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Provision of Water to the Poor in Africa

EXPERIENCE WITH WATER STANDPOSTS AND THE INFORMAL WATER SECTOR

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About AICD

This study is a product of the Africa Infrastructure Country Diagnostic (AICD), a project designed to expand the world's knowledge of physical infrastructure in Africa. AICD will provide a baseline against which future improvements in infrastructure services can be measured, making it possible to monitor the results achieved from donor support. It should also provide a better empirical foundation for prioritizing investments and designing policy reforms in Africa's infrastructure sectors.

AICD is based on an unprecedented effort to collect detailed economic and technical data on African infrastructure. The project has produced a series of reports (such as this one) on public expenditure, spending needs, and sector performance in each of the main infrastructure sectors—energy, information and communication technologies, irrigation, transport, and water and sanitation. *Africa's Infrastructure—A Time for Transformation*, published by the World Bank in November 2009, synthesizes the most significant findings of those reports.

AICD was commissioned by the Infrastructure Consortium for Africa after the 2005 G-8 summit at Gleneagles, which recognized the importance of scaling up donor finance for infrastructure in support of Africa's development.

The first phase of AICD focused on 24 countries that together account for 85 percent of the gross domestic product, population, and infrastructure aid flows of Sub-Saharan Africa. The countries are: Benin, Burkina Faso, Cape Verde, Cameroon, Chad, Côte d'Ivoire, the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania, Uganda, and Zambia. Under a second phase of the project, coverage is expanding to include as many other African countries as possible.

Consistent with the genesis of the project, the main focus is on the 48 countries south of the Sahara that face the most severe infrastructure challenges. Some components of the study also cover North African countries so as to provide a broader point of reference. Unless otherwise stated,

therefore, the term “Africa” will be used throughout this report as a shorthand for “Sub-Saharan Africa.”

The World Bank is implementing AICD with the guidance of a steering committee that represents the African Union, the New Partnership for Africa’s Development (NEPAD), Africa’s regional economic communities, the African Development Bank, the Development Bank of Southern Africa, and major infrastructure donors.

Financing for AICD is provided by a multidonor trust fund to which the main contributors are the U.K.’s Department for International Development, the Public Private Infrastructure Advisory Facility, Agence Française de Développement, the European Commission, and Germany’s KfW Entwicklungsbank. The Sub-Saharan Africa Transport Policy Program and the Water and Sanitation Program provided technical support on data collection and analysis pertaining to their respective sectors. A group of distinguished peer reviewers from policy-making and academic circles in Africa and beyond reviewed all of the major outputs of the study to ensure the technical quality of the work.

The data underlying AICD’s reports, as well as the reports themselves, are available to the public through an interactive Web site, www.infrastructureafrica.org, that allows users to download customized data reports and perform various simulations. Inquiries concerning the availability of data sets should be directed to the editors at the World Bank in Washington, DC.

Contents

Abstract

This paper reviews recent literature and available data on standpipes and the informal water sector in Sub-Saharan Africa. It identifies gaps in the research and outlines recommendations for additional research on water provision to the poor. The analysis draws on two data sets. The first comprises results on water services from 63 national Demographic and Health Surveys (DHS) covering urban households in 30 countries in Sub-Saharan Africa. The second is the water supply and sanitation (WSS) database of the Africa Infrastructure Country Diagnostic (AICD), which contains information on each country's largest city, gathered from government officials and utility staff. Independent case studies based on primary field research fill gaps in the AICD database.

The poor in the cities of the region rely on water supply alternatives that are generally higher in cost and unreliable compared to piped household connections. Standpipes that dispense water from utilities appear to be the most common of these alternatives. Fifty-five percent of the unconnected urban population relies on standpipes as their first water source. Other informal water provisioners include household resellers—one of the more prevalent though difficult-to-quantify sources—and a variety of water tankers and vendors that are the first water source of 1 percent and 3 percent, respectively, of the urban population. Formal or "official" standpipe prices, heavily subsidized by utilities, are far below the real, or informal, price that water consumers pay.

In the cities studied, the percentage of unconnected households ranges from 12 percent to 86 percent of the population. Standpipe coverage is often overestimated; independent studies offer a very different picture of coverage than do utility and government data. For example, in Dar es Salaam, standpipe coverage is as low as 4 percent according to an independent study, compared with 45–58 percent based on DHS data.

The strategy adopted toward the unconnected market will differ substantially depending on the level of coverage of household connections. The percentage of unconnected people covered by standpipes is substantially higher for countries with higher rates of household connection, while the percentage of unconnected people covered by water tankers or water vendors is higher for countries with lower rates of household connection.

Households with private connections or yard taps pay water prices significantly lower than those of standpipes and alternative water sources in the informal market (where prices are 1.3 to 5 times higher). Household water resellers emerge when standpipes are not available or become inoperable—in sampled countries only 42 percent of standpipes are in good working order, according to independent studies—but some people resort to water resellers for the service convenience they offer. In spite of subsidies for standpipe water, the prices charged by standpipe operators are closely related to the informal water reseller price. When piped water service is disrupted, prices in the informal sector tend to rise.

Standpipe management models affect the informal price paid by consumers for standpipe water. In the case studies, local officials and water committees interfered in the operation of standpipes, greatly exceeding their oversight roles, and leading to increased prices for standpipe consumers, who, in the end, do not benefit from existing subsidies.

Analysis of standpipe management models reveals several important trends: a significant shift from free to paid standpipes; a move from utilities management to delegated management models; and increased efficiency from private contractors, sometimes accompanied by poor service and higher prices.

The shift to delegated management models without the accompanying monitoring, oversight by regulators, or dissemination of information to consumers on prices or on management responsibilities has often led to declines in service levels and increased prices. Conflation of “community” interests with those of specific individuals in a neighborhood contributes to the capture of resources from standpipe sales. Social accountability mechanisms have the potential to improve this aspect of standpipe management and pricing.

A broad menu of water-supply options would likely benefit the large numbers of Africans without household connections. Standpipes should not be viewed as the only or even the most efficient solution in peri-urban areas. Promotion of private household connections through connection programs adapted to specific socioeconomic characteristics of the urban poor in each city and innovative arrangements to improve the functioning and pricing of the household resale market, should be part of the range of measures considered by policy makers in designing successful urban water programs.

1 Urbanization and the unconnected water market

Sub-Saharan Africa is the fastest urbanizing region in the world, a phenomenon accompanied by growth in informal settlements. At the same time, its GDP per capita has been falling at an annual rate of 0.66 percent (WDI 2007). This combination of urban growth and economic recession has contributed to the expansion of informal settlements (Fay and Opal 2006). For example, for the 24 Sub-Saharan African countries included in this study, total population grew at an annual average of 2.5 percent, while the growth of slum population has doubled at 4.43 percent in the past decade.

Countries have been unable to match investment and maintenance in urban water and sanitation services with urban growth and have not prioritized expansion in informal settlement areas. Utilities, central actors in service delivery in the urban context, face risks and transaction costs in doing business in informal settlements; these include the unclear legal status of many residences in these areas, which increases the possibility of demolition of the settlement (Kariuki and others 2003), as well as physical challenges to planning networks for haphazard residences that may be later changed or regularized. At the same time, incentives to perform according to financial targets have discouraged utilities from prioritizing expansion in these areas.

The situation is especially acute in post-conflict areas. The urban process is accelerated by people from refugee camps and insecure rural areas that stream into unplanned urban areas. At the same time, conflict, particularly prolonged conflict, exposes infrastructure to deterioration, and diverts the attention of utilities away from improvements in finance, continued investment, and management. High-conflict countries tend to have higher percentages of unconnected population (table 1.1).

The gap in private water connections in urban areas has been filled by a wide range of alternative water providers. These include suppliers such as public standpipes/kiosks (part of the formal water sector), and alternative sources in the “informal” water market. In addition, households seek their own alternative free sources by harvesting rainwater, drilling shallow wells. and collecting surface water. The ability of the alternative suppliers to provide an adequate service to unconnected people is still under debate, but the literature recognizes their important role. That recognition is beginning to give us a better understanding of the function of alternative suppliers in water provision to the urban poor (Collignon and Vézina 2000; Kariuki and others 2003; Kariuki and Schwartz 2005; Keener and Banerjee 2007).

The unconnected market is heterogenous and made up of many players. Figure 1.1 presents the different categories of alternative providers considered in the study according to the relationship to the water source and technology employed in water service delivery. The formal alternatives include public standpipes/kiosks, which can be managed under a variety of schemes. The informal alternatives include sources that resell network water. In most countries with low- to medium-coverage, the most important informal source is people who resell water directly from their house connection. Given its importance, it is surprising that there are so few in-depth case studies of the prevalence of this practice, its coverage, and its market dynamics.

Table 1.1 Slum and unconnected population sorted by conflict incidence

Conflict index	Country	Slum urban population* (% of total urban population)	Unconnected population** (% of total)
High	DRC	50	60
	Sudan	86	63
	Uganda	93	86
	Angola	83	N/V
Medium	Ethiopia	99	52
	Mozambique	94	80
	Rwanda	88	84
	Côte d'Ivoire	68	35
	Namibia	38	21
	Chad	99	78
Low	Kenya	71	50
	Lesotho	57	50
	Nigeria	79	85
	Ghana	70	66
	Benin	84	40
	Burkina Faso	77	67
	Niger	96	69
	Senegal	76	23
	South Africa	33	12
	Malawi	91	68
	Zambia	74	54
	Cameroon	67	76
	Cape Verde	70	0
	Madagascar	93	83
	Tanzania	92	78
	Mauritania	94	72
Average		77.73	58.04
High conflict index		78	70
Medium conflict index		81	58
Low conflict index		76	56

Source: UN Habitat 2005; AICD DHS/MICS Database, 2007.

Note: The conflict index is a compound indicator that takes into account four different measures related to conflict incidence: lapse of time since the last violent conflict; its duration; and its intensity, measured by number of casualties and internally displaced persons.

* 2001 data ** latest available data.

Figure 1.1 Typology according to source and technology employed

		Relationship to source	
		Dependent (source supplied by utility)	Independent (develop own source)
Technology employed	Small piped network (SPN)	Community SPN Private SPN	Community SPN Private SPN
	Point source	Public standpipe Private standpipe (kiosk) Household reseller (informal standpipe)	Private standpipe (kiosk) Community standpipe
	Mobile distributor	Water tankers Carters: Animal traction carters Hand carters Water bearers	Water tankers Carters:

Source: Kariuki and Schwartz, 2005

Mobile distributors, often referred to as vendors, supply a large share of the urban unconnected population in only a few countries. Private standpipes dependent on network water are even more rare. Non-network sources include small-scale independent providers (SSIPs)—businesses or people that sell water from sources they have developed or found such as boreholes, wells, or even rivers. In the past decade, these various sources, which together comprise the " informal"water market, have gained more attention from the development community.

This paper summarizes the available knowledge on standpipes and the informal water sector, focusing primarily on coverage, price transmission mechanisms, regulation, and standpipe management in urban Africa. It identifies gaps in the research and outlines priorities in terms of future field work to fill those gaps. In preparing the paper, we performed an extensive review of all of the available literature on the topic and analyzed data from a subset of African countries (see below). Another objective of the study is to design indicators that show cross-country comparisons of the structure of the informal water market and its relative importance.

The paper draws upon two data sets, the AICD DHS/MICS database 2007 and the AICD WSS database (2007). The first database relies on 63 national Demographic and Health Surveys (DHS) covering households in 32 countries. This DHS database provides information on water services at the urban level based on household surveys. The second database, AICD WSS, is based on surveys of government officials and utility staff in the largest city of each of 24 countries in Africa [1]. Existing independent case studies based on sector-specific field research were used to fill specific data gaps and to test the validity of some utility-reported data appearing in the AICD WSS database (2007).

A study on the unconnected market is complicated by data constraints. The AICD DHS/MICS database (2007) on water coverage is very comprehensive, but the breakdown of water by source does not include household water resellers of water as a separate category; it therefore misses the coverage

[1] With the exception of Kaduna, Nigeria, the AICD 2007 Database is based on information collected during January – July 2007 in 24 countries in Africa, and included a module on SSIPs for the largest city in each country.

information of an increasingly important informal water service provider.[2] DHS data refers only to a primary source of water, and it fails to capture the fact that households in sub-Saharan Africa, and in particular the urban poor, are increasingly forced to rely on more than one source of water. In the case of the AICD WSS database, data is divided between information coming from utility staff and government documents (74 percent) and independent studies (10 percent);[3] comparing these two data sources provided for a more accurate assessment of what the current multi-country data sources were missing. Comparison of case studies and the AICD analysis on the informal sector revealed that there was serious bias depending on the source. Independent studies note that information from the utility or the government overestimated the coverage of the population by standpipes and underestimated the extent of the informal water sector. Because of these caveats, comparable cross-country information (DHS) on the urban informal water sector is most likely to provide an indication of its *minimum* coverage rather than an overall coverage level.[4]

There is tremendous diversity among countries in the size of the unconnected market as well as in the composition of coverage provided by each water supplier. The unconnected urban population can be anywhere above 80 percent in Uganda, Mozambique, Rwanda, Nigeria, and Madagascar. In contrast, the middle-income countries in Southern Africa—Namibia and South Africa—have 21 percent and 12 percent unconnected urban population respectively. Central and Eastern Africa rely to a greater degree on standpipes (almost as important as house/yard connections); Western Africa has slightly lower reliance on standpipes (21 percent of the urban population) but substantially higher reliance on wells and boreholes (37 percent of the urban population), which can also capture a portion of the informal sector market. It is interesting that ECOWAS countries, despite being only slightly richer in per capita terms than central ones, enjoy much better piped water coverage (table 1.2). This regional (DHS) data must be interpreted with caution, because informal water sellers can show up under several categories: “standpipe” (SSIPs), “boreholes” (SSIPs), “house connection,” and “vendor.”

[2] While DHS surveys ask respondents about water vendors, the informal water sector can take many forms, from resale of water from house connections, to resale from boreholes, to more traditional mobile water vendors who may obtain water for a variety of sources (including public standposts); some households who purchase water from their neighbor’s piped connection categorize this source as piped water from a house connection rather than a vendor, particularly in countries where such purchase is illegal or discouraged. By the same token, the DHS surveys asking about standpost use do not distinguish between public, private, network or non-network standposts. In addition, much of the cross-country data only accounts for a primary source of water, when in fact poor households may regularly rely on multiple sources for different uses. Nonetheless, to date the only available cross country primary data for urban areas comes from these imperfect sources.

[3] Due to the common problem of lack of adequate records for the informal sector, about 16 percent of the information on the 24 largest cities in the study was not available.

[4] Comparison of case study data with DHS data suggests that households reliant on resale from neighbor’s taps are likely to report in categories other than “vendor” (for example, private tap, standpost, etc.).

Table 1.2 Urban households connected and unconnected to piped water by region

Percent

			Unconnected				
Region	Connected	All unconnected	Standpipes	Wells and boreholes	Surface	Vendor	Other
West	28	72	21	37	6	7	0
Central	34	66	32	14	16	1	3
East	37	63	31	20	8	1	3
South	65	35	22	9	3	0	0
Total	38	62	25	24	7	4	2

Source: AICD DHS/MICS Database, 2007

Most utilities have pursued expanded coverage and financial viability primarily via household connections, which are typically used to subsidize the cost of standpipes. Almost no urban utilities have pursued standpipes as a primary mode of expansion of coverage.[5] The percentage of unconnected people covered by standpipes is substantially higher for countries with higher household connection rates. In countries with medium to high household connection rates, 71 percent of the unconnected population relies on standpipes, on average. In countries with low to medium household connection rates, 48 percent of the unconnected population relies on standpipes, on average; and in countries with very low household connection rates, 32 percent of the unconnected population relies on standpipes, on average. The very existence of a relatively expanded water network has spillover effects, allowing better access through standpipes.

The prevalence of the informal market is directly linked to the household connection rate. Not surprisingly, the DHS data show that the percentage of unconnected people covered by water tankers or water vendors is higher for countries with lower household connection rates. Countries with very low household connection rates have 13 percent of their urban unconnected population that relies on either water trucks or water vendors, on average. In countries with low-medium household coverage rates, 4 percent of the urban unconnected population relies on either water trucks or vendors, on average; for countries with medium-high household coverage rates, only 2 percent of the urban unconnected population relies on either water trucks or vendors, on average.

Standpipes

Standpipes represent the main source of water for unconnected households for most cities. Therefore, it is particularly important to take them into account if one is to understand not only the characteristics of water coverage but also the dynamics of the water market and supply chains. Average standpipe coverage in the cities studied is 28 percent, but standpipe coverage can provide up to 53 percent of the water supply for the unconnected households (table 1.3). These results are very much in line with the widespread belief that standpipes are the main water source for the urban poor and that the poor are likely to comprise a

[5] In recent projects in urban Burundi, there is a greater focus on standpipes, largely because of constraints in bulk water supply and capital financing.

larger proportion of standpipe users.[6] The wide inter-city variation in standpipe coverage implies that the policies governing standpipes need to be tailored. The approach to standpipes in Johannesburg, where this source provides almost the totality of coverage to the unconnected and disconnected, will clearly differ from that in Khartoum, where water vendors abound and there is only marginal standpipe coverage, or from that in another country where some portion of standpipe users may actually be eligible for house connections but unable to pay the high connection fees.

The "real" coverage of public standpipes falls when the results of independent sectoral surveys are compared to the official data from utilities and governments. Independent studies assessed the coverage provided by standpipes as well as by other alternative providers in detail and made it possible to compare results with official statistics. In Maseru, the capital of Lesotho, for example, MICS data revealed about 50 percent of the urban population did not have a piped connection but the utility assumed that this segment was reliant on its free public standposts. However, an earlier detailed sectoral survey undertaken in Maseru in 2002 showed that coverage by free public standpipes was as low as 16 percent of the population, with the coverage among the unconnected falling from 100 percent to 24 percent of that population group (Sechaba/Hall 2002).[7] In spite of the three year lag between surveys, it is unlikely that this accounts for the differences in these numbers. Similarly, in Ethiopia the formal standpipe coverage is overestimated, with the gap filled by resale from household connections.

Utility data deviate from sectoral household survey data in estimating standpipe coverage. The most common way utilities calculate standpost coverage is to multiply a "standard" number of people using a stand post (300–500ppl/standpipe) by the number of existing standpipes.[8] This estimation, however, can be highly inaccurate as it cannot take into account the variety of factors that affect the real usage of standposts (geographic distribution relative to population, distance, water pressure, operating hours, functioning or non functioning). In Ouagadougou, for example, the number of people that rely on standpipes was often calculated using a rate of 700 people per standpipe. However, detailed field studies showed that the real coverage was much lower; as a result, the utility reduced that "standard" number from 700 to 300 people per standpipe for water studies.[9]

[6] Standpipe users have higher incomes than those with no access to standpipes at the national level. The poorer rural population relies on less-improved water sources than standpipes. However, within urban areas, and in particular within primary cities, standpipes represent an important water source for lower income residents.

[7] These figures are likely to have changed. Since this study was completed, the WASA (the water utility) has undertaken a new standpost program focusing on token run standposts, with apparent success.

[8] For all the cities for which we could only rely on utility's information, coverage was calculated this way.

[9] Personal communication with Seydou Traore, WSP, on September 25, 2007.

Table 1.3 Coverage of water supply in the largest cities

23 cities included in AICD study

				Other				
Country	Largest city	Household connection (%)	Standpipes/ kiosks (%)	Water tankers (%)	Household resellers (yes/no/%)	Water vendors (yes/no)	Small piped networks (yes/no)	Ratio of stdp-kiosk/ unconnect. (%)
Benin	Cotonou	31	N/V	N/A	yes	no	yes	N/V
Burkina Faso	Ouagadougou	34	61	N/A	no	5	no	92
Ethiopia	Addis Ababa	39	40	N/A	yes	yes	no	66
Mozambique	Maputo	26	26	N/A	26	yes	12	35
Niger	Niamey	31	21	N/A	no	10	no	30
Nigeria	Kaduna	48	2	N/V	yes	yes	no	3
Rwanda	Kigali	35	51	3.21	10	no	no	79
Senegal	Dakar	77	19	N/A	yes	no	no	81
South Africa	Johannesburg	88	12	0.24	no	no	no	98
DRC	Kinshasa	36	N/V	N/A	yes	no	yes	N/V
Ghana	Accra	56	N/V	N/V	yes	yes	no	N/V
Kenya	Nairobi	51	41	N/V	no	8	9	84
Lesotho	Maseru	33	16	1.00	31	5	no	24
Malawi	Blantyre	47	N/V	N/A	yes	no	no	N/V
Namibia	Windhoek	73	20	N/A	no	no	no	74
Sudan	Great Khartoum	27	0.11	0.43	yes	60	no	0.1
Zambia	Lusaka	27	58	N/A	yes	yes	no	79
Cape Verde	Praia	34	60	6.30	no	no	no	90
Chad	N'Djamena	22	N/V	N/V	yes	yes	yes	N/V
Cote d'Ivoire	Abidjan	65	N/V	N/A	yes	no	yes	N/V
Madagascar	Antananarivo	42	34	N/A	yes	8	yes	58
Tanzania	Dar es Salaam	29	4	2.00	35	2	yes	6
Uganda	Kampala	30	5	N/V	yes	yes	yes	7
	Average	43	28	2.20	N/V	N/V	N/V	53
	Median	35	21	2	N/V	N/V	N/V	66
	Minimum	22	0.11	0	10	2	6	0.1
	Maximum	88	61.0	6	35	60	12	98.1
	Number of countries with relevant presence	all	all	11/23 (48)	17/23 (74)	14/23 (61)	9/23 (39)	

Source: AICD WSS data, other.
Note: For the unconnected market, the data obtained from independent studies have been highlighted. The remaining data come from utility and government sources.

These factors point to a trend of utility overestimates of coverage from public standpipes. But in some countries, that overestimation is mitigated by substantial mobile resale of standpipe water. In cities where standpipe coverage is very low, vendors sell water door-to-door or from existing household connections. In these cases, while people may occasionally obtain their water from the standpipe, they also obtain it from vendors who buy it from the standpipe. Since utilities and standpipe operators do not keep track of

the different customers they serve, coverage numbers "hide" the breakdown by type of consumer. This is very important when it comes to understanding the price structure of the market, for the standpipe operator usually charges the direct consumer and the reseller differently. In peri-urban areas of Accra, although most water is sold primarily through standpipes, 20 percent of that water is resold by cart operators (Sarpong and Ambrampah 2006). Likewise, standpipes in Khartoum sell most of their water (80 percent) to cart operators, who then resell it to households (Elamin and Gadir 2006). Similarly, in Ouagadougou, more than 80 percent of water sold at standpipes is bought by carters and not by individuals (Collignon and Vézina 2000). In Luanda, Angola, most of the water delivered in peri-urban areas, where the majority of the population lives, is brought in by trucks that sell water obtained either from the piped water system or directly from the river. The water trucks then sell the water to an estimated 10,000 nonmobile water vendors, primarily households that have built water storage tanks; these households in turn sell the water to the rest of the population. In peri-urban areas of Luanda, 70 percent of the dwellers purchased their water from water vendors (Development Workshop 1995).

Utilities reported that 19 percent of public standpipes were dysfunctional, but the real number is probably higher. Estimates of working standpipes obtained from independent studies gave much lower rates—with an average of 42 percent of standpipes in working order, versus the utility generated estimate of 81 percent (table 1.4). This raises reasonable doubts about the accuracy of the numbers reported by utilities on the status of standpipes.[10]

Further, many utilities do not have an updated inventory of existing public standpipes and their current operating conditions, reflecting a low level of monitoring of this generally low-revenue-generating service for the utility—and an absence of regulation. Recent studies conclude that standpipes in many cities have been poorly maintained, with a decline in the number of standpipes in use as well as in the quality of their service (hours of operation and pressure) over time. For future research, it will be very important to understand the capacity that utilities have to deal with these issues, in terms of financial and human resources. Finally, the information base is weak in part because regulators often track hours of water service of the system, but not the number of standpipes in good working condition.

Support for the premise that charging for standpipe water will provide incentives to the utility or to a standpipe manager to keep it in good working order does not clearly emerge from a review of 15 city utilities. However, because of the caveats noted on utility reporting, this finding needs to taken with caution and prioritized for further scrutiny in future research. Countries with a higher conflict incidence show a somewhat lower percentage of standpipes in good working condition.

[10] As reported in AICD WSS data. Since water provision through standpipes is considered an "improved" source in the MDGs (a person supplied through a household connection counts the same as one supplied by a standpipe), there is an incentive for government officials and utility staff to err on the side of "inflating" coverage numbers (Cudjoe and Okonski, 2006).

Public standposts are by and large connected to a city-wide utility water system. Standposts that rely on groundwater for their supply are found only in cities with accessible groundwater resources and in less densely populated peri-urban areas with low exposure to pollution hazards. In these places, private boreholes have flourished, as noted below. These are most often found in specific areas within a city where the utility does not have a water network.

Table 1.4 Public standpipes in good working order and free of charge in 15 cities

Country	Largest city	Share in good working order (%)	Share free of charge (%)
Sudan (HCI)	Great Khartoum	100	0
DRC (HCI)	Kinshasa	21	N/V
Mozambique (MCI)	Maputo	58	0
Rwanda (MCI)	Kigali	75	0
Namibia (MCI)	Windhoek	100	100
Lesotho (LCI)	Maseru (a)	48	100
Kenya (LCI)	Nairobi	89	0
Nigeria (LCI)	Kaduna	55	96
Benin (LCI)	Cotonou	100	0
Burkina Faso (LCI)	Ouagadougou	100	0
Cape Verde (LCI)	Praia	100	0
Niger (LCI)	Niamey	98	0
Zambia (LCI)	Lusaka	97	0
Malawi (LCI)	Blantyre	90	0
Madagascar (LCI)	Antananarivo	82	40
	Average	81	24

Source: AICD WSS Survey, 2007.

Note: Data obtained from independent studies have been highlighted. The remaining data come from utility and government sources.

a. A negligible percentage of the standpipe/kiosk coverage is paid.

LCI = low conflict index; MCI = medium conflict index.

Household resellers

Perhaps the most significant sign of the inability of utilities to keep pace with urban growth is found in the development of household resellers in countries with medium to low water coverage levels. This phenomenon is somewhat hidden, but it emerges clearly when comparing detailed case studies. About 70 percent of utilities surveyed have reported that the resale of water from households is commonplace, and consumer assessment surveys in cities in Mozambique, Lesotho, Ethiopia, and other countries have shown that reliance on household water resellers can account for as much as 50 percent of water resources for a city's population, and up to 80 percent of water resources for the urban poor.

Households usually "hide" in the surveys the fact that they buy water from their neighbors because household water resellers often are not listed in the established categories of household surveys. Therefore, the household water resellers are concealed in the "piped water" or "other" coverage categories. Independent sectoral surveys on the coverage of household water resellers for four cities included in the AICD study ranges from 10 to 35 percent for the connected and from 15 to 50 percent for the unconnected. Evidence from case studies suggests that household water resellers can be as important as standpipes for the supply of the unconnected in Sub-Saharan cities.

This market can represent a significant loss for the utility. Detailed analysis in a consumer assessment in five cities in Mozambique in 1996 showed that the estimated annual sales of water in Maputo totaled $3.2 million, of which $1.2 million could be attributed to formal house connections and yard tap sales and $1.5 million to yard tap owners who resell water to their neighbors (SAWA 1997; Keener and Banerjee 2007). Thus, the sales volume in the informal resale market exceeded the size of the domestic consumer market, representing a benefit for yard tap owners and lost revenues for the water utility. Ironically, the

other delivery vehicle for low-volume water sales, standposts, was also in a state of decline. In the much-smaller secondary city of Quelimane, the size of the resale water market was constrained by very low and irregular supplies of network water. The approximate value of water sold per annum was $711,000, of which only 32 percent ($230,000) went to the water utility. As in Maputo, the largest source of sales from water in the informal market came from the resale of yard tap water, accounting for estimated annual sales of more than $400,000. Standpost sales generated roughly $60,000 in sales; with less than $8,000 received by the water company in revenues. In Maputo, residents with yard taps were able to resell this water for 219 percent of the price they paid for it, and in Quelimane water was re-sold for 686 percent of the purchase price (see below).

Household water resellers often provide a competitive service preferred by consumers over standpipes, though this depends also on relative pricing. In some cases, household resellers offer a "middle" level of service between a full house connection and a standpipe. Household water resellers are also common in cities where the distance between standpipes is too large or the usage (in terms of people per standpipe) too high, as in Dakar, Abidjan, Conakry, and Addis Ababa (Hall 2002; Kariuki and others 2003; Lauria and others 2005; Boyer 2007; O'Connor 2007). Certain studies indicate that there are several additional reasons why households may prefer to choose to buy water from their neighbor instead of using the standpipe. Neighbors can offer more convenient hours of operation and a better water pressure level; because neighbors are located close by, less time is needed to collect the water. In addition, neighbors may offer more flexible payment mechanisms than either public standpipes or one's own house connection (Maputo: SAWA 1997; Boyer 2007; Accra: Sarpong and Abrampah 2006; Maseru: Hall 2002; Abidjan, Cotonou, Conakry, Kampala, and Yaouandé: Kariuki and others 2003; Dakar: Brocklehurst and Janssens 2004; Blantyre: Chirwa and Junge 2007; O'Connor 2007).

Certain neighborhood types are fertile for household resale, such as insecure, high-density slum areas. Households in high crime areas tend to prefer purchase of water from household resellers because they want to avoid going out after dark. Moreover, public standposts in such areas are more likely to have been vandalized, and no longer functional.

In some instances, resales from household connections are linked to deterioration in standpipe service. The low quality of standpipe service comes from poor maintenance by the utility, or the delegated manager, but also from illegal connections of standpipe lines. For instance, in inner peri-urban areas of Maputo and Dar es Salaam, low pressure and shortages at the standpipes are associated with illegal connections. Most of the illegal connections are made in the periphery of the network where the water pressure is usually the lowest, thus further degrading the water pressure of standpipes, which are often located near the ends of the network (SAWA 1997; Kjellén 2006). Low pressure adds to waiting time at standpipes and makes the purchase from neighbor's yard taps more competitive. In Maseru, Lesotho, a similar pattern occurred in terms of the decline in standpipes relative to household resellers; there standpipe coverage fell from an estimated 66 percent to 16 percent (Hall 2002) of the urban population, while household water resellers provided water to 31 percent of the urban population and to almost half of the unconnected population. In Maputo's inner peri-urban areas, the standpipe system suffers from the most acute maintenance problems, and thus household reseller coverage can be as high as 69 percent of the population (Boyer 2007).

Mobile vendors

Although mobile vendors do not represent a significant source of water for the unconnected in most African countries, they do serve a significant portion of urban households in some African countries.[11] For two-thirds of the African countries surveyed, less than 1 percent of the urban population reports that they purchase from vendors, although, as noted, this likely represents only a portion of the informal water market. There are exceptions, however. In Mauritania, 32 percent of urban residents purchase water from mobile vendors, and in Khartoum, 60 percent of the population is served by water tankers. Cities in Burkina Faso, Chad, Niger, Nigeria and Tanzania also had more than 5 percent of households reporting they were dependent on vendors. The estimates of coverage are based on household surveys or calculated indirectly to determine coverage from the sources. The literature shows little quantitative data on the different ways water carters get their water and their different prices. Water vendors often provide water to communities situated a long distance from the network and to informal settlements where private connections and standpipes have not been installed (Kariuki and others 2003).

Water truckers often supply mostly upper- and middle-income households. They are especially present in cities where the piped water service is very poor, both in terms of reliability and extension of the network, such as in Nairobi, Dar es Salaam, and Kampala. Half of the cities considered in the study have mobile distribution for water, but coverage is relatively limited to a small percentage of the population, from 0.24 percent to 6.5 percent (see table 1.3). In other cities, such as Accra and Luanda, water tankers supply directly to upper- and middle-income households but also play a key role in the supply chain. Due to the limited extension of the piped water network, a great part of the kiosks depend on water supplied by tankers. In fact, in informal settlements of Accra, 70 percent of the water bought in kiosks comes from water tankers (Sarpong and Abrampah 2006). In the case of Luanda in the mid- to late-1990s, the majority of the population (between 70 and 100 percent) living in peri-urban areas purchased water from water vendors that sold from household water tanks usually filled by water tankers (Development Workshop 1995).

Small-scale independent providers

There are small secondary water networks operated by small-scale independent providers (SSIPs) in almost 40 percent of the cities in the study. These may be connected to the main city network, as in Nairobi, Cotonou, and Abidjan, or completely separate from the city network, as in Kampala, Nairobi, and Maputo. However, the coverage of small secondary water networks is in general low—only 12 percent in Maputo and 9 percent in Nairobi (table 4). Those that are not connected to the utility's network, but rather to independent boreholes, are referred to here as "independent standpipes/kiosks." These have emerged in peri-urban areas that are less densely populated and often out of reach of the utility's water network. Although they are not prevalent in any African city, independent standpipes/kiosks appear to be one of the fastest-growing segments of the informal water market.[12] This source often offers consumers a

[11] Although not specified in the DHS, this category is often associated with mobile water sources.

[12] Of 19 AICD cities, 8 reported some standpipes connected to independent systems. In five cities (Maputo, Nairobi, Kaduna, Maseru, and Lusaka), this service caters to a minority of the overall urban population. In Kinshasa, Dar es Salaam, and Khartoum all or most standposts use groundwater that is independent from the utility network.

good quality service because it is not constrained by network hours of supply and often offers good water pressure and more flexible hours, albeit at a higher price than standpipes connected to the network that are managed by community organizations or local leaders (Maputo: SAL 2007; Dar es Salaam: Materu and Mkanga 2006). It would be useful to have data on the coverage provided by each modality (i.e. connected to the main network vs. independent from the main network) in order to assess the future potential of each option. It would be equally interesting to have information on the income level of the households currently covered by this source.

Case study of the evolution of water sources: Mozambique

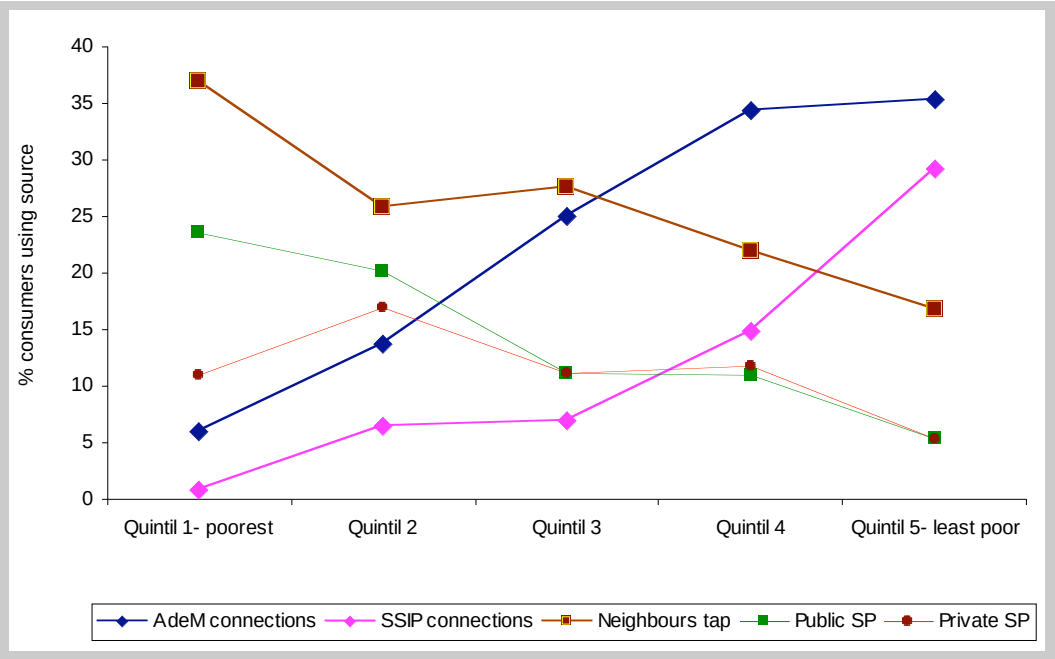
The case of Mozambique provides an interesting example of how various segments of the water market interact over time. In Maputo and several other cities in Mozambique, periodic surveys of the water market were carried out over a 10 year period in tandem with its water sector reform. First, a 2006 consumer assessment confirmed that poorer peri-urban households were more likely to depend on higher-priced re-sold yard tap water and on standposts. The assessment grouped households into poverty quintiles using standard factor analysis of 21 variables of household assets and indicators of wealth (figure 1.3).

Second, the series of consumer assessments showed that the number of people reliant on formal house and yard tap connections has continued to decline since 1996 to a low of 23 percent of peri-urban residents' primary water source. However, because of long-term improvements in the financial and management aspects of the utility (currently under a lease contract), in recent years the sector has made improvements to bulk water supply, thus increasing the availability of water in urban systems. The utilities have also been able to attract funding and are about to undertake a large new wave of network expansion, which should have a substantial impact on these figures.

Between 2001 and 2006, independent providers who supply small piped systems connected to boreholes (SSIPs) increased their market share to 23 percent from 9 percent, largely in the outer peri-urban areas where use of standpost water has also declined (figure 1.4).[13] Consumers reported that SSIPs provided a very efficient service and responded more quickly for a request for a connection than did the utility, Aguas de Maputo. On the other hand, SSIPs were priced higher than some other sources and out of reach of the lower quintiles. Purchases from neighbors' taps continued to grow, accounting for 26 percent of peri-urban water sources.

[13] Data are also available for 1996. However, because the 1996 data also included a center urban area that was not included in the later surveys, the 2001 and 2006 surveys provide a better comparison.

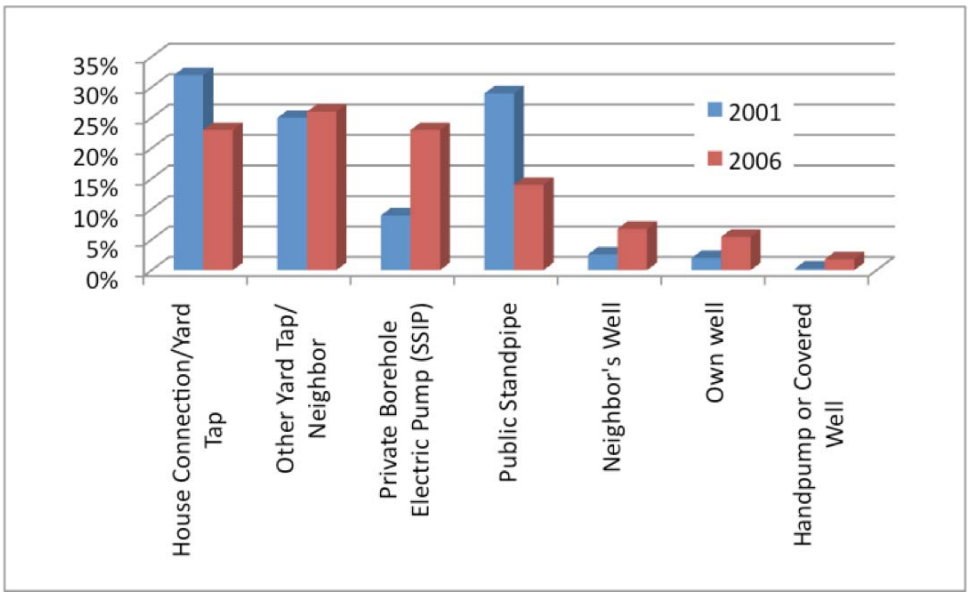
Figure 1.3 Source of water by wealth quintile: Maputo, Mozambique, 2006



Source: Thompson, SAL Consultants 2007.

Note: Includes Maputo and adjacent areas of Matola and Boane.

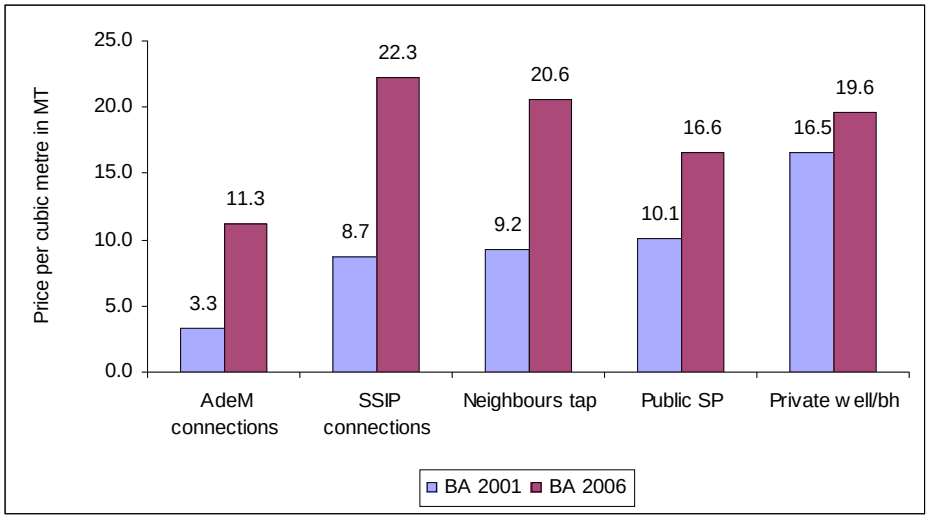
Figure 1.4 Primary water source in peri-urban Maputo, 2001 and 2006



Source: Thompson, SAL Consultants 2007.

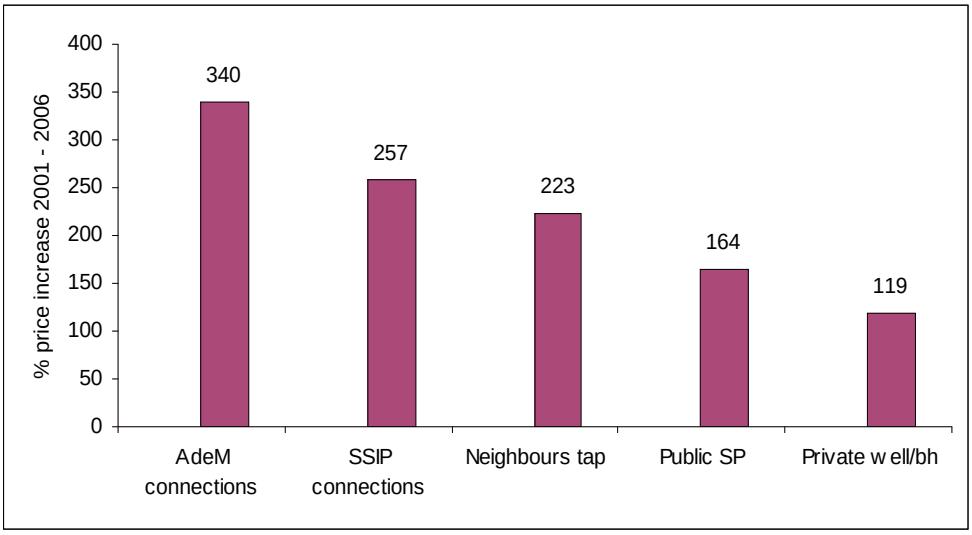
The assessments also provided an indication of how prices have varied over time (figure 1.5). While those with connections to the utility (AdeM) saw increases of 340 percent in prices over the five-year period from 2001 to 2006, the price for household resale only increased by 223 percent (figure 1.6).

Figure 1.5 Price per cubic meter by source in peri-urban Maputo, 2001 and 2006



Source: Thompson, SAL Consultants 2007.

Figure 1.6 Percent price increase by source in peri-urban Maputo, 2001 and 2006



Source: Thompson, SAL Consultants 2007.

Finally, by dissagregating the different types of peri-urban neighborhoods by social, water, and density characteristics, one can see that in the outer peri-urban areas where the utility's piped network did not reach, SSIPs quickly filled the gap (table 1.5), while in inner peri-urban (slum) areas, purchases from those with house connections were more important than public standpipes.

Table 1.5 Maputo water source by type of peri-urban area, 2006

Percent; N = 600

Water sources used	Inner peri-urban	Middle peri-urban	Outer peri-urban
Formal household connection	30	30	2
SSIP connection	1	8	31
Neighbors tap/other neighborhood	36	30	6
Public standpipe	22	13	7
SSIP standpipe	6	8	25
Private well/borehole (neighbors)	4	5	14
Own well/borehole	1	7	10
Public handpump (on well/borehole)		0	7
Total	100	100	100

Source: Thompson, SAL Consultants (2007).

2 Management of the unconnected water market

There has been much debate on how management arrangements for public standpipes and kiosks affect the final retail price, the quality of service, payment to the utility, and the proper functioning of the standpipe, but data gaps remain. Information on the success of management models for standposts and kiosks is still based on individual case studies and anecdotes. Cross-country primary research on the effectiveness of different management models under different conditions is needed in order to draw more definitive conclusions.

There are many variations on how public standpipes are managed and who retains responsibility for payment, supervision, and maintenance (table 3.1). However, management systems tend to fall into two general patterns where: (i) the utility retains control; or (ii) the utility delegates various functions to third parties and serves primarily as a bulk water supplier. [14] In a little more than one-quarter of the cities studied, utility staff retains responsibility for managing standpipes along one of three management models (free, pre-payment, or managed by a paid utility staff member). In almost three-quarters of the cases, utilities had entered into a contract with a third party (whether a private individual or a community organization) or with a support institution (local government, CBO or NGO) for management of the standpipe.[15]

Direct management by utilities

Standpipes have been directly managed by utilities in three ways: free of charge, attended, and prepaid (figure 3.1).

In the last three decades, there has been a shift from standpipes owned and managed free of charge by the utility to standpipes run either by private individuals or community groups, and kiosks that are privately or community owned. The data reveal that free standpipes are declining, largely because they are viewed by many utilities as transaction-intensive and a financial drain. As a result, among the sample cities only five (27 percent) still had standpipes free of charge.

With the exception of Madagascar, for which less than half the standpipes provide free water, free public standpipes were mostly concentrated in larger piped systems or cities with sufficient levels of piped coverage to cross subsidize the costs—in South Africa, Namibia, Lesotho, and Nigeria. Further, other cities are moving towards paid standpipes or kiosks, except for Kaduna, Nigeria; the cities of Johannesburg, Maseru, and Windhoek are installing prepaid standpipes, and Antananarivo is installing kiosks.

[14] In the majority of Sub-Saharan cities, the utility follows one of these two models. There are examples of kiosks that are both owned and operated by private individuals that use utility water, as in Nairobi and Blantyre (Oenga and Kuria 2006;Chirwa and Junge 2007) or that are owned and operated by community groups, as in Dakar (Brocklehurst and Janssens 2004). However, these are largely the exceptions.

[15] In about half of the AICD cities, more than one management model was being used, either because one model is in the process of being replaced by another (Lesotho for example) or because of heterogeneous areas demanding different management approaches.

The second model, in which the utility directly hires a salaried attendant, is an increasingly uncommon practice still in use in a few countries (3 out of 18 sampled). This model has been rejected in some countries because experience has shown that there is limited incentive for a wage-earning employee to ensure cost-recovery. In Zambia, the utility has tried to improve this model by introducing water commissions.

Table 2.1 Modes of standpipe management

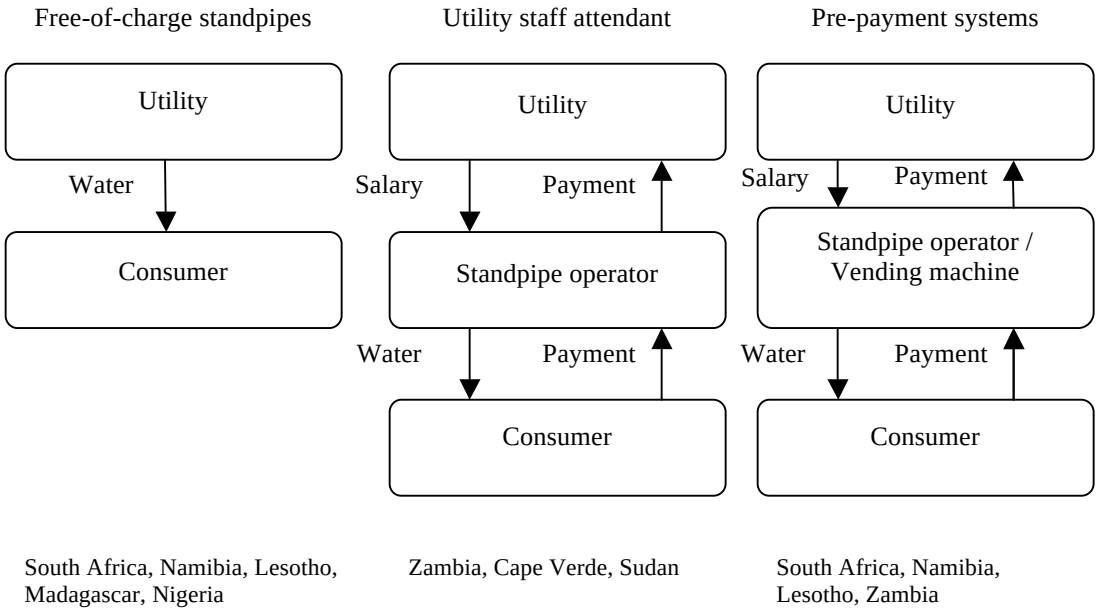
Ownership	Country	City	% free of charge	Management (% by:)		
				Private	Utility	Community *
Utility	South Africa	Johannesburg	100	0	100	0
	Namibia	Windhoek	100	0	100	0
	Lesotho	Maseru	100	0	97	3
	Zambia	Lusaka	0	5	90	5
	Madagascar	Antananarivo	40	60	0	40
	Nigeria	Kaduna	96	4	96	0
	Cape Verde	Praia	0	0	100	0
	Sudan	Great Khartoum	0	0	100	0
Private	Benin	Cotonou	0	100	0	0
	Burkina Faso	Ouagadougou	0	100	0	0
	Niger	Niamey	0	100	0	0
	Rwanda	Kigali	0	100	0	0
	Kenya	Nairobi	0	88	0	12
	Senegal	Dakar	0	85	0	15
Community	Mozambique	Maputo	0	44	0	56
	Ethiopia	Addis Ababa	0	0	0	100
	Malawi	Blantyre	0	N/V	N/V	70

* In the community category we merge the delegated management model with direct contracting with a community group and the delegated management model with institution support as discussed later in this section.

Source: AICD WSS Survey, 2007.

Pre-paid electronic standpipes have no on-site manager, and are intended to reduce management costs. Lower management costs should reduce costs to the consumer and avoid the politically charged problem of non-payment and consequent need to shut standpipes down. A pre-paid system also has the potential to provide more targeted subsidies, as the tokens for pre-payment can be distributed via existing safety net systems. Electronic pre-payment cards and vending machines are currently in use in South Africa and are being introduced in Lesotho and Namibia. In Zambia, as an alternative to vending machines, tokens or monthly cards are used. These systems allow for tariffs to be set at a unit rate that is lower than the smallest coin (Kariuki and others 2003; Brocklehurst 2004) and may allow for more efficient transmission of prices as they eliminate the middleman. In Lesotho, the water utility sells the pre-paid cards, which are also sold at retail outlets. In some instances, however, self-styled “operators” set up at the standpipes and offered higher priced tokens; while this can provide a convenience to some customers, information dissemination on formal prices and formal outlets is important.

Figure 3.1 Utility direct management models

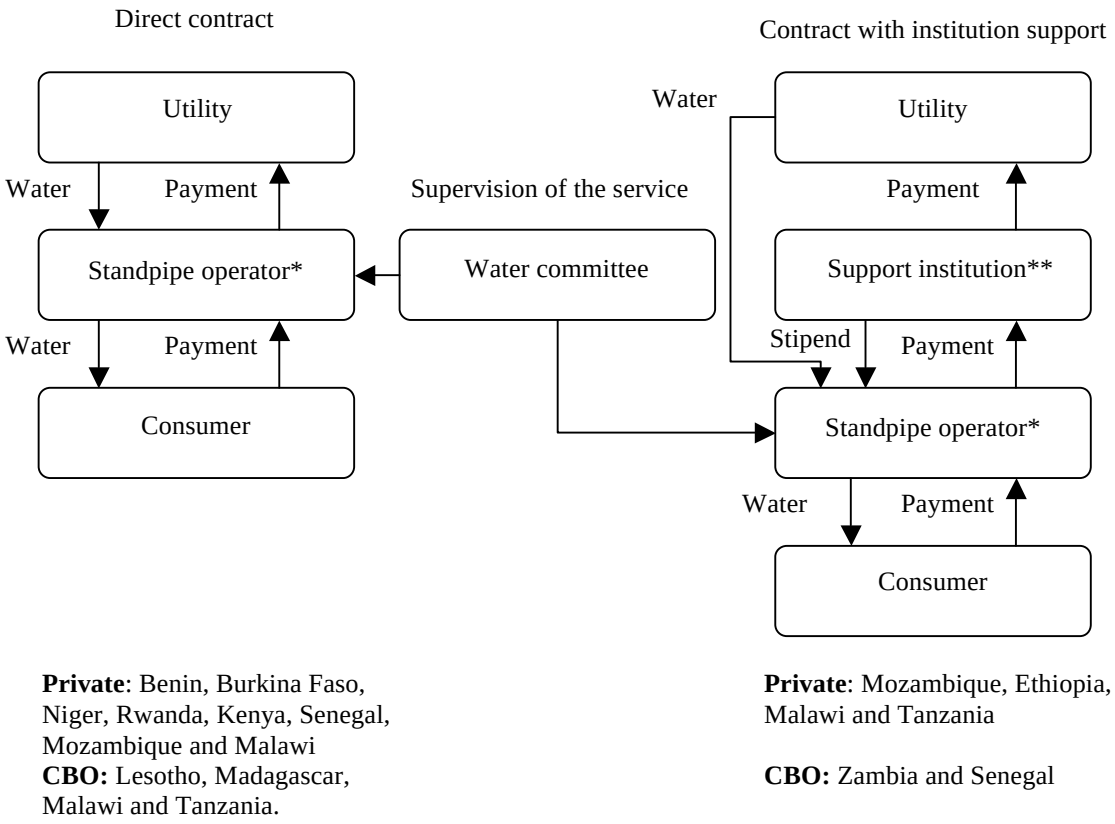


The delegated management model

In the increasingly common delegation model for public standpipes (figure 3.2), utilities either sign a contract directly with a standpipe operator, who maintains responsibility for paying the standpipe bill (and in some cases for maintaining the standpipe), or they sign a contract with a support institution. In the support institution model, the operators are then supervised by members of a water committee or supervised directly by local officials. The utility issues a bill for each standpipe at a bulk water price that is paid by the institution in the institution support model. In most of the cities studied, even though the water provided at the standpipes is subsidized, this subsidy does not reach the final consumers, who pay several times the subsidized rate. The selection processes for standpipe operators typically involves a community-level group or a local government representative, and is generally far from transparent, subject in many cases to local political influence.

Existing case studies suggest that, over the medium-term, the delegation model has had very mixed results in terms of providing a reliable service with timely bill payment to the utility; in terms of providing a subsidized or "social" price to the end-consumer, as the next chapter will show, it has by and large not been effective. The cases that have been most successful have involved sufficient utility (or external) oversight and monitoring, thus adding to the costs of administering the schemes. Conversely, where the utility has delegated all aspects (management, monitoring, maintenance, oversight), it has often been at the cost of higher consumer prices, and break-downs in service. There are exceptions, particularly in areas with high social capital.

Figure 3.2 Delegated management models



* Standpipe operator can be a private individual or a community based organization
** Support Institution: Local leaders, local authority administrators or NGOs

Another important disincentive to payment of standpipe fees is that standpipes receive less attention from the utility. In Maputo, standpipes account for less than 1 percent of total water consumption from the utility and less than 0.5 percent of total revenues for the utility (Boyer 2007). For certain cities with available data, we find similar low percentages for the utility's market share. In Dakar and Addis Ababa, standpipes account for 6.4 percent and 8 percent of total revenues respectively (Boyer 2007; AICD WSS database). The fact that standpipes comprise a small percentage of the utility business, together with the highly polititical reaction to shutting down the operation of standpipes when bills are unpaid, creates incentives for utilities to focus their attention on increasing their revenue base through better maintenance and improved billing collection from household connections. In some other cities, utilities informally admit to rationing water to standpipes in order to minimize losses.

Community-based management

Local leaders: There are wide variations on how communities and their representatives are involved in standpipe management and oversight. In some cases, utilities have assumed that local leaders will represent the broader public interest of their communities, and have handed over responsibility for operations and maintenance to these leaders (in parts of Maputo, Blantyre, Addis Ababa, and Dar es

Salaam). In these cases, performance of the standpost in terms of pricing, maintenance, timely bill payment and so forth, is largely a function of local social context, the skills in financial management and legitimacy of the local leader and the degree of oversight by an external party. In many cases, utility staff does not have the skills or personnel with time to assess these issues up-front, nor to monitor them sufficiently.

Management by Community Organizations: In an effort to improve the accountability of standpipe/kiosk operators towards consumers, several schemes have implicated community organizations in management or oversight, and have been somewhat more effective than schemes that simply delegate management to a local leader. This is still very limited in urban and peri-urban areas of sub-Saharan countries and in those cases where there is not enough social cohesion, strong local power structures, and no oversight from a supporting institution, the model can also lead to corruption and mismanagement. In Blantyre and Lilongwe, community managed kiosks that had been developed with extensive community involvement were captured by local elites as soon as the mediating NGO left. In another case in Dar es Salaam, pricing policies did not cover standpost operation and maintenance, and voluntary community contributions (in kind or in cash) do not bridge the gap.

The principle of community pressure only works where there is a mutually recognized sense of "community" and where there is personal security and common social values in confronting those who digress. Unlike rural areas, urban areas exhibit a greater degree of heterogeneity among different types of neighborhoods. Residents in some neighborhoods – for example in the outskirts of a city - may retain a sense of belonging to a community, know their neighbors, share social norms that can create "community pressure,"; in many other inner urban or core slum neighborhoods, residents may come from different ethnic or geographic areas and live in the area for a short time, without any of the social bonds that contribute to social capital, and face crime and insecurity that causes them to refrain from confronting someone who may not have managed a standpipe well. In such areas, information also may not circulate sufficiently on the accountability arrangements for a standpipe. In such areas, it is not clear that a designated "community" leader is accountable to any wider public.

Political economy issues are central to many problems both with standpipe payment and with selection of who manages and captures revenues from standpipes. An example of the types of implementation challenges experienced with schemes involving communities and their designated leaders can be found in Maputo, Mozambique. In Maputo, communities would elect a neighborhood water commission which would, in turn, elect a caretaker for a standpipe responsible for maintenance of the water points, together with the collection of the consumers' payments. Although designed to be apolitical, local party structures in Mozambique are very strong, and some local leaders have ensured that they are represented in these commissions that are ultimately responsible for payment to the utilities. Many local officials interfered in the operation of the standpipes to an extent that far exceeded a mere oversight role. Since the utility encounters strong political opposition to shutting down a standpipe with a large account in arrears, non-payment of standpipe bills is very common. Local officials have an incentive to develop rent-seeker behaviours, for they can keep the money collected by the standpipe attendant, pay the attendant a small stipend and then withhold payment to the utility because they know that the utility will not close the standpipe. One study found that bill collection rates in Maputo were only 37 percent in 2002 and 44 percent in 2003 (Boyer 2007). As a result, few public standposts had ever had repairs, and many

have fallen into different levels of degradation. Similarly, in slum areas of Luanda, Angola, in the 1990s, where the informal price of water was extremely high, there were reports in some areas that local party leaders had taken over the revenue collection at standpipes to provide capital for local party activities.

In schemes that have experienced problems, information dissemination to the broader community or consumers is often lacking. At the same time, community pressure only works when there is sufficient information dissemination. In the Mozambique case, a 2006 assessment confirmed that: (a) the majority of consumers did not know who water committee members were; (b) few consumers had a clear idea of the roles and responsibilities of the local structures for standpipe management and oversight; (c) and consumers generally played no role in the selection of management structures.

Experience with schemes involving community organizations varies across countries and depends on the degree of social cohesion of the community, management capacity in the community and external monitoring. A WSP Report on the role of small and medium-size organizations providing water in urban areas stressed the limitations of community-based management models without enough external monitoring and support as: i) there is a tendency to minimize expenses by limiting the extension of the system; ii) although in principle based on the voluntary participation of members of the community to reduce operating and maintenance costs, actual management is often controlled by a small group that may not be representative of all the users and that monopolizes control of the finances (Vézina 2002). With such arrangements, elite capture remains a problem that requires strong institutional controls, and active monitoring.

Some more recent models for community involvement integrate more sophisticated incentives, and monitoring to mitigate corruption by larger water user associations or NGOs. In Blantyre, Malawi, water users associations (WUAs) control as many as 70 water points each. The utility provides technical assistance, legally registers the WUA, and monitors operation of the standpost. The WUA employs both the kiosk attendants and meter inspectors. The latter check the meter readings; if there is a difference between the meter reading from the inspector and the amount of revenue collected, it is subtracted from the attendant’s salary. Although the price of this water is 25 percent higher than at other kiosks, because the quality of service is monitored and reliable, households prefer to purchase from these kiosks than from their neighbors. This is not the case with other neighborhoods with kiosks. In Senegal (Dakar), about 15 percent of the public standposts were built through a partnership between the utility and NGO (Enda Tiers Monde). ENDA works with communities and local neighborhood associations (women’s groups, self-help groups), and arranges for them to pay 25 percent of the capital costs of a standpipe which is built by the utility. Once operational, the utility bills a standpost operator selected by the community, and ENDA assists in the creation of a local water council.

Private management

Utilities also contract out the operation and management of standpipes to private managers on the premise that commercial management promotes efficiency and cost-recovery and avoids some of the implementation challenges noted above, but experience has also been mixed. Many utilities in African cities such as Cotonou, Ouagadougou, Niamey, Kigali, Nairobi, Dakar, Quelimane and Blantyre have leased their installations to private operators and sold the operators bulk water. There are two particular

weaknesses of the model: the poor transparency of the selection procedures for the standpipe operators, particularly when the municipality is involved in choosing the manager; and the lack of monitoring efforts by the water utility in collecting water revenues, ensuring good quality service and maintaining adequate tariff levels.

Privately managed standpipes tend to be better maintained (in working order) than those managed under alternative schemes (table 2.2) but they are more expensive for consumers. However, because of issues with utility reporting and the sample size, this finding is not conclusive. The estimation problem arises as utilities may over-estimate the number of properly working standpipes/kiosks if these are not regularly monitored.

Table 2.2 Type of standpipe/kiosk management and percentage in good working condition

Standpipe / kiosk operator	% good working condition
Private	91
Utility	83
Community	74

Source: AICD WSS database

This model is dependent on regular hours of supply and pressure of water to the standpipe by the utility. In the 1990s in Quelimane, Mozambique, private standpipe operators were invoiced according to fixed estimates of water consumption, but water supply was extremely limited and intermittent. Certain standpipe operators found it difficult to generate enough water revenues to pay back the water bill and did not have funds for adequate maintenance of the standpipes (SAWA 1997).

3 Analysis of water prices, costs, and regulation

The range for prices of water by service provider goes from 1.3 times the utility price for small piped networks to 10 to 20 times the utility price for mobile distributors (table 3.1). Standpipe prices include "formal"rates by the utility which differ from "retail" prices (referred to here as "informal" prices) faced by the consumer when there is a delegated management model.

Table 3.1 Prices by water service provider

Country	Largest city	HH connection (US$/m3)*	Small piped network (US$/m3)	Standpipe (US$/m3)	HH reseller (US$/m3)	Water tanker (US$/m3)	Water vendor (US$/m3)
Benin	Cotonou	0.41	N/A	1.91	1.91	N/A	N/A
Burkina Faso	Ouagadougou	0.90	N/A	0.48	N/A	N/A	1.67
Ethiopia	Addis Ababa	0.19	N/A	0.87	1.44	3.85	N/V
Mozambique	Maputo	0.96	0.98	0.98	0.98	N/A	N/V
Niger	Niamey	0.52	N/A	0.48	N/A	N/A	1.79
Nigeria	Kaduna	0.17	N/A	N/V	N/V	3.43	5.71
Rwanda	Kigali	0.44	N/A	1.79	1.79	4.48	N/A
Senegal	Dakar	0.37	N/A	1.53	N/V	N/A	2.29
South Africa	Johannesburg	0.05	N/A	N/A	N/A	N/V	N/V
DRC	Kinshasa	0.05	2.11	1.02	1.01	N/A	N/A
Ghana	Accra	0.52	N/A	5.51	1.53	5.46	6.89
Kenya	Nairobi	0.18	0.60	1.73	N/A	3.74	3.47
Lesotho	Maseru	0.40	N/A	2.58	N/V	N/V	N/V
Malawi	Blantyre	0.12	N/A	1.16	3.38	N/A	N/A
Namibia	Windhoek	1.45	N/A	N/A	N/A	N/A	N/A
Sudan	Great Khartoum	0.37	N/A	1.15	N/V	4.32	3.00
Zambia	Lusaka	0.56	N/A	1.67	N/V	N/A	3.00
Cape Verde	Praia	2.67	N/A	9.44	N/A	9.67	11.38
Chad	N'Djamena	0.22	N/V	N/V	N/V	N/A	N/V
Cote d'Ivoire	Abidjan	0.04	N/V	0.93	1.82	N/A	3.35
Madagascar	Antananarivo	0.11	0.47	1.24	N/V	N/A	2.33
Tanzania	Dar es Salaam	0.39	N/V	0.87	0.98	2.40	2.56
Uganda	Kampala	0.25	N/A	1.40	1.40	N/V	4.50
	Average	0.49	1.04	1.93	1.63	4.67	4.00
	Median	0.37	0.79	1.24	1.49	4.08	3.00
	Min	0.04	0.47	0.48	0.98	2.40	1.67
	Max	2.67	2.11	9.44	3.38	9.67	11.38
	Overprice**		2.14	3.36	4.02	11.03	8.11

** 4 m3 / month*
*** Price SSIP/HH connection*
Source: AICD WSS database, Other

Note: Data from 23 cities. Standpipe price is the "retail" otherwise referred to as informal price paid by the consumer at the tap.

Standpipes

In almost three quarters of the sampled cities,[16] utilities had set a formal/wholesale standpipe price below the unit price for those with house connections, implying a "social" tariff or tariff reflective of the lower level of service.[17] Only in Sudan, Madagascar, Tanzania and Ghana did utilities have a standpipe rate that was above that of household connection water.

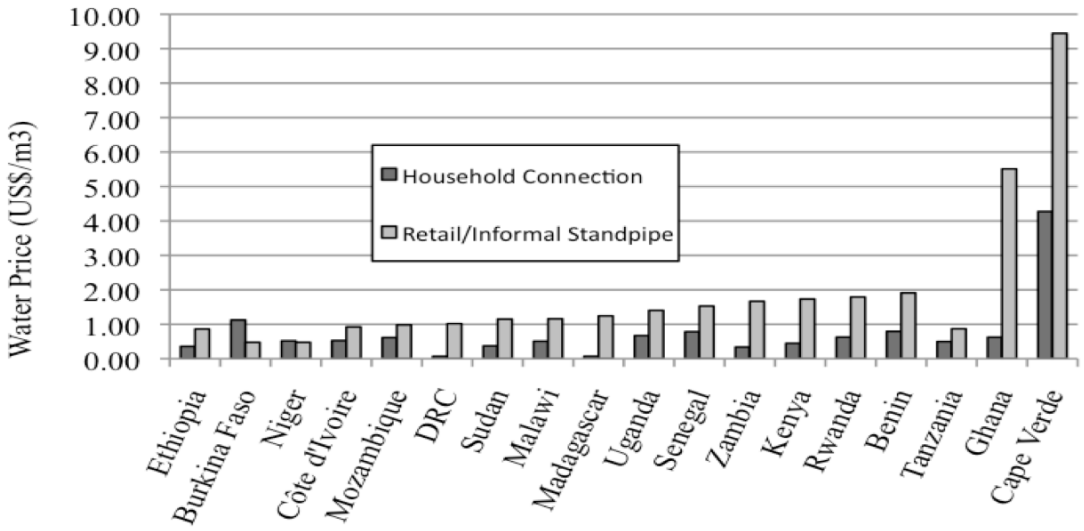
[16] Analysis based on data from 9 cities.

[17] For this analysis it was assumed average household consumption of 10 M3 for house connections (60 l/c/d).

While standpipe water appears to be cross-subsidized by utilities, only in a minority of cases does this subsidy reach the ultimate water consumers. In 89 percent of the sample cities, the informal or retail standpipe unit price exceeded that for house connections (figures 3.1 and 3.2), in some cases by a large degree—as in Kinshasa, where consumers pay over 20 times the formal price. Thus the social tariff has not, by and large, been effective at reaching the end-consumer, who pays a median of three times the "wholesale" or formal price of water to the standpipe. [18]

The cases of Burkina Faso and Niger are worth further exploration, as these were the only two countries (out of 18) that appear to have a social tariff that reaches the actual consumer (see figure 3.1). A social tariff is defined here as a retail/informal standpipe price that is below the unit price for water from a household connection. Key analysis should include both the management structures, incentives for these schemes, as well as the financial impact on the utilities themselves.

Figure 3.1 Comparative water price from household connection vs. from standpipe



Source: AICD WSS database 2007.
Note: Unit price household connection based on assumption 10m3 consumption per household per month.

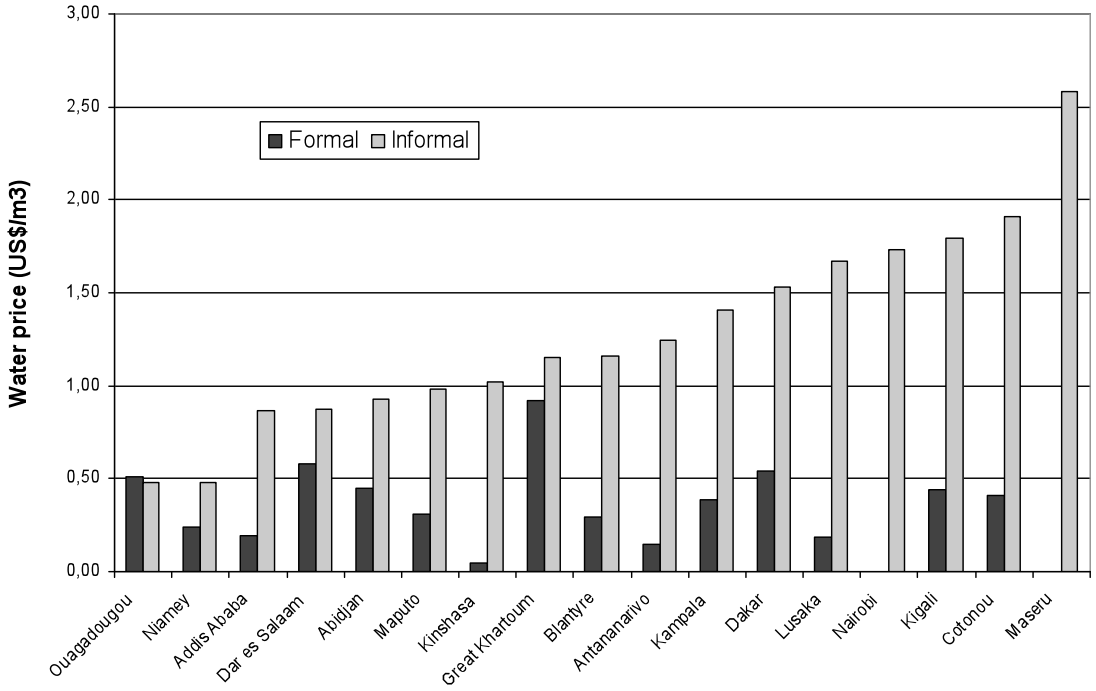
In most cases, the utility sets a formal/wholesale price for standpipes that is below the price for house connections (table 3.2). The differential, or cross-subsidy, amounts to between $0.19 million per annum to $1.3 million per annum per country. In many cases, a significant percentage of this cross-subsidy is used by the standpipe operator.

In the case of standpipes / kiosks that depend on the utility's water, the literature suggests that the underlying causes for higher informal tariffs are not driven by high operation and maintenance costs, but are, in some cases, linked to high profits (Whittington 1991; CollignonandVézina 2000; Brocklehurst and Janssens 2004; Gulyani and others 2005; Boyer 2007). The main reasons for this situation are as follows: (a) low operating and maintenance costs due to inadequate maintenance of the standpipes; (b) low water costs due to the existence of "social" tariffs subsidized by the government; (c) underpayment of water

[18] Where there is a standpipe manager, the formal price refers to the wholesale price that the manager pays to the utility; where the utility takes care of operations and maintenance, the formal price is the suggested price.

bills to the utility; (c) low level of regulations / enforcement of formal and subsidized tariffs; (d) social factors (degree of community cohesion, community pressure or lack thereof, high crime).

Figure 3.2 Formal and Informal standpipe prices



Due to the combined factors of high informal prices and large population coverage by standpipes, the total gross profit[19] captured by standpipe operators in economic terms is quite high. In the cities in which it could be estimated, the annual value of the gross profit ranges from $15,477 in Khartoum to almost $10 million in Lusaka. In relative terms, the gross profit captured by the standpipe operator compared to water revenues of the utility can represent a significant percentage: Maputo 12 percent, Addis Ababa 44 percent and Lusaka 120 percent. Because there is a great variability in costs by country, further research is needed on the factors that affect why some operators charge the maximum the market will bear (which may lead to high profits) while others appear to charge a level below the maximum rate for the informal sector.

[19] Gross Profit = Revenues from water sales – Cost of water sales. This calculation does not include OandM ,other overhead costs, taxes and financial costs

Table 3.2 Formal and Informal standpipe / kiosk price

			Informal (US$/m3)								Population coverage (%)	
Country	City	Formal (US$/m3)	Min	Max	Avg.	Rate	House-hold conn. (%)*	Annual cross-subsidy ($)	Annual gross profit ($)	Conflict index	House-hold connec. (%	Stdpipe/ kiosk
Burkina Faso	Ouagadougou	0.51	0.42	0.50	0.48	0.9	0.76	1,278,002	-164,241	Low	34	61
Niger	Niamey	0.24	N/V	N/V	0.48	2.0	0.36	191,293	375,635	Low	31	21
Ethiopia	Addis Ababa	0.19	0.58	1.15	0.87	4.6	0.24	545,418	7,210,815	Medium	39	40
Tanzania	Dar es Salaam	0.58	0.55	1.20	0.87	1.5	0.45	–109,102	250,715	Low	29	4
Côte d'Ivoire	Abidjan	0.45	0.60	1.25	0.93	2.1	0.06			Low	65	N/V
Mozam-bique	Maputo	0.31	0.31	1.51	0.98	3.2	0.38	224,480	2,078,976	Medium	26	26
DRC	Kinshasa	0.05	N/V	N/V	1.02	20.4	0.05			High	36	N/V
Sudan	Great Khartoum	0.92	N/V	N/V	1.15	1.3	0.37	–37,232	15,477	High	27	0.1
Malawi	Blantyre	0.29	0.63	1.48	1.16	4.0	0.29			Low	47	N/V
Madagascar	Antananarivo	0.14	N/V	N/V	1.24	8.6	0.06	–394,068	5,360,254	Low	42	34
Uganda	Kampala	0.39	0.25	2.00	1.40	3.6	0.74	214,305	612,383	High	30	5
Senegal	Dakar	0.54	1.15	1.91	1.53	2.8	0.37	–614,036	3,608,063	Low	77	19
Zambia	Lusaka	0.19	N/V	N/V	1.67	9.0	0.39	1,368,437	9,818,638	Low	27	58
Kenya	Nairobi	N/V	1.39	2.08	1.73	N/V	0.60			Low	51	41
Rwanda	Kigali	0.44	N/V	N/V	1.79	4.1	0.50	201,407	4,937,298	Medium	35	51
Benin	Cotonou	0.41	0.50	2.50	1.91	4.7	0.63			Low	31	N/V
Lesotho	Maseru	N/A	1.48	3.69	2.58	N/A	0.43			Low	36	N/V
Ghana	Accra	3.64	N/V	N/V	5.51	1.5	0.52			Low	56	N/V
Cape Verde	Praia	N/V	N/V	N/V	9.44	N/V	3.09			Low	34	60
	Average	0.58	0.71	1.75	1.93	4.64						
	Median	0.40	0.58	1.51	1.24	3.40						
	Minimum	0.05			0.48	0.94						
	Maximum	3.64			9.44	20.40						

Source: AICD WSS database 2007.

* Household connection at 10m3/month