

**Water and
Sanitation
Program**

An international
partnership to help the
poor gain sustained
access to improved
water supply and
sanitation services

**Independent Water and
Sanitation Providers
in African Cities**
Full Report of a Ten-Country Study

April 2000

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Contents

Foreword	1
1. Introduction	2
2. The Setting	4
2.1 The African City	4
2.2 Physical and Hydrological Conditions	7
3. Public and Private Sector Roles	10
3.1 The Institutional Context	10
3.2 The Importance of Independent Providers	12
4. How Water Is Produced and Delivered	17
4.1 Households Have Choices	17
4.2 One City, One Water Company	17
4.3 Limited Alternatives to City Water Production	20
4.4 One Water Company, Many Water Sellers	20
4.5 Many Niches, Many Operators	22
4.6 How the Water Market Works	22
5. How Sanitation Services Are Delivered	24
5.1 Self-help Sanitation	24
5.2 Sanitation Options for Every Household Budget	24
5.3 Septage Disposal and Treatment: Environmental Alert	25
5.4 The Diversity of Independent Sanitation Providers	25
5.5 How the Sanitation Market Works	27
6. Water and Sanitation Occupations	29
6.1 Water Occupations	29
6.2 Sanitation Occupations	33
7. Operational Characteristics of Independent Providers	37
7.1 Social and Geographic Origins	37
7.2 Investment Financing	38
7.3 Strategies for Limiting Risk	38
7.4 Competition and Cooperation	40
8. Commercial and Pricing Strategies	42
8.1 Intense Competition Keeps Profit Margins Down	42
8.2 Individual Connections	42
8.3 Standpipe Service	44
8.4 Door-to-door Water Delivery	46
9. Advantages and Constraints	47
9.1 Operational Advantages	47
9.2 Refuting Popular Misconceptions	48
9.3 Obstacles to Expansion	50
10. Next Steps	53
10.1 Strategic Approaches to Improved Service	53
10.2 Avenues for Future Work	54
10.3 “Improvements” to be Avoided	57
11. Conclusion	59

Boxes

Unauthorized settlements in Ouagadougou	7
Independent water providers	31
Independent sanitation providers	36
Kampala City Council and private management of public toilets	50
The solution is partnership	50
Masons in Ouagadougou	55
Mali's Water Advisory Unit (CCAEP)	56
Benin's Union of Sewerage Entities: Right idea, wrong application	57

Tables and Figures

Table 2.1. Access to drinking water and sanitation services, ten African cities, 1999.	5
Table 2.2. Income, purchasing power, and literacy statistics for ten African countries.	5
Table 2.3. Poverty, informal employment, and urban growth rates in ten African cities.	7
Table 3.1. Annual water sector income in five African cities and Port-au-Prince, Haiti.	12
Table 3.2. Market share, earnings, and employment of concessionaire and independent water and sanitation providers in Dakar and Bamako.	13
Table 3.3. Examples of investments made by independent water and sanitation providers in African cities.	14
Table 3.4. Earnings and employment in water sector, Bamako.	15
Table 4.1. Public water service in ten African cities.	19
Table 5.1 Household sanitation options in African cities.	26
Table 6.1. Presence and importance of independent water providers in ten African cities.	30
Table 6.2. Presence and importance of independent sanitation providers in ten African cities.	34
Figure 2.1. Urban growth in six African cities, 1955–2000.	6
Figure 3.1. Numbers of workers employed in the water sector in five African cities and Port-au-Prince.	15
Figure 4.1. Percent of households served by public water networks in ten African cities.	18
Figure 4.2. Average daily per capita water distribution from household connections and standpipes in ten African cities.	20
Figure 4.3. From source to household: How the water market works in African cities.	23
Figure 5.1. Percentage of households served by public sanitation networks in ten African cities.	24
Figure 5.2. From downtown to the urban fringe: How the sanitation market works in African cities.	28
Figure 8.1 Water connection fee and monthly per capita income in eight African countries.	43
Figure 8.2 Water tariff structures of nine African water companies.	44
Figure 8.3. Water rates paid and charged by urban standpipe vendors in nine African countries.	45
Figure 8.4. Gross profit margins of standpipe operators in nine African countries.	45
Figure 8.5. Unit cost of water to standpipe users and high-volume water consumers in ten countries.	46
Figure 8.6. Unit sales price of water delivered by donkey/horse carts and truck in six African countries.	46

Annex Tables

Table A.1. Annual operating accounts for three standpipe operators in Ouagadougou and Dakar.	61
Table A.2. Annual operating accounts for five water carters in Nouakchott, Bamako, Ouagadougou, and Conakry.	61
Table A.3. Annual operating accounts for water truckers in Nouakchott, Nairobi, and Kampala.	62
Table A.4. Annual operating accounts for six private borehole and small network operators in Ouagadougou, Bamako, Nairobi, Kampala, Conakry and Cotonou.	62
Table A.5. Annual operating accounts for two public toilet facility operators in Bamako and Kampala.	63
Table A.6. Annual operating accounts for three manual latrine cleaners in Dakar, Bamako and Nairobi.	63
Table A.7. Annual operating accounts for seven suction truckers in Bamako, Ouagadougou, Dakar, Nairobi, Kampala and Conakry.	63

Foreword

The majority of people living in poor urban neighborhoods and informal settlements in developing countries do not have adequate water and sanitation services. Given increasingly high population growth rates and declining quality in utility performance, service coverage by utilities is destined to get worse. This situation is not new to public utilities and is fast becoming a major concern for new private sector utility operators. It may come as a surprise to some that most families obtain water and dispose of waste without recourse to the utility networks. Over 75 percent of the urban poor get water directly from a range of private but small independent providers (vendors, water truckers, and network providers). Sanitation services are in most cases provided exclusively by such providers (manual cleaners and suction truck operators).

The situation of the low-income and poor urban communities thus highlights the importance of this type of private sector involvement in water and sanitation delivery. Until now, little work has been done to understand or to develop the capacity of the alternative providers, since their activity was perceived as a temporary and marginal solution. There are also other reasons linked to the attitude of utilities, who have conducted their businesses as monopolies. However, where they fail to serve large groups of customers—as is common in developing country cities—informal alternative supply options, such as tanker delivery, spring up.

This ten-country study in Africa, and another covering five countries in Latin America, have

provided a wealth of information on a vibrant independent water and sanitation sector that responds to market niches and meets the needs of both the poor and other unserved communities on a very broad scale. These studies further indicate that independent providers are creatively tackling the challenge of water and sanitation service delivery in a variety of ways, and may be the only option for many poor urban households.

Interestingly enough, the entrance of the large-scale private operators into the water and sanitation sector has brought about a renewed interest in the small-scale private operators. Sector decision makers should be aware that

- independent providers are part of the solution to providing water and sanitation services to a growing urban population, and that
- policy matters in getting independent providers to maximize their potential to service the poor to the benefit of all.

It is therefore important to deepen our understanding of the operating environment and incentives faced by independent providers so that we can mainstream independent providers' operations in our client dialogue processes and our project and program designs. I call on sector practitioners and decision makers to meet this challenge.



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1. Introduction

When walking through the low-income neighborhoods of large African cities, one is struck by the presence of countless small artisans going about their business to perform the most basic of public services: delivery of water and removal of sanitation wastes.

Whether they are operators of standpipes or public toilets, water carters, resellers of water, or latrine cleaners, these self-employed individual entrepreneurs and small businesses are the ones who distribute water for domestic use and perform sanitation services for most families in these neighborhoods. Though the water they sell may be drawn from the city piped water network, these private operators rarely have any official status. Most of the time, they work for themselves, independent of the city water agency or concessionaire and of the modern formal sector. In the case of sanitation, they are virtually the only providers, since piped sewerage systems are virtually nonexistent in sub-Saharan Africa. Mostly unregulated and untaxed, they belong rather to the non-formal sector of the economy which employs 70 to 90 percent of all urban workers in Africa.

In contrast to parastatal or multinational companies that seek new urban service concessions, these independent entrepreneurs reap no monopolistic benefits or rents. They must win their customers' loyalty and maintain their equipment on a daily basis. They must be ready to innovate and adapt in order to stay in business in this

competitive market.

These women and men provide a public service without any subsidy. They deserve the recognition and support of national and municipal authorities because they are responding to the demand for water and sanitation services from most poor households. This clientele is often ignored by the city water authorities because they are said to be too poor to pay for their services. In fact, they are able to pay, but for a lower cost, lower standard, more adaptable range of services, as offered by the independent providers.

The provision of water and sanitation services to such low-income urban areas in the developing world is a major focus of the Water and Sanitation Program (WSP). WSP began commissioning the collection of information about the role of small independent providers in the provision of such services about two years ago, in order to understand who they are, the range of services they offer and the key elements of their successful operations. Following an initial global survey in 1998, WSP launched a three-year program of studies, support to regional associations and networks to promote the exchange of information, capacity building and pilot projects. The program's objective is to improve the involvement of independent providers as partners with formal utilities, with the ultimate goal of improving the supply of water and sanitation services to low-income and informal urban settlements. This means encourag-

ing operators who can sustain low-cost provision of these services to this clientele—not creating new enterprises, but supporting existing ones that have been catering to this market for many years.

As part of this program, surveys were carried out in ten sub-Saharan African countries during July 1998 and July 1999, and an international workshop was held in Bamako, Mali, in September 1999, which was attended by many independent providers. The ten-country study was co-sponsored by the WSP and the World Bank Institute, with funding from The Netherlands and Belgium and dissemination funds from Germany (GTZ). The countries covered were Benin, Burkina Faso, Côte d'Ivoire, Guinea, Kenya, Mali, Mauritania, Uganda, Senegal, and Tanzania. In each of these countries, local private consultants (with methodological support from Hydroconseil and IRC) gathered information about independent water and sanitation operators and brought them into contact with one another, in order to increase knowledge and understanding of their roles and needs. The individual city reports may also be obtained from the country survey leaders and from the West Africa Regional Water and Sanitation Group (see end of report for contact information).

This report consolidates the results of the ten city studies and seeks to answer the big questions about independent water and sanitation providers:

- How do they provide water service in areas where city water authorities and concessionaires hesitate to invest?
- How important are the services they supply—how many households do they serve, how many people do they employ, and what is the volume of their business?
- How do they finance their investments in an infrastructure-intensive sector of business?
- What kinds of relationships do they have with local authorities and with large water producers, both public and private?
- What are their main advantages, what obstacles do they face in seeking to expand their activities or improve the quality of service, and what policies would be likely to improve their services and benefit the low-income urban consumers they serve?

The overall picture that emerges from the study

suggests that by recognizing and regularizing the activities, roles, and institutional position of independent providers, and by facilitating intermediation, coordination, and partnership between city-wide operators and independent providers, municipal and national authorities can set the stage for better delivery of water and sanitation services to the urban poor.

2. The Setting

Having passed the 6 million population mark, the world enters a new millennium on the threshold of another major milestone: more than half of its residents will live in cities. Urbanization has become an unavoidable corollary of socio-economic development. Although Africa is one of the last continents to pass through this transition, already 37 percent of sub-Saharan Africans live in cities—110 million persons. The degree of urbanization varies considerably, with a higher rate of urbanization in coastal areas and a lower one deep in the interior regions.

Physical and hydrological conditions also vary greatly from one region of Africa to another, and each city has its particular constraints regarding the availability of water, physical layout, and terrain. The independent providers that play a central role in water and sanitation services in all ten sub-Saharan African cities studied, and indeed in all urban areas in Africa, are thus faced with different contexts in each location. The one constant across the continent is the low level of public water and sewerage coverage by city-wide networks.

One of the great advantages of independent providers is their flexibility in adapting to local conditions and it is therefore not surprising to find that the technical approaches found in one city will not necessarily be transferable to another location. In each city, independent providers have often arrived at an appropriate set of technical and economic options that work best in that environ-

ment, through a process of trial and error. The investment of new resources to improve service should begin with an effort to understand how these choices were arrived at.

2.1 The African City

Each of the ten cities included in the study has a population of between one and three million and they are all growing exponentially (at 5 percent per annum) due to the combined effects of natural growth and continued migration from the rural areas (except for Nouakchott and Ouagadougou, which are growing faster— 8 and 9.4 percent respectively; see fig. 2.1). Residential growth occurs both by densification of existing settlements and expansion at the peri-urban fringe.

Low Service Coverage and Low Incomes

Roughly half of all Africans have access to drinking water and coverage is not expected to expand very much over the next few years (see table 2.1). The problem of extending service coverage to fill this huge gap is compounded by the fact that these countries are among the poorest on the planet (see table 2.2 for economic indicators). Annual GNP per capita in the ten countries studied is between US\$120 and 660, and more than 80 percent of these countries' residents live on less than a dollar a day. There has been a slight increase in GNP per capita since 1985 but

Table 2.1. Access to drinking water and sanitation services, ten African cities, 1999.

	Abidjan (Côte d'Ivoire)	Nairobi City (Kenya)	Dakar (Senegal)	Kampala (Uganda)	Dar es Salaam (Tanzania)	Conakry (Guinea)	Nouakchott (Mauritania)	Cotonou (Benin)	Ouagadougou (Burkina Faso)	Bamako (Mali)
Source of water for household use (percent of households)										
In-home connection	76	71	71	36	31	29	19	27	23	17
Standpipe water fetched by h'hold	2	1	14	5	0	3	30	0	49	19
Indep. providers or traditional sources	22	27	15	59	69	68	51	73	28	64
Means of disposal of household septic waste (percent of households)										
In-home connection to piped sewerage	25	20	15	6	3	10	4	1	0	2
(Near network: connection feasible)	(45)	(35)	(25)	(9)	(6)	(17)	(4)	(1)	(0)	(2)
Family labor or indep. providers	75	80	85	94	97	90	96	99	100	99

Table 2.2. Income, purchasing power, and literacy statistics for ten African countries.

Country	Average GNP per capita		Purchasing power (USA = 100)			% illiterate
	\$US	average annual growth 1985-1995	1985	1995	Ranking within group	(Literacy rate)
Senegal	600	-	7.3	6.6	1	67 (33)
Benin	370	-0.3	6.9	6.5	2	63 (37)
Côte d'Ivoire	660	-	8.2	5.9	3	60 (40)
Mauritania	460	0.5	6.0	5.7	4	-
Uganda	240	2.7	4.7	5.5	5	38 (62)
Kenya	280	0.1	5.7	5.1	6	22 (78)
Burkina Faso	230	-0.2	3.3	2.9	7	81 (19)
Tanzania	120	1.0	2.6	2.4	8	32 (68)
Mali	250	0.8	2.3	2.0	9	69 (31)
Guinea	550	1.4	-	-	-	-

Source: UNDP, 1999.

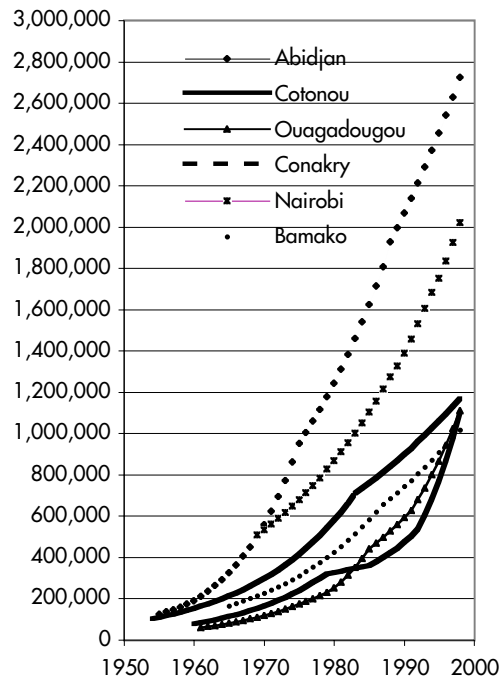


Figure 2.1. Urban growth in six African cities, 1955–2000.

the numbers are still very low, below the global average. In terms of purchasing power parity (PPA), incomes in these countries amount to 2 to 7 percent of incomes in the richest countries.

In the cities, lack of salaried work opportunities and the low skill level of rural migrants means that around a quarter to a third of urban residents have incomes falling below the official poverty line (see table. 2.3). They have little to spend on even the most basic necessities—between US\$5 and 20 a year per capita for water and US\$2 to 10 a year per capita for sanitation, a fraction of that spent in industrialized countries (US\$100 to 200 for water and sanitation combined). In most of the countries studied, 30 to 60 percent of urban residents live with little or no security of tenure in areas subject to flooding or mudslides, where unstructured spontaneous settlement areas lack many public services. The incidence of water- and sanitation-related diseases in these areas is high, especially among infants and small children, and families have little means to pay for visits to the clinic and medication.

Spontaneous Urban Development Patterns

National and municipal authorities create the basic outlines of African cities through construction

of main arteries and zoning of land use, but there is little attempt to organize or plan for growth. One of the main characteristics of African cities is the spontaneous—some would say, anarchic and out of control—nature of land development. Entire sections of the city are built up without the benefit of paved streets or even the semblance of a grid. Secondary roadways connecting the cities' different areas to each other and the downtown business center are improvised. Roadways lack proper drainage and become impassable during the rainy season. Official land records cover only a fraction of the city and most urban residents lack title to their plots. The extent of these conditions varies from one city to the other but does not seem to bear any systematic relationship to the degree of prosperity. In Abidjan, the most economically prosperous city in sub-Saharan Africa, there are more than 80 unauthorized residential areas.

These conditions create problems for water and sanitation providers. Lack of a reasonable secondary and tertiary road network makes it difficult to lay water pipelines and virtually impossible to extend sewerage lines. Lack of land tenure discourages private infrastructure investment, which can be expropriated at any time. It is little wonder that city-wide concessionaires expand their networks only slowly (or not at all) into the low-income areas. When they do so, it is most often with external donor financing or grants.

The concessionaires are aided and abetted in their reluctance by the official policy of labelling unserved areas as "unauthorized", since such areas are automatically excluded from receiving public services—roads, water, electricity, sewerage, telephone. The decision to declare certain areas of a city "unauthorized" is rarely made with the intention of improving living conditions; it is at best a tacit admission of the authorities' failure to carry out proper urban infrastructure extension and subdivision, or to create the legal and regulatory conditions that would allow the private sector to do the job. The main result of the label is, in effect, to penalize residents for the inability of public authorities to cope with the urbanization process.

Booming Informal Sector Response

The independent providers that are the subject of this study have filled the service gap left by city-

wide water and sewerage agencies. They represent one sector of the informal or unregistered economy that has always existed in the cities and that has seen its market expand along with that of the private sector as a whole, as governments have relinquished control over the economy. On average, half of the labor force in the countries studied works in the informal economy, where earnings are far from limited to the subsistence level (see table 2.2). In Conakry and Cotonou, it is more—three-quarters of the labor force is employed in unregistered activities—and in Bamako, it is less (about a third).

2.2 Physical and Hydrological Conditions

In one way or another, hydrological conditions are problematic in most African cities: there seems to be either not enough water, or too much. Some cities are favored with the presence of plentiful surface water and rainfall, while others are located in areas subject to drought conditions.

It has been argued that because water production under such unfavorable conditions requires heavy public investment, a water monopoly is justified. But in practice, even under

Unauthorized settlements in Ouagadougou

The political (rather than technical or economic) nature of unauthorized settlements is well illustrated by the case of Ouagadougou. In 1983, more than 70 percent of Ouagadougou's structures were classified as unauthorized. Between 1983 and 1987, the Sankara regime undertook a massive regularization of more than 95 percent of all constructed lots in the city (over 80,000 lots). However, since 1987, the application of this policy has languished and the incidence of unauthorized construction rose to 25 percent in 1993. Thus a quarter of the city's residents live outside the areas eligible to receive basic water and other public services, and their numbers continue to grow.

these conditions, independent providers have successfully competed with city water authorities to produce and distribute water. In every city there are private investors who have drilled boreholes and transported water to clients who can pay but who are not served by the city-wide water company. In some ways better adapted to local physical conditions than the concessionaire, they

Table 2.3. Poverty, informal employment, and urban growth rates in ten African cities.

City	% households below poverty threshold	Country poverty thresholds (US\$/hh/month)	% employment in informal sector	% annual city growth rate
Kampala (Uganda)	77	\$144	46	4.76
Conakry (Guinea)	41	n.a.	73	5.80
Abidjan (Côte d'Ivoire)	36	\$284	65	5.00
Bamako (Mali)	36	n.a.	36	6.40
Cotonou (Benin)	28	n.a.	77	4.05
Nairobi (Kenya)	27	\$32	52	4.70
Nouakchott (Mauritania)	25	\$95	41	8.00
Dar es Salaam (Tanzania)	23	n.a.	56	4.30
Dakar (Senegal)	12	\$76	47	3.40
Ouagadougou (Burkina Faso)	11	\$244	60	9.40
AFRICA	39	\$92	56	5.20

Source: UNDP, 1999

Some of the variation in poverty rates reflects different methods of calculating the urban poverty threshold and different national strategies for reducing poverty.

are more likely to suffer from administrative harassment or policy constraints, such as restrictions on drilling or an outright ban on water production, intended to protect a sole water concessionaire.

Problems with Salinity

Two of sub-Saharan Africa's largest cities, Dakar and Conakry, are situated on peninsulas where the water table is vulnerable to seawater invasion. As existing boreholes in the heart of these two cities have gone brackish over time, concessionaires have been obliged to drill others, located successively further inland. Nonetheless, there are also many private wells in Dakar and Conakry that provide a substantial share of water to low-income residential areas not served by the piped water network.

Problems with Flooding

Many cities on the Gulf of Guinea coast—Abidjan, Cotonou, Lomé, Freetown, and Accra—were built on low-lying dune ridges interspersed with lagoons that are often flooded by periodic high tides and storm surges. Though construction is officially prohibited in areas frequently subject to flooding, it is precisely in these areas that low-income residents end up squatting, attracted by the low cost of housing and proximity to work. Proper disposal of human waste is impossible in these areas, and concessionaires have no incentive to invest in infrastructure there because land tenure is unobtainable. They rely on independent operators to fill the gap.

In Abidjan, SODECI has installed commercial water connections for hundreds of residents of authorized settlements living close to the edge of such *non edificandi* zones, with full knowledge that the water will be resold to clients living in areas that they cannot officially connect to their network. The water resellers do not hesitate to lay hundreds, if not thousands, of meters of tubing or piping to carry water into these marginal zones. The same situation exists in Cotonou, although SBEE does not officially authorize resale of the household water it provides. Oddly enough, SBEE does provide these same unauthorized settlement areas with electricity.

Low Yields from Underground Water Sources

Many African cities located away from the coast, including Ouagadougou, Bamako, and Niamey, are located in geological zones of a crystalline platform, where boreholes can be drilled to reach water but the yield is low. In a rural context, this hydrological situation is perfectly suited to providing water at the village level, using small boreholes equipped with manual pumps. But in large urban areas, water producers must make use of more plentiful surface water sources. This has required large infrastructure investments—dams and reservoirs to supply Ouagadougou, treatment stations for river water in Bamako and Niamey—recoverable only over a long period of time (30 years).

A City on a River

Bamako's development along the banks of the Sahel's major river has given it the advantages of

- a cheap source of water for washing and bathing,
- a natural drain for gray water, with adequate flow for good dilution in most years, even in the dry season,
- a navigable waterway for the transport of crops and fish.

But this same ease of access has compromised the adoption of any environmental sanitation system worthy of the name—the river refuses no offering. One of the main potential benefits from better coordination between municipal authorities and septic cleaners would be to make arrangements for environmentally safe disposal of septic sludge that is now simply dumped into the river.

A City in the Desert

When Mauritania's capital city was established in 1957, it was a small administrative outpost sited with little concern for long-term growth, since at the time most of the country's citizens were nomadic. Following years of drought, much of the population has become settled and there are now fewer than 10 percent who continue the nomadic way of life. Nouakchott has therefore expanded at one of the highest urban growth rates in the world, despite the fact that the nearest stream is 300 km away; it is one of the few African cities where private wells are rare. What little subsurface water

can be tapped is brackish, so that the deep boreholes that now provide water to the city were drilled at some distance (Idini water basin, more than 50 km away). More alarmingly, the salinity of water drawn from this aquifer has recently begun to increase, indicating incipient overexploitation.

In this case, substantial public investment by the national water authority, SONELEC, was the only way to get water for the city and the many private water distributors have no alternative but to buy their water from this source.

3. Public and Private Sector Roles

In sub-Saharan Africa, water and sanitation (the hydraulic sector) remain a central government and not a local responsibility, in contrast to the situation in, for example, Latin America. African governments have presented water and sanitation, along with other community services, as basic public services to which all citizens are entitled, with generous public subsidies as required. In rural areas, this promise has been fulfilled through central government investment in wells and boreholes, generally run at a substantial loss by community associations. In urban areas, however, where public water service is assigned to a single city-wide water authority, many residents have no direct access to clean, piped public water.

3.1 The Institutional Context

Some African countries chose at independence to delegate responsibility for public services such as water to private operators; many chose instead to provide such services through government offices or public enterprises, regarding any private sector initiative with suspicion and subject to expropriation. Government attitudes towards the private sector have become more open in recent years, and in fact the current trend is in the direction of privatization of public services. Over the last five years, three of the ten countries have completed the establishment of joint public-private (Guinea) or entirely private (Senegal, Côte d'Ivoire) water

distribution companies. The same process is underway in several other countries (Uganda, Kenya, Benin, Mali). In all cases, one entity is given exclusive rights to operate the city-wide piped water network and ownership is dominated by a large international corporation.

Water Sector Privatization

The way in which privatization is carried out indicates that the underlying perspective is commercial rather than service-oriented, since any notion of a competitive market is absent from the concession and leasing contracts, and the multitude of independent private providers who have been delivering water (truckers, carters, resellers, small network operators) are completely ignored, except possibly when their investment can be expropriated. The concession areas encompass the most profitable urban markets, where densities and incomes are highest and unit infrastructure costs lowest, leaving the towns and low-income urban areas to the independent providers. Yet the independent providers are expected to charge the same water rates, which were set to allow the concessionaires to cross-subsidize service to less profitable markets with profits from their core markets. In Côte d'Ivoire, where SODECI distributes water down to the village level, SODECI in fact does finance a large part of water service to towns from profits earned in Abidjan's prosperous neighborhoods.

Relations between City-wide Water Companies and Independent Providers

In nine of the ten cities studied (all except Cotonou), the city-wide water company contracts with private operators for the management of standpipes built with public funds, where water is resold by the bucket or jerrycan. Such standpipes are particularly numerous in Dakar, Bamako, Ouagadougou, and Kampala. The two parties sign a contract specifying resale prices, official hours of operation, terms of payment, and conditions for rescinding the contract. However, the written terms are far from dictating actual practices. The fontainiers relationships with their customers are largely determined by the conditions of supply and demand and other non-contractual factors.

- In Cameroon, where standpipes are rare and the resale prices set by SNFC way below what the market will bear, water is commonly sold at twice the official rate (US\$ 1.60 per cubic meter rather than US\$0.80).
- A smart fontainier will set actual hours of operation in response to customer demand and not by the schedule set in the contract.
- Because concessionaire agents have no compunction about cancelling the contract of a particularly profitable standpipe at the first opportunity (late payment of water bill) in order to reassign the business to a friend, fontainiers may prefer to simply make it worth their while for the agent to leave the standpipe in their hands by offering them bribes.

Access to Water Resources and Utility Rights-of-way

Under law in most African countries, ownership of water resources is vested in the state and not, as in many European countries, in the owner of the land through which it flows. This provision opens up the possibility of central government banning independent operators from drilling for water, leaving the concessionaire as the only authorized water producer. Some concessionaires, such as those in Dakar and Nouakchott, have attempted to use this legal situation to eliminate potential competitors, by demanding the government ban independent operators from drilling for water. Were private drilling to be banned, competition would effectively be eliminated in those cities where private wells and boreholes presently provide water for

many low-income areas (Dakar, Conakry).

In the absence of cooperation or partnership between the concessionaires and the independent providers, and in a policy environment which favors the concessionaires and gives them sole right to lay pipe in public right-of-ways, the concessionaires have every incentive to drag their feet about extending the network to unauthorized areas. Instead, they let the independent providers take the risk of laying "illegal" pipes, and simply expropriate them once they decide to move into those areas (with or without compensating the providers).

Professional Organizations

In several countries, central authorities have sought to institute oversight of independent providers by requiring them to join professional organizations which serve primarily to enforce government or political party policy. But political or administrative domination of these organizations reduces their usefulness to independent operators, who are more interested in forming their own organizations to oppose what they consider to be administrative abuses. In fact, one of the study's main findings was the eagerness with which independent operators, brought together in city workshops by trade specialty, spontaneously began organizing and arranging to pool equipment and experience. The urge to organize was much stronger than anyone had imagined and has become one of the most promising follow-up activities that has emerged from the study.

Decentralization and Local Government Roles

Over the last ten years, the democratic spirit sweeping across Africa in recent years has created pressure to share responsibility, has put decentralization at the heart of political debate, and has spurred the practice of delegation of responsibility for public services. Local governments have found themselves playing an increasing role in the delivery of public services that used to be entirely in the domain of central government authorities (infrastructure investment, civil works bidding and contracting, supervision of works and services, drafting and implementation of local regulations). However, the very limited resources of fiscal and technical resources of local governments leaves

them in a weak position to carry out these new responsibilities. Until fiscal resources are redistributed in favor of local governments, decentralization may simply become a way for central authorities to disengage from local affairs.

The municipalities reviewed in this study have yet to become active participants in a productive dialogue involving independent providers of water and sanitation services. When they do become involved, it is mostly to restrict their activity by

- fining suction truckers in Bamako for illegal dumping, despite the fact that there is not a single authorized dump in the city,
- prohibiting private operators from laying water pipes in Abidjan's unauthorized settlements, though these areas have existed for ten years and are carefully recorded on city planning maps, and
- arbitrarily limiting the number and location of standpipes to those designated by the municipality, rather than allowing private operators to set them up where they are needed.

3.2 The Importance of Independent Providers

While the sums spent on urban water and sanitation in African countries are a small fraction of those spent in countries with higher incomes, they represent a substantial amount for African families, and constitute a substantial local market: US\$5 to 40 million a year in each of the ten cities studied, or about 1 to 3 percent of each cities' gross product (see table 3.1).

The city-wide water authorities, while contractually obligated to provide service to all residents, in practice serve at most 70 percent in a few cities and more like a third or less in most; the independent operators do the rest. Together, the private water and sanitation sectors provide many jobs and an increasing share of new infrastructure investment. The urban sanitation market is even more dominated by independent providers than is the case for water (see table 3.2).

City-wide Water Company Performance

The performance of the water agencies with city-wide responsibility for water supply varies a great deal and does not depend on whether they are public (ONEA in Burkina Faso) or private concessionaires (SODECI in Côte d'Ivoire, SdE in Senegal) (see table 3.2).

- In Dakar, SdE serves 71 percent of household by direct household connections and also supplies water to 1,300 standpipes that serve another 14 percent of families.
- But in Bamako, EdM serves few household connections: 18 per 1,000 residents, or barely 18 percent of households.

It is in the three cities of East Africa that the city public water services are particularly weak and where piped water service is nonexistent or irregular in many residential areas, from the poorest to the richest. City water authorities are caught in a vicious circle: poor service leads to poor payment of bills, and there is little incentive to seek better cost recovery in order to improve service and fulfill the terms of their contracts, which call for city-wide service.

Table 3.1. Annual water sector income in five African cities and Port-au-Prince, Haiti.

(CFAF million, 1999)	Kayes (Mali)	Bobodioulassou (Burkina Faso)	Nouakchott (Mauritania)	Ouagadougou (Burkina Faso)	Dakar (Senegal)	Port-au-Prince (Haiti)
City water company	45	1,468	4,054	8,000	6,343	1,065
Independent providers	100	714	1,334	4,410	1,691	5,623
Total, water sector	145	2,182	5,388	12,410	8,034	6,688
Water sector income per urban resident (CFAF)	2,652	4,848	7,697	12,410	4,017	3,334

Increasing Private Investment in Infrastructure

But no family can live without water, and independent providers have every incentive to expand into areas left unserved by city-wide authorities. They have moved into every area and service level and are playing an increasing role in extending physical infrastructure, encouraged in recent years by the trend toward privatization of state-run water agencies. The main factor restraining private investment in water and sanitation is legal uncertainty: lack of recognition of their contributions by the authorities and the risk, instead, of seeing their investment expropriated by the concessionaires discourages all but short-term investment.

- In Dakar, private developers have paid for and constructed more than 50 km of water distribution network every year over the last three years, or 60 percent of additions to the network. Once constructed, this infrastructure is handed over to SONES, government holding agency for national assets, and served by SdE, the national water company.
- In Mauritania, where all 250 motorized pumping stations are being handed over to private managers, these operators are investing

large sums of money to extend the water networks and install metered household connections.

- In Kampala, two small networks fed from private boreholes have been built since 1995 by a private company, including both standpipes and household connections.

In the sanitation sector, independent providers own 15 to 30 trucks in each city studied, with the number increasing each year. In Cotonou, a private entrepreneur built the first sludge treatment plant in the city. The construction of facilities for treating sanitation waste is the main area where investment, whether private or public, lags far behind potential market demand. Public authorities collect and treat a part of such waste in Dakar, Kampala, and Accra, but most of it ends up being dumped somewhere, with no treatment.

Table 3.3 gives examples of investment amounts and sources of financing for independent providers gathered by the study survey consultants. Sources of financing are discussed further in Chapter 7 (Operational Characteristics).

Table 3.2. Market share, earnings, and employment of concessionaire and independent water and sanitation providers in Dakar and Bamako.

	Households served		Annual income		Employees	
	Number	% of total	\$US 000	% of total	Number	% of total
Bamako						
Water						
Independent operators	92,000	84	2,527	46	1,730	68
City water agency (EDM)	18,000	16	3,000	54	800	32
Sanitation						
Independent operators	108,300	98	1,389	98	1,205	99
Municipal sewerage	1,700	2	31	2	10	1
Dakar						
Water						
Independent operators	45,000	26	4,218	25	1,390	40
City water agency (SdE)	130,000	74	12,500	75	2,100	60
Sanitation						
Independent operators	150,000	75	2,981	54	1,470	65
Public sewerage (ONAS)	50,000	25	2,545	46	800	35

Table 3.3. Examples of investments made by independent water and sanitation providers in African cities.

Type of investment	Usual source of finance	Cities	Unit cost (US\$)	Asset life (years)	Cost/annual earnings ratio
Sanitation sector operators					
Manual latrine cleaning equipment	Own and family savings	Dakar	25	2	1%
		Bamako	19	1	2%
		Nairobi	50	4	6%
Second-hand suction truck	Formal or informal loan	Bamako	15,000	6	90%
		Ouagadougou	8,300	5	30%
		Dakar	16,700	5	27%
		Kampala	25,000	10	70%
Public latrines and shower facilities	Formal or informal loan	Bamako	200	5	4%
		Kampala	3,500	10	40%
Sludge treatment plant using ponds	Own funds and bank loan	Cotonou	200,000	20	300%
Water sector operators					
Handcart	Own and family savings	Ouagadougou	50	5	6%
		Bamako	120	10	10%
		Nouakchott	135	10	9%
Donkey-drawn cart	Own and family savings	Nouakchott	150	1	10%
Water truck	Formal or informal loan and earnings from other activities	Nouakchott	15,000	10	48%
		Nairobi	13,000	5	19%
		Kampala	7,500	10	13%
Standpipe	Own and family savings	Ouagadougou	50	5	1%
		Dakar	700	10	20%
		Nouakchott	700	10	50%
Overhead water tank to fill trucks	Own and family savings	Kampala	2,000	5	11%
Private borehole + standpipe	Bank loan	Nairobi	37,400	16	82%
Small network with standpipes	NGO loan	Conakry	12,500	10	58%
	Own and family savings	Cotonou	1,500	5	27%
Autonomous standpipe	NGO financed	Ouagadougou	15,000	20	500%
Small network w/ metered household connections	User subscription costs	Guerou (Mauritania)	3,000 (per km)	25	300%

Water Sector Employment

In each of the cities studied, the water sector employs from 2,000 to 8,000 people, or about 1 to 2 percent of the active urban labor force—about the same order of magnitude as the water sector as a whole in urban GDP (see figure 3.1). Most of these workers are employed by the independent providers (70 to 90 percent), with 10 to 30 percent working for the city-wide water concessionaire (see examples of Dakar and Bamako, table 3.2). Independent providers' role is even more important with respect to employment than with respect to earnings. There are many water sellers with formal contracts, such as standpipe operators, but the greatest number of workers are found in the informal sector, such as handcarters, carters using animal traction, and manual latrine cleaners. The latter are an important source of local employment for newcomers and residents of unauthorized and low-income settlements and bring much appreciated income into these areas. Also, the profits are largely reinvested in the water or sanitation business or in other local economic activities.

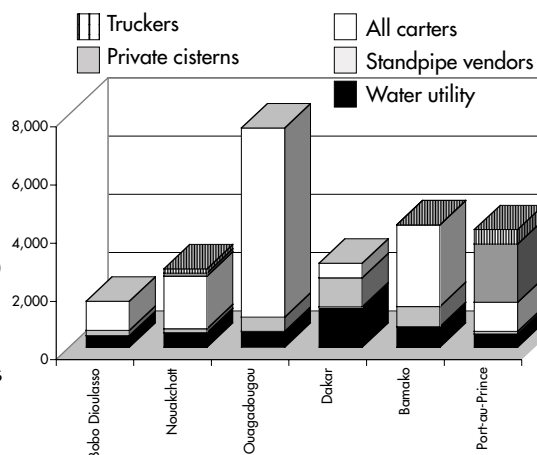


Figure 3.1 Numbers of workers employed in the water sector in five African cities and Port-au-Prince, Haiti.

Independent Water Providers' Market Share: 30 to 80 percent

Looking at the urban water market, independent providers are dominant in six of the ten cities studied and play a major role in the others, serving most of the low-income areas in all cases.

- In Bamako, where EdM's service is limited, independent standpipe operators and carters supply about 84 percent of households, collect nearly half of water sector revenue, and employ two-

Table 3.4. Earnings and employment in water sector, Bamako.

	Cost of water = water operator sales					Employees	
	Households served	000 cubic meters sold/year	Unit price (CFAF)	Total water sales (CFAF million)	% of water sales	No.	% of sector
City water agency (EDM)	18,000	30,000	55	1,650	54%	800	32%
Independent providers	92,000	2,400	580	1,390	45%	1,730	69%
Private wells	50,000	100	500	50	2%	n.a.	n.a.
Small network operators	2,000	100	400	40	1%	30	1%
Standpipe operators	35,000	2,000	400	800	26%	700	28%
Carters	5,000	200	2,500	500	16%	1,000	40%
TOTAL, WATER SECTOR	110,000	32,400	94	3,040	100%	2,530	100%

- thirds of the sector's labor force (see table 3.4).
- In the three East African cities, independent operators have filled the gap left by the public water agencies by trucking water to higher income areas, taking over operation of most standpipes, and drilling boreholes which supply private water networks. In Kampala, the small private borehole networks offer service comparable to that of NWSC; a private borehole operator in Nairobi sends the water out via tanker truck.
 - In Mauritania, water networks in all but a few of over 100 small towns are run by young entrepreneurs who have built at least as much infrastructure and connected at least as many households as the public enterprise did previously.
 - In Dakar, since SdE serves 85 percent of households through standpipes or household connections, the independent providers' share of the market is relatively limited (15 percent) and consists of those buying water from carters or who share courtyard wells .

Independent Sanitation Providers' Market Share: 60 to 90 percent

Independent providers dominate the sanitation sector in most cities, even those where there is a sewerage system, because the public sector does little (the exceptions are Dakar, Abidjan, and Nairobi). Most households, and virtually all low-income households, use simple on-site facilities, most of which are built and periodically cleaned out by independent providers. Their dominance applies to number of households served, revenue collected, and employment created.

It is more difficult to estimate the volume of business in the sanitation sector than in the water sector because most of it is unrecorded, and the fees charged vary greatly depending on the volume of waste to be cleared, site accessibility, and whether waste can be reburied on-site. The best information concerns suction trucks, because their numbers are limited and because they must register their vehicles and are therefore easily identifiable. There are about 15 to 40 such trucks in each city (about one per 60,000 residents), of capacity ranging from 6 to 12 cubic meters. Two thirds are equipped with a suction pump and a third with water jet hoses for flushing open drains.

Each truck is staffed by two to four men, and rates range from US\$20 to 60 per visit for household clients; the truckers also serve many institutional clients with lined septic systems (schools, hospitals) and some are hired by municipal authorities to flush city drains.

Getting an accurate idea of the volume of business and employment in the non-mechanized sanitation sector (manual latrine cleaners) would require broad survey work because charges vary widely as a function of a number of physical and economic factors, there is little reliable information about the frequency of household latrine cleaning, and little is known about the share of cleaning done by family members and hired hands, or about the relative importance of occasional cleaning done by masons and other tradesmen.

What is clear from the surveys carried out for this study is the dynamic of market progression from self-help to mechanized septic cleaning.

- In less densely settled peri-urban areas, residents follow the same practices as in rural areas, digging a new pit when the old one is full. Newly arrived urban immigrants tend to do the work themselves.
- As urban settlements densify, households tend to start clearing out new and old pits and reusing them, and start to hire others to do it as their household size increases and income permits.
- Demand for mechanized septic cleaning (by suction truck) has been rapidly increasing over the last ten years, as indicated by the relative youth of many suction truckers, probably because it is the only way to get the sludge off the site and out of the neighborhood.
- Manual cleaners will continue to handle most of the work in the most rapidly growing areas where poor road access makes truck access difficult or impossible.

4. How Water Is Produced and Delivered

In all African cities, the primary network, run by a monopolistic city-wide operator, coexists with a wide variety of independent providers who resell this piped water, either by delivering it to households by cart or truck, or by selling it from fixed locations such as standpipes or cisterns. Independent providers are especially active at the edge of the city where new settlements are being created, where the city water operator has not yet extended the piped network, and where new, low-income arrivals from the rural areas are settling and possibly even trying to raise a few crops. But independent providers also cater to inner city residents who cannot afford a connection, including those squatting on land subject to flooding and other marginal sites, and to middle- and high-income customers living beyond the network's reach.

4.1 Households Have Choices

Unlike cities in the industrial North, where there is often a single source of water serving all residential and most industrial customers, in all cities of the South there is a wide variety of water suppliers. People can get water from household wells, from their neighbors' wells, from springs, from collecting rainwater, from water carriers, hand carters, carters using animal traction, standpipes, boreholes with manual pumps, or even individual connections to the city water network.

Any analysis of access to water must therefore go beyond the households served by the city water network, especially for low-income users who, our surveys show, decide on a daily basis where they will get water—whether from more expensive, better quality sources such as a standpipe or a neighbor's household connection, or from less expensive, sometimes less clean ones such as wells, springs, rivers, or stored rainwater.

The choice depends on how much household income and time are available, and on where water is available. It costs more to buy water from a door-to-door carrier but using the time saved to earn money may more than cover the difference in water cost. And water supply from different sources will vary depending on rainfall, network down time, and other factors.

Quality factors, such as the taste and clarity of the water and maintaining good relations with neighbors, also influence the decision of where to get water, but the importance of these more subjective factors is often overestimated by the experts, in the absence of sound analysis of the objective factors facing poor families such as cost, distance, availability, and ease of access.

4.2 One City, One Water Company

Monopolistic City-wide Operators

In each of the ten capital cities surveyed, a single enterprise has received concessionary rights from

central government authorities to produce and distribute water. In some cases, it is the municipal authorities who have granted the concession, but this occurs much less often in Africa than in Latin America, for example. Table 4.1 gives details for each city about the city water operator’s production and distribution.

In some cases, the concessionary terms require the enterprise to invest its own funds in network upkeep and expansion. More often, the state retains ownership and responsibility for the infrastructure (through a holding company, like SONES in Senegal), with the enterprise simply leasing its use or agreeing to manage water operations.

Whether public or private, these water enterprises have insisted on and obtained sole rights to the sale of water in the capital cities and main towns. The monopoly does not extend to rural areas or small towns, considered less profitable, nor to water production, since industries and individuals are almost always allowed to produce water for their own use, from wells or boreholes.

Concessionaire Focus on Household Connections

Whether public (Uganda’s NWSC) or private (Senegal’s SdE), water monopolies earn 70 to 90 percent of their revenue from water sold in the capital city. Not only is a large share of the country’s population concentrated there, but that is also where most high-income households live. And the service standard which the concessionaire has to offer—individual household connections—is exactly what high-income households want. However, individual connections serve only a small part of the total market—less than 40 percent, except in Dakar, Nairobi, and Abidjan—and very few low-income families.

Standpipes for the Poor

The city water authority’s or concessionaire’s main market is the homes, offices, and businesses with individual water connections. But they also install and supply water to standpipes, an invaluable source of water to poor families, who can buy water there in small quantities as their limited means permit.

Standpipes are a very efficient means of water distribution, especially in cities with limited water resources, because they limit water wastage and provide a way of allocating available water to

reach the largest number of households. Figure 4.1 shows public network coverage in all ten cities. Since the water companies tend to calculate their coverage optimistically, the data have been standardized by assuming that one household connection serves ten persons and that each standpipe provides 20 liters/day/user.

The figure shows that of the ten capital cities surveyed, Ouagadougou (Mali) has the highest rate of city water company coverage (86 percent), despite a low per capita consumption (barely 34 liters/day/person), because ONEA distributes a third of its water by standpipes. They supply 60 percent of the city’s residents, with 27 percent more receiving water directly from household connections. Standpipe water distribution is also very effective in Nouakchott (Mauritania), where the fontainiers (standpipe operators) are active investors in the system, constructing their own storage tanks to increase their volume of trade in spite of frequent piped water cutoffs. In contrast, there are cities like Cotonou (Benin) and Conakry (Guinea) where few standpipes are in service, and where public water network coverage is very low (below 40 percent).

One Public Water Producer

In all ten capital cities, the concessionaires operate the primary water mains and produce the drinking water that flows through them, whether treated surface water (Dakar, Conakry, Bamako, Dar es Salaam, Ouagadougou) or water from boreholes (Dakar, Cotonou, Abidjan, Nouakchott). None of

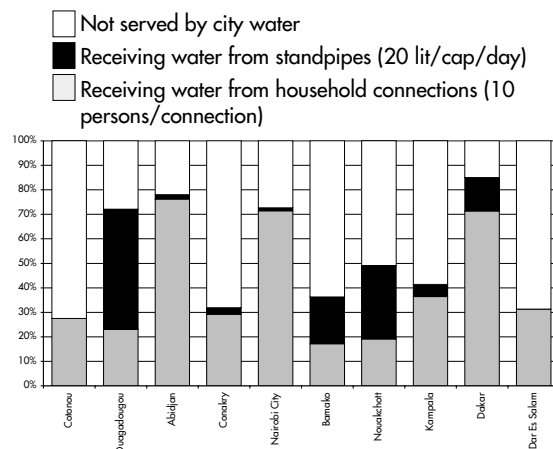


Figure 4.1. Percent of households served by public water networks in ten African cities.

Table 4.1 Public water service in ten African cities, 1999.

	Cotonou (Benin)	Ougadougou (Burkina Faso)	Abidjan (Côte d'Ivoire)	Conakry (Guinea)	Nairobi (Kenya)	Bamako (Mali)	Nouakchott (Mauritania)	Kampala (Uganda)	Dakar (Senegal)	Dares Salaam (Tanzania)
City population (million)	1.1	1.0	2.8	1.1	2.0	1.0	0.7	1.1	2.2	2.8
City concessionaire status	SBEE	ONEA	SODECI	SEEG	NCC	EDM	SONELEC	NWSC	SDE	DAWUSA
services	parastatal water & electricity	public water & sewerage	private water & sewerage	private water & electricity	municipal water & sewerage	public water & electricity	public water & electricity	parastatal water & sewerage	private water & sewerage	parastatal water and sewerage
Water volume										
Production (000 m ³ /day)	34,000	n.a.	255,342	90,000	400,000	77,000	40,000	100,000	210,000	204,000
Distribution (000 m ³ /day)	24,000	33,787	201,644	54,000	200,000	42,000	35,000	51,000	168,000	95,880
Per capita (liters/ day)	22	34	72	48	100	41	50	46	76	34
Leakage & loss (%)	29%	n.a.	21%	40%	50%	45%	13%	49%	20%	53%
Household connections										
Number (000)	34	28	213	35	150	18	13	40	157	88
Pop./connection	32	28	13	32	13	57	52	28	14	32
Coverage (%served)	31%	28%	76%	31%	75%	18%	19%	36%	71%	31%
Standpipes										
Number	0	482	142	120	1,500	700	242	528	1,240	0
Volume dist. (m ³ /day)	0	11,749	1,000	650	500	4,000	4,200	1,090	6,000	0
Volume dist. (m ³ /day/unit)	0	24.4	7.0	5.4	0	5.7	17.4	2.1	4.8	0
Volume dist. (% total)	0	35%	0	1%	0	10\$	12%	2%	4%	0
Coverage (% served)	0	59%	2%	3%	1%	20%	30%	5%	14%	0
Not served by city water	69%	14%	22%	66%	24%	63%	51%	59%	15%	69%

them purchases water from another source, but for the consumer, there are many alternative sources.

4.3 Limited Alternatives to City Water Production

Water Company Production

While water sales are shared by the public and private operators, most water produced for resale is public. In all ten capital cities, there are a few private boreholes with electric pumps (especially for industrial use) and in five cities, such boreholes also provide some water for residential use (Dar es Salaam, Nouakchott, Nairobi, Bamako, Ouagadougou, Kampala). In the first three named, the borehole water is distributed by truck, in Bamako and Ouagadougou, by standpipes, and in Kampala, by household connections. But the volume of water provided from private boreholes is small, and private boreholes are important points of resale only in Nairobi and Ouagadougou.

Private Water Production

There are also a multitude of small private water points, each of which may serve only a few families, but which together provide for the needs of more people than the entire city piped network. This is true

- in Ouagadougou and Bamako, where small boreholes are pumped by hand;
- in Bamako and Niamey, where the river provides water to many;
- in Dakar, Bamako, Conakry and Ouagadougou, where there are many small private wells, and
- in Conakry, Abidjan, and Dar es Salaam, where rainwater collected in barrels is widely used.

Wells located in a common courtyard play a particularly important role, because they supply 30 to 70 percent of urban households directly, in particular (but not only) households in the peri-urban areas, even in a city such as Dakar where service coverage is high. Most users of these alternative sources consider the water so obtained not clean enough for drinking or cooking, but use it for washing and bathing. This water still constitutes an appreciated resource for low-income families, since it allows them to limit their purchases of water from the piped network.

liters per capita per day

□ household water
■ standpipe water

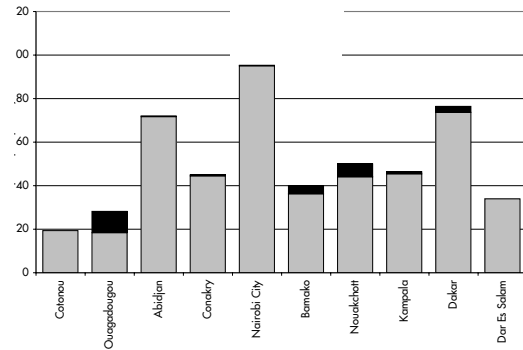


Figure 4.2. Average daily per capita water distribution from household connections and standpipes in ten African cities.

However, water from these many small private sources in African cities is used directly by the wells' owners and is rarely resold. The only examples of resale of well water were found by the survey consultant in Bamako and Ouagadougou, and this only on a seasonal basis. This activity tends to carry a social stigma because "one does not sell the water from one's own well."

4.4 One Water Company, Many Water Sellers

In all ten capital cities, there is a strong contrast between the quasi-monopoly at the upstream or production end of the water market and its downstream distribution by a wide variety of independent operators. Many users are not connected to the piped water network because they are beyond its reach, because they cannot afford the connection charge, or because they have been turned down because they live in an area considered to be illegally occupied.

Resale in Small Quantities

In all African cities, demand is high for the purchase of water in small quantities (10 to 200 liters). Most low-income earners do not work in salaried positions and the irregularity of their earnings means that they are managing their money on a day-to-day basis. The surveys indicate that they always manage to come up with the means to satisfy their daily needs for water, but

are not in a position to set money aside for larger payments required for individual household connections or quarterly water bills. What independent providers offer is what they need and can afford—small quantities of water.

These sales may be made by door-to-door carriers or by many other means:

- water carriers in Bamako and Port-au-Prince (Haiti, where the water market is comparable to those in African cities),
- handcarters in Ouagadougou and Conakry,
- donkey or horse-pulled carts in Nouakchott, Dakar, and Bamako,
- flexible plastic tubing from a neighbor's house in Abidjan and Nouakchott,
- water tank trucks in Port-au-Prince, Dar es Salaam, Nouakchott and Nairobi.

But many poor families prefer to fetch their own water at the point of sale—standpipe, neighbor with a household connection, well, or borehole who resells water—in order to get it at a lower price.

The Role of Standpipes

Since most standpipe users are from low-income households, the role of standpipes is a good indicator of the city water company's service strategy. ONEA in Ouagadougou and SONELEC in Nouakchott distribute a major share of their water through standpipes, while the amount thus distributed is marginal for SBEE in Cotonou and SEEG in Conakry (see figure 4.2). In Dakar, the share of water distributed by standpipe is relatively low but because there are many standpipes (nearly 1,300) and many households have individual connections, standpipes serve half of the households without connections.

Water Resellers, Carriers and Carters

The most popular resale outlet is the standpipe, but individual households with connections also resell water. This is done illicitly but with tacit approval except in Côte d'Ivoire, where SODECI has instituted a unique policy of licensing a few hundred connected households as resellers.

In terms of contractual relationships between the water resellers and the water-producing concessionaire, resellers fall into three categories:

- **Standpipe vendors** are small entrepreneurs who operate a standpipe installed by the city water

concessionaire. These are especially common in Dakar, Bamako, and Ouagadougou.

- **Licensed water resellers** are micro-entrepreneurs who have contracted to resell water piped to their homes and who may invest in standpipe installation and network extension investment to do this, as in **Abidjan (Côte d'Ivoire)**. In principle, the existence of the formal contract should protect them from expropriation of their investment, but the situation varies in practice.
- **Unlicensed household water resellers** are not seen as professionals, although they do provide water to a major share of the market in three cities (Conakry, Cotonou, Nairobi, Abidjan).

Water resellers extend the effective coverage of the piped network, but carriers and carters are often the only water suppliers that reach the urban fringe. Many settlement areas at the urban fringe, in difficult terrain (steep hillsides and valleys), and in undeveloped infill areas, are located far from the piped water network. Many residents of these areas would need to walk several hundred meters or even several kilometers to fetch water, and this gives rise to a strong market for door-to-door delivery.

Door-to-door Delivery

In cities such as Nouakchott, Ouagadougou, and Bobo Dioulasso, more than 80 percent of waters sold at standpipes is bought by carters and not by individuals. Rather than lines of young women waiting their turn at the standpipes, as seen in rural areas, in the urban areas, it is groups of handcarters and men with carts pulled by donkeys or horses who compete for places in line at the standpipe. These carters then deliver water door to door.

Home-delivered water is more expensive than that purchased at the standpipe, so why are so many families taking home delivery? Several factors explain the rapid growth of this type of service in the urban areas surveyed, as compared to rural areas where it is minimal.

- Household accounts are much more monetized in urban areas. Income and expenditures are handled with money payments and households do not have substantial in-kind income or reserves in the form of farm produce, grain or animals.
- Walking distances to reach the nearest water may be considerable in some marginal urban areas where poor households settle because

they did not have to purchase occupancy rights. In rural areas, no village would be located far from water.

- The volume and density of demand offer the private carters a steady income in this delivery specialty, though with a lower level of sales during the rainy seasons when drinking water can be collected freely.

The tendency to rely on carters represents a radical departure from rural practices in another way: in poor rural families, there is always someone available (often young women and children) who can be sent to fetch water. In the city, paid work opportunities are much more available and poor families often prefer to have their water delivered so that everyone in the family can be out earning money.

The growing popularity of home water delivery is probably one of the factors that has led to the abandonment of hand water pumps in the large cities. The carters want to fill their 200-liter barrels quickly, even if at greater cost, rather than spending time pumping this much water by hand.

Another important clientele for the carters and water tank truckers is middle- and upper-income households who are not getting the water they need from the piped network, either because the network has not reached their area or because there are frequent service interruptions.

4.5 Many Niches, Many Operators

It is easier for independent private operators to offer a wide variety of services adapted to diverse consumer needs because they are free of the contract conditions facing the city-wide water companies, conditions based on an industrialized city model. Private operators are free to serve low-income residents who are the designated target population of the Water and Sanitation Program, along with middle- and upper-income households—whose homes, including luxury villas, may be located in areas beyond the piped network. In fact, a good part of the independent providers' income comes from more prosperous households; high-income families are the principal clientele of the water truckers in Nairobi, who also charge quite high prices.

Independent providers are called on to offer the whole range of services, from high-volume, high-income customers to the poorest of the poor, who buy as little as they must after having exhausted all the free sources (illegal taps or simple leakage from the piped system, wells, rainwater, rivers or streams). While high-income customers will eventually be connected to the piped network, because they can afford it and because they will use their political influence to see that the network reaches them, residents of illegal settlements most likely will not. Though the spreading peri-urban areas house a growing share of urban residents, these residents will need to rely on independent water providers for many years to come.

4.6 How the Water Market Works

Figure 4.3 summarizes schematically the sources of water production and the diversity of water distribution to low-income residents of Africa's big cities.

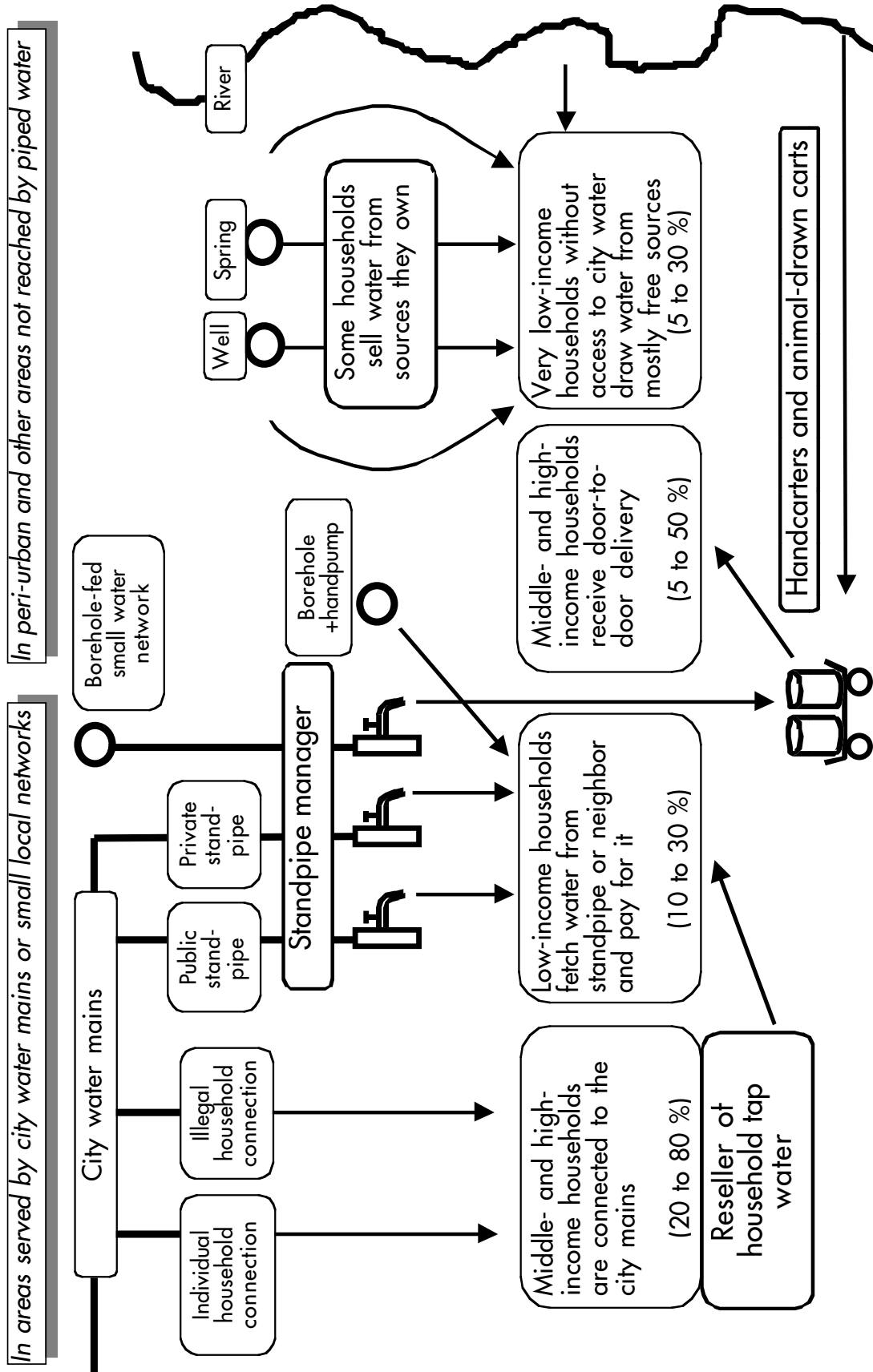


Figure 4.3. From source to household: How the water market works in African cities.

5. How Sanitation Services Are Delivered

Most households in African cities—70 to 90 percent overall, and virtually all poor households—deal with their own waste by building their own latrines or septic tanks or hiring others to do it. Since the public sector is generally not involved in this area, private providers dominate the market and offer services tailored to customers' needs and incomes, for the tasks that households choose not carry out themselves: masons who build latrines, manual latrine pit cleaners, suction truck operators for septic tanks, and manual or mechanized drain and latrine ditch cleaning services. Such independent providers were the focus of the city surveys for this study, which does not directly cover solid waste collection or rainwater drainage.

5.1 Self-help Sanitation

Limited public sewerage systems are in operation in nine of the ten cities, but only in Abidjan, Nairobi, Dakar, and Conakry do they serve more than 10 percent of households. In Abidjan, the city with the highest coverage, 45 percent of households are connected (see figure 5.1 for public sewerage coverage). In contrast to water supply, none of these public sewer operators has—or is interested in claiming—a monopoly, even in Dakar, where the National Sanitation Office (ONAS) could well extend coverage. They know all too well the low profitability of the systems they operate and are only too happy to see most households take care of their own needs.

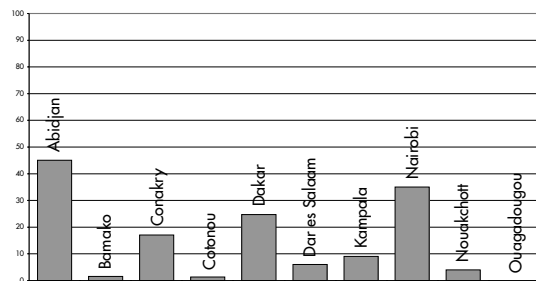


Figure 5.1 Percent of households served by public sanitation networks in ten African cities.

For their part, African urban residents seemed to have accepted the idea that no public sanitation solutions are likely to arrive any time in the fore-seeable future. While they clamor for better public water service, and expect their elected representatives to press for it, there is little public outcry about the lack of adequate city-wide public sanitation.

5.2 Sanitation Options for Every Household Budget

In African cities, households have adopted one of several basic solutions to the problem of disposing of human waste at the household level, depending on the physical conditions and on how much money they can spend for construction and periodic cleaning. The solutions range from a simple pit or ditch, lined or unlined, with or without a platform slab, to a water closet with

provision for flushing with a soak pit for the waste water, or, at the high end of the market, a two-stage lined septic tank (see table 5.1 for technical details and costs). There are independent providers active in the construction and upkeep of these sanitation systems, as basic or sophisticated as the client demands.

- In peri-urban areas of larger cities, households organize **family manual labor** to dig new latrine pits or ditches, dig out the sludge when full, and either rebury it or simply dig another pit when lot size permits.
- In denser low-income areas, often closer to downtown, latrine pits are generally not lined and liquid waste is absorbed through the earth walls, leaving a compact mass that is generally removed with a pick and shovel. Many families hire **manual cleaners** (in Dakar, they are called *baye pelle* or old shovel man), who charge a hefty sum to empty a pit (US\$ 15-25). They bury the waste on the lot or wherever they can, at times risking disputes with the owners of lots where the waste ends up, or from the city authorities. Only in Nairobi did the survey consultant observe hired manual cleaners who carted the septic waste to disposal sites at some distance from the work site, due to the high population density of the Kibera slum area where they were working.
- In more «modern» residential areas, the holding pits are usually cement-lined and therefore water-tight, so sludge removal is done by **suction truck** and carried off to disposal sites—a less odiferous but more expensive solution. Lined pits must be emptied more frequently (in some cities, once or twice a year) at US\$20 to 60 per visit, so this level of service is affordable to middle- and high-income households.

5.3 Septage Disposal and Treatment: Environmental Alert

Households are satisfied with these on-site household sanitation facilities and find them affordable even at the lowest levels of income. They are probably the most appropriate solution for urban areas where there are fewer than 300 persons per hectare, as in many towns and recently settled peri-urban areas. When the pits fill

up, they can be closed and a new one dug, or emptied and the waste buried on the same lot.

But in denser areas (more than 300 persons per hectare), on-site reburial becomes difficult and another disposal site must be found. Manual cleaners usually find a place to dump or bury waste nearby; the advantage of suction trucks is that they can transport waste beyond the edge of the city. However, since there are few authorized dumps, the untreated sludge ends up dumped into ravines and low-lying areas. Only in Bamako did the survey find sludge used to fertilize agricultural sites.

The disposal of septic waste represents a serious environmental problem in all ten cities. Only in Cotonou has a sludge treatment plant been opened, as a private business venture, and while it is expanding as fast as it can, the plant still operates on far too small a scale to handle the city's entire sludge production. In other cities surveyed (Dakar, Kampala, and Abidjan), dump sites have been officially designated, which at least encourages dumping in less environmentally sensitive areas (such as into the sea near Dakar), but there is no attempt at appropriate treatment at these sites. Two cities—Bamako and Ouagadougou—have designated no suitable dump sites. More disturbingly, the inadequacy of these disposal solutions seems of little concern to either urban residents—even those living near the designated sites—nor elected municipal authorities.

5.4 The Diversity of Independent Sanitation Providers

Independent sanitation providers offer a range of services tailored to individual households' needs and incomes. They may also carry out clearing of municipal roadside and stormwater drains. This type of work can constitute an important market for some small enterprises, whether they use suction trucks or manual labor, but work for the municipality also means bidding for public works contracts, which has its drawbacks. The formal bidding process takes time and requires paperwork, and the selection process is not always transparent.

Both household and municipal work is subject to wide seasonal fluctuations, peaking during the rainy season, when many pits and drains overflow

Table 5.1. Household sanitation options in African cities

Option	Clientele	Construction cost (US\$)	Maintenance		Annual cost (US\$)
			Procedure	Frequency	
<p>1. Unlined pit</p> <p>The pit is dug by hand and is unlined, the opening covered with boards. It is used for human wastes, wastewater, and organic garbage.</p>	Residents of rural and peri-urban areas where plots are relatively large.	\$30–60	When plot size is large enough, pits may be closed off when full and another pit dug elsewhere on the plot. Work is done by family members or a hired hand.	Cleaned or new pit dug every two years.	\$10 (for hired hand; otherwise not monetized)
<p>2. Unlined latrine with platform and soakpit</p> <p>An unlined pit is equipped with a cement platform, which may have a manhole cover. The soakpit is dug separately to receive wastewater and filled with large stones to prevent collapse.</p>	Residents of peri-urban areas, where plot size permits.	\$50–100	A manual cleaner is hired to dig out the solids compacted at the bottom of the pit. If the soakpit fills up, either family labor or a cleaner is hired to empty it out.	Manual cleaner hired every year or every two years.	\$15–20
<p>3. Lined latrine with platform</p> <p>The pit is lined and waterproof. Often used for wastewater as well as human waste, it fills up fairly quickly. When regularly cleaned, this type of pit minimizes pollution.</p>	Residents of urban areas, where small plots require reusable pits.	\$150–300	The pit fills quickly with liquid effluent and its cleaning is generally carried out by a suction truck. Compacted solids may need to be dug out by a hired manual cleaner.	Suction truck once or twice a year, plus manual cleaner every two years.	\$30–50
<p>4. Latrine or toilet + lined pit linked to soakpit</p> <p>When a lined pit is linked to a soakpit for liquid overflow, the frequency of cleaning is reduced.</p>	Residents of urban areas. Public buildings (schools, offices)	\$300–800	The pit fills with fairly liquid effluent and its cleaning is generally carried out by a suction truck. Compacted solids may need to be dug out by a manual cleaner, possibly hired from the trucker's staff.	Suction truck once a year, plus manual cleaner every two years.	\$30–50
<p>5. Septic tank + grease trap + soakpit /filtering trench</p> <p>An effective septic tank system includes at least two linked compartments. Waste passes first through a filter which traps solids and greases, and liquid overflow passes into a separate soakpit. This system can be said to be self-purifying.</p>	Residents of high-income housing (villas). Unaffordable to most households.	\$800–3,000	The grease trap is manually cleaned on a regular basis. The septic tank can be cleaned only by suction truck because it generally lacks access by manhole.	Grease trap cleaned regularly, septic tank every 3–5 years.	\$15–25

due to heavy rainfall. Work falls off during the dry season, and enterprises turn to other types of work, such as water carrying or construction work.

Septic tank cleaning services

These providers pump sludge out of lined latrine pits and septic tanks using suction trucks of 6 to 10 cubic meter capacity. Most of their vehicles are purchased second-hand from Europe for about US\$25,000, a quarter of the price of a new vehicle. There are about ten such providers in each of the cities surveyed, each owning fewer than half a dozen trucks. They are licensed enterprises whose registration and insurance documents are regularly checked by national or municipal police officers.

Most of these enterprises also offer other types of sanitation, construction, or transport services, such as delivering water to construction sites, which helps them to keep their businesses going during the dry season, when demand for tank pumping is slow.

Manual cleaning services

Pick and shovel work is an unpleasant and unsanitary trade, generally practiced by young men from the same neighborhood. They generally work in pairs, with one doing the digging out and the other hauling the waste, using simple tools (shovel, bucket, rope) and generally without protective clothing.

Manual cleaning is the most common means of maintaining household facilities and is often the only way to deal with latrine sludge in many unserved areas, where roads are too narrow for trucks and where unlined septic pits accumulate dense, dried out waste material that is not suited to mechanical cleaning.

Latrine construction

Masons who build latrines do not generally specialize in this work. Most masons who build houses can also build a latrine at the same time, unless the household chooses simply to dig a ditch.

There is an interesting exception in Ouagadougou, where the water company launched an ambitious program to upgrade household sanitation facilities. By specializing in the construction of the new latrine design which the water company is promoting, a group of masons has created a new market niche for

themselves. Households wishing to take advantage of the program, which subsidizes 20 to 30 percent of the construction cost, must hire masons registered with the water company. In this way, participating masons have embarked on a new commercial strategy based on an innovative product.

Toilet and shower operators

Public toilet facilities may be found in most large public gathering places such as train stations, markets, stadiums, and universities. When these are operated by municipal staff, they are often poorly maintained or even abandoned. In the larger cities, authorities have chosen to entrust their management to independent private operators, who are responsible for paying the facility's water bill, as in the case of private management of city standpipes.

Small-bore sewerage

Small-bore sewerage systems are rare in African cities, in contrast to the situation in Latin America. A single example of such a system was found by the consultant in Bamako and it seemed to have been created more as a community-based environmental improvement project rather than as an entrepreneurial response to market demand.

5.5 How the Sanitation Market Works

Figure 5.2 summarizes schematically the options offered by independent providers of sanitation services to low-income residents and other customers in Africa's big cities.

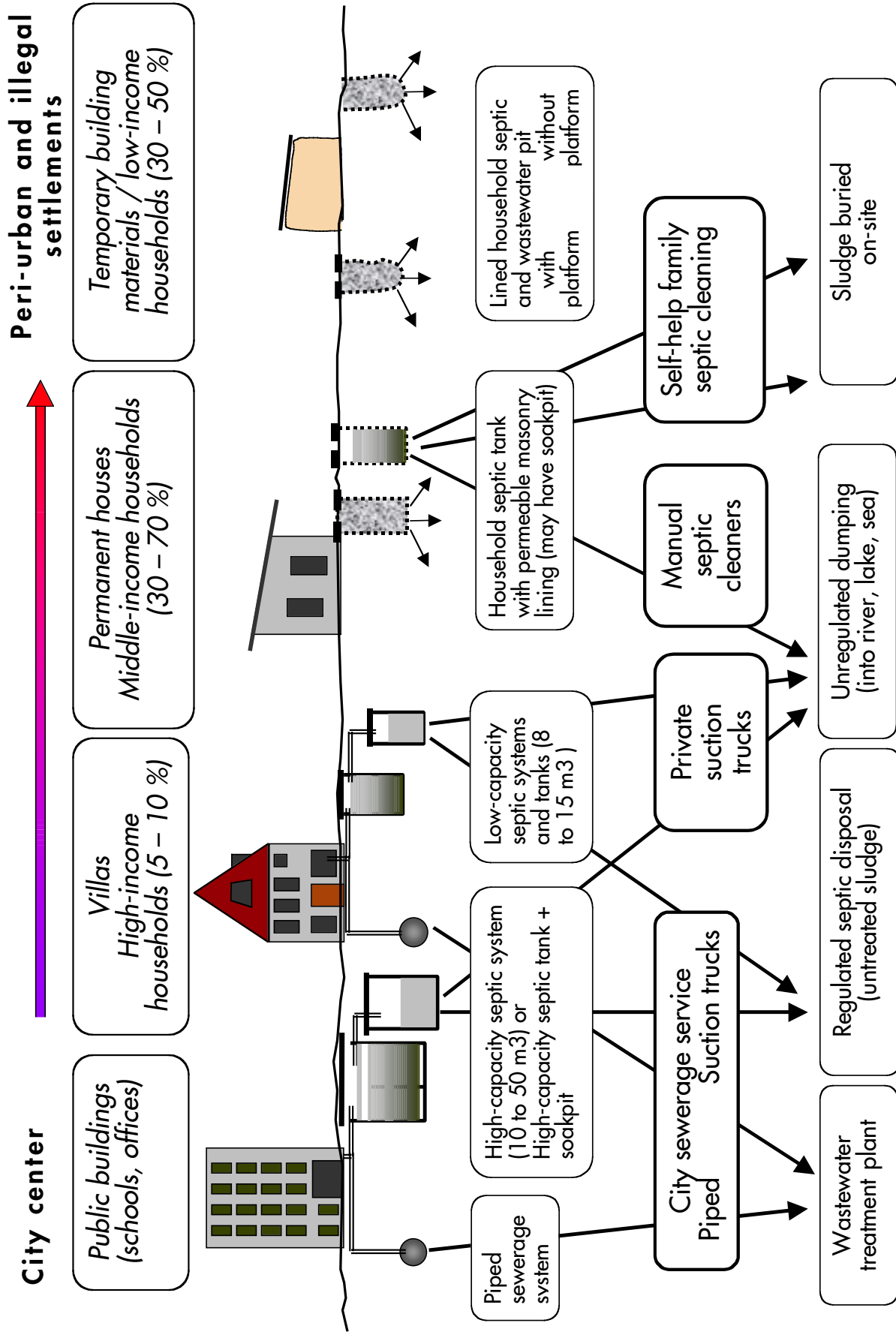


Figure 5.2. From downtown to urban fringe: How the sanitation market works in African cities.

6. Water and Sanitation Occupations

The wide variety of water and sanitation providers indicated in the previous two chapters has evolved to fill specific market niches. Depending on the economic and institutional context of individual cities, some trades may play a more important role and others less so. There are number of them which are found in all ten cities and are the main providers of water and sanitation services to low-income areas. These major players are described here in terms of their clientele, commercial strategy, technical means and earnings.

6.1 Water Occupations

Table 6.1 summarizes the presence and importance of independent water providers in the ten African cities studied. Standpipe operators are fairly numerous in five of the ten cities, resellers of home water are numerous and tolerated in nine cities, and hand carters or carters using animal traction are numerous in eight cities. There are many water truckers in four cities, and some independent water producers (well and borehole operators) may be found in six cities. A few small network operators are found in three cities, some of whom manage networks they financed themselves and others who manage installations that were built with external aid. The city network has been extended by private investment in three other cities, mostly by housing developers.

Standpipe operator-managers (*fontainiers*)

There are now many standpipe operator-managers in Africa—1,300 in Dakar and 700 in Bamako—but this is a relatively recent occupation, since standpipe water was originally free of charge. The rapid growth of the urban population and the monetization of economic transactions led to their conversion into water sale points. In all ten countries, the historic evolution has followed the same path.

- In an initial phase, the public had free and direct access to the standpipes and there were no operators or managers. Such a system remains in operation only in Sao Tome. Standpipe service ceased to be free once urban populations exceeded 5 percent of a country's total population and the cost of free urban water became too onerous for government budgets.
- In the next phase, standpipes were gradually abandoned (as in Benin and Haiti) or handed over to municipal authorities who were supposed to recover the costs of water through taxes or resale through standpipe operators. Such a system remains in operation in Cape Verde but has disappeared elsewhere. Most municipalities found it much too difficult to organize water sales and recoup sufficient funds to pay the water bills, so the service was suspended for lack of payment.
- In the current phase, standpipe service has been contracted to private operators over the past five

Table 6.1 Presence and importance of independent water providers in ten African cities.

Type of operator	Cotonou (Benin)	Ouagadougou (Burkina Faso)	Abidjan (Côte d'Ivoire)	Conakry (Guinea)	Nairobi (Kenya)	Bamako (Mali)	Nouakchott (Mauritania)	Dakar (Senegal)	Dar es Salaam (Tanzania)	Kampala (Uganda)
Reseller of home water (informal standpipe)	Numerous and tolerated because few city standpipes.	Numerous but little documented.	Numerous and tolerated because few city standpipes.	Very numerous, welcome supplement to few city standpipes	Numerous and tolerated because few city standpipes.	Numerous but little documented.	Numerous but little documented.	Numerous and tolerated because few city standpipes.	Numerous but not highly visible.	
Operator of city standpipe	City standpipes no longer in service.	Many in service; distribute 35% of city water.	A few coin-operated ones. Distribute little water.	Few in service (120); supplemented by many home resellers.	Few in service. Far outstripped in sales by home resellers.	Fairly numerous (700) and growing in number (+15/year)	Fairly numerous. Distribute 20% of city water.	Many in service (1,000), despite wide-spread home connection (6.5/100 pop.)	Terms of concession unclear	Fairly numerous (more than 500), terms of concession clear.
Water carrier						Some Dogon women active. Fading out.				
Handcarter	A few.	Many (7,000).	Rare.	Numerous	Numerous	Numerous	Rare.	Rare.	Numerous.	Numerous; use bicycles.
Donkey- or horse-cart er	A few.	A few.	A few.			Many	Many	Many		
Water trucker					Many; supply private cisterns of well-to-do.		Many; supply all peri-urban areas.	Many; supply private cisterns of well-to-do.	Many; supply private cisterns of well-to-do.	
Well operator		Found in some neighborhoods; seasonal activity.				Found in some neighborhoods; seasonal activity.		Found in some neighborhoods; seasonal activity.		
Borehole operator		Supply small networks (AFS) or autonomous standpipes (FEA)			Supply many water truckers.	Supply six small networks (AEPS)	Supply many water truckers.	Supply many water truckers.	Supply two small networks.	
Small network operator		Many PEAs installed during drought, some now connected to city network.				Six AEPS, one privately managed.			At least two independent networks with home connections.	
Operators of mini-network extensions of city network	Numerous. Some extension up to 3 km in length.		Numerous. Some extensions up to 3 km in length.		Numerous extensions to supply 1 or 2 standpipes.				Several cases found in peri-urban areas.	
Major sources shown in bold. Blank cells = not found										

to 15 years in the ten countries surveyed, and this has allowed reactivation of abandoned standpipes and the construction of new ones.

From a commercial point of view, there is an important distinction to be made between

- publicly constructed equipment whose management is contracted to a *fontainier*, often a local public figure selected by the municipal authorities for his standing in the community rather than his management ability, who operates the standpipe as a kind of sinecure.
- equipment constructed with private financing, possibly on public land, and connected to the public mains, at the initiative of an independent provider who plans to make a profit from his investment and expand its service.

Both types of standpipes may coexist in the same city, as in Dakar and Abidjan, and the contrast is striking between the dynamism of the privately managed ones and the passivity of the others, whose operators were chosen under less than transparent conditions. Annex table A.1 gives details of operating costs and revenues for two publicly constructed standpipes in Ouagadougou and a privately constructed one in Dakar.

Water Resellers

There are many households with individual connections who resell water from their homes. This practice is sometimes officially prohibited, as in Dakar and Bamako, but the prohibition is not generally enforced. In Cotonou, Conakry and Nairobi, it is tolerated or actively encouraged, and the concessionaires appear to have given up on the notion of setting up a viable standpipe system. Abidjan is a special case, where SODECI has formally licensed about 700 households for the resale of home water to those in neighboring areas that are not reached by the water network.

These operators generally serve a limited number of households in the surrounding area, no more than a hundred. Resellers' clientele is more extensive in cities like Cotonou and Conakry, where the concessionaire's coverage is most limited. But home water resale also takes place in cities where city-wide coverage is relatively good, as in Abidjan, because every city contains areas that lie beyond the concessionaire's reach.

The resellers invest their own money in the

equipment and infrastructure necessary to distribute the water and in some cases this can add up to substantial sums (Cotonou, Abidjan). They are among private investors who contribute substantially to secondary and tertiary water distribution infrastructure. For example, in Dakar, private investment in water infrastructure amounts to 50 to 80 km a year, or more than half that built by the concessionaire.

Water tariff policies are unfavorable for resellers. In Cotonou and Abidjan, most resellers are billed according to the standard progressive tariffs, which rise steeply as volume of water consumed increases. This penalizes the resellers and the low-income families to who are their customers.

Most water resold from homes is from the concessionaire's mains, but there is also some resale of privately produced water from wells. In the past, well water was not a commodity to be sold. Neighbors could ask to use another's well and it would have been a serious violation of social reciprocity to have refused such a request. The surveys carried out for this study indicated that the current situation is quite different. During the dry season, many families sell the water from their wells and some even stock water in barrels for resale to handcarters.

Carriers and Carters

There are three types of non-motorized door-to-door water delivery.

- Water bearers, who carry buckets or basins of water by hand and earn very little money for their trouble, are disappearing from the streets of African cities but are still common in very low-income cities such as Port-au-Prince in Haiti, where conditions are similar to the African cities studied for this report. Their dwindling numbers in African cities is an encouraging index of economic development since they are being replaced by more efficient carters.
- Hand carters, who pull or push carts that can hold 100 to 200 liters of water, are particularly common in Ouagadougou and Conakry. The prices charged by door-to-door carters are affordable to a steady clientele that is relatively well off, but even the poorest families may get their water this way (rather than fetching it themselves) when the time savings can be used

A group of young people managing a standpipe in Dakar

A group of 30 young people from the Fass Delorme neighborhood in Dakar got together and created a cultural association. In order to earn money, they built a standpipe with funds put up by a local leader and had it connected to the water company mains. The group's members take turns manning the standpipe and invest most of their profits in equipment they use to start other money-making ventures (sound system, video camera).

Madame Kaboré, a hand carter in Ouagadougou

For the past four years, Madame Kaboré, who is 37 years old and mother of four children, has worked 12 hours a day as a hand carter. Her husband bought her the cart with his own money. She buys water at US\$0.10 for a 200-liter barrel and sells at three or four times cost (200 to 300 percent markup). She sells on average seven barrels a day, which brings in about US\$2 a day, enough to feed her family.

Sidi Ould Amar, owner-operator of a donkey cart in Nouakchott

Sidi, now 25 and a bachelor, arrived in the city five years ago and started work as a hired cart driver, a job his uncle found for him. In 1997, he was able to buy his own cart with a loan that has since been repaid. He spends six months of the year delivering water in the city, and returns to his village during the other half of the year in order to plow his fields and help other migrants do the same. While in the city, he shares rented accommodations with other carters from the same region.

Private Network Investment in Dakar and Operators in Kampala

In Dakar, more than half the water distribution network has been built by independent private land developers. Their private investment is automatically transferred to the national water authority, SONES, with a promise of compensation.

In Kampala, private standpipe operators are managing small networks with several standpipes serving an entire peri-urban community, under contract to the water users' association that invested in network extension. Because the water corporation, NWSC, discourages such extensions, five wholly freestanding borehole networks have been built by Kalebu Limits, founded by an engineer and his wife, a marketing specialist. Starting with a single network, fed by water pumped from a well with an electric motor, they financed the second one from the profits on the first. The company also manages a group of eight coin-operated standpipes connected to the city network.

to earn money away from home.

- Carters using animal traction, who have a cart plus a donkey (in Nouakchott) or a horse (in Dakar) to pull it, can transport up to 500 liters of water. They are found primarily in the cities of the Sahel (Bamako, Dakar, Nouakchott), where there is a ready supply of these animals and where they are not endangered by the tsetse fly.

Water delivered door-to-door costs more than water from a household connection or from a standpipe: from US\$2 to 6 per cubic meter, about four times as much as water fetched from a standpipe (US\$0.60 to 1.50 per cubic meter) or six times as much as water from a home tap

(US\$0.30 to 1.00). Nonetheless, this type of service is much appreciated by households of all income levels, and its price is determined in a highly competitive market and accurately reflects the convenience of buying in small quantities (4 to 20 liters a day per household member), the time saving of having the water brought to the home (which can have a monetary value), and the higher operating costs of transport by cart (the carter's investment and his labor). See Annex table A.2 for details of five carters' operating accounts in four cities.

Even at these prices, the surveys indicate that a household's water expenses remain at from 1 to 3

percent of their income, and the carters' daily earnings are kept low by competition—no more than US\$2 to 3 a day. The surveys carried out for this study found no evidence of low-income households paying more than 10 percent of their income for water, as has been reported in the press. Thus the water is affordable and there is no need to mandate lower water prices, which would have the effect of driving the carters out of business and forcing households to carry their own water at much greater time cost.

Water Truckers

Water truckers supply mostly high-volume water consumers with cisterns (private villas, government and business office buildings). The market for water trucking services is most developed in cities where the concessionaire's level of service is poor—long cutoff periods and many unserved areas, as in Nairobi, Nouakchott, Dar es Salaam, and Kampala—and less so in cities where the primary water mains reach most of the settled area, as in Dakar and Abidjan.

Purchase of a water tanker truck, even a second-hand one, is a major investment, but may be recouped within a year's time, especially in the East African cities where demand for alternatives to piped water is strong. Annex table A.3 gives annual operating details for water truckers in Nouakchott, Nairobi, and Kampala.

Small Water Networks

In most African capital cities, there are some small secondary water networks operated by independent providers. These may be connected to the city mains or totally independent from them.

- In Nairobi, Cotonou, and Abidjan, there are small water networks hooked up to the city mains that supply water to towns or urban neighborhoods where public standpipe service is scarce or non-existent.
- In Kampala, Ouagadougou, Bamako, and Nairobi, there are private water networks that are totally separate from the city network. This is a new development in African cities (within the last five years), since, unlike the situation in Latin America, the law in African countries often reserves underground water rights as the exclusive privilege of state authorities.

Annex table A.4 gives details of operating costs for six private and small network operators in six cities.

6.2 Sanitation Occupations

Table 6.2 summarizes the presence and importance of independent sanitation providers in the ten African cities studied. Manual latrine cleaners and suction truckers are well organized and widespread in all ten cities. Privately toilet operators are successful in five of ten cities. One city has a successful private septic waste treatment facility whose owner has worked successfully with municipal and national policy makers to improve the regulatory framework.

Public Toilet Operators

In most African cities, most city-operated public toilets have fallen into disrepair or have been abandoned due to lack of maintenance. These facilities are coming back into use now, as municipal authorities allow independent operators to take the risk of rehabilitating them and reopen them on a pay-per-use basis. The operator may lease an existing public facility or may be a true concessionaire, investing his own funds to construct new private facilities, as in Bamako and Abidjan. These small enterprises are able to offer a large range of services in response to user demand: toilets, showers, drinking water sales, and even tables where coffee and tea are served. Annex table A.5 gives details of annual operating accounts for two public toilet facility operators in Bamako and Kampala.

Manual Cleaning Services

Outside of Abidjan, Nairobi and Dakar, public piped sewerage service is available to less than 20 percent of urban households. Households are on their own for the disposal of human waste and most dig the pits and empty them with family labor or hire one of the hundreds of manual cleaners (called *baye pelle* or «old shovel man» in Dakar). These workers usually hire out to people they know, living within a few hundred meters of their own home. This work may be one of a number of ways in which they earn money and they are not eager to discuss it as it is not a prestigious

Table 6.2. Presence and importance of independent sanitation providers in ten African cities.

Type of operator	Cotonou (Benin)	Ouagadougou (Burkina Faso)	Abidjan (Côte d'Ivoire)	Conakry (Guinea)	Nairobi (Kenya)	Bamako (Mali)	Nouakchott (Mauritania)	Dakar (Senegal)	Dar es Salaam (Tanzania)	Kampala (Uganda)
Manual latrine cleaner	Most widespread form of service, used by most low-income families. Distinction between self-help family labor and of paid latrine cleaners sometimes blurred.									
Mechanized manual latrine cleaners	Some NGO experiments.									
Suction trucks	"Mini-Spiros" (mini-suction trucks)									
Septic waste treatment facility using lagunage.	Well-organized market; single fee structure and syndicate	Well-organized market. Service standards. 80% private.	Well-organized market. Service standards. 90% private.	Well-organized market. One dominant operator (SPTD)	Well-organized market. Service standards. 80% private.	Well-organized market. Service standards. 80% private.	Well-organized market. Service standards. 100% private.	Well-organized market. Service standards. 90% private.	Well-organized market. Service standards. Mostly private.	Well-organized market. Service standards. Mostly private.
Mini-sewerage network	Private treatment facility using lagunage.	Well-organized market. Service standards. 80% private.	Well-organized market. Service standards. 90% private.	Well-organized market. One dominant operator (SPTD)	Well-organized market. Service standards. 80% private.	Well-organized market. Service standards. 80% private.	Well-organized market. Service standards. 100% private.	Well-organized market. Service standards. 90% private.	Well-organized market. Service standards. Mostly private.	Well-organized market. Service standards. Mostly private.
Privately operated public toilets	A few.	Well organized at train and bus stations, markets.	Well organized at train and bus stations, markets.	Well organized at train and bus stations, markets.	Fairly numerous.	Well organized at train and bus stations, markets.	Well organized at train and bus stations, markets.	Well organized at train and bus stations, markets.	undocumented	Fairly numerous.
Latrine builder	Encouraged by licensing requirement of Sanitation Plan									
Latrine platform builders	One innovative artisanal enterprise.	undocumented	undocumented	undocumented	undocumented	undocumented	undocumented	undocumented	undocumented	undocumented
City drain and culvert cleaning	Organized by public authorities, often municipal ones. When subcontracted through public works contracts, offers important potential market for private operators									
Major sources shown in bold. Blank cells = not found.										

occupation. Its low social status may explain why so little has been published about this type of worker, though they do the lion's share of the pick-and-shovel work. Annex table A.6 gives details of annual operating accounts for three manual latrine cleaners in three cities.

Suction Truckers

Suction truckers clean latrine and septic pits for 10 to 15 percent of households in the two cities studied, mostly relatively well-off households. The cost is not much more than that of manual cleaning (US\$30–60 for 6 to 10 cubic meters), but these households, who have invested in cement-lined pits, prefer to avoid the double nuisance of a longer cleaning period when the pit's odors must

be endured and of a more difficult disposal problem. The trucks can carry the sludge farther away, while manual cleaners will seek to bury the waste as near as possible, risking complaints from the neighbors.

These businesses are all operating in the formal sector because they must register their vehicles with the authorities, and this makes them easier to study. This is why some sanitation sector studies cover only this type of service and not the manual cleaners, who nonetheless do the lion's share of the work. The suction truckers use their vehicles for other types of transport during the slow period of work during the dry season. Annex table A.7 gives details of annual operating accounts for seven suction truckers in six cities.

In Dakar's Fass Delorme district, a two-man pick-and-shovel team

Teamwork lightens the workload for this pair, whose regular customers include about a thousand residents clustered around the hundred-odd courtyards of this small district, plus the occasional client from outside who has heard about their work by word of mouth. They also do some drain cleaning as a sideline, and do a lot of business repairing caved-in or damaged latrines.

Clients hire them for two types of service: annual pit emptying for about CFAF 15,000 for an 8 cubic meter pit, or a partial digout for CFAF 3,000 every two or three months.

Waste is generally reburied on-site, if there is room and the courtyard is unpaved, or in the roadway nearby, which gives rise to protests from the neighbors and sometimes a visit from the municipal sanitation authorities. But this pair usually escapes any penalty by taking the fellows out for a drink.

In Bamako, an economic interest group (GIE) operates two suction trucks

The Sema Saniya GIE operates a number of sanitation business ventures. They began with the collection and sorting of household waste for resale and recycling and then added the sale of trash cans, operation of a public toilet and shower facility at the main train station, and septic and latrine pit emptying.

In July 1995, they bought a second-hand suction truck with a CFAF 10 million grant from ACCT (Cultural and Technical Cooperation Agency). Within two years, the success of this operation convinced them to buy a second truck, using CFAF 6 million of their own earnings and a CFAF 5 million loan from BMCD (Malian Bank of Development Credit), which they reimbursed within a year. Business is still booming and there are plans for the purchase of a third truck in 1999.

Sema Saniya's customers are mostly individual households, who pay CFAF 8,500-15,000 in cash for a complete pit emptying; the price varies with the distance the truck must travel. A significant number of clients are referred by agents called *coxers* (after the English term for coxing a sculling crew) who receive a commission for each successful referral.

EMAPROHY, a rapidly expanding suction truck business in Bamako

The founder of EMAPROHY started work as a construction worker. Seeing the heavy demand for septic tank cleaning, he bought a suction truck in 1991. He has reinvested his profits and now operates four trucks. Since 1995, he expanded his business into the construction area, which now accounts for two-thirds of his annual turnover.

Sludge Disposal and Treatment

Though proper disposal and treatment of waste from latrines and septic pits is crucial to protect the environment and public health, there is little market demand for this type of service. Households are interested only in getting the sludge out of the pit and off the plot, whether two meters or two miles away, and are not inclined to pay cleaners for waste treatment. There are therefore few independent providers who have specialized in such work. Municipal or national public authorities operate sludge dumps and pretreatment facilities in Dakar, Abidjan and Kampala, and subsidize the operating losses. Only in Cotonou has a private operator set up a pretreatment facility (SIBEAU). Municipal authorities were then able to set fairly rigorous sanitation policy and have also required trucks to dispose of septic sludge at this facility. The operator receives no subsidies and the cost is recovered from the truckers and passed on to households. But there is still some competition from truckers who choose to dump in unauthorized areas.

7. Operational Characteristics of Independent Providers

The portrait of a typical independent provider of water or sanitation services in a sub-Saharan African city shows a versatile man, risk and publicity averse; capable of raising important sums of money when necessary, but without a logo or a front office. He seeks no loans from the bank, nor does he pay the city business tax, if he can avoid it. He can and does cover many bases, depending on what is most profitable today. His relations with other providers are opportunistic, governed by the practical advantage conferred, with little inclination (at least so far) to control or restrict the free operation of market forces. He has just joined, or is thinking about joining, a new trade association in his city.

7.1 Social and Geographic Origins

Few Women, Except in Ouagadougou

Water and sanitation trades are practiced by men, with the notable exception of Ouagadougou, where many standpipes and hand carts are operated by women. This may be traced to the Sankara era, when it was national policy to promote the participation of women in all political and economic activities.

Many Hand Carters from Rural Areas

Hand carting of water from door to door is dominated by young men from rural areas who have been in the city for less than ten years. The work is physically hard but easier to come by than

other jobs in the city because the initial investment is low and the market is very open. No evidence was found in any city studied of any restrictions on entry for those arriving from the country and wishing to go into business as water carters. This trade is thus often an entry point for new migrants, who retain strong ties with their home villages. Many carters in Nouakchott alternate between work in the city while fields lie fallow, and work in the fields during the growing season.

Standpipe Operator, a Position of Respect

In contrast to the carters, the standpipe operators are generally much older, long-time city residents. Frequently they are prominent neighborhood residents who are considered to be honest and responsible men and would not otherwise be likely to be granted the standpipe lease. Since income from this activity is steady, reliable, and virtually free from competition, it is little surprise that traditional elders and local leaders vie for the honor of holding a standpipe lease.

In recent years, standpipes have been leased to active investors who have the resources to rehabilitate a standpipe that has fallen into disrepair or to take care of past unpaid water bills left by the previous leasor. Such investors have sometimes taken over several standpipes and the study sought to determine whether this has led to creation of mini-monopolies by individuals with personal ties to municipal authorities or water companies. No evidence of such a tendency was

found and the largest such operators identified operate no more than three or four standpipes.

7.2 Investment Financing

Independent operators' ability to raise funds in the informal sector to finance equipment and infrastructure investment is one of their key characteristics. Banks and financial institutions are conspicuous by their absence in the world of independent providers, and most enterprises contacted during the surveys have never had occasion to borrow money from the banking sector. While this would be expected for individuals or very small businesses, who lack access to credit because they are micro-enterprises of the informal sector, it is a bit more surprising for providers holding public sector contracts, such as municipal standpipe operators, or vehicle licenses, such as suction truck owners. In particular, the purchase of a suction truck requires a cash investment of US\$20,000 to US\$40,000.

Family Savings Put to Work

The family is the first source of financing for small providers. Most hand carters started work with equipment provided by a father, brother, or maternal uncle who had been living in the city for a few years. They are then able to pay back the loan in one to six months from their profits. The level of investment required for these very small providers, whose clientele may include a few dozen or at most a few hundred households in a small area, is on the order of US\$50 to 1,000.

Savings Clubs

Most adults living in the city participate in one or more savings clubs or tontines, usually involving about ten members, each of whom puts a small amount into the pot on a weekly or monthly basis. The sum thus gathered goes to each in turn. This financial arrangement is very common in the business and service sector because it is a good way to maximize the leverage of small regular savings with no administrative cost and low risk, since the members share a strong bond. The survey found that many carters using animal traction use this means to finance the purchase of a new beast of burden.

Financing of Larger Investments

Independent providers serving a larger market niche and more expensive equipment must raise larger amounts (US\$5,000 to 200,000) in order to purchase vehicles or build small water distribution networks. Since they cannot generally qualify for a bank loan, which would require collateral or security deposit, they will seek contributions from households that will be served by water network extensions, for example, to prefinance the construction costs, or will pay higher interest rates to borrow elsewhere. To keep finance charges down, and to minimize the risk of loss through expropriation of infrastructure, they keep investment to a minimum. Though the annual amounts invested are substantial (on the order of US\$30 million a year in the ten cities surveyed), the impact of this short-term investment is less than optimal: for proper long-term sector growth, medium-term (two to five years) and long-term investment in infrastructure built from more permanent materials would be required.

7.3 Strategies for Limiting Risk

Foremost among the concerns of any African entrepreneur is protection from the vagaries of the unpredictable political and economic conditions found in most countries (coups d'état, being sent back home if an immigrant, arbitrary cancellation of signed contracts) in a legal environment where legal considerations tend to run a distant second to who you are and who you know.

Minimize Investment

A common response is to limit investment in order to minimize exposure to theft and expropriation. This strategy is illustrated by the preference of suction truck operators in Bamako, Cotonou and Dakar to purchase second-hand vehicles, which cost only 20 to 30 percent as much as a new vehicle but require substantial maintenance costs.

Water resellers use the same strategy when extending their unauthorized distribution networks: they buy the cheapest possible type of PVC pipes. Though these break more often and cost a lot more to maintain than more expensive plastic or metal pipes, this type of piping minimizes the loss in the case of uncompensated expropriation or destruc-

tion by public authorities, as has occurred repeatedly in Abidjan in recent years. As a result, few small networks have been constructed over the last two years.

Diversification

Few African entrepreneurs specialize in a single activity, preferring rather to diversify their involvement and shift resources to whatever will prove most advantageous. Independent water and sanitation providers are no exception to this rule for survival in a volatile economic and political environment. They strive to avoid becoming locked into exclusive relations with a single client in order to keep their resources working and avoid down time. In addition to being alert to business opportunities, as providers of public services, they must also respond to shifts in national or municipal water and sanitation policy and regulations, and keep abreast of what the city water company is up to.

Expecting this kind of entrepreneur to specialize in delivery of a single type of public service means expecting him to increase his exposure to risk, a consideration often overlooked by external investors with a narrow project focus. In fact, the format and conception of the typical project is directly opposed to the spirit of enterprise which these providers represent. In thin and uncertain markets, maintaining income means earning as many small sums in as many ways as possible. This is particularly true of providers who have invested in vehicles.

- In the dry season, when demand for mechanized septic cleaning is low, owners of suction trucks in Bamako use their vehicles to transport water to construction sites, which are then in full swing.
- In the rainy season, when demand for door-to-door water delivery is low, hand carters in Dakar switch over to transporting merchandise.
- During the planting and growing season, Nouakchott's hand carters work their fields in the country, returning to the city to haul water once crops are gathered in.
- Plant nursery operators in Dakar take work as manual latrine cleaners and haul the waste to the nursery for fertilizer.
- Nairobi's water kiosks strive to function as the corner convenience store where many necessi-

ties can be purchased and not just water.

- When construction work is slow, masons, well drillers, and small construction contractors will look for work cleaning latrines and septic pits.
- Truckers in Cape Verde will switch to carrying water only when the price has been driven up because of severe water shortages.

Keep Your Head Down (Stay Quiet, Be Happy)

Many African entrepreneurs deliberately keep a low profile, downplay their successes, and avoid obvious displays of wealth. One company in Nouakchott continued to do business from a back alley even after it became the leading supplier of solar equipment in Mauritania and even throughout West Africa. A number of suction truckers in Dakar and Bamako have gone one better—they have no office at all, though they handle more than 10 percent of the local market for such services. Their only publicity is the trucks themselves, which always park near the markets. Such behavior is not motivated by modesty but rather by the desire to avoid political or administrative abuse, motivated by the jealousy which an obvious display could attract.

Stay in the Informal Sector

The vast majority of operators surveyed have remained in the informal sector. Like 90 percent of all African entrepreneurs, they have not registered their business with the authorities because

- municipal business taxes can be substantial and the fees are often arbitrarily set, setting the scene for yet further demands;
- social security charges must be added to payrolls even though the benefits they are meant to finance are rarely received.

The only exceptions identified are the suction truck operators who must register their vehicles, and enterprises who realized a direct benefit from taking formal sector status, such as participation in civil works contracts to clean the drains in Dakar for the meeting of the Organization of African States, and in municipal contracts for septic tank service to public buildings in Bamako.

7.4 Competition and Cooperation

In order to better understand the structure of the independent providers' world and the extent of their independence from, or dependence on, each other, the study sought to define the range of relationships among them. They all have dealings with the water company or the municipality, but they may or may not associate with their fellow practitioners in the same area and their relationships range from cooperation to indifference or outright hostility. The following six types of interaction are proposed as a aid to understanding and not as a universal typology.

Friendly Competition

When individuals are rivals in seeking the same job, they are said to be in competition. Although the pick and shovel men, water carriers, and suction trucks find themselves in this position vis-à-vis their peers on a daily basis, they are motivated to develop solidarity and to follow certain self-imposed guidelines by their common struggles with the public authorities.

- In Bamako, water carters tend to come from the Gao and Segou regions of the country. They get together at night to tell their stories and receive advice from the more experienced among them. They keep each other posted on the going rates they are charging, but there is no price fixing. Prices are determined on the ground by the conditions of supply and demand, in particular the ever-changing conditions of physical access to the areas being served.
- In Cotonou, a suction trucker stopped by sand trying to reach a potential client will refer the client to another trucker who is equipped with sand tires. In this way, the truckers recognize each others' particular skills and don't seek to invade each other's market niches.
- The lady water resellers of Ouagadougou have been known to pair up to push a cart heavily laden with water. This kind of friendly competition grows naturally out of the camaraderie of a group of 10 to 15 women in frequent contact around the same standpipe.

Conflict

Competition between the different types of providers can deteriorate into conflict. At the periphery of Nairobi, water carriers' business was threatened by the extension of a community water network in an area where they had been providing water. Before giving up this territory to the standpipe operators, the water carriers inflicted damage on the newly laid pipes to show their displeasure. During a severe water shortage in Ouagadougou, hand carters were forced to go from standpipe to standpipe in search of water and did not hesitate to threaten the operators physically to make sure they got it.

Business Relationships

Some operators build and maintain business relationships as subcontractors, suppliers, or distributors. This occurs, for example, between standpipe operators and the plumbers who maintain their pumps, and also in water sales. A borehole manager will sell to a trucker who supplies a cistern manager, who supplies a water carrier. The survey observed cases where loyalty over time had created a permanent relationship which lacked only the paper signature to be recognized as a contract.

Formal contracts were more often drawn up when one operator delegates management authority to another, as in the case of the Water Users' Associations in Malian towns, which contract with a fontainier to operate a standpipe and pay him a commission based on the volume of water sold.

Cooperative Teamwork

Business relationships can extend beyond those of supplier-subcontractor to true teamwork, in the interest of increasing both parties' income. The baye pelle of Dakar often act as sales agents for certain suction truckers, recommending their services to customers in need in exchange for a commission on each successful referral. In Cotonou, some news kiosk operators play the same role. The cooperation works in both directions: the truckers will also refer customers to the baye pelle with whom they are associated when the pit waste is too dry and compact for them to pump it. In this way, each partner acts to

increase the revenue of both.

A similar kind of teamwork exists in the relationship between the Water Advisory Unit (CCAEP) in Mali and the Water Users' Associations in a number of towns, to whom CCAEP provides technical and audit support. Since the associations pay CCAEP a fee based on the volume of water produced, CCAEP has a financial interest in keeping their equipment in good shape.

Professional Association

Though their numbers are still few, more and more professional and trade associations have begun to be formed as civil society awakes in Africa following the replacement of autocratic institutions by democratic ones in recent years. In the water and sanitation trades, independent providers have established professional and trade associations primarily as a means of organizing collective action to advocate common interests. Such organizations have long since been formed by public transportation providers and market vendors. In the water and sanitation services sector, they include

- **Mali's** Union of Water Suppliers (UEAEP-Mali) represents Water Users' Associations in 16 Malian towns in discussions with authorities and with a para-public entity within the Water Ministry which audits independent providers' accounts (CCAEP, see page 55).
- **Côte d'Ivoire's** AREQUAPCI, whose members are licensed by the water company (SODECI) to resell water from their home connections in Abidjan's low-income areas, has successfully negotiated with SODECI to buy water at the same preferential rate as standpipe operators.
- **Benin's** Union of Septic Cleaners (USV), whose members are suction truck owners in Cotonou, has successfully lobbied for improved legislation and permission to open a private sludge treatment facility using lagoon treatment.
- **Ouagadougou's** Association of Standpipe Managers (KADIOKO) was organized to fight back against the water company's capricious cancellation of contracts and their reassignment.

These associations can play a key role in improving professional practices, promoting technical innovation, and integrating private and public service systems.

Collusion

It is a small step from a legitimate cooperative movement to one of economic collusion. Going beyond the protection of common interests, cartels seek total market control, including control over or barriers to entry. While it is natural to expect such pressure, it will only succeed to the extent that public authorities give their support. Open entry and competition is the best way to ensure the responsiveness of the service provider; since collusion restricts competition and leads to price fixing, it is detrimental to consumer interests. It is one of the legitimate and necessary roles of the public sector to protect these interests.

While professional and trade associations should be recognized and negotiated with in order to establish fair conditions for doing business, care should be taken not to confer any sort of exclusive status that would tend to encourage cartel-like, price-fixing business practices. For example, in Cotonou, the Union of Septic Cleaners (USV) has become a cartel since passage of legislation to regulate professional practices. It refuses to admit new members, maintaining that the treatment facility is operating at capacity, and encourages the authorities to harass truckers who are not members. Evidence for price-fixing is seen in the high prices for septic cleaning in Cotonou—the highest in all of West Africa—80 or 90 percent higher than in Bamako, though vehicle and fuel prices are actually higher in Bamako.

The association of water resellers in Abidjan (AREQUAPCI) would like to have similar powers over the standpipe water market, and have requested authority to approve new standpipe locations, in order to protect their market to resell water from their home connections. But the best proof that an open market serves consumer interests is, again, the fact that it is in cities where standpipes are few that water prices are highest (Cotonou, Conakry, Dar es Salaam, Nairobi).

8. Commercial and Pricing Strategies

Independent operators set their commercial practices to closely match the needs of their clients, especially their ability to pay. They sell water in small quantities, down to a single glass of cold or ice water. They may choose to let their neighbors buy water on short-term credit. Their prices vary with the availability of water, distance to the piped network, the season (rainwater scarce or plentiful), and willingness to pay for priority service privileges (a surcharge may advance a client to the front of a long line).

8.1 Intense Competition Keeps Profit Margins Down

Independent providers are sometimes criticized by public authorities or NGOs for reaping high profits on the backs of their low-income customers. But the surveys carried out for this study found no evidence to support this view. On the contrary, the survey results indicate rather that the market for water and sanitation services is extremely competitive and profit margins low. Most operators surveyed earn just enough to maintain and replace equipment and pay themselves a modest wage. Net earnings were found to be on the order of a few dollars a day, except for suction truckers:

- carters using animal traction in Nouakchott and Bamako: US\$ 2 to 3 a day
- hand carters in Ouagadougou and Bobo Dioulasso: US\$ 2 to 2.50 a day

- standpipe operators in Dakar, Bamako, Conakry, Abidjan: US\$3 to 4 a day
- suction truckers in Bamako and Dakar: US\$100 a day

The intensity of competition keeps the profit margins down and will continue to do so as long as the market stays open to competition. Providers who attempted to raise prices would simply lose business to others operating at long-run margin cost. For this reason, any policy tending to limit the number of providers does not benefit consumers, since it allows the artificially low number of operators to raise their prices (oligopoly pricing), as in the case of Cotonou's Union of Septic Cleaners (USV).

8.2 Individual Connections

Running water in the house is a highly desirable service, especially in the big cities, but one out of the reach of many low-income families because of the high up-front cost. Individual house connections are the main option offered by the city water companies, which charge a connection fee composed of a security deposit (rarely refunded) and the installation charge. The amount involved is a substantial sum, amounting to two to five months' income for an average urban worker (see figure 8.1)

The standard billing cycle of two or three months creates an additional problem for low-income households because their fluctuating

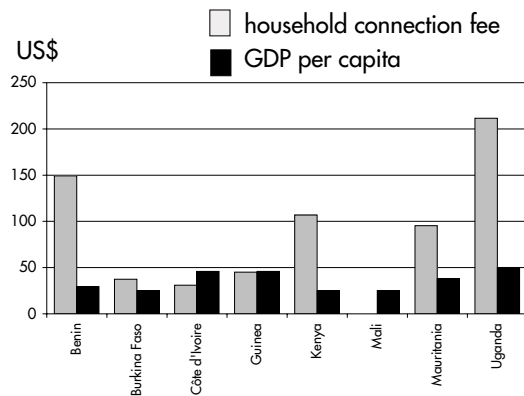


Figure 8.1 Water connection fee and monthly per capita income in eight African countries.

income makes it difficult to pay a large bill, no matter how infrequently. While in principle a flat monthly fee, such as used by SEEG in Guinea, would seem to help, in practice such fees are set too high and exceed the cost of the low volumes of water actually used by low-income families.

Connection subsidies

Some concessionaires, well aware of the inequality in access to water resulting from their billing practices—not to speak of the loss of potential clients—have introduced a policy of subsidizing some household connections with funding support from external donors (“social” connections offered by SBEE and SdE) or central government funds created by higher priced water sales to high-income customers (SODECI’s Water Development Fund). In cities where the network’s coverage is broad such as Dakar and Abidjan, such policies favor household connections by those at the median income. But these policies are of little help to low-income households who live in areas outside the network coverage area.

Furthermore, such connections are generally reserved for those holding title to the land on which they live, automatically excluding residents of unauthorized settlements where large numbers of low-income residents live, especially in Abidjan and Nairobi.

Prepayment

Prepayment systems using plastic cards with magnetic information strips have become very popular in Africa for paying telephone charges and are beginning to be developed for electricity

services as well. Water companies in South Africa are seeking to develop the use of such cards for water purchase, spurred by the need for new payment solutions following the fall of apartheid.

Such a system could be a good solution for households lacking regular sources of income, if they could use it to buy water when they have money. If they did not need to have a household water account, there would be no risk of having service suspended for non-payment. A prepaid card system appears more suited to the needs of a city-wide water company than to independent providers, since it requires accurate accounting systems and regular maintenance of sophisticated card-reading equipment. But it remains to be seen how such systems will actually work and whether they can be adapted for use in low-income urban areas.

Cross Subsidies

The water tariff systems of the African concessionaires are structured along the same lines, whether they are run by public or private operators, and tend to favor a certain degree of cross-subsidy. There are important variations from one country to another that reflect different national social policies (see figure 8.2).

- Unit price increases with the amount consumed, with two, three, or four tariff levels between 5 and 100 cubic meters monthly water consumption. High-volume users thus pay more (the reverse of the situation in Europe) and the surplus is intended to balance out the loss from charging less to lower volume users.
- The differential is greatest in Burkina Faso, where the rates charged to high-volume consumers are five times those paid by low-volume users, a legacy of the Sankara era. It is least in Guinea, where the rates are practically uniform.

Such a tariff structure does not constitute much of a social policy where few low-income families actually have house connections, as in Mali and Benin, or when less than half the high-volume consumers actually pay their water bills, as in Kenya and Haiti. In Kenya and Benin, the overall level of tariffs is quite low (less than US\$ 0.50 per cubic meter) and still the cost recovery rate is very low. This type of subsidy thus ends up mostly benefiting those middle and high-income water customers who have house connections.

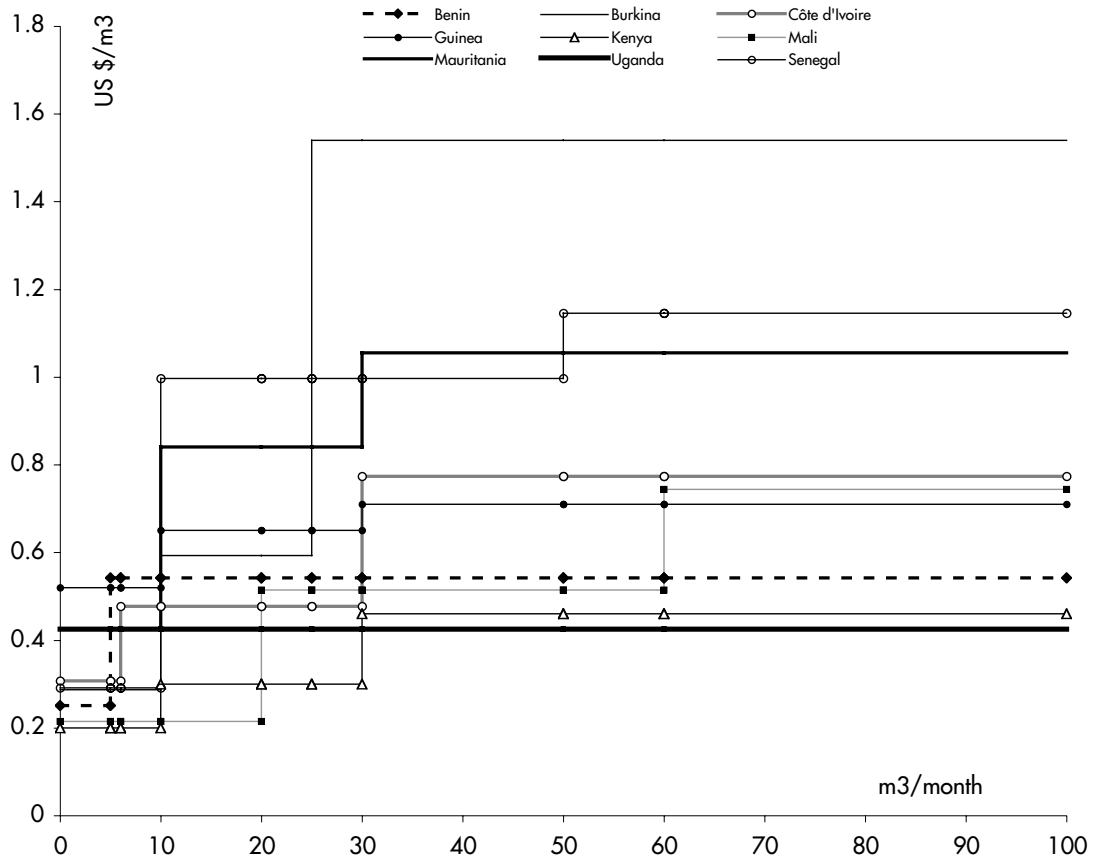


Figure 8.2. Water tariff structures of nine African water utility companies.

Water Resale is Penalized by Progressive Tariffs

In many peri-urban areas and some entire cities (Conakry and Cotonou), resale of household water supplies a large share of low-income families, because of the scarcity of standpipe service. Consumers in these areas heavily penalized by the progressive tariff structure, because the more water they buy, the higher rate they pay. A good reseller of household water with many clients can sell more than 100 cubic meters a month and will end up paying the highest water rate, while standpipe operators buy close to the lowest rate. The impact is greatest in cities where there are few alternatives.

8.3 Standpipe Service

Standpipe Operators Make a Good Profit

Standpipe operators buy water directly from the water company and generally are charged a preferential rate close to the lowest subsidized or «social» tariff rate (around US\$ 0.40 to 0.60 per

cubic meter). They are able to charge a 50 to 900 percent markup, so that their gross profit amounts to 30 to 90 percent of the resale price (see figures 8.3 and 8.4). The highest rates of gross profit (80 to 90 percent) are those of private standpipe operators in Cotonou and Nairobi, cities where public water service is especially inadequate throughout the city and where the operators' return must cover infrastructure investment to bring the water into urban neighborhoods. In these cases, the "standpipes" may be simple taps near a door or window of an operator's home.

Standpipe Water Costs the Consumer Close to the Highest Tariff Rate

Consumers who buy at the standpipe are paying about US\$ 1 per cubic meter, about the same as the highest tariff rate paid by high-volume consumers in all countries except Burkina Faso (see figure 8.5). This underlines the tendency of cross-subsidy policy to benefit middle-class households with individual connections, rather

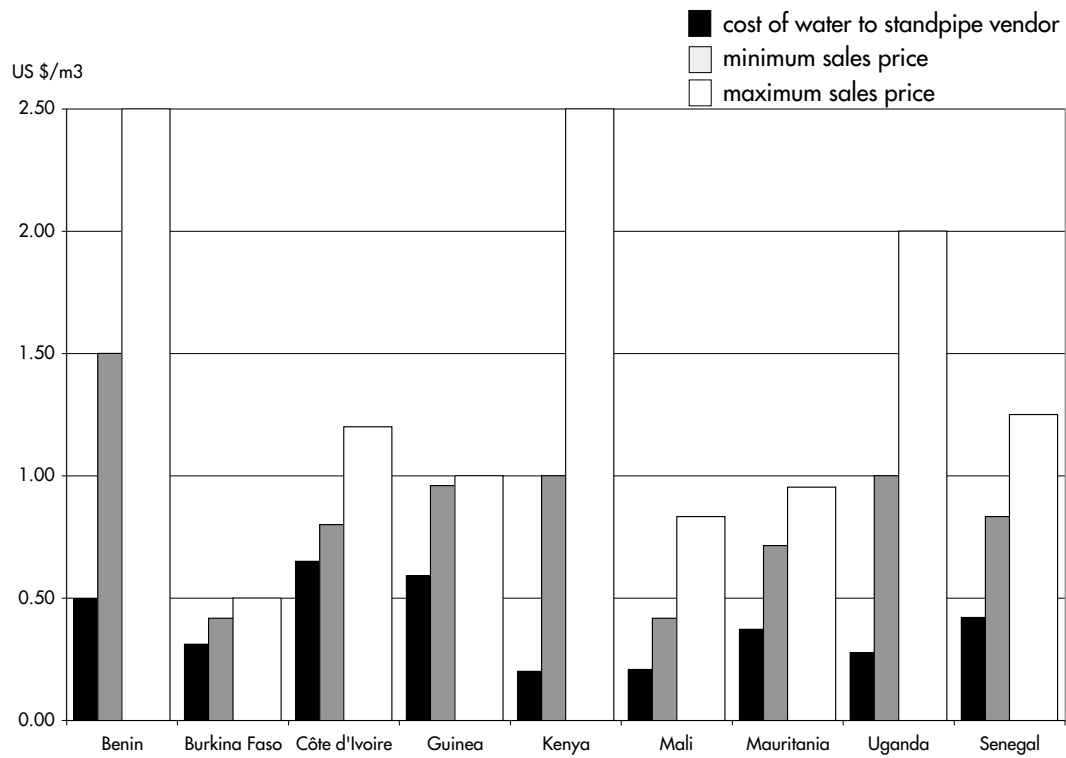


Figure 8.3. Water rates paid and charged by urban standpipe vendors in nine African countries.

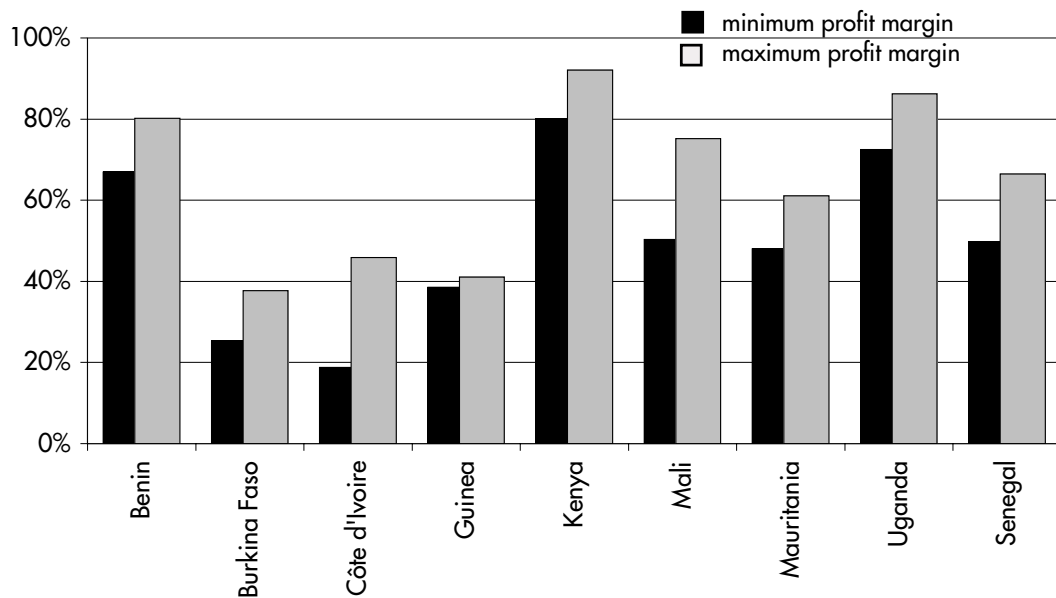


Figure 8.4. Gross profit margins of standpipe operators in nine African countries.

than low-income and poor families, who do not have house connections but buy water at standpipes. Burkina Faso's ONEA is the only water company to set rates to standpipe operators so low that the final price at the standpipe is well below the maximum tariff (US\$ 0.45 vs. 1.50 per cubic meter) and thus is the only one to serve the poor well.

8.4 Door-to-door Water Delivery

Higher Prices, Higher Costs

The cost of water delivered to the home is higher than that bought at the standpipe due to the transport costs. In all ten cities, water delivered to the home costs between US\$2 and 8 per cubic meter. There is little difference between the unit sale price of hand carters and water tankers, probably because of the strong competition between the two in the provision of certain types of clients, such as construction sites (see figure 8.6).

While some public authorities and concessionaires tend to jump to the conclusion that these prices are exorbitant and that the water carriers are exploiting their poor customers, in fact strong competition means that the hand carters earn but a meager wage (US\$1 to 3 a day). It is also true that home delivery is not a luxury service in cities like Ouagadougou and Nouakchott, where the standpipes serve mostly the hand carters (7,000 of them in Ouagadougou), who then carry water long distances into settlements far from the piped network. This door-to-door service is in fact the

only water that is available in these areas.

Apparent Problem of Small Change

Although there is a demand for quantities of water light enough to be easily transported by pan or jerrycan on the heads of small children (less than 10 liters), it is difficult to figure out how to charge for it because it should cost less than the smallest coin available (CFAF 5, one ougiya). One may also wonder how water sellers cope with the multiplicity of containers of varying shapes and sizes which are used to carry water, which also raise the question of how to make change. The providers themselves seem not to find it a problem; they have had a lot of practice in judging water volumes and coming out ahead in the prices they charge while staying on good terms with their customers. Since they are in daily contact with their customers, they are continually adjusting water prices in any case to reflect constantly changing conditions of supply and demand and their past dealings with their customers.

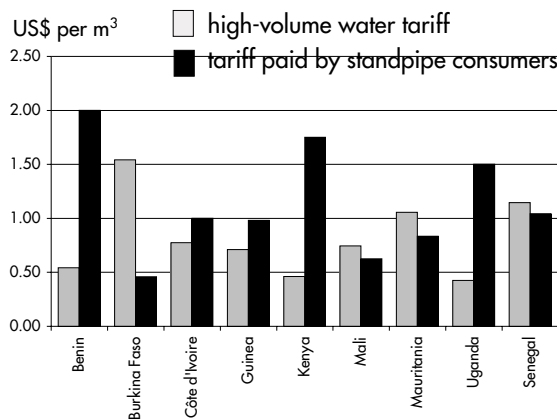


Figure 8.5. Unit cost of water to standpipe users and high-volume water consumers in ten African countries.

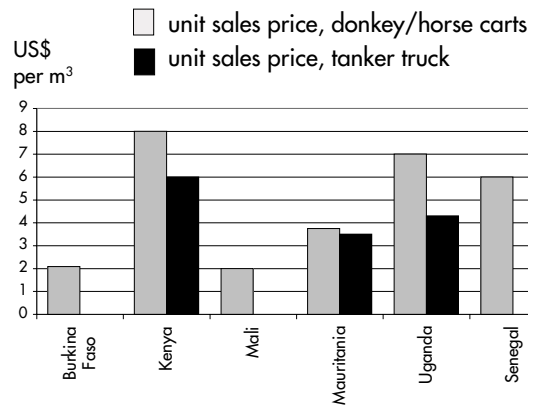


Figure 8.6. Unit sales price of water delivered by animal-drawn carts and tanker trucks in six African countries.

9. Advantages and Constraints

The main advantages of independent providers are their ability to respond quickly to changes in demand, to offer services needed by low-income families, to self-finance, and to recover all costs. The main constraints to their expanding and improving their service levels are a number of popular misconceptions about their pricing strategies and service quality, lack of recognition and communication with public authorities, absence of policy and regulation in the water and sanitation sector, hostile attitude of the city-wide concessionaires, lack of access to bank loans, lack of access to civil works contracts, and insecurity of infrastructure they build on public land and rights-of-way.

9.1 Operational Advantages

Independent providers in African cities can

- offer flexible, convenient services, perfectly tailored to the needs of a diverse clientele, who are not served by the standard options available from city water companies;
- mobilize investment capital required to build piped network extensions, mini-networks, and sludge treatment stations, and to purchase vehicles and pumping equipment;
- set fees to recover costs for water services, even in neighborhoods where this was previously thought to be difficult;
- reinvest their profits in order to expand service delivery.

Demand-responsive Service to Low-income Households

In most large African cities, the water concessionaires neglect certain areas or types of customers, despite the requirement in their contracts to provide city-wide service in exchange for exclusive rights to water production. Independent providers have demonstrated their ability to overcome the barriers cited by the concessionaires in justifying their neglect of these areas.

- Elevation: Independent truckers deliver water to urban areas located above the level of the water mains in Nouakchott, Kampala, and Nairobi.
- Flooding: Water resellers in Cotonou and Abidjan raise their plastic water tubing above the ground in zones subject to flooding and must constantly patrol them.
- Illegal settlements: Residents of illegal settlements in Abidjan, who have no legal tenure to the land on which they squat, purchase water from water resellers in adjacent, legal settlements.
- Low sales volume: Carts are happy to sell water in small quantities to households with low and irregular incomes, who consume less than two cubic meters of water a month. The cost of metering and billing by the concessionaire would exceed the actual cost of water consumed by these households.

The rigidity of the concessionaires' contracts make it difficult for them to match the flexibility of the independent providers, who can vary their prices for distance and other factors and can also

switch to other kinds of work when demand falls off (less demand for water and for latrine cleaning services during the dry season). The independent providers survive because of this flexibility and their responsiveness to demand. They can work within the limitations of their clients' circumstances, for example, by adapting their payment requirements to take into account the daily and weekly variations in income of many poor households.

The surveys indicate that the customers of independent providers are quite satisfied with their services. First and foremost, they know they will be able to get water virtually anytime and anywhere, whether or not the concessionaire's service is up or down. Because the sector is very competitive, users know that they have some selection among different vendors and this competition keeps value for money high. Independent providers are also appreciated for their commercial sensitivity to client feedback. The user is respected and has no difficulty making herself heard if service quality is not satisfactory. The user is treated as a valued client, is spared administrative hassles, and has not far to go to be in touch with the neighborhood water vendor.

Self-financing

During the surveys in the ten African countries covered in the study, several hundred independent providers of all sizes were interviewed and every one of them self-financed their start-up with family funds and their expansion costs with profits. The discovery of the scale of infrastructure constructed by independent providers was one of the big surprises of the study (100 km a year of water distribution network in Dakar financed by land developers, network extensions and household connections in Mauritania, public toilet facilities in Bamako). At every level, profits are reinvested in the business: an operator who now manages 20 handcarts started with a single one. The case of a group in Bamako that bought their first suction truck with a non-profit loan, and of the sludge treatment plant in Cotonou that is now negotiating a loan on concessional terms with a bilateral donor to build a second plant, are the rare exceptions to this rule.

Cost Recovery

In contrast to the concessionaires who have often commented on the need for outside financing or subsidies, especially to extend service in low-income areas (80 percent of household connections in Abidjan are subsidized with donor assistance, independent providers have no choice but to recover all their costs. They simultaneously maintain good relations with their clients, including advancing credit and giving discounts when warranted, again in contrast to the concessionaires, who are inclined to cancel water service at the first late payment.

9.2 Refuting Popular Misconceptions

While the surveys found that users themselves are satisfied with the level of service and value for money provided by independent entrepreneurs in otherwise unserved areas, others have raised objections to the involvement of independent providers in the water and sanitation sector. Their criticisms may be summarized as follows:

"Water supply has always been a public monopoly."

"Water resellers charge much more than the city water companies."

"Community systems can be run by the community, without involving private operators who do not deserve the fees they charge."

"Vendors outside the system sell poor quality water."

"Private providers push the public water suppliers out of the market."

None of these statements is supported by the results of this study, and each needs to be reexamined to see why it is not valid.

Monopoly Is Not a Guarantee of Quality Service

In Europe, city water monopolies have emerged relatively recently, following a period of 400 years of evolution and fierce competition. City-wide monopoly systems make sense in the context of fully industrialized economies where the desired product is fairly standard: individual water and sewerage connections for each residence. But where this model has been transplanted to African cities, it encounters a much wider variety of customers. Many urban residents need to buy water in small quantities and are not interested in filling out forms or dealing with billing systems.

This clientele is more comfortable buying water from independent local providers.

Fees Match Demand from Poor Households

The price of water delivered door-to-door is more expensive (US\$2 per cubic meter in Dakar, Bamako, Nouakchott, Conakry) compared to water purchased at a standpipe (about US\$1 per cubic meter), but this difference is accepted by the clientele served because they recognize that

- the higher price pays for the cost of transport,
- because of competition, profits are low, and
- they can make more than enough money with the time saved not fetching water to pay the difference in water price.

Comparing water rates charged by independent providers with those charged by water companies also fails to take account of the fact that, if water companies were to extend their networks into the unplanned areas where low-income residents live, they would be forced to raise their rates to reflect the difficult nature of the terrain. Also, the product they would be offering would not be the same as that offered by the independent providers, who sell smaller quantities and deliver them door-to-door. This group of customers is justified in its choice of independent providers, who earn very little for the often backbreaking work they do (US\$1–4 per day on average).

Constraints Increase the Price of Water

Administrative and technical constraints intended to “protect consumers” impose additional costs on independent providers, which are passed on in the form of higher prices. Otherwise, independent providers raise their prices only when water is scarce, alternative sources are limited, or there is collusion among operators. There is a legitimate regulatory role to be played by the public sector, but the objective should be to promote competition rather than limit the number of providers.

Non-profit and Community-based Arrangements Can Lead to Hidden Costs

Projects carried out with external funding in African cities have often given responsibility for managing community services such as water delivery to non-profit groups. In cases where these groups are not successful, their mistakes have proven costly in the long run. Where they are

successful, the heavy burden of sustaining service has driven them to seek some means of remuneration, whether overtly or by creative accounting practices.

Much time and effort might have been saved in these cases by giving management responsibility to professionals from the outset and assigning supervision responsibility to representatives chosen by the community. For example, in Mali, neighborhood Users’ Associations subcontract financial auditing and technical assistance to a Water Supply Advisory Unit, which, for a fee of CFAF20 per cubic meter of water, periodically audits the accounts and prepares a financial statement. This gives the associations a source of reliable financial data and performance indicators.

Water Quality is Similar to That of Water Companies

The quality of water provided by independent providers is practically the same as that of water from the mains, where it is drawn, and is better than that of water drawn and carried home by household members in uncovered basins. The quality of water in the mains depends primarily on treatment at the source, in particular, chlorination. Good water quality depends on treatment of water as it leaves the city reservoir, and on reducing the incidence of pressure loss, which leads to contamination through aspiration or infiltration of wastewater.

The Private Sector Can Promote Public Water Services

Private sector involvement is not necessarily synonymous with anarchy nor does it keep public water companies out of the market. On the contrary, strong private sector involvement at the distribution level requires strong public sector performance at the production level, in terms of good production-level performance indicators, good long-term coordination with distributors, and ability to guarantee a stable and favorable regulatory environment.

9.3 Obstacles to Expansion

The main constraints that face independent operators are not the availability of equipment or material, lack of appropriate technology, or lack of human resources. The main constraints are

The solution is not to limit or prohibit independent provider activity in the delivery of water and sanitation services, in the name of protecting monopoly privilege or social ideals. Bringing independent providers into partnership with other actors can lead to new ideas, sources of energy, and even sources of financing. Reducing the obstacles faced by independent providers will increase their commitment to working in partnership.

institutional and legal and stem from the lack of an appropriate public policy framework. One indicator is the poor state of relations with public authorities and with commercial banks.

Lack of Communication with Authorities

The absence of any dialogue between independent providers and public authorities is strikingly consistent across all the cities and towns surveyed. The silence is due in part to the lack of professional associations to represent the independent operators, but also to a studied lack of interest on the part of the authorities. They turn a blind eye to the presence of independent providers, neglecting to designate sites for proper disposal of septic waste or to make use of independent providers' intimate knowledge of demand in siting new standpipes. For lack of any official recognition or status, independent providers are subject to pressure from some government agents who may otherwise impose fines. In addition to increasing

costs, this type of unwarranted interference increases risk and discourages investment.

The shortage of public space is a specific constraint that arises from this lack of dialogue: the absence or scarcity of approved dumping areas for sludge in most of the cities imposes extra transport and time costs on the truckers who collect sludge, which raises costs to the users. In Bamako, the lack of municipal land on which to build public latrines and showers is a major constraint to increasing supply in areas where demand is high (train stations, markets), since there is no lack of private operators ready to finance construction and handle facilities management.

Lack of Independent Regulatory Authority

Another striking aspect of the water and sanitation sector in African cities is the absence of any kind of independent regulatory agency. Experience in Europe and Latin America has shown the extent to which the role of such agencies and the degree of their independence can have a major influence on the quality of service offered, in particular to low-income households who are not the most profitable customers for city-wide water companies. The absence of such agencies in the African cities has led to wastage, as too much water is sent to some areas and not enough to others; misuse of water resources, as city-wide public interest is ignored in favor of commercial overexploitation; and inequality in access to basic water service.

The regulatory agency must be truly independent in status and in practice, since it must be able

Kampala (Uganda) City Council simultaneously encourages—and discourages—private management of public toilets

Three private operators signed contracts with the Kampala city government to provide municipal public toilets. There is a high volume of business: in the city center, an eight-toilet facility is used by 70 persons an hour, eleven hours a day. But at the same time, the expansion of toilet facilities is hindered by the high cost of repairing the existing facilities, the high cost of water delivered by the water company (US\$2 per cubic meter of water for a facility where 16 cubic meters is used per day on average), and the imposition of a monthly municipal tax of US\$1,000 after three years of operation. And then there are the frequent cuts in water provision. The owner of one of the private operators, KKM All Services Ltd., decided to rehabilitate a borehole near his facility in order to have access to water supply from a more reliable source than the city network. He bought a pickup truck fitted with a water tank to transport water from the borehole, and undertook to maintain the drains. He earns about \$15,000 a year from his business, 70 percent of whose clientele are poor households.

to balance the divergent interests of different parties, especially in the case of a conflict between public authorities and private operators. A government office is not necessarily the best candidate to perform such a function, given the long tradition of rivalry in the services and civil works arenas between public sector forced account and private service and construction entrepreneurs. Two examples come to mind from this study:

- Some public authorities make a point of testing the quality of water distributed by independent providers but rarely test water distributed in the city-wide mains.
- Some public authorities would like to put a ceiling on the price of water but have no intention of subsidizing the difference between the maximum price and the cost of providing water.

Urban Development Policy Vacuum

The capital cities of sub-Saharan African countries have been growing at annual rates of 5 to 8 percent for the last 30 years, a rate of growth that implies rapid and continual response to the growing demand for public services. But there is a consistent absence of public policy to deal with urban growth in all these countries. The municipal authorities have been starved of resources and authority to act by central governments unwilling to release real power and the fiscal resources to match. The lack of any clear strategy for extending infrastructure and developing new land—more a case of benign neglect or *laissez faire* than of any deliberate intention—has led to the mushrooming of unplanned settlements and of illegal ones on land difficult to provide with basic infrastructure (areas subject to flooding, ravines, lanes impassable to motorized vehicles). While this situation has created opportunities for independent providers, who can more easily provide water and sanitation services in such areas than can the city-wide water concessionaire, it also has raised the cost of delivering such service.

Abuse of Monopoly Power

Typical concession contracts for city-wide water operators, in Africa and elsewhere, grant long-term (30-year) monopoly rights to water resources, often prohibiting the pumping or sale of water

within the concessionaire's service area. The effect of such arrangements is to eliminate competition, and along with it, the incentive to innovate and diversify service delivery options. Having won such favorable terms, the concessionaires defend them fiercely, whether they are public or private enterprises. This competitive instinct can extend into abuse of monopoly power, as in reported cases where fontainiers report that city water company employees seek to annul their contracts at the slightest pretext in order to replace them with their own front men. The users are the ones who suffer, since they have no recourse should the concessionaire choose to set tariffs artificially high or deliver unsatisfactory service.

Financial Sector Indifference

The modern banking sector in the countries studied does not offer loans to the small individual operators and local enterprises that make up the informal sector, except for purchase of equipment, such as trucks, that can serve as collateral for the loans. Independent water and sanitation providers are therefore obliged to finance their investment through more traditional means—family savings, savings clubs (*tontines*), moneylenders, and suppliers' credits. The exceptions found in this study were two cases where loans were obtained outside the modern banking sector: SIBEAU in Cotonou received external donor financing for expanding their plant, and Sema Saniya in Bamako received a loan from an NGO. Because there is no means to share risk when using traditional financing sources, small enterprises tend to minimize their risk by investing in short-term improvements (6 to 12 months). As a result, independent water and sanitation providers tend to make a number of sequential smaller investments rather than take advantage of economies of scale.

They find the funds they need, even for fairly large investments, but they pay a high effective interest rate for capital. Moneylenders' rates can exceed 40 percent a year and suppliers charge 3 percent a month. Transaction costs for family and *tontine* funds involves reciprocity—contributions in kind equal to the amount borrowed.

The informal sector is constrained in its rate of expansion due to the lack of access to larger loans. But the financial sector is also losing out on

a large and potentially profitable market for its services because it offers no loan instruments appropriate to the urban informal sector, though this market produces 40 to 70 percent of urban GDP. Donor funding of lines of credit restricted to small and micro-enterprises has not in the past created any motivation for banks to develop a commercial strategy for the urban informal sector. The urban informal sector would be better served by measures to improve bank loan administration policies and procedures generally, and to broaden loan eligibility terms in order to respond to market demand. If independent operators' access to commercial bank credit could be expanded, the savings in the cost of credit would be passed on to their customers.

Exclusion from Public Works Contracts

Many independent entrepreneurs, including those involved in the water and sanitation sector, would like to be able to participate in bidding for civil works contracts to extend piped networks or to build pits and tanks, and for service contracts to collect sludge or clean drainage ditches. They are kept from participating by the large size of job lots, sometimes so large that they can be handled only by a few large national or international enterprises, and sometimes by backroom deals between a few large contractors and the civil servants awarding the contracts.

Lack of access to this market marginalizes the small contractors because such public contracts, especially externally financed ones, make up the lion's share of work in the sector—more than 80 percent. The lack of competition in bidding hurts not only the independent operators but also the consumers and those paying for the works, since it results in higher costs for works and services.

Unprotected Investment

Independent providers must be careful to limit their risks by undertaking only short-term investments that can be recouped in a short time, generally less than two years. They do this not out of a lack of professionalism, but deliberately and out of necessity, in order to protect their investment. For example,

- In Cotonou, most water network extensions have been made in unplanned settlement areas,

where land may be expropriated without compensation from one day to the next.

- In Bamako, sludge collection trucks are sometimes confiscated under vague pretexts and their owners can never be sure they will recover their property.
- In Kampala, the builders of two small water distribution networks on the city's edge stand to lose everything when the water company decides to move its own network into the area and sell water at its highly subsidized rates.

10. Next Steps

Independent providers are not looking for handouts or grants and often do not need loans. They do not expect technical training or social security benefits. More than anything else, independent providers are unhappy with the lack of recognition from municipal and water company officials for the value of the services they perform. What they would like most of all is a fair institutional and legal environment that would be favorable to more investment and expansion of activity on their part, in response to their clients' demand. They would also like better coordination with city authorities and water companies.

While the study results do not point to simple solutions or blueprints for success, they do suggest some dos and don'ts:

- widely applicable strategic approaches,
- promising avenues for future work, and
- «improvements» to be avoided.

10.1 Strategic Approaches to Better Service

Strengthen Legal Security

Independent providers avoid long-term investments because their property is unprotected when located, as it is for the most part, in unplanned settlements. This is a major obstacle to extension of water supply services in these settlements, where expropriation is always a possibility. Their current vulnerability to punitive fines and harassment by

the authorities increases their operating costs and raises the rates they must charge.

Official Recognition and Contractual Relationships with Civil Authorities

Independent providers interviewed for this study often complain about the lack of recognition from municipal and water company officials for the value of the services they perform. Coordination among public and private actors would clarify the points of mutual interest and the obstacles to better service delivery, such as lack of sludge dumping sites. Users would benefit from better coordination through a reduction in costs and better service coverage.

Transparency and Competition

It is in the consumers' interests for the authorities to stimulate competition and transparency, which are driving forces in ensuring responsiveness to consumer demand and in keeping prices low. The public sector has an important role to play in opening public contracting to small entrepreneurs, keeping the market open, avoiding excessive licensing requirements, and supporting good management by independent providers (for example, by facilitating financial audit as in Mali by CCAEP; see page 56).

10.2 Avenues for Future Work

Local-level Communication Among Sector Actors

Public authorities, both national and municipal, are not familiar with the work of independent providers and generally underestimate the importance of their activities. Their ignorance is particularly obvious in the sanitation sector, where most urban planning documents ignore septic waste dumping activities and the need for designated dumping areas for the suction truckers who are handling the bulk of this waste. Developing mechanisms of communication would be a low-cost way of encouraging cooperation and resolving conflicts.

Coordination of Service Among Providers

Communication among actors would facilitate coordination of their activities. The study revealed a surprising number of instances of misuse of resources (or missed opportunities for more efficient use of resources) stemming from lack of coordination.

- The 700 standpipe operators in Bamako could serve many more households if the concessionaire could supply them more reliably and at greater pressure, as is the case in Nouakchott and Ouagadougou, where standpipe sales average 20 cubic meters a day.
- During the dry season, when standpipe demand goes up because many private wells run dry, water concessionaires could easily increase coverage by sending a greater proportion of water produced to the standpipes, where the same water volume would serve a far greater number of people because per capita consumption is lower for standpipe clients (demand management).
- When there are no designated sites for septic waste dumping, suction truckers will choose their own dump sites and these are not always environmentally appropriate. But in Dakar, Kampala, and Cotonou, where proper sites have been designated, the truckers have shown that they are ready to use them as long as they are accessible year-round, even if the fees for their use are high (in Cotonou, dump site fees amount to about 20 percent of the total cost of mechanized septic cleaning).

- A similar situation exists for household garbage disposal, where problems also occur in the poor links between those who collect the garbage, often quite efficiently (economic interest groups in Bamako and Ouagadougou), and the designation of garbage dumps far too distant for these groups to reach.
- The example of SODECI's pragmatic decision to license home resellers of water indicates that concessionaires too can benefit from taking the independent providers' activities into account, by increasing their coverage and volume of business and by reducing the incidence of clandestine water taps.

Recognition and Contractualization

The first step to improving service offered by independent providers is for public authorities to recognize their role. Even if steps are also taken to ease their way into formal sector status, independent providers should not be required to leave the informal sector. A choice to remain in the informal sector does not diminish the value of a provider's services and may make better economic sense for those distributing private water in peri-urban area. Once they are recognized, independent providers could also work out contractual relations with public authorities that would make it easier for them to expand their services to match the pace of urban development.

Access to Civil Works Contracts

Many independent providers interviewed for this study complained about their exclusion from public sector civil works and urban services contracts, which constitute from 10 to 50 percent of the total volume of business in the water and sanitation sectors. For example, in Dakar, water network extensions are built exclusively by a single company that is a subsidiary of the concessionaire (an obvious conflict of interests). In Bamako the mechanical cleaning of septic wastes at government office buildings is repeatedly contracted out to the same two or three enterprises. Opening up the market to independent providers would introduce a healthy dose of competition and would require simple changes in procurement procedures:

- smaller work lots,
- simpler bidding document formats that do not

- require several days to prepare, and
- fewer penalty clauses, along with a reduction in advance payments.

Easier Access to Formal Sector Status

Most independent operators in the water and sanitation services have elected to remain in the informal sector, though they are delivering an important public service. They thus remain beyond the reach of any kind of regulation that could improve service delivery, and not pay taxes on their business income or social security charges for their employees. The authorities' usual response to this situation is fairly hostile—forcing them to register prohibiting their activities—and not difficult to circumvent by concealing their presence, working at night, or bribing petty officials. A more effective approach that would give independent providers an incentive to “turn formal” would involve

- simpler and fairer taxation, rather than the usual flat fees which encourage arbitrary administrative action and bribery,
- social security arrangements designed as self-run mutual aid fund, rather than requiring contributions to a national fund with high overhead charges,
- better legal protection for formal sector enterprises through a business court outside the national legal system, and
- ready access to commercial loans based on greater confidence on the part of the financial sector.

Study findings indicate that independent providers are not allergic to formal sector status and could find it quite advantageous if it means better relations with customers and public authorities.

Better Financial Management

Survey data collected on independent provider financial accounts during this study indicate that profit margins are very low in the water and sanitation business, yet public authorities often hold the view that their prices are too high. In order to clear the air on the subject and also to help improve financial management and pricing by these providers, financial audits by an independent agency, such as those carried out by a parapublic entity in Mali, may prove useful. The Water

A group of masons in **Ouagadougou (Burkina Faso)** has chosen to move into a new market niche by specializing in the construction of an improved latrine design proposed by an innovative program to promote household sanitation, introduced as part of the city's Strategic Sanitation Plan. The program was designed to open the market for sanitation infrastructure to individual artisans and micro-enterprises, rather than structuring it so that only large international companies could respond. Households wishing to take advantage of the program, which subsidizes 20 to 30 percent of the construction cost, must hire masons registered with the water company. In this way, participating masons have embarked on a new commercial strategy based on an innovative product.

Advisory Unit (Cellule de conseil aux adductions d'eau potable, or CCAEP) sponsored by the Water Ministry has been very successful in improving service delivery and reducing operating costs for the Water Users' Associations who choose to subscribe to the unit's services. It is Mali's first experience with a new model for management of water delivery in smaller cities and towns, involving a three-way sharing of responsibility between the Users' Associations who operate the equipment, local authorities who are expected to take over responsibility for infrastructure construction and maintenance, and outside experts who will provide management support.

Recognition of Professional Associations

In a number of cities, private operators have established a growing number of professional and trade associations through which they can address common problems and advocate common interests. These include

- Mali's Union of Water Suppliers (UEAEP-Mali)
- Côte d'Ivoire's Association of Water Resellers (AREQUAPCI- Côte d'Ivoire)
- Benin's Union of Sewerage Entities (USV-Benin)
- Ouagadougou's Association of Standpipe Managers

As long as these associations remain genuinely representative of the group, meaning that mem-

Mali's Water Advisory Unit (CCAEP)

Mali's Water Advisory Unit (Cellule de conseil aux adductions d'eau potable, or CCAEP), sponsored by the Water Ministry beginning in 1994, offers to member Water Users' Associations in Mali's towns a number of financial, management, and training services in exchange for a fee of CFAF 20 for each cubic meter of water distributed by the association. The fees, which amounted to CFAF 16,486,940 (about US\$30,000) in 1998, go towards covering the unit's operating costs.

Services offered include

- semiannual financial audits of operating accounts,
- advisory services for equipment and infrastructure maintenance and repair, ensured by daily radio contact,
- accounting and technical training for association officers, and
- regular communication among the member associations and between association officers and the unit's own governing board.

This arrangement has been very successful, resulting in a steady reduction of unit operating costs by about half over a five-year period from about US\$0.70 per cubic meter to about US\$0.30. The reduction in unit costs of about US\$ 0.30 per cubic meter amounts to about six times the unit's fee. The source of these savings has been primarily economies of scale through expansion of production, but also better management of both costs and water stocks.

CCAEP also provides the Water Ministry with a self-financing means of monitoring water operations in these towns. The unit collects data on a number of indicators, such as per capita water consumption, unit production costs (per cubic meter of water), cost of fuel per unit produced, and gross profit, allowing it to identify towns where there appear to be problems or deficits.

With the creation of local authorities planned for 1999, CCAEP's audits will form the basis of contractual relationships to be established between the users' associations and the local authorities, and between the local authorities and the Water Ministry. The audits will constitute a powerful decision-making tool for

- regulating water service and establishing fair prices for the consumer and a fair return for the operator,
- resolving any disputes between the local authorities and the water operator,
- motivating operators to improve performance to match or exceed their peers, and
- keeping consumers informed about the performance of their local water operators.

The availability of comparable data from a credibly independent agency also encourages competition and ensures transparency, a factor required to attract participation by existing independent providers in other markets where such a unit might be established.

For more information, see Lucien Angbo, *Community-based Management of Piped Water Supply Systems*, Water and Sanitation Program, 1999.

bership is open to anyone practicing the trade, they can play a key role in improving professional practices and the quality of service delivery, promoting technical innovation, and integrating private and public service systems.

Municipal authorities can support such associations by recognizing their legitimacy and negotiating with them to establish fair conditions for doing business. But they should take care not to confer any sort of exclusive status that would tend to encourage cartel-like, price-fixing business

practices. When this happens, in the context of implementation of a specific project or because of close ties to a particular political party or municipal government, the natural tendency of interest groups to seek to control their market niche quickly solidifies into a mini-monopoly. In Abidjan, the ink had not yet dried on the new by-laws of the water resellers' association (AREQUAPCI) when they began demanding the right to authorize new water resellers, in order to limit competition. In contrast, the concessionaire's policy of granting

anyone the license to resell home water works precisely because it keeps the market open.

In recognition of the risk of cartelization, municipal authorities and project managers should support the creation of professional and trade associations, deal only with those whose membership requirements are legitimate, and also be ready to work with two or more competing associations.

Professional Training

Although the notion of providing technical or business management training for independent providers seems like a good one and has been included in a number of projects, the study found few cases where they had actually benefitted from such training. For one thing, it is hard to plan the scheduling of such training given the long days put in by most providers. For another, few training staff are able to design course material that matches the needs of this group, whose experience is very different from their own. And most technical training centers and workshop schools play a limited role, afterthoughts of a formal academic system that is generally unrelated to actual labor market needs or working conditions.

On the other hand, some of the operators interviewed during this study did express interest in very specific kinds of practical training, such as how to write good contracts with the public sector, market demand analysis, preparation of loan applications, and specific technical topics. It should be possible to respond to this kind of request, possibly by hiring other operators with experience in these areas, in order to strengthen local expertise in response to specific local needs.

Restriction of Monopoly Powers

The city-wide water concessionaires have an important role to play in primary infrastructure provision where competition is not needed: dam building, large-scale water production, and laying of primary water mains. However, when it comes to distribution of water in African cities, monopoly conditions foster poor performance, with or without subsidies:

- a total lack of investment in distribution lines to areas where 30 to 60 percent of the urban population lives,

Benin's Union of Sewerage Entities: The right idea, the wrong application

The by-laws of Benin's Union of Sewerage Entities (USV-Benin) provide a good summary of the objectives of a professional association (article 2):

"to defend the material and ethical interests of its members,

"to promote the development of the profession by contributing to the formulation and strengthening of a professional code of ethics,

"to participate actively alongside public authorities in the establishment of a regulatory framework and in making the decisions that affect professional interests,

"to create, not only a place for dialog and analysis concerning the profession, but also a force for initiating new ideas and decisions, based on the association's structure and its representative nature."

Unfortunately, since its founding in 1995, USV has had exclusive rights to licensing new suction truckers, has not in fact licensed a single one since then, has fixed a single price list for mechanized septic cleaning services (that seems higher than it needs to be), and has prohibited its members from giving customers discounts.

- a lack of regularly scheduled investment to increase the system output,
- continuing to base service delivery on a single standard—metered home connection—despite its inappropriateness to most urban residents' needs.

Competition is the main force which can motivate operators to innovate and adapt service to meet water distribution market needs. As long as concessionaires allow competition to flourish, independent providers can happily co-exist with them.

10.3 "Improvements" to be avoided

Targeted Loans

Before setting up new credit facilities for the private water and sanitation sector operators, it is a good idea to check whether lack of credit is a

local constraint. In many cases, good credit mechanisms already exist.

Unproductive Constraints

The performance of independent providers depends on their ability to respond and innovate in response to market changes. It is counterproductive to impose administrative constraints on their activities, such as banning retail activity near standpipes.

Support that Encourages Monopoly Behavior

The smooth functioning of the market, especially competition between providers, is the best way to keep providers on their toes, ready to improve services and respond to demand. Market mechanisms are a powerful force in this direction, and studies in all ten capital cities have shown that such mechanisms have resulted in the selection of the fittest enterprises, capable of delivering to low-income clients a number of essential services that public authorities nor concessionaires have been unable to deliver:

- cleaning of latrine and septic pits, in all African cities and towns,
- water delivery in low-lying settlements bordering the lagoon in Cotonou,
- water delivery to the poorest families.

Their success has only been possible through a gradual process of eliminating all but the most capable and innovative providers. It is important to trust the market process and avoid the temptation to interfere. This means that any effort to support independent providers must pay special attention to the need to keep competition open and avoid favoring certain providers over others. For example, any new lines of credit that may be established should be made available to the broadest range of operators and should target service delivery rather than a specific type of enterprise. Rather than creating new instruments favoring the water and sanitation sector, it is preferable to improve existing ones and expand their availability to a wide variety of informal and formal micro- and small enterprises in all urban areas.

Better as the Enemy of Good

Many project funders (donors, NGOs, twin or sister cities) have a tendency to underestimate the

role of existing independent providers or to criticize them as charging too much, having low service standards, or operating illegally. Their vision of the ideal provider can be an obstacle in working effectively with those who are already doing the job.

Distrust of the Profit Motive

When it comes to delivering service to low-income groups, many development organizations, in particular NGOs, have a tendency to favor association or community-based entities in preference to commercial operations. This preference may make sense in other parts of the world where market forces exclude the poor, who must then organize their own communities to provide some public services. It is not appropriate in the context of African cities, where most households live in low-income areas, and where basic services such as water and sanitation have long been delivered by independent providers. An aversion to working with private enterprises has led some funders to support short-lived associations that lacked any real community roots and vanished without a trace, after having enjoyed project-related tax benefits that are hardly justified in such a dynamic market.

Unsupervised Oversight

Oversight mechanisms are sometimes proposed for the purpose of improving service quality (water quality, rates charged, hygiene practices). Experience has shown that setting up a viable and objective such mechanism is very difficult in countries where courts offer little recourse in cases of errors or abuse of power. The quality of oversight depends very much on the independence of the overseer and the presence of democratic supervision. In the absence of community scrutiny, oversight mechanisms can quickly be subverted by corruption and be used to support monopolistic behavior by a few enterprises.

11. Conclusion

In the context of the burgeoning growth of Africa's cities, neither state monopolies, their privatized successors, the concessionaires, nor non-profit or community-based organizations has been able to keep up with the pace of rising demand for water and sanitation services in the low-income urban areas. Fewer than 30 percent of households in Bamako, Cotonou and Dar es Salaam have access to piped drinking water. Piped sewerage is but a far-distant dream for 90 percent of urban Africans. Yet governments have generally continued to give priority to the tried and true, standard issue solution: a city-wide piped network run by a single, monopolistic operator.

But this monolithic solution does not match the wide variation in demand for these services by a wide variety of households, living in very different environments and using different amounts of water that vary by the time of day and from season to season. Even the most experienced international water corporations have had to admit how hard it is to find a way to get water to poor urban households, most of whom live in unplanned or poorly planned subdivisions, often located at the city's edge, on difficult terrain (steep hillsides and valleys) and in undeveloped infill areas. These marginal locations are very difficult to serve through the usual water distribution and drainage networks.

Independent providers respond to the needs and preferences of a clientele composed primarily of low-income families. How do they manage to

do this, for customers who are said to be too poor to pay for city water? How can they provide service coverage of areas where city water authorities and concessionaires hesitate to invest? The answer is that independent providers' services are demand-driven and they deliver them the way their clientele needs them: reliably, and in small quantities which remain affordable when family funds are tight and income irregular. The clients they serve have historically been of little interest to the large concessionaires, whose primary objective is to make a profit.

Independent providers serve many functions in the provision of water and sanitation services. Some manage one or more water points or sell individual buckets of water from door to door. Others are hired to clean out latrines and pump out septic tanks. Still others operate small piped water systems and even, in Cotonou (Benin), a sewage treatment plant.

These activities provide jobs for several thousand people in each capital city (1 to 2 percent of the labor force), from 70 to 90 percent of those employed in the water sector (compared to 10 to 30 percent who work for the concessionaires). They provide a main source of income for dozens of thousands of low-income families and generate a volume of business comparable to that of the city water companies, despite the fact they must survive in a difficult environment, are perceived as operating outside the mainstream,

and are often subject to the hostility of government authorities.

More flexible than the concessionaires, independent operators can respond more easily to rapid changes in demand linked to the growth of unplanned urban areas. They offer a wide variety of services close to where people live, allowing them to select the most convenient. They adapt to the limitations of their clients' needs and income, and communicate face-to-face with their clients about problems, for example, with water quality, rather than at a distance and through the time-consuming bureaucratic procedures of the concessionaires.

Over the last ten years, decentralization has been at the heart of political debate, and the practice of delegation of responsibility for public services has been spreading. The water and sanitation sectors have been opened to private financing, and central authorities have transferred much responsibility for water and sanitation services to local authorities. Supporting independent providers is thus perfectly in tune with current institutional and economic trends in Africa, and it does not imply a choice between city-wide entities and independent operators. The central and municipal governments' roles are rather to see that these two kinds of providers complement each other in the marketplace and that fair competition is encouraged. Given the choice, users can be trusted to judge for themselves where to take their business.

For those who choose to look beyond standard leasing or licensing formulas and who are willing to give independent providers an incentive to invest in all forms of facilities—drainage, standpipes, suction trucks, and sludge processing plants—constraints that limit the flexibility of operations need to be removed, including cumbersome administrative procedures, expropriation without compensation, punitive fines and harassment. An effort should be made to limit the extent of unfair competition from subsidized public enterprises.

This does not mean a reduction in the public sector's role, but rather a refocusing of public authorities' attention on regulatory functions that protect consumer interests, such as:

- requiring regular financial audit of independent providers' accounts and technical inspection of equipment and infrastructure;

- establishing a regulatory framework which is based on a supporting and consultative relationship between providers and local authorities responsible for water and sanitation oversight;
- creating coordination mechanisms at the municipal level, where elected local officials and community leaders can discuss and debate how basic urban services should be developed and at what standards, without unduly interfering with ongoing provision of service;
- adapting regulations to reflect conditions in the unplanned peri-urban areas;
- encourage professional development among independent operators by recognizing their associations as representative interlocutors.

Including professional organizations in the dialog would enhance their authority to negotiate with public authorities and the concessionaires. From a technical perspective, better partnerships between public and private actors would facilitate the emergence of appropriate service standards that would reflect the independent providers' experience in the day-to-day, face-to-face delivery of water and sanitation services.

Improving services available to low-income households and reducing their costs requires finding the sources of synergy inherent in the interfaces between activities that public and private actors have so far been pursuing without talking to each other. When they sit down together, in each city, to explore their options, they may wish to consider the key lessons that have emerged from this study:

1. Competition is a much better way to ensure fair rates and efficient service than administrative supervision.
2. Independent providers offer door-to-door services that are well adapted to the varied needs of households living in unplanned urban areas.
3. Official recognition and respectful treatment of independent operators can lead to new ideas, sources of energy, and even new sources of financing.
4. Mutual respect and partnership among all water and sanitation sector actors can help to bring water and sanitation issues into the broader urban development policy debate, in particular as they relate to health and environmental issues.

Table A.1. Annual operating accounts for three standpipe operators in Ouagadougou and Dakar.

	Ouagadougou	Ouagadougou	Dakar
	High-volume standpipe in Kalgoudin	High-volume standpipe in Sector 29	A privately built standpipe
Initial investment (US)	n.a.	n.a.	\$700
Number of daily clients	2,547	2,750	2,750
Volume of water sold (cubic meters/day)	49.0 m ³	52.9 m ³	5.0 m ³
Unit sales price (US\$/m³)	\$0.43	\$0.38	\$1.92
Unit cost (US\$/m³)	\$0.31	\$0.31	\$0.42
Annual gross revenue (US\$)	\$7,673	\$7,415	\$3,498
Annual expenses (US\$)	\$6,010	\$6,571	\$1,270
Purchase of water	\$5,530	\$5,956	\$770
Taxes and insurance	–	–	\$ 33
Payroll	\$372	\$315	\$300
Maintenance	\$108	\$300	\$ 27
Depreciation allowance	–	–	\$140
Annual profit (including return to owner)	\$1,663	\$844	\$2,228
Daily profit	\$4.56	\$2.31	\$6.11

Table A.2. Annual operating accounts for five water carters in Nouakchott, Bamako, Ouagadougou and Conakry.

	Nouakchott	Bamako	Ouagadougou	Conakry	Conakry
	Owner of cart & donkey	Hand cart owner	Woman hand cart owner	Cart owner w/ water connection & 1 employee	Cart renter purchasing standpipe water
Initial investment (US)	\$135	\$117	\$ 50	\$ 54	–
Number of daily clients	6	39	7	53	53
Volume of water sold (cubic meters/day)	1.4 m ³	0.8 m ³	1.4 m ³	1.1 m ³	1.1 m ³
Unit sales price (US\$/m³)	\$3.10	\$4.20	\$1.70	\$4.20	\$4.20
Unit cost (US\$/m³)	\$0.90	\$1.20	\$0.50	\$0.80	\$1.00
Annual gross revenue (US\$)	\$1,584	\$1,200	\$ 869	\$1,597	\$1,597
Annual expenses (US\$)	\$ 850	\$ 408	\$ 326	\$ 781	\$ 724
Purchase of water	\$ 460	\$ 336	\$ 256	\$ 295	\$ 399
Taxes and insurance	\$ 12	\$ 13	\$ 60	\$ 53	–
Payroll	–	–	–	\$ 300	–
Maintenance	\$333	\$ 42	–	\$ 75	\$ 75
Cart rental	–	–	–	–	\$ 250
Depreciation allowance	\$ 45	\$ 17	\$ 10	\$ 58	–
Annual profit (including return to owner)	\$ 734	\$ 793	\$ 543	\$ 815	\$ 873
Daily profit	\$2.01	\$2.17	\$1.49	\$2.23	\$2.39

Table A.3. Annual operating accounts for three water truckers in Nouakchott, Nairobi, and Kampala.

	Nouakchott	Nairobi	Kampala
Initial investment (US)	\$15,000	\$13,000	\$ 7,500
Number of daily clients	2	n.a.	n.a.
Volume of water sold (cubic meters/day)	16.0 m ³	21.3 m ³	54.8 m ³
Unit sales price (US\$/m³)	\$3.80	\$8.30	\$4.30
Unit cost (US\$/m³)	\$1.00	\$2.10	\$1.10
Annual gross revenue (US\$)	\$22,192	\$64,889	\$86,800
Annual expenses (US\$)	\$13,435	\$20,240	\$35,942
Purchase of water	\$5,840	–	\$21,600
Taxes and insurance	\$ 485	\$ 804	\$ 800
Payroll	\$2,100	\$2,796	\$2,592
Fuel and maintenance	\$3,510	\$14,040	\$ 10,200
Depreciation allowance	\$1,500	\$2,600	\$ 750
Annual profit	\$8,757	\$44,649	\$50,858
Daily profit	\$23.99	\$122.33	\$139.34

Table A.4. Annual operating accounts for six private borehole and small network operators in Ouagadougou, Bamako, Nairobi, Kampala, Conakry, and Cotonou.

	Ouaga- dougou	Bamako	Nairobi	Kampala	Conakry	Cotonou
	Borehole- fed private standpipe	3 standpipes fed by borehole; private lease	Private borehole	Tanker truck filling station (city water); private lease	AGPSP network of 9 stand- pipes (SEEG water)	Home water reseller w/ 800m of pipes
Initial investment (US)	\$17,500	(lease)	\$37,400	\$2,000	\$12,525	\$1,333
Number of daily clients	1,300	2,491	7	10	1,392	616
Volume of water sold (cubic meters/day)	25.0 m ³	49.8 m ³	56.0 m ³	50.0 m ³	27.8 m ³	12.3 m ³
Unit sales price (US\$/m³)	\$0.42	\$0.35	\$2.13	\$1.00	\$2.08	\$1.07
Unit cost ((US\$/m³)	–	–	–	\$0.50	\$0.69	\$0.57
Annual gross revenue (US\$)	\$3,802	\$6,279	\$43,435	\$18,250	\$21,165	\$4,800
Annual expenses (US\$)	\$1,915	\$ 2,873	\$ 10,180	\$10,725	\$13,648	\$3,680
Purchase of water	–	–	–	\$9,125	\$7,027	\$2,550
Taxes and insurance	–	–	–	–	–	–
Payroll	\$ 248	\$ 675	\$3,000	\$1,200	\$4,943	\$ 800
Maintenance	\$ 500	\$ 770	\$4,800	–	\$ 425	\$ 63
Depreciation or lease	\$ 1,167	\$1,428	\$ 2,380	\$ 400	\$ 1,253	\$ 267
Annual profit (including return to owner)	\$1,888	\$3,405	\$33,255	\$7,525	\$7,518	\$1,120
Daily profit	\$5.17	\$9.33	\$91.11	\$20.62	\$20.60	\$3.07

Table A.5. Annual operating accounts for two operators of public toilet facility operators in Bamako and Kampala.

	Bamako	Kampala
	Toilets and showers leased at a train station	11 toilets leased from the city (28 employees)
Initial investment (US\$)	–	\$38,000
Number of daily clients	142,005	1,147,500
Average fee per client	\$0.042	\$ 0.08
Annual gross revenue (US\$)	\$5,917	\$91,800
Annual expenses	\$2,502	\$77,480
Water, elect., fuel	\$ 558	\$6,000
Taxes and rent	\$ 137	\$16,800
Payroll	\$ 1,469	\$28,800
Maintenance	\$ 338	\$24,000
Depreciation	–	\$ 3,800
Annual profit (incl. return to owner)	\$ 3,415	\$14,320
Daily profit	\$9.36	\$39.23

Table A.6. Annual operating accounts for three manual latrine cleaners in Dakar, Bamako, and Nairobi.

	Dakar	Bamako	Nairobi
	Team of two manual cleaners	A cleaner w/ two hired hands	Small business: cart + team of 4
Initial investment (US\$)	\$ 25	\$ 19	\$ 50
Clients per year	80	60	100
Fee for cleaning household pit	\$ 25	\$ 17	\$ 8
Annual gross revenue (US\$)	\$ 2,000	\$ 1,000	\$ 800
Annual expenses (US\$)	\$ 100	\$ 372	\$ 53
Taxes, fines, ins.	\$ 33	–	–
Payroll	–	\$ 350	–
Maint. and fuel	\$ 54	–	\$ 40
Depreciation	\$ 13	\$ 22	\$ 13
Annual profit (incl. return to owner)	\$ 1,900	\$ 628	\$ 748
Daily profit	\$5.20	\$1.70	\$2.00

Table A.7. Annual operating accounts for seven suction truckers in Bamako, Ouagadougou, Dakar, Nairobi, Kampala, and Conakry.

	Bamako	Ouagadougou	Ouagadougou	Dakar	Nairobi	Kampala	Conakry
	Business w/ 4 trucks	Bus. w/ 3 trucks	Bus. w/ one truck	One trucker	Small cistern w/ tractor	Bus. w/ 8m ³ truck	Firm w/ 4 10 m ³ & 2 8m ³ trucks
Initial investment	\$60,000	\$25,000	\$8,333	\$16,667	\$20,900	\$32,750	\$94,167
Clients per year	2,667	3,494	832	2,000	1,200	576	n.a.
Fee per cleaning	\$ 25	\$25	\$25	\$30	\$60	\$60	n.a.
Annual gross revenue	\$66,667	\$87,360	\$20,800	\$60,000	\$72,000	\$34,560	\$73,170
Annual expenses	\$25,383	\$31,529	\$10,617	\$24,333	\$22,156	\$26,351	\$68,763
Taxes, fines, ins.	\$ 3,050	\$ 1,512	\$ 250	\$ 2,167	\$ 996	\$ 6,300	\$ 9,888
Payroll	\$ 4,833	\$ 4,017	\$ 1,200	\$ 6,333	\$ 3,000	\$ 4,200	\$ 15,446
Maint. and fuel	\$ 7,500	\$21,000	\$ 7,500	\$ 12,500	\$ 13,980	\$ 12,576	\$ 10,757
Deprec. + reimb.	\$10,000	\$ 5,000	\$ 1,667	\$ 3,333	\$ 4,180	\$ 3,275	\$ 32,672
Annual profit	\$41,283	\$55,831	\$10,183	\$35,667	\$49,844	\$ 8,209	\$ 4,408
Daily profit	\$113.10	\$153.00	\$27.90	\$97.70	\$136.60	\$22.50	\$12.10

