that sanitation surcharge systems offer a powerful way forward for financing slum sanitation, and particularly for supporting the operational costs of particular aspects of the sanitation chain: for example, onward tankering of faecal sludge from neighbourhood sludge holding tanks.[3]

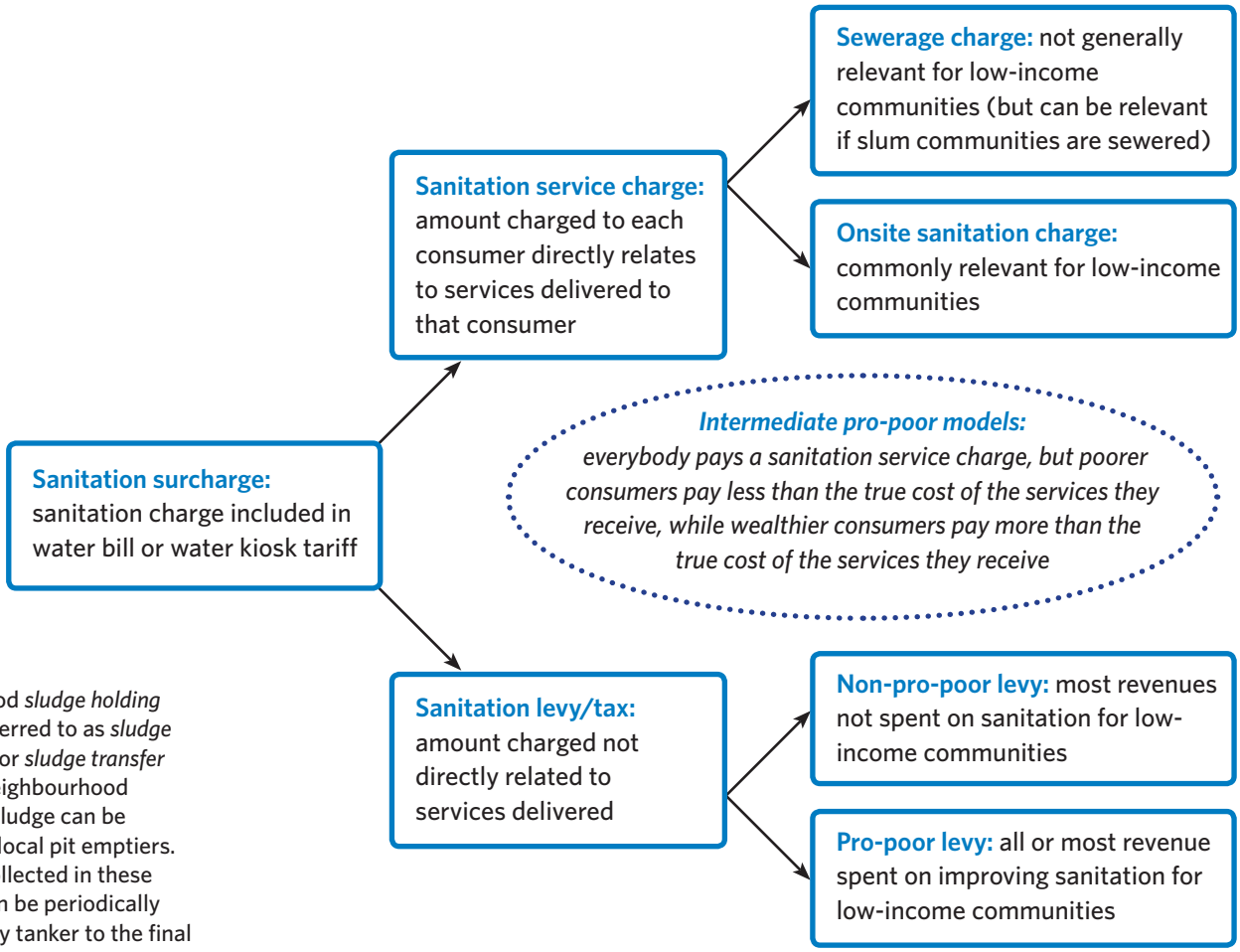


Figure 1. *Summary of the main types of surcharge system covered in the present report (see also Section 1.1 Terminology). But note that this is a simple classification: as discussed in the text, a more sophisticated classification must carefully assess exactly what charging and disbursement patterns exist within the system (independently of whether a given system is* nominally *pro-poor). For example, an onsite sanitation charge can be considered pro-poor if it forms part of a system which directs a net subsidy to low-income communities; but equally, it can be considered abusive if the services provided are of lower value than the charge applied. See especially Section 5.*

[3] Neighbourhood *sludge holding tanks*, also referred to as *sludge transfer tanks* or *sludge transfer stations*: i.e neighbourhood tanks where sludge can be deposited by local pit emptiers. The sludge collected in these tanks can then be periodically transported by tanker to the final treatment/disposal location. By allowing local pit emptiers to tip to these tanks for free or for a small charge, pit emptying at a cost affordable to low-income consumers can become a viable business. However, WSUP's experience in Nairobi and elsewhere indicates that this model is not straightforward: in order to work, the offer of a free local disposal facility (the holding tank) may need to be combined with regulatory control and penalties (e.g. fines) for dumping of sludge to local watercourses or other inappropriate locations.

> “The focus here is on systems that are at least subsidy-neutral”

1.1 Terminology

Diverse terms are used in relation to sanitation surcharge systems. This section defines terminology as used in this document, and also comments on terms used in French and Portuguese.

sanitation - Sanitation is here understood to refer primarily to excreta management, and we are here primarily interested in systems to support excreta management in slum districts. However, it is important to note that the French term *assainissement* and the Portuguese term *saneamento* generally encompass not only excreta management, but also solid waste management and stormwater drainage.

sanitation surcharge - This term will be used in the present report to refer to any inclusion of a sanitation charge within a water bill: this may be either a *sanitation levy* or a *sanitation services charge* (i.e. a *sewerage charge* or an *onsite sanitation charge*) (see Figure 1).

sanitation levy - A surcharge applied on domestic and non-domestic water bills citywide, which may or may not be ring-fenced for disbursement in low-income areas. Sanitation levy is the term used in Lusaka.

sanitation services charge - A charge for sanitation services received (i.e. a *sewerage charge* or an *onsite sanitation charge*), as opposed to a levy. However, note that a sanitation services charge may be a) genuinely cost-reflective; or b) less than the true cost of the service (implying redistributive subsidy of a pro-poor service, or non-justifiable subsidy of a non-pro-poor service, or simply non-sustainable under-charging); or c) more than the true cost of the service (implying redistributive taxation of non-poor customers, or non-justifiable over-charging of poor customers).

sewerage charge - This is a services charge applied to sewer-connected customers, typically collected through the water bill. This might in theory be a cost-reflective charge, though in fact in most cases it is likely that this charge only covers part of the real lifecycle costs of sewerage. Terms used with this basic meaning include *sewerage tariff* (Lusaka), *redevance assainissement collectif* (Ouagadougou), *redevance assainissement* (Dakar) and *taxa de saneamento* (Beira): for full details about each city see Section 2. Sewerage charges are of course collected in many African cities with sewerage systems; but such charges are not a focus of the present report, since these sewerage systems are typically very small, often dysfunctional, and do not serve low-income communities. [It should also be noted that the possibility exists of sewerage charges paid by sewer-connected slum dwellers; however, sewerage of low-income communities is currently a very rare situation in African cities.]

onsite sanitation charge - This is a services charge applied to non-sewer-connected customers. As far as we know, the only African city in which such a charge is currently applied at the city level is Ouagadougou, where it is called *redevance assainissement autonome*.

The primary focus here is on pro-poor systems, i.e. systems that are at least subsidy-neutral (i.e. adequate sanitation services provided for both non-poor and poor communities, without subsidy of non-poor communities by poor communities), and ideally redistributive (i.e. revenues raised from non-poor customers are used in a targeted manner to support improved services in poor communities). Note also the possibility of water-to-sanitation cross-subsidy: i.e. *profits* from water supply services are used to finance sanitation. We also briefly consider a related but different model, which we refer to as district-level co-charging (see Box B): in this model, a sanitation surcharge is collected only within a low-income district.

Finally, we draw attention to a range of somewhat similar concepts which are not considered in this Discussion Paper, but which are clearly related: these include sanitation surcharges included in other types of service bill (e.g. electricity bills, mobile telephone bills); specific sanitation taxes collected by the municipal government; and allocations to sanitation from general budgets (e.g. from the general municipal budget, or from national health or housing budgets). Likewise, this paper does not consider other closely related disbursement areas (e.g. solid waste management, stormwater drainage, hygiene education).

Box A. Municipal budget allocations to sanitation

As noted in the text, this paper does not consider sanitation allocations from municipal budgets (i.e. from the budgets of city governments). USAID (2006) classifies municipal resources (for expenditure on sanitation, or in any other area) into three broad categories: revenues from taxes and tariffs collected by the municipality; intergovernmental fiscal transfers; and borrowings. Very little information is available about sanitation allocations by municipal governments of African cities: we do not know of any published assessment of sanitation allocations in any individual city, nor do we know of any wider situation review. WSUP's own experience in African cities indicates that municipal funding for sanitation is typically very limited and irregular, with municipal sanitation departments (if they exist) often grossly under-resourced.

In Maputo, for example, the municipal water and sanitation department DAS has a small office and small staff, but no significant resources for investing in sanitation for low-income districts;[4] in practice, the department's primary responsibilities are to empty the septic tanks of government buildings, and to manage stormwater drainage. No data is available on allocations from the general municipal budget. Likewise in Antananarivo, the municipal sanitation department is primarily concerned with emptying the septic tanks of government buildings, and with management of the drainage system; again, no data is available on allocations from the general municipal budget.

This is in line with the USAID (2006) report, which states that *"Inadequate financial resources is one of the principal reasons that municipal services are inadequate in almost all developing countries and transitional countries. Even when local governments have been assigned clear service delivery responsibilities, lack of revenue-raising powers and unpredictable intergovernmental transfers often hinder the ability of municipalities from efficiently discharging these functions in a way that is responsive to local constituencies. At the same time, underdeveloped financial markets (both weak capital markets and banking systems) are typically unable to provide long-term financing for essential municipal infrastructure"*.

In the authors' opinion, there is a strong need for collection of more detailed information on the current situation in African cities regarding sanitation allocations from municipal budgets, particularly with a view to identifying promising models that may offer useful lessons for other cities.

[4] Although this is the current situation, local stakeholders are hopeful that the next couple of years will see increasing allocation of resource to DAS, enabling it to function more effectively in sanitation services provision for low-income districts.

2. Case studies

Section 2 outlines the two pro-poor sanitation surcharge systems known to be functioning at present in African cities (Ouagadougou and Lusaka); the somewhat related but not clearly pro-poor systems existing in Dakar (Senegal), Antananarivo (Madagascar) and Beira (Mozambique); and the system under consideration in Maputo (Mozambique). Table 2 provides a summary of the different systems in the six locations. Also in this section, Box C provides a brief overview of systems of this type in other low- and middle-income countries outside Africa, while Box D highlights some related district-level sanitation charging systems under development in Lusaka and Antananarivo. Key statistics for the cities discussed in this paper (e.g. population size, percentage of population with sewer connection) are listed in Appendix I.

2.1. Lusaka

Water and sanitation in Zambia is regulated by the National Water and Sanitation Council (NWASCO). Formed in 1998, NWASCO became operational in 2000 and is responsible for regulation of eleven commercial utilities (NWASCO 2012a). The mandate to supply both water and sanitation services to the city of Lusaka and three neighbouring towns (Kafue, Chongwe and Luangwa) is held by Lusaka Water and Sewerage Company Limited (LWSC) (NWASCO 2009). LWSC was incorporated in 1988 through a Lusaka City Council resolution, based on recommendations in a study sponsored by the German government operating through the *Gesellschaft für Technische Zusammenarbeit* (GTZ) [now *Gesellschaft für Internationale Zusammenarbeit*, GIZ]. The Company is divided into eight operational branches, namely Central, Kabulonga, Kabwata, Lumumba, Chelstone, Chawama (covering peri-urban areas in the south east of the city), George (covering peri-urban areas in the north-east of the city) and Lusaka East (covering informal settlements in the eastern part of the city) (IWA WaterWiki 2010).

A sanitation levy has been in place in Lusaka[5] for about 5 years, since 2007. It is charged to all LWSC customers,[6] and is distinct from and additional to the sewerage tariff charged to sewer-connected customers.[7] It is calculated as 100 Zambian k6wacha (ZMK) per cubic meter of water consumed; this works out at roughly 3 or 4% of the water bill,[8] or about $1.50 per month for a customer consuming the Lusaka domestic average of 70 cubic metres.

The levy is fed to a sanitation fund which is ring-fenced for sanitation improvements in low-income settlements (in Lusaka corresponding to, and generally referred to as, peri-urban areas = PUAs). According to Kelvin Chitumbo, head of the regulator NWASCO, a total of about US$2 million has been raised to date. Disbursement from the Fund is closely controlled by NWASCO: except for very small amounts, LWSC must seek authorisation for any expenditure. Expenditures to date have included subsidised construction of about 200 onsite sanitation facilities in three low-income peri-urban areas lying outside the direct area of responsibility of LWSC (Kanyama, Chaisa and Chipata), and ongoing part-financing of construction of a condominial sewer system in Kalingalinga peri-urban area (Chitumbo 2012).

The Lusaka sanitation levy was introduced following a period of substantial sector reforms, in response to demands from the regulator NWASCO that LWSC should start providing sanitation services to low-income communities. The idea for the levy initially came from LWSC management, and was strongly supported by NWASCO. However, in 2009, two years after collection started in 2007, NWASCO suspended collection of the levy. Different respondents report different reasons for this suspension (WSUP 2012), including disagreement about how the money was being spent, and concern that the money was being spent too slowly. Some respondents report that NWASCO judged the fund to be have been spent inappropriately, on projects including rehabilitation of a water supply network in the low/medium-income central district of Kaunda Square.

[5] Sanitation levies are also collected by several other Zambian water utilities: but unlike in Lusaka, the corresponding sanitation funds are reportedly not ring-fenced for low-income districts.

[6] There was some discrepancy among respondents here: it is not clear whether bulk tariffs charged to the two Water Trusts with water supplied from the main LWSC network (Kalikiliki and Ngombe) include the levy in any way; all other Water Trusts currently obtain their water from boreholes, and do not pay any sort of abstraction fee (so their customers do not pay the levy).

[7] The sewerage charge is 40% of the water bill: so a sewer-connected household paying 100,000 ZMK for water pays an additional 40,000 ZMK for sewerage.

[8] Since water tariffing uses a rising blocks system (i.e. the price per m^3 increases with increasing consumption), it is not straightforward to express this as a percentage, but given that average monthly consumption by LWSC domestic customers is about 70 m^3, this implies that the sanitation levy typically amounts to about 3 or 4% of the water bill (and thus a somewhat lower percentage of the water+sewerage bill). Note that 70 m^3 per month is the average consumption considering households with a piped connection only: the average for the city as a whole is of course lower.

Other respondents report that NWASCO judged inappropriate the above-mentioned expenditure on subsidised construction of toilets in Kanyama, Chaisa and Chipata: these were ecosan facilities constructed under the PPURSS project, and use of the sanitation fund was reportedly (?) to cover non-disbursement of a part of the funds pledged by the World Bank and the Ministry of Local Government and Housing. It is also possible that NWASCO suspended authorisation with a view to enforcing expenditure on sewerage only.

Collection of the levy was re-authorised in early 2011, and since then expenditure has only been authorised in the Kalingalinga condominial sewerage project noted above.[9] The Kalingalinga project is Phase 1 of three phases, a pilot of 250 households, due to start soon: the World Bank is financing the software components of the project (technical assistance, capacity building, hygiene promotion, and community engagement), while the condominial network will be financed partly from the Sanitation Fund and partly by the Ministry of Local Government and Housing (again with funds originally from the World Bank).

Currently the NWASCO policy direction is that the fund should be spent exclusively on sewerage infrastructure for low-income districts, not on onsite sanitation (e.g. subsidised toilets) or faecal sludge management systems (e.g. sludge transfer stations) or soft measures (e.g. hygiene promotion or sanitation marketing). However, an LWSC respondent reports that, in special cases, NWASCO can allow use of the fund for other purposes such as hygiene promotion. This respondent also reports a further requirement (not yet enforced by NWASCO) that LWSC should publish all uses of the money collected under this levy in the national press, so that members of the public can see how their money has been spent.

Several Lusaka respondents explained that the current restriction of the Sanitation Fund to sewerage reflects a high-level political attitude that Zambia needs to move away from pit latrines towards sewer systems. Many Lusaka respondents expressed the view that this sewerage-only attitude is unrealistic, and argued for expenditure not just on sewerage (if appropriate), but also on non-sewered sanitation solutions and indeed on "soft" interventions like hygiene promotion (WSUP 2012). As noted, there may already be some flexibility here, and there is clearly a constructive ongoing debate between the actors about how best to spend these funds. [For a wider discussion of how funds raised by sanitation surcharges might be spent, see Section 5.]

At present, the Fund can only be spent in low-income areas that are under LWSC's direct jurisdiction, not in Water Trust districts (mostly low-income peri-urban areas). However, LWSC respondents indicate that this is only a temporary situation, and that appropriate expenditure in Water Trust districts may be authorised in future.

Thus Lusaka's Sanitation Fund is currently being spent mainly to part-finance the capital costs of sewering low-middle-income districts. Independently of debates about whether sewerage can be a cost-effective model for low-income districts, there seems to be a clear regulator commitment to ensuring that this Fund is used in low-income districts only, and we consider that the Lusaka Sanitation Fund is a very interesting model for other cities. However, we will argue in Section 5 that expenditure on recurrent costs might be more useful than expenditure on capital costs.

[9] However, one respondent also notes some continued expenditure on the Kaunda Square project.

> “All users pay a fixed surcharge, plus a surplus based on volume consumed”

2.2. Ouagadougou

Achieving the objectives of the National Plan for Water Supply and Sanitation (*Programme National d'Approvisionnement en Eau Potable et d'Assainissement*) is the responsibility of the Ministry of Agriculture and Water, primarily through a) the Directorate for Wastewater and Excreta Sanitation (DGAEUE), which is responsible for monitoring the implementation of wastewater and excreta projects and programmes, and b) the state-owned National Water and Sanitation Utility (ONEA). ONEA is responsible for planning, constructing and managing all major infrastructure related to urban and peri-urban sanitation: this includes the preparation of strategic plans for sanitation in Ouagadougou and 46 other cities and towns throughout Burkina Faso (Bassan 2012). Within Ouagadougou, the municipal government (like other urban communes) likewise has responsibilities for managing basic urban services including sanitation: these responsibilities include regulation, planning, construction and operation. These tasks are often delegated to ONEA or to local private companies (e.g. for provision of emptying services for onsite sanitation facilities). Thus both ONEA and the municipal government have important responsibilities for sanitation in Ouagadougou, and at the time of writing we have been unable to precisely delineate these responsibilities.

In order to finance sanitation services in Ouagadougou, in 1985 the Ministry of Agriculture and Water presented a proposal to the Council of Ministers, requesting authorisation to levy a “fee for sanitation services” (*redevance assainissement*) on water bills issued by ONEA. Authorisation was granted, and the surcharge has been collected continuously since then. The terminology used makes no reference to taxation, which means that ONEA can collect and manage the revenues directly (WSP 2004).

The surcharge is designed in a different way to the Lusaka levy. All users with an individual connection to the water supply network pay a fixed surcharge of CFA 1,000 per month on their water bill, plus a surplus based on the volume of water consumed. This surplus is calculated according to a two-tier pricing structure designed to ensure that consumers with sewer connections pay more than poorer households with onsite sanitation facilities. Thus, water customers connected to the sewerage network pay a surcharge of CFA 60 (about $0.13) per m^3 of water consumed, while customers without a sewerage connection pay a lower surcharge of CFA 21 (about $0.04) per m^3 (ONEA 2008) (see Box B for an example).

Box B. Sanitation surcharge calculations in Ouagadougou

Households A and B both consume 17 m^3 of water per month: however, A is connected to the sewerage network, while B uses onsite facilities. The sanitation surcharge component of their water bills is calculated as follows:

Household A (connected to water supply and sewer): 1000 + (60*17)	=	CFA 2020 per month (sewerage surcharge)
Household B (connected to water supply, not to sewer): 1000 + (21*17)	=	CFA 1357 per month (onsite sanitation surcharge)

For water standpipe (*borne fontaine*) users, a sanitation surcharge of CFA 10 per m^3 is applied.

We have conflicting reports on who exactly pays the sewerage surcharge. The wording used (*ménages raccordés*) suggests that only households actually *connected* to the sewerage network pay the surcharge; but one respondent reports that this is misleading, with the sewerage surcharge rate in fact paid by all water-connected households lying within nominally sewered districts (even if they are not actually connected).[10]

The surcharges are collected by the Customer Directorate on behalf of ONEA, and then transferred to separate sanitation accounts. The current tariffs were set in 2008, and are valid for a 5-year period terminating end 2012. ONEA is reported to be carrying out a study to assess ability and willingness to pay, and to re-adjust tariffs if necessary.

WSP (2004) states that in 1999 a total of US$ 0.5 million was collected via the two sanitation surcharges. Of this, 53% was used to promote onsite sanitation, 32% was spent on operational costs (staff, transportation, maintenance and repair of facilities, etc.) and approximately 14% on ONEA's capital investments (WSP 2004). A more recent report (Yofe 2012) estimates ONEA's annual revenue from these surcharges at approximately US$ 2 million, 72% of which is spent on social marketing of sanitation (including training activities), reflecting an increased focus on "soft" aspects of sanitation (up from 53% in 1999). Some of the fund has also been spent on subsidy support for onsite sanitation facilities (mainly ventilated improved pit latrines) and for household connections to the sewerage network; there is currently no expenditure on faecal sludge management (FSM) infrastructure or services (Ouibiga 2012)

The percentage of the total raised by each of the two surcharges individually –the sewerage surcharge and the onsite sanitation surcharge– is not known (i.e. we have not been able to obtain data on this); but it certainly appears to be the case that only a small proportion of the fund is currently being spent on capital and recurrent costs of the sewerage system. Yofe (2012) highlights that there are insufficient funds to cover sewerage system operation and maintenance costs, and that this is making it difficult to deliver adequate sanitation services in Ouagadougou. In any case, the lack of clear data and the absence of a strong regulatory authority for sanitation in Burkina Faso means that it is difficult to draw strong conclusions about the current pattern of expenditure of these funds. It appears that the fund is being spent in a basically pro-poor manner, but we cannot state this with certainty.

[10] This can be considered a justifiable approach if everyone in the community can afford connection, so that non-connection is a genuine householder choice (because all households are benefiting from the district-level benefits of living in a sewered community); however, this approach cannot be considered justifiable if the costs of sewer connection are too high for some householders to afford.

2.3. Dakar

Sanitation in Senegal is under the responsibility of the Ministry of Urbanisation and Sanitation. Through a service contract, the state has delegated the responsibility for implementation and management of national sanitation policies to a national sanitation utility, the Office National de l'Assainissement du Sénégal (ONAS), created in 1995. Sewerage coverage in Dakar is high by comparison with most African cities (25% considering the agglomeration as a whole), with an extensive sewerage system that covers significant areas of the city, although with currently very limited coverage of lower-income districts (see Norman et al. 2011); however, the majority of households use non-networked facilities, notably pour-flush latrines discharging to septic tanks or pits (Direction de la Prévision et de la Statistique 2004).

ONAS explicitly assumes responsibility for onsite sanitation in low-income communities, working alongside private pit emptiers with the aim of providing sanitation services throughout Dakar. However, capacity and commitment to fulfil these responsibilities in practice are limited. Scott (2011) estimates that only 14% of the faecal sludge collected is actually treated before disposal. Nonetheless, it should be recognised and applauded that ONAS is one of the very few utilities in sub-Saharan Africa to accept responsibility for pit emptying in low-income communities, and likewise one of the few utilities in sub-Saharan Africa to be making serious efforts to extend sewer networks into low-income communities. A major sanitation programme, the *Programme d'assainissement dans les quartiers périurbains* (PAPQUD), was launched in 2002 with World Bank support. This programme has aimed to improve sanitation services in low-income districts outside central Dakar, through heavily subsidised construction of onsite sanitation facilities (mainly two-pit pour-flush latrines), onsite washing facilities (sinks with soakaways, bacs à laver puisard) and, in some low-income districts, settled sewerage networks.

ONAS levies a sanitation surcharge (*redevance assainissement*) citywide. This surcharge is collected by the water utility, Sénégalaise des Eaux (SDE), through all water bills: the surcharge amount depends on type of consumer (domestic, commercial/industrial, institutional, standpipe operator), and in the case of domestic consumers, on water consumption volume (Table 1). Considering all water sold, the sanitation surcharge amounts on average to about 8% of the total water charge; this percentage varies among customer types, being much lower for low-volume domestic consumers than for higher-volume domestic consumers and for industrial/commercial consumers.

This surcharge in its current form might be considered a *non-pro-poor levy*, as defined in Figure 1 (page 5): it is charged to all water consumers with a household connection, but spent largely on sewerage systems that primarily benefit non-poor districts of the city. Nonetheless, defining Dakar's sanitation levy as "non-pro-poor" or "pro-poor" is not black-and-white, since it is certainly the case that ONAS dedicates significant resources to networked and non-networked sanitation services in lower-income communities, and it is also the case that households without a sewer connection are likely to be lower-volume water consumers, who pay a much lower sanitation surcharge than higher-volume consumers (see Table 1).[11]

Dakar's charging model (the surcharge is calculated in the same way for non-sewered and sewered customers) reflects the underlying legislative framework, which classifies cities and towns in Senegal as *assainies* (sewered) or not: in cities and towns classed as sewered, ONAS can levy the surcharge. All communes of the Dakar agglomeration (Dakar, Pikine, Guédiawaye and Rufisque) are classified as sewered, although certainly the proportion of households with a sewer connection is low (around 25%) in the agglomeration as a whole, and lower still in the non-central communes of Pikine, Guédiawaye and Rufisque (Hoang-Gia et al. 2004). [The underlying logic for this model is presumably that a sewered city is a clean and healthy city for all the city's inhabitants, not just those connected to the network: but this logic clearly breaks

[11] Two particular aspects of the charging system merit special comment. First, the very high rate charged to institutional consumers can be considered a positive aspect: a widespread situation in African cities is for institutions to be under-charged or not charged for water and sewerage, with negative consequences for utilities' financial health. Second, the high rate charged to standpipe operators is difficult to justify, since people who consume water from standpipes will tend to be the poorest communities in the city, benefiting little from the sanitation services provided by ONAS.

down when – as in Dakar and practically all other African cities – large areas of the city are unserved by the sewer network and have severely deficient sanitation.]

As noted, the proceeds of the surcharge are reported to be fully absorbed by ONAS's operating expenditure, primarily expenditure on the sewerage network and wastewater treatment plant. However, the funds raised do not cover operating costs: over the period 2003–2006 only about 78% of ONAS's operating expenses were covered,[12] and certainly there was no surplus for capital investment (Boulenger 2012). There does not appear to be any clearly defined pro-poor investment of the funds.[13] In a major consultant report on Senegal's ongoing water and sanitation policy, published by the Ministry of Agriculture and Water, Hoang-Gia et al. (2004) propose that the surcharge system needs to evolve to a model under which sewer-connected households pay 3.5 times more (70 CFA per m^3 of water consumed) than households not connected to the network (20 CFA per m^3).[14] Potentially, such a model would not only help redress the injustice of charging low-income households for a sewerage service from which they do not benefit: it would also incentivise ONAS to extend its sewerage network. Currently, as noted by Boulenger (2012), there is no strong financial incentive for ONAS to extend its sewerage network, or to increase coverage rates in areas already sewered.

***Table 1**. ONAS sanitation surcharge tariff blocks, since 2003. 1 US$ ≈ 495 CFA (West African franc).*

Customer type (consumption level)	**Surcharge**	**Example payment** (US$ per month)
Domestic household connection (first 10m^3 per month) [a]	10.00 CFA per m^3	$ 0.20 (for hhold using 10 m^3 per month)
Domestic household connection (next 10 m^3 per month)	45.65 CFA per m^3	$ 1.12 (for hhold using 20 m^3 per month)
Domestic household connection (beyond 20m^3 per month)	62.45 CFA per m^3 + 18% VAT	$ 4.10 (for hhold using 40 m^3 per month)
Commercial and industrial customers [b]	62.45 CFA per m^3 + 18% VAT	$ 5.95 (for 40 m^3 per month)
Institutional customers	295.00 CFA per m^3 + 18% VAT	$ 28.13 (for 40 m^3 per month)
Standpipe operators [c]	49.43 CFA per m^3 + 18% VAT	$ 3.99 (for 40m^3 per month)

Sources: Boulenger (2012) and Diallo (2012).

[a] Note that billing is in fact every two months, not monthly, and the domestic consumption thresholds are "first 20 m^3", "next 20 m^3" and "above 40 m^3" per two months: but this is here expressed in monthly equivalents for ease of comprehension.

[b] There is also a specific formula for horticultural users, not detailed here.

[c] This is the surcharge rate charged to standpipe operators, who can then be expected to pass this on to their customers.

[12] Though clearly sub-optimal, we suspect that this partial recovery of sewerage system operating costs is much better than is achieved in most African cities.

[13] However, it should be noted that ONAS does have significant involvement in sanitation services for low-income districts: notably, ONAS finances and manages a faecal sludge treatment plant, and is involved in the planning and regulation of faecal sludge management systems. In addition, under the PAQPUD project, with World Bank funding, ONAS has expanded low-cost settled sewerage networks into low- and low-middle-income districts.

[14] Though in fact this might imply little real change, and it might be questioned whether the sewerage charge proposed by Hoang-Gia et al. is sufficient, given that low-volume consumers already pay a lower surcharge per m^3 than higher-volume consumers (see Table 1): sewered households are in general likely to be higher-volume consumers than households with onsite sanitation only.

2.4. Antananarivo

In Madagascar, the state-owned urban water and electricity utility JIRAMA is responsible for water supply in urban areas, but currently has no responsibility for sanitation. Within central Antananarivo (the Commune Urbaine d'Antananarivo, CUA), solid waste management, stormwater drainage and sewerage are the responsibility of a CUA department called SAMVA (Antananarivo Municipal Maintenance Service). SAMVA works within a National Sanitation Policy Strategy (PSNA) developed by the Directorate of Water and Sanitation (DEA) of the Ministry of Energy and Mines. Following a law passed in 1995, the PSNA was agreed in 2006 and states that all beneficiary households of public water supply should pay three specific surcharges/taxes, one of which is a sanitation surcharge (*redevance assainissement eaux usées*) (Ramanantsoa 2012).

The Antananarivo surcharge in its present form must be considered a *non-pro-poor levy* (see Figure 1, page 5): it is calculated as 10% of the water bill[15] and is levied by JIRAMA on behalf of the CUA on water bills for all households, regardless of whether they are connected to the sewerage network (estimated coverage 17% in the CUA, negligible outside this area). There is no additional specific service charge for a sewer connection. The surcharge is only collected in the CUA area, not currently in the non-central areas of Greater Antananarivo governed by the FIFTAMA association of peri-urban communes.

Once collected, the sanitation surcharge revenues should be transferred directly from JIRAMA to SAMVA: some respondents have indicated that full transfers are regularly made, others that the funds are not fully transferred. Assuming that the funds are fully transferred to SAMVA, they will still have no strong pro-poor impact, since SAMVA has no direct involvement in faecal sludge management (beyond emptying the septic tanks of government buildings) or in supporting low-cost sanitation solutions for low-income districts. SAMVA indicates plans to assume city-level responsibility for faecal sludge management, but this is not currently the case in practice.

Although the Antananarivo system as it stands must be considered a non-pro-poor levy, it is certainly the case that water consumers accept the concept of a significant sanitation levy, and the existing framework could *potentially* be remodelled to make it genuinely equitable (for example, by instituting a separate sewerage charge, and retaining the existing surcharge as a pro-poor levy similar to the Lusaka model).

[15] The law (*Loi n° 95 035 du 30 octobre 1995 autorisant la création des organismes urbaines et fixant les redevances pour l'assainissement urbain*) states that local taxes and surcharges levied by local jurisdictions may not exceed 10% of the bill's amount, exclusive of all taxes.

2.5. Beira

In Beira (a coastal city in central Mozambique), a sanitation surcharge of 15% has been levied on water bills since 1985.[16, 17] The surcharge was introduced to cover the operating costs of the sewerage system serving the central area of the city. This is a combined sewerage system (i.e. collection of both sewerage and stormwater) first constructed in 1964, and subsequently rehabilitated and expanded in various projects since the early 1990s. Very recently, a wastewater treatment plant has been constructed with EU funding (€ 63 million). The system includes 4 main pumping stations and 11 smaller pumping stations, and the high cost of operating these stations was one of the motivations for introducing the surcharge.

The surcharge is levied on water bills by the utility,[18] reportedly from all water-connected households in the sewered central district of the city (about 45000 people), regardless of whether the household is actually connected to the sewer network. Of the 15%, 2.5% is kept by the utility to cover administration and collection costs, while the remaining 12.5% is transferred to the municipality. Several respondents report that, in the past, there has been concern that the money has tended to go to the general municipal budget rather than to sanitation: however, several respondents report that at present most of the money is being transferred regularly to the sanitation authority responsible for the sewerage system (Beira Sanitation Service, SASB). Respondents also report that there have been some difficulties with getting transparent data from the utility on the amounts collected, but that this situation is now improving.

The Beira sewerage system does not cover the low-income areas of the city, and there is no evidence that any of the funds collected are spent on onsite sanitation services or on sanitation promotion in low-income areas (Manhique 2012b). Thus, following the classification in Figure 1, the surcharge can be considered a *sewerage services charge* (if basically paid only by sewered households) or a *non-pro-poor sanitation levy* (if paid extensively by non-sewered poor households).

[16] In fact this levy has a long and complex history. It was originally introduced pre-Independence, in the 1970s; after Independence, the levy was stopped for a period, then later restarted. Reportedly, the funds raised were simply being absorbed into the general municipal budget, rather than directed to operation and maintenance of the sewerage system. From around 2000 a new problem arose, with the money being collected by the water utility and not properly transferred to the municipality. However, as noted in the text, several respondents report that the levy is now being appropriately transferred to the municipal sanitation authority.

[17] A similar sanitation surcharge has recently been introduced in the city of Quilamane, though at present this system is reportedly not authorised by the regulator.

[18] The body currently acting as water utility in Beira is in fact FIPAG, the national water supply asset holder.

2.6. Maputo

Maputo does not currently have any form of sanitation surcharge in place, but is a very interesting case in that extensive high-level discussions have been ongoing for several years, looking for ways of implementing an effective surcharge system.

The institutional arrangements in Maputo for supply of sanitation services have traditionally been quite separate from those for supply of water services. However, the framework is evolving rapidly and these two closely related service areas are becoming more connected. Water supply assets in major cities are held by the Water Supply Investment and Assets Fund (FIPAG), which in Maputo delegates management of water supply to the water utility Aguas da Região de Maputo (AdeM). Nationally, sanitation is the responsibility of the National Water Directorate (DNA). In Maputo, the assets and responsibilities of the DNA are in the process of being transferred to the Water and Sanitation Department (DAS) of the Municipal Council (CMM).

DAS manages the city's sewerage network and wastewater treatment plant, but has no significant involvement in the provision of pit-emptying services, which is largely done by private-sector operators (SEED 2011). In 2009 a new asset-holding authority, the Water Supply and Sanitation Infrastructure Board (AIAS) was created, with responsibility for water supply assets in secondary towns and sanitation assets in all urban areas including Maputo. Water supply is regulated by a national regulator CRA, but in 2009 CRA was also tasked with the regulation of sanitation services (Alvarinho 2012b). As at 2011, however, the roles of AIAS as sanitation asset holder and of CRA as sanitation services regulator are not yet substantially implemented in view of resource and capacity deficits, and uptake of these roles is a gradual process, within the context of a major ongoing re-think of the urban sanitation sector (EIB 2012).

Currently, DAS does not charge consumers connected to the sewer network in Maputo (estimated at less than 15% of the population), while those who use non-networked services have to pay for pit-emptying services (Manhique 2012a). Faced with this situation, in 2001 the city council passed a municipal by-law approving the raising of a sanitation surcharge (*taxa*)[19] through water bills, as 10% of the water charge. However, this surcharge has not yet been applied. The surcharge is explicitly mentioned in the National Strategy for Water and Urban Sanitation 2011-2025 (see GoM 2012), which refers to the introduction of a "*sanitation levy in principle levied on water bills [...] to fund the operation and maintenance of public sanitation*".[20]

The Strategy states that the surcharge should apply only to households who consume more than the "domestic social tariff" (10 m^3/month), so that it would generally not be paid by most people in low-income districts. The Strategy clearly states that public sanitation should be considered to include all excreta disposal options, not just sewerage. Some respondents raised concerns that the surcharge may end up as a non-pro-poor sanitation levy used basically for sewerage system maintenance. However, other respondents indicate that the precise definition of the sanitation services to be funded by the eventual levy is receiving very serious attention; that it will predominantly be used for improving sanitation services in lower-income areas; and that the regulator is committed to ensuring that this is the case.

In fact difficulties in agreeing on the exact nature of this surcharge, and particularly the services to be funded, have been a key constraint delaying implementation. The President of the regulatory authority CRA fully recognises that implementation of the sanitation surcharge is a priority, but notes that the CRA has not yet reached an agreement with the city council (CMM) on the type of services to be provided and costs involved (Alvarinho 2012b). An outline Citywide Sanitation Planning Strategy document developed recently on the basis of extensive stakeholder consultation by a WSUP-supported local consultancy (SEED 2011) concurs with this analysis, and observes that the obstacles preventing implementation of the sanitation surcharge centre

[19] As noted above, the Portuguese word *taxa* can be understood to mean either tax/levy or charge/fee.

[20] The current policy goal in Mozambique is that sanitation should be charged through water bills, solid waste through electricity bills, and drainage through the property tax.

around two issues: an ongoing lack of investment in improving the sewer network and encouraging new connections, and uncertainty about the way in which the surcharge will be structured. There is concern that application of the surcharge may result in water bills rising too high –specifically above an 'acceptable' level stipulated by CRA– which would be unpopular and politically opposed. CRA acknowledges the need to evaluate consumers' willingness to pay the extra charge (Alvarinho 2012b).[21]

Alvarinho (2012a) further highlights the difficulty of introducing a surcharge when the current sanitation service levels in Maputo are very low. While water supply services are improving steadily, sanitation services lag far behind, especially in low-income districts. CRA is deeply committed to supporting sanitation improvements, but it considers that imposing a sanitation surcharge would be inappropriate given the currently poor level of service, and that it would be unpopular with consumers. Alvarinho (2012a) therefore suggests that the charge should only be applied to customers' water bills once a programme of service improvements has been initiated. This sequence of events would enable Maputo's residents to observe exactly what the surcharge is being spent on, and help them better understand the benefit to them. However, we (the authors) note the danger that this approach may mean continued delay in implementing the surcharge: certainly Maputo is already benefiting from very substantial donor investment in slum sanitation, so substantial service improvements are already starting.

2.7. Pro-poorness of the different cases

This section has outlined existing or proposed sanitation surcharge systems in six African cities, exploring the extent to which each can be considered pro-poor. In fact, the pro-poorness of a sanitation surcharge is defined by two aspects: whether the money is *raised* in an equitable manner, and whether the money is *spent* in an equitable manner. We could in theory define metrics of the pro-poorness of a sanitation surcharge, taking into account pro-poorness of both revenue generation and expenditure: one such metric might be *[pcRw/pcEw]/[pcRp/pcEp]*, where *pcR* is revenue raised per person per annum from the wealthiest tercile (*pcRw*) and the poorest tercile (*pcRp*), while *pcE* is the sanitation expenditure per annum benefiting each person in the wealthiest tercile (*pcEw*) and the poorest tercile (*pcEp*). So this metric would be 1 for a perfectly subsidy-neutral system (*"everybody gets exactly what they pay for"*), greater than 1 for a pro-poor system, and less than 1 for an anti-poor system (as when a sewerage system benefiting only wealthy citizens is paid for by all citizens).[22] In practice, we do not have data to estimate this or similar metrics for any of the surcharges described in the present review.

[21] An ongoing study by Stanford University researchers, supported by WSUP and the World Bank, may provide information on this.

[22] To give meaningful results, this metric requires certain assumptions to be met, for example that all revenues raised by the surcharge are indeed spent on sanitation. Also, common benefits would need to be assigned proportionally to the wealthiest and poorest terciles.

Table 2. Summary of sanitation surcharge system characteristics in the six case studies.

City *Country*	Type of sanitation surcharge in water bill (see classification in Figure 1)				Pro-poor revenue generation? *[i.e. do wealthier citizens pay more than slum-dwellers?]*	Pro-poor expenditure? *[i.e. is the money raised spent on services for slum-dwellers?]*
	Sanitation levy		Sanitation services charge			
	Non-pro poor levy	Pro-poor levy	Sewerage charge	Onsite sanitation charge		
Lusaka *Zambia*		✓	✓		Yes: clear separation of sewerage charge from pro-poor sanitation levy, and most of levy is raised from non-poor citizens.	Yes, at least in principle: funds are invested in improving sanitation in LICs: schemes implemented include both sewered and non-sewered solutions. In practice, pro-poor targeting of expenditure could certainly be improved.
Ouagadougou *Burkina Faso*			✓	✓	Not strongly pro-poor: the pricing structure means that wealthier and sewer-connected consumers pay somewhat more, but not much more.	The precise balance of pro-poor versus non-pro-poor spend is not clear, but appears significantly pro-poor: used for both LIC areas (sanitation promotion and subsidised onsite sanitation facilities) and non-LIC areas (sewerage infrastructure investment and O&M).
Dakar *Senegal*	✓				No: although the levy is proportional to water use (which has some correlation with wealth), it is raised from all consumers (including standpipe users), and there is no separate services charge for sewer-connected customers	No: expenditure is mainly on a sewerage network that mainly benefits non-poor areas.
Antananarivo *Madagascar*	✓				No: although the levy is proportional to water use (which has some correlation with wealth), it is raised from all consumers (including standpipe users), and there is no separate services charge for sewer-connected customers	No, not strongly pro-poor: spent mainly on a sewerage network that largely benefits non-poor areas only.
Beira *Mozambique*	✓		✓		Not pro-poor, possibly anti-poor. If most people who pay the levy are connected, or could afford to connect, to the sewer network, this can be considered a subsidy-neutral sewerage charge. But if a significant number of non-sewered poor households pay, this must be considered an anti-poor levy.	The levy is spent mainly on a sewerage network that basically benefits non-poor areas only.
Maputo *Mozambique*	?	?	?	?	If current thinking becomes reality, we can hope that this will be pro-poor, in that collection will be only from consumers with household connections who consume above the "social tariff" amount.	If current thinking becomes reality, we can hope that this will be pro-poor, in that expenditure will be on recurrent costs of sanitation services in low-income communities.

Box C. Sanitation surcharge systems worldwide

In a number of cities in low- and middle-income countries worldwide, a sanitation surcharge of some kind is applied on water bills. These are predominantly sewerage services charges (see Figure 1), i.e. sewerage service charges billed to sewered customers only, and used to finance operation and maintenance of the sewerage system. A brief overview of systems of this type in a selection of countries is given in what follows. [The authors thank diverse respondents from the World Bank's Water and Sanitation Program (WSP) for very helpfully supplying much of this information.]

In **India**, most cities incorporate 'service taxes' within the property tax system to finance sanitation: these cover sewerage (if provided), drainage and solid waste management services. These taxes are generally known as conservancy charges or taxes (Mehta 2012). In some cities a specific sewerage services charge is applied, generally around 10% of the water bill (which is widely considered to be insufficient to meet requirements; Kacker 2012). There is a gradual effort to increase the sewerage services charge amount, for instance in Delhi, where a "Sewerage Maintenance Charge" is levied and currently set at 60% of the water bill. Some municipal corporations in Maharashtra also levy a "Sewerage Benefit Tax" (again a sewerage services charge paid by sewered customers only); this is intended to recover capital costs (Mehta 2012).

In Manila, **Philippines**, two surcharges are included on all Manila Water Company Inc. (MWCI) water bills: an environmental charge of 18% (to cover solid waste management), plus a sewerage services charge (sewered customers only) set at 10% of the water bill for domestic customers and 30% of the water bill for commercial customers. The funds raised are transferred to the mandated authority in charge of the respective services (MWSS 2011). [We have reports that a part of the environmental charge has been used to provide pit-emptying services in low-income districts, but we cannot state this with certainty.]

In **Vietnam**, the World Bank (2011) reports that an "Environmental Protection Fee set by law at 10% of the related water tariff is collected to cover wastewater, environmental sanitation, and solid waste treatment"; respondents in Vietnam indicate that in fact this surcharge is used only for wastewater (presumably sewerage). The fees are generally between 0.01 and 0.024 US$ per m^3. The World Bank report notes that this fee level is too low to cover the various operational costs; the law does allow for the collection of additional wastewater fees to cover operation and maintenance costs plus movable assets, but few provinces apply this extra fee.

In Phnom Penh, **Cambodia**, a 10% surcharge is applied to the water bill of houses connected to the sewer network. The fee is collected by the water supply authority for the municipality; however, this mechanism is not used in any other city in Cambodia (Kov 2012).

In **Nicaragua**, the National Water Supply Utility adds approximately 30% to the water bill of each sewer-connected customer to cover sewerage services (Medina 2012).

In Nairobi, **Kenya**, a sewerage services charge is levied on all sewer-connected customers. The charge is applied to all domestic household, commercial and government institution connections and is currently set at "75% of [the] corresponding [water supply] consumption block"; it is not applied to operators (or users) of water kiosks (NCWSC 2009). *Although not discussed in the text, this is a very interesting African case: this is a genuine sewerage services charge payable only by sewer-connected customers, and the amount charged (75% of the water bill) is a very substantial amount, approaching the cost-reflective amounts seen in water and sewerage bills in wealthy countries.*

In **Peru**, and in contrast with these examples, Marmanillo (2012) reports that incorporating sanitation surcharges into water bills is explicitly disallowed under the law.

Finally, in the **UK**, where urban sanitation is almost entirely sewered, sewerage is generally charged as a separate "sewerage" amount on the water bill, proportional to the water charge. Typically the sewerage charge will be about the same as the water charge: in some cases it may be up to twice as much. This is indicative of the true costs of sewerage, and highlights the point that charges of just 10% or 50% are clearly insufficient to cover the true costs of a sewerage system.

Box D. District-level sanitation charging systems in Antananarivo and Lusaka

This paper has focused on city-level surcharging systems. However, analogous systems may also work at the district level. The examples below illustrate existing or proposed systems, both in the context of programmes supported by WSUP, under which water consumers within a low-income district pay a surcharge on their water bill (or water kiosk tariff), which is then used to improve sanitation services within that district. In Antananarivo, water kiosk revenues are used to finance cleaning of local drains, while in peri-urban districts of Lusaka a similar model is being considered as a way of part-financing latrine desludging services. It is important to note that in systems of this type there is no cross-subsidy from rich to poor: these are basically onsite sanitation service charges (see Figure 1), administered at the district rather than city level.

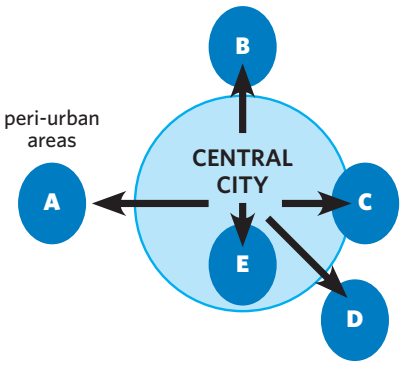
RF2 model in Antananarivo

The poorest districts of central Antananarivo are mostly low-lying and flood-prone. A network of open canals receives stormwater and wastewater originating from septic tanks, latrines and open defecation; regular cleaning of these canals –particularly to remove accumulated solid waste– is essential. CARE Madagascar and Antananarivo's Municipal Hygiene Office (BMH) have been working to establish community-level organisations for water and sanitation management, notably Water User Associations (WUAs) that operate water kiosks in low-income districts (fokontanys). Since 2009, WSUP in partnership with CARE and BMH has been supporting start-up of community groups called RF2s (Rafitra Fikojana ny Rano sy ny Fahadiovana) to coordinate community management of water, sanitation and hygiene. A key focus of the RF2s has been to clean a drainage canal that runs through eight low-income fokontanys in the central area. The RF2 structure uses revenues obtained from the WUA-operated water kiosks (in addition to other local contributions) to cross-finance the canal-cleaning activities. During an initial phase a total of 5 km of canal was cleared: since then BMH has autonomously extended the RF2-led canal-cleaning model throughout all low-income fokontanys in central Antananarivo, and canal cleaning continues without donor support, using revenues only from WUA-operated water kiosks and other sources.

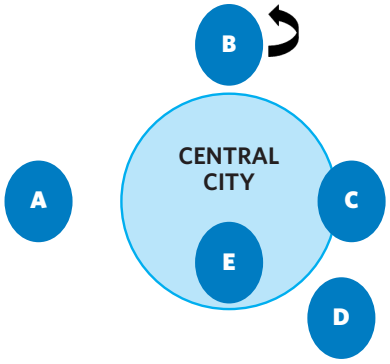
Proposed faecal sludge management surcharge for Kanyama Water Trust, Lusaka

WSUP has an ongoing programme in Lusaka, aiming to develop innovative approaches to water supply, sanitation and hygiene promotion in partnership with Lusaka Water & Sewerage Company (LWSC), local community-based water and sanitation providers and Water Trusts (see Kayaga & Kadimba-Mwanamwambwa 2006). The Water Trusts are legally established and representative entities which operate under license from LWSC under delegated management contracts. Over the last three years, WSUP has been working in partnership with LWSC and the Water Trusts of two communities, Kanyama and Chazanga, to improve access to water supply and sanitation services (WSUP 2011a). A recently commenced LWSC/WSUP project, funded by the Stone Family Foundation, includes a proposal that pit-emptying services for Kanyama Water Trust be fully or partially financed by a surcharge added to the kiosk tariffs charged by the Water Trust. This would be known as a faecal sludge management (FSM) surcharge, and would be independent of the city-wide Sanitation Levy (which is not payable by consumers supplied by Water Trusts in the peri-urban districts like Kanyama and Chazanga; i.e. this would not be double-charging). Although the FSM surcharge would be at Water Trust level (as opposed to LWSC level), it would nevertheless require authorisation from the regulator NWASCO (Mayumbelo 2012). Mayumbelo (2012) also points out that the proposed surcharge would be very small by comparison with the current one-off cost users pay for pit emptying; this should make it attractive for Kanyama's consumers, as the cost would be spread over a long period of time, while the service would be improved and regulated. Nonetheless, there are some difficulties with setting up this surcharge: it might be argued that setting up a parallel system in the Water Trust areas could act to dissuade institutions from investing Sanitation Levy funds in those areas, so that it would be essential to define the purpose of the surcharge in relation to the wider Sanitation Levy. Furthermore, it seems likely that a cost-reflective amount sufficient to genuinely cover pit-emptying services might raise water costs beyond people's willingness to pay. So this idea may not prove workable in Lusaka: but we report it here on the view that approaches of this type might be of value elsewhere.

City-level sanitation levy models (as in Lusaka): the levy is raised mainly in wealthier areas of the city, and spent only in low-income districts.



District-level sanitation surcharge models: funds are raised and spent within low-income districts.



3. Developing existing pro-poor surcharge systems

As noted, nominally pro-poor sanitation surcharge systems are in place in Lusaka and Ouagadougou. To what extent have these systems been genuinely pro-poor? What obstacles need to be overcome in order to ensure genuine pro-poor impact?

Lusaka's Sanitation Levy and associated Sanitation Fund are clearly designed to improve sanitation in the lower-income areas of the city, but ensuring genuine pro-poor expenditure of the Fund has not proved easy. As detailed in Section 2.1 above, all customers of Lusaka Water and Sewerage Company[23] pay a Sanitation Levy within their water bill (over and above the sewerage charge if they are sewer-connected customers). The funds raised by the Levy are not subsumed into sewerage operation and maintenance, but are instead used to finance improvements to sanitation services in the low-income areas only. In principle at least, this is basically a redistributive tax, through which relatively wealthy residents pay an amount (proportional to their water use) that is then spent on sanitation improvements for poorer residents in low-income areas.

The regulator NWASCO is fully supportive of the Levy, and despite some initial problems ensuring expenditure on sanitation for low-income communities (see Section 2.1), it now appears to have been clearly ring-fenced, with strict regulator control and current expenditure only on a sewerage project within a low-medium-income area of the district of Kalingalinga. This is in line with a clear current government and regulator policy that the fund should be spent specifically on *sewerage* infrastructure, not on onsite sanitation. It is certainly possible that sewerage may be an appropriate and cost-effective sanitation solution for some low-income settlements in Lusaka, particularly in settlements with high population density. However, we (the authors) and several key sanitation specialists in Lusaka consider that city-wide sewerage is unrealistic in the short and medium term, both physically and institutionally.

In many areas of Lusaka sewerage is not a practical solution: most peri-urban areas are remote from the main sewer network, are poorly served by water services, and most importantly are built on rocky terrain where laying sewerage (whether decentralised or forming part of the centralised network) would be extremely expensive compared to onsite solutions (Mayumbelo 2012); these are areas with high levels of disease attributable to poor current sanitation, such that there is a clear and urgent need for improvements in onsite sanitation including flood-proofing and improved desludging services.

As noted in Section 2.1, there appears to be a widespread understanding among key actors in Lusaka that the sewerage-only policy should not be rigidly interpreted, and that the Sanitation Fund needs to be made available for other types of sanitation investment, not just low-cost sewerage. Achieving some formal recognition of this would be a valuable step in ensuring that Lusaka's Sanitation Levy is invested in a genuinely pro-poor manner: however, it remains to be seen whether this can be achieved in the face of "sewerage only" attitudes held by high-ranking politicians.

Ouagadougou operates a *sanitation services charge* system as defined in Figure 1 (as opposed to the *sanitation levy* system seen in Lusaka). The Ouagadougou system is likewise clearly equitable in intent: the question is how effectively does it achieve equity in practice. ONEA's two-tier pricing structure creates a distinction between sewered households which pay a sewerage charge on their water bill, and households with onsite sanitation facilities which pay a reduced onsite sanitation charge. The fact that both revenues are deposited into dedicated sanitation accounts protected from direct governmental intervention means that they are safe-guarded against inappropriate non-sanitation expenditure.

It is understood that a proportion of these surcharges (no data currently available to assess what proportion) is invested in improving sanitation in LICs within Ouagadougou. As stated in Section 2.2, most of ONEA's expenditure in LICs goes towards funding social marketing activities, such as promotion of onsite sanitation and capacity

[23] So the levy is paid by all people with a household connection in the central area of the city served directly by LWSC; the levy is not currently paid by people living in the (generally poorer) peri-urban areas, a significant minority of whom are supplied by water kiosks fed by the LWSC network; see Section 2.1.

-building of local sanitation product suppliers (e.g. latrine slab manufacturers). Some funds are spent on subsidising improved latrines. Plans are reportedly in place to extend ONEA's responsibilities to faecal sludge management (FSM), including possible support for pit-emptying services.

It must however be taken into account that the revenues obtained by ONEA through the sanitation surcharge are insufficient to cover expenditures on the existing sanitation services, i.e. operational cost recovery is not currently being achieved. This lack of revenue highlights a dilemma commonly faced by decision-makers in low- and middle-income countries: should limited funds be spent on new sanitation facilities and services for LICs, or on financing the operation and maintenance of existing sanitation infrastructure in non-LIC areas. There is often insufficient finance available to fund both. We would argue that major capital investment is not the optimal use of sanitation surcharge revenues: the *recurrent* costs of sanitation services are very difficult to finance, even without recovery of capital costs, and we suggest that sanitation surcharges should, at least initially, be used to cover the recurrent costs[24] of existing systems, or of new systems constructed with government and/or donor capital. Once sanitation systems have been introduced and are up-and-running, a decision can be made to move excess funds towards capital costs, including loan repayments.

Another difficulty in Ouagadougou is that the regulatory framework is rather weak, making it difficult to improve and enforce the pro-poorness of sanitation financing. As detailed in Section 2.2, several government bodies have partially overlapping responsibilities for regulation of sanitation services and tariffs, and in some areas (including tariff setting) these responsibilities are unclear and currently difficult to implement (Yofe 2012).

The current sanitation surcharging system in Dakar, though at first sight "anti-poor" (because what is basically a sewerage levy is charged to non-sewered customers), in fact has some strong points: it is raised primarily from non-poor domestic customers and commercial/industrial customers, with only a small charge to low-volume domestic water customers; it covers about 70% of the costs of the sanitation utility (including an extensive sewerage system); and the sanitation utility, although primarily focused on non-LIC sewerage, is increasingly involved in LIC sanitation. However, it would certainly make sense for this system to evolve towards a more clearly pro-poor system, with different tariffs for sewered and non-sewered households, and clearly ring-fenced allocations for LIC sanitation.

Finally, the current sanitation surcharging system in Antananarivo cannot be considered to be a functioning pro-poor system. However, the necessary legal framework is in place, and this could *potentially* evolve into a functional system. Current difficulties derive in part from the inefficiency of revenue collection by the water and electricity utility JIRAMA, due to illegal water and electricity connections. As a result, sanitation tax revenues are not being passed on to the sanitation utility SAMVA. Even if SAMVA were to receive the sanitation tax revenues, its involvement in onsite sanitation is currently minimal. Although there is general agreement among local stakeholders on the need for investment in faecal sludge management, Antananarivo's current situation is similar to Ouagadougou's in that SAMVA currently has no capacity or resources to do this. Thus, although the existing sanitation tax system has the *potential* to serve low-income areas, it would need to be radically re-modelled in order to achieve this in practice.

[24] Possibly including relatively minor capital costs, such as neighbourhood-level sludge transfer tanks.

4. Introducing new pro-poor surcharge systems

The preceding section has discussed existing sanitation surcharge systems and ways in which they might be made more effectively pro-poor. This section discusses the challenges seen in setting up new systems from scratch, and ways in which these challenges might be overcome. Maputo is a very interesting case here, because there has been a long-standing commitment to introducing a system of this type, and because key institutions are now taking very seriously the need to improve sanitation in low-income communities.

As detailed in Section 2.6, collection of a sanitation surcharge (*taxa de saneamento*) was approved for Maputo in 2001, but has not yet been brought into force. The precise mechanism of the surcharge is still under consideration by the regulator and other key actors including the water utility and the sanitation services department within the municipality (DAS). However, it is clear that the surcharge will apply only to households who consume more than the "domestic social tariff" (10 m^3/month), and that it will be available for expenditure on all excreta disposal options, not just sewerage. The regulator CRA is strongly committed to ensuring that it be predominantly used for improving sanitation services in lower-income areas.

What then is preventing implementation of the surcharge system in Maputo? Respondents in Maputo highlighted three key constraints: 1) the current lack of visible sanitation services in Maputo except for the small sewerage system; 2) the fact that institutional responsibilities for sanitation remain fragmented and poorly defined; and 3) a widely held perception that consumers will not be willing to pay a surcharge unless they genuinely believe that services are going to improve.

The President of CRA (Alvarinho 2012a 2012b) recognises that the very low current levels of sanitation service provision in Maputo are a major concern, and argues that it is difficult to introduce a surcharge in advance of adequate services being made available. He suggests that external capital investment is needed to finance sanitation improvements in LICs; once citizens begin to see visible evidence of service improvements, a surcharge could be introduced, and used to cover operational costs. [We (the authors) agree that sanitation surcharges are best reserved for recurrent costs, as opposed to capital costs: as noted in Section 3 above, the recurrent costs of sanitation systems are very difficult to finance, even without cost recovery, and we suggest that sanitation surcharges should, at least initially, be used to cover the recurrent costs of existing systems or new systems constructed with government or donor capital.]

Related to both the current lack of sanitation services for LICs and the perceived unwillingness of water system customers to pay an additional surcharge, Manhique (2012b) reports a recent social experience that could be influencing decision-making about the sanitation surcharge in Maputo. A tax for solid waste management (garbage collection) is included within the electricity bill, but solid waste services are not consistently and effectively provided throughout the city, so that there is widespread consumer dissatisfaction with this tax.[25] Thus, ironically, the generally poor level of sanitation services in Maputo can be seen as one of the major barriers preventing its improvement: the sewerage system managed by DAS serves so few residents that imposing a sanitation surcharge is seen as inappropriate until the level of service improves.

Another less obvious barrier preventing implementation of the surcharge may be simply the terminology *taxa de saneamento*. The Portuguese word *taxa* can in fact be understood to mean either tax/levy or fee/charge; but Manhique (2012b) suggests that people will interpret *taxa* in this context as a tax, with negative connotations. However, CRA respondents prefer to describe the future surcharge as a service charge, and this presentation might engender less resistance. Another possibility would be to adopt an alternative term like *contribuição de saneamento* or *contribuição ambiental*.

[25] Indeed, one respondent suggested that this may have been one of the factors behind Maputo's riots in 2009.

> *"The system should not only be equitable, it should be seen as such"*

Of course these would be circumlocutions, since the surcharge argued for in this paper is certainly a tax: nonetheless, it is certainly the case both in Maputo and elsewhere that public support for systems of this type is likely to be strongly dependent on use of well-chosen language and serious attention to social marketing. In other words, it's essential not only that the system should be effective, equitable and socially beneficial, but that it should be seen as such by consumers.

One possible solution to address Maputo's chicken-and-egg problem (no services without surcharge, no surcharge without services) might be to split the proposed *taxa de saneamento* into two separate charges, as in Lusaka where sanitation services for LICs are at a similarly low level of development. This could be done by charging all water-supply connected customers who consume at levels above the social tariff a small *sanitation levy* (initially say 2 or 3% of the water bill, as in Lusaka), while at the same time charging those who benefit from the existing sewerage service (between 5% and 25% of the population) an appropriate *sewerage charge* (at very least 40% of the water bill, as in Lusaka). This would differentiate between the two levels of service currently being experienced by the city's residents. The sewerage charge would provide a revenue stream for operation and maintenance of the existing sewerage system. The sanitation levy, ring-fenced for LICs, could be used to support faecal sludge management services in LICs (for example, provision of neighbourhood sludge transfer tanks for free use by private pit-emptying enterprises, with municipally subsidised onward tankering of sludge from neighbourhood tanks to the sludge treatment works); and/or to support sanitation and hygiene promotion activities in LICs; and/or potentially to finance operation and maintenance of low-cost sewerage systems in high-population-density LICs in which such systems might be an appropriate solution. However, we should note that this possible solution (separate sewerage charge and sanitation levy) was not judged positively by all respondents consulted for this study: some respondents suggested that a single charge would be more appropriate.

Notwithstanding the very positive current climate for progress on LIC sanitation in Maputo, and the ways in which the existing *taxa de saneamento* idea could be "tweaked" to create a genuinely viable and equitable sanitation financing system, it certainly remains challenging to move this concept forward: apart from the issue of consumer resistance, the institutional framework is somewhat more complex than in Lusaka, with the water utility AdeM separate from the sanitation authority DAS (a department of the municipality). So strict rules and regulations would be needed, to ensure that the correct funds were collected and regularly transferred to the appropriate account. Furthermore, the regulatory agency CRA was given authority to regulate sanitation as well as water only relatively recently, and it is still "learning the business". However, CRA is a dynamic and forward-thinking organisation that is ideally placed to facilitate introduction of a sanitation surcharging system and to proactively engage with all stakeholders to drive progress. Clearly, a strong regulatory authority is required to ensure that the future surcharging system works for low-income consumers and is at the same time fully acceptable for Maputo's water and sanitation operators.

5. So what to spend the money on?

A recurrent question arising throughout this paper has been how to spend the funds raised by a pro-poor sanitation surcharge: notably, should the funds be used to cover capital costs or recurrent costs? In Lusaka, the Sanitation Fund has been used largely for capital costs to date. However, most respondents contacted by us argued that funds raised by a sanitation levy should be used towards the recurrent costs of sanitation services, which are notoriously difficult to cover by other means. Possible areas of expenditure are as follows:

Table 3. *Possible ways of spending funds raised by a pro-poor sanitation surcharge.*

Area of expenditure	Is this a likely expenditure area?	Is this an appropriate expenditure area?
Core capital costs of major infrastructure	No: it is unlikely that a sanitation levy would be used to cover the capital costs of major infrastructure.	No: we do not consider that this would be an appropriate use.
Extension capital costs of major infrastructure programmes	Yes: in Lusaka, the currently approved expenditure on the Kalingalinga sewerage programme falls into this category, i.e. the levy will be used to support local network construction and (possibly) subsidised household connection in a low-income district, within a major sewerage construction programme funded by a major development bank.	Questionable: in our view such costs would be better covered by government and/or the external funder.
Capital costs of small-scale infrastructure	Yes: in both Lusaka and Ouagadougou, surcharge funds have been used to cover small-scale infrastructure projects.	Possibly: we would certainly judge it appropriate to use sanitation funds to construct neighbourhood sludge holding tanks, or to part-finance the construction of shared toilet facilities for very-low-income tenant compounds.
Household sanitation subsidy (i.e. subsidy of householder capital costs)	Yes: the Ouagadougou surcharge has been used for subsidy of household sanitation improvements, notably provision of cleanable slabs	Possibly, but only with very careful control to ensure that subsidies are carefully targeted at the very poor: as is well known, poorly designed subsidy systems tend to a) be sequestered by the less poor and b) inhibit local market development.
Soft investment costs	Yes: again, in both Lusaka and Ouagadougou, sanitation surcharge funds have been spent on areas including sanitation marketing and hygiene education.	Possibly: but where associated with major infrastructure programmes, we would argue that these costs are better covered by government and/or the external funder.
Recurrent costs	Yes: we consider this a likely area of expenditure.	Yes: as detailed in the text, we consider this to be a highly appropriate and useful expenditure. Appropriate areas include faecal sludge management (notably onward tankering of sludge from neighbourhood sludge holding tanks).

> “The availability of a fund to cover recurrent costs should facilitate access to capital”

In the view of the authors, and various of the respondents contacted for this study, appropriate expenditures of a sanitation fund include the following:

- part-subsidy of construction of shared toilets for groups of very-low-income households
- construction of neighbourhood sludge holding tanks (for free use by local pit-emptiers)
- onward tankering of sludge from neighbourhood holding tanks to treatment/disposal site

WSP respondent Peter Hawkins has pointed out that using a sanitation fund for recurrent costs (as opposed to capital investment) implies that it will only benefit people who have a service already. This is certainly the case: the use of a sanitation levy for recurrent costs of sanitation services needs to be paralleled by capital investment from other sources (e.g. national government and/or donor funds), in order to ensure extension of service to unserved areas. The availability of a levy-derived sanitation fund to cover recurrent costs should facilitate access to capital investment: notably, development banks and other international funders are more likely to invest capital if they see that an existing mechanism is in place to generate revenues for recurrent costs.

Finally, we can expect the manner of collection and the pattern of expenditure of any pro-poor sanitation fund to evolve over time. For example, we might envisage a situation in (say) Lusaka 50 years from now, in which 90% of the population is served by a sewerage system: in such a situation, it would perhaps no longer make sense to collect a pro-poor sanitation levy separate from the sewerage charge. Or we can envisage a situation in which a pro-poor surcharge is initially collected mainly from the top 25% wealth bracket, but is then gradually extended first to the top 50% then to the top 75%, as income levels rise and the proportion without sanitation access declines. But currently these can be seen as hypothetical situations: in most African cities, a large proportion of the population is poor and has inadequate sanitation services, so that this general concept –a levy collected mainly from higher-income water consumers, and spent largely in low-income communities without sewerage– can be considered widely applicable at present.

6. Conclusions and recommendations

What is the root problem?

The root problem in low-income cities throughout the world is a lack of finance for sanitation in low-income and informal settlements. Major potential sources of finance are householders (i.e. tariffs), local and national government (i.e. taxes) and international donors (i.e. transfers) [the three Ts]; private finance may also contribute to capital costs, but only in expectation of payback from one of the three Ts. International donors may be expected to contribute substantially to capital costs, alongside other actors including householders and national governments; but donors are not likely to contribute substantially to long-term recurrent costs (Evans et al. 2009). So recurrent costs must basically come from what householders are willing to pay for services received[26] and from local- or national-level taxes.[27] A widespread problem here is that municipal revenues are typically grossly insufficient to pay for basic services, reflecting both inadequate municipal taxation systems and inadequate transfers from central government.

Where are pro-poor sanitation surcharges currently in place?

In many African cities, sewer-connected customers pay a sewerage charge added to their water bill. But this model cannot be considered substantially pro-poor, since sewer systems rarely serve low-income communities: in fact sewerage charges are usually much less than cost-reflective, so that a common situation is for sewerage systems serving wealthy residential and business districts to be government-subsidised, while sanitation for low-income communities receives little or no public support. Only two African cities currently have sanitation surcharge systems that can be considered pro-poor: Lusaka and Ouagadougou.

How exactly do pro-poor sanitation surcharges function?

As detailed in this paper, there are two basic models of pro-poor sanitation surcharge. In the Ouagadougou model (service charge model), water consumers pay either a sewerage services charge if they are sewer-connected, or an onsite sanitation services charge if not: this can be considered pro-poor in that at least there is some services provision for low-income communities. But there is no cross-subsidy from wealthier districts to lower-income districts, and there is an evident risk that the revenues raised by the onsite sanitation services charge may not be used to generate genuine service improvements. The Lusaka model, by contrast, is a redistributive levy. As noted in Figure 1, intermediate models are fully possible: i.e. services charge systems under which wealthier consumers pay more than the value of services received, while poorer consumers pay less. Nonetheless, ensuring the correct function of an intermediate model of this type would require a strong regulator and highly transparent accounting. The authors of the present paper consider that the Lusaka model is both the most workable and the most equitable: it is a system under which sewerage can be financed by cost-reflective pricing, while at the same time a ring-fenced levy is raised to improve sanitation in low-income communities. This model is also compatible with additional charging for sanitation services in low-income communities: in other words, we are certainly not suggesting that sanitation services in low-income communities should be entirely subsidised. The repeated failure of latrine subsidy programmes and similar approaches is well known, and there are strong arguments for demand-led models that ensure genuine ownership and avoid subsidy dependence: nevertheless, there remains a clear need for public revenue streams to provide carefully targeted subsidy support to the very poor, and to fully or partially support higher levels in the sanitation chain (for example, faecal sludge transport and treatment).

[26] Including *sanitation service charges* collected through water bills, as defined in Figure 1.

[27] Including *sanitation levies* collected through water bills, as defined in Figure 1.

> “Paying sanitation surcharges through the water bill is intuitive and logical”

Are pro-poor sanitation surcharges working?

Evidence from Lusaka and Ouagadougou indicates that substantial funds have been raised and spent in low-income communities. In Ouagadougou, we do not have detailed data on current expenditure of the sanitation funds, but it appears that the fund is being spent in a basically pro-poor manner, largely on sanitation marketing and latrine subsidy. In Lusaka, the fund likewise appears to have been spent in a basically pro-poor manner, though with some initial lack of clarity that has been corrected by the regulator. Currently the Lusaka fund is reported to be ring-fenced for *sewerage* of low-income districts only, with no authorisation of non-sewerage sanitation expenditures: however, this appears to be a current political attitude, rather than a formal requirement.

As illustrated by the case studies, the extent to which a sanitation surcharge system can be considered pro-poor requires careful analysis. In particular, and regardless of the *nominal* structure of the charging system, we need to know what proportion of overall sanitation expenditure is being directed towards low-income communities, and what proportion is being directed to non-poor communities.

Isn't this just side-stepping the problem of inadequate municipal budgets?

Are sanitation surcharges raised by water utilities simply a way of “side-stepping” the need for effective municipal taxation, creating a parallel revenue-collection body alongside the democratically elected institution which should be responsible for revenue generation, and freeing the municipality of its obligation to provide adequate sanitation services for its citizens? We do not think so: in other words, we do not think that this is a significant critique of the sanitation surcharge concept. First, any system of sanitation surcharging through a utility should be subject to government and/or regulator approval, ensuring democratic accountability. Second, and although sanitation surcharging involves revenue collection by the water utility, there is no necessary requirement for the disbursement to be controlled by the utility: indeed, it would be possible for disbursement of the revenues raised to be controlled by the municipality.

However, we certainly believe that models of this type can only be effective in contexts in which reasonably transparent accounting can be expected: if there is no existing ethos of transparent reporting of public investment, we cannot reasonably expect a sanitation surcharge system to function well.

What lessons for introduction and development of sanitation surcharge systems?

We suggest that the following lessons can be drawn from the case studies analysed in this paper:

- Lusaka's pro-poor sanitation levy is an outstanding model for other cities: the actors behind this initiative (notably LWSC, NWASCO and GIZ) deserve great credit for creating this innovative and effective system. In the opinion of the authors, levies of this type offer exciting potential for supporting sanitation improvements for the urban poor.
- Paying sanitation surcharges through the water bill is intuitive and logical, and seems to be readily accepted: in cities including Lusaka, Ouagadougou and Antananarivo, people appear generally happy with this concept. To maximise public support, it may be best to avoid using the word “tax”: but it needs to be remembered that a sanitation levy as seen in Lusaka *is* a tax. In other words, levies of this type are mechanisms for public revenue generation that international agencies can argue for, but certainly cannot impose. Like any other tax, a sanitation levy needs to be authorised by relevant democratic institutions, or by their administrative representatives (e.g. by a regulator).
- Sanitation surcharge systems require a favourable institutional framework: ideally a single utility in charge of water and sanitation, and/or a strong regulator capable of fairly balancing the needs of consumers and service providers. Where the

framework is not currently strong, it perhaps makes sense to improve the framework before implementing a sanitation surcharge system. The very positive Lusaka experience provides powerful support for the view that a strong sanitation regulator is a key component in the institutional framework.

- Transparent accounting is critical: a sanitation fund can only be effectively ring-fenced for pro-poor use if there are transparent rules defining how it can be spent, and transparent reporting of how it has been spent. Strong regulation is essential.
- Independently of our support for pro-poor sanitation levy systems, we argue strongly for separation of sewerage charges from wider sanitation surcharges, with rigorous regulatory oversight to ensure correct expenditure of the pro-poor component. We also argue strongly for cost-reflective sewerage service charges, certainly for non-poor consumers and commercial, industrial and institutional customers: in many cities sewerage charges are currently around 10% of the water bill or less for domestic consumers, but true cost-reflective charges are likely to be much higher. More realistic models here are Lusaka (40%) and Nairobi (75%), and indeed in the UK sewerage charges are often 110% of the water charge.[28]
- Conversely, our support for pro-poor sanitation levy systems in no way precludes onsite sanitation service charges paid directly by households or at the district level (see Box D): in other words, we are certainly not arguing for 100% subsidy of sanitation in low-income communities. We are suggesting that public revenue streams are necessary to support particular elements of the sanitation chain in a targeted way: for example, latrine or sewer-connection subsidies closely targeted at very-low-income households within low-income districts; and/or sludge holding tanks enabling local market-driven desludging services; and/or municipally subsidised onward tankering of sludge from neighbourhood transfer stations to final treatment/disposal locations.

Possible strategies for introducing a sanitation surcharge system

Finally, we tentatively suggest the following possible strategy for introducing a sanitation levy system as seen in Lusaka. As noted, we consider that surcharge systems are most likely to be implemented successfully in contexts with clear institutional responsibility for sanitation, and strong regulatory oversight; and we consider that introduction of systems of this type requires not only that the system be effective and equitable, but also that it should be *perceived* as effective and equitable (so requiring careful attention to communication).

- Simultaneously introduce a sewerage charge for sewered customers[29] and a separate sanitation levy for all customers (sewered or not) with water consumption above a defined minimum threshold.
- Set the sanitation levy at a small percentage initially, but with a defined mechanism for automatic increases in this percentage over coming years (without such a mechanism, the sanitation levy is likely to remain small).
- At least initially, use the sanitation levy funds for recurrent costs (e.g. municipally subsidised onward tankering of sludge). We suggest that the existence of a revenue stream of this type, covering recurrent costs, will be a strong supporting factor in accessing grant or concessional loan funding for capital investments.

(Of course this is just one possible strategy, expressed very briefly: the best strategy to adopt will clearly vary depending on local context.)

In conclusion: we consider that market-driven approaches are likely to be essential for improving slum sanitation, but at the same time we consider that there is a need for municipal support of some components of the sanitation chain. We consider that pro-poor sanitation levies raised on water bills offer great promise for achieving this.

[28] Estimate from Richard Franceys, personal communication, July 2012.

[29] In fact sewerage charges should ideally be charged to all water consumers within the sewered area who could reasonably afford to connect; this incentivises connection to the network.

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Appendix I:
Key sanitation statistics for the cities discussed in this paper

Antananarivo

Population size (whole agglomeration, not just formal city)
1.8 million people (Brinkhoff 2010)

Access to improved sanitation:

Networked sanitation (i.e. sewerage)
17% in CUA, 1% in peripheral communes (i.e. almost non-existent) (INSTAT (2002) in WSUP (2010))

Non-networked sanitation (i.e. latrines, septic tanks, etc.)
9% septic tanks, 74% dry pits and others (INSTAT 2002)

No access to improved sanitation [JMP definition of improved; WHO/UNICEF 2010]
89% (Tucker and Mason 2011)

Beira

Population size (whole agglomeration, not just formal city)
0.4 million (Brinkhoff 2010)

Access to improved sanitation:

Networked sanitation (i.e. sewerage)
Not known (significant, there is an extensive system)

Non-networked sanitation (i.e. latrines, septic tanks, etc.)
Not known

No access to improved sanitation [JMP definition of improved; WHO/UNICEF 2010]
Not known

Dakar

Population size (whole agglomeration, not just formal city)
2.7 million (Brinkhoff 2010)

Access to improved sanitation:

Networked sanitation (i.e. sewerage)
26% (Scott 2011)

Non-networked sanitation (i.e. latrines, septic tanks, etc.)
70% (Scott 2011): this includes technologies such as flush to septic tank, covered latrine, and ventilated improved pit latrine (VIP).

No access to improved sanitation [JMP definition of improved; WHO/UNICEF 2010]
4% (Scott 2011): includes households with simple latrines, bucket latrines and those with no sanitation.

Lusaka

Population size (whole agglomeration, not just formal city)
1.8 million (Brinkhoff 2010)

Access to improved sanitation:

Networked sanitation (i.e. sewerage)
Less than 10% (estimate by Mayumbelo 2012)

Non-networked sanitation (i.e. latrines, septic tanks, etc.)
Great majority use onsite sanitation: estimates vary, but possibly about 90%.

No access to improved sanitation [JMP definition of improved; WHO/UNICEF 2010]
Estimates vary, but possibly as many as 80% of total population use unimproved sanitation, i.e. open defecation or unimproved onsite facilities. However, a recent NWASCO report suggests that the figure could be lower (NWASCO 2011).

Maputo

Population size (whole agglomeration, not just formal city)
1.9 million (Brinkhoff 2010)

Access to improved sanitation:

Networked sanitation (i.e. sewerage)
25% (but only 5% connected to treatment plant) (SEED 2011)

Non-networked sanitation (i.e. latrines, septic tanks, etc.)
40 to 56% [estimates vary] (SEED 2011).

No access to improved sanitation [JMP definition of improved; WHO/UNICEF 2010]
19% to 35% [estimates vary] (SEED 2011)

Ouagadougou

Population size (whole agglomeration, not just formal city)
1.5 million (Brinkhoff 2010)

Access to improved sanitation:

Networked sanitation (i.e. sewerage)
Reportedly 22% [although likely to be much lower] (EIB 2012)

Non-networked sanitation (i.e. latrines, septic tanks, etc.)
Vast majority use onsite sanitation.
Estimates vary, according to Ouagadougou's Strategic Sanitation Plan:
* 75% pit latrines (WSP 2002)
* 5% VIP latrines or septic tanks (WSP 2002)

No access to improved sanitation [JMP definition of improved; WHO/UNICEF 2010]
7% open defecation (WSP 2002)

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