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BACKGROUND PAPER 12

AFRICA INFRASTRUCTURE COUNTRY DIAGNOSTIC

Ebbing Water, Surging Deficits: Urban Water Supply in Sub-Saharan Africa

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About AICD

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

AICD will produce a series of reports (such as this one) that provide an overview of the status of public expenditure, investment needs, and sector performance in each of the main infrastructure sectors, including energy, information and communication technologies, irrigation, transport, and water and sanitation. The World Bank will publish a summary of AICD's findings in spring 2008. The underlying data will be made available to the public through an interactive Web site allowing users to download customized data reports and perform simple simulation exercises.

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

AICD is being implemented by the World Bank on behalf of a steering committee that represents the African Union, the New Partnership for Africa's Development (NEPAD), Africa's regional economic communities, the African Development Bank, and major infrastructure donors. Financing for AICD is provided by a multi-donor trust fund to which the main contributors are the Department for International Development (United Kingdom), the Public Private Infrastructure Advisory Facility, Agence Française de Développement, and the European Commission. A group of distinguished peer reviewers from policy making and academic circles in Africa and beyond reviews all of the major outputs of the study, with a view to assuring the technical quality of the work.

This and other papers analyzing key infrastructure topics, as well as the underlying data sources described above, will be available for download from www.infrastructureafrica.org. Freestanding summaries are available in English and French.

Inquiries concerning the availability of datasets should be directed to vfoster@worldbank.org.

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Abbreviations and acronyms

AAGR	annual average growth rate
ACC	annualized change in coverage
ADAMA	Nazareth Water Company, Ethiopia
ADeM	Aguas de Mocambique
AICD	Africa Infrastructure Country Diagnostic
AWSA	Addis Ababa Water Services Authority, Ethiopia
BWB	Blantyre Water Board, Malawi
CRWB	Central Region Water Board, Malawi
CSO	country status overview
DAWASCO	Dar es Salaam Water and Sewerage Company, Tanzania
DHS	demographic and health survey
DUWS	Dodoma Urban Water and Sewerage Authority, Tanzania
ERM	Environmental Resources Management
GWCL	Ghana Water Company Limited
IBNET	International Benchmarking Network
ICA	investment climate assessment
JIRAMA	Jiro sy Rano Malagasy
JMP	Joint Monitoring Program
KIWASCO	Kisumu Water Company, Kenya
LIC	low-income country
LWB	Lilongwe Water Board, Malawi
LWSC	Lusaka Water and Sewerage Company, Zambia
M&E	monitoring and evaluation
MDG	Millennium Development Goal
MIC	middle-income country
MICS	Multiple Indicator Cluster Surveys
MWSA	Mwanza Water And Sewerage Authority, Tanzania
MWSC	Mombasa Water and Sewerage Company, Kenya
NEPAD	New Partnership for African Development
NRW	nonrevenue water
NWASCO	Nairobi Water and Sanitation Company, Kenya
NWSC	National Water and Sewerage Company, Uganda
NWSC	Nkana Water and Sewerage Company, Zambia
O&M	operations and maintenance
ODA	overseas development assistance
OECD	Organisation for Economic Co-operation and Development
ONAS	Office National de l'Assainissement du Senegal
ONEA	Office Nationale des Eaux et d'Assainissement
PPI	private participation in infrastructure
PPIAF	Public-Private Infrastructure Advisory Facility
PRSC	poverty reduction support credit
PwC	PricewaterhouseCoopers–Africa
QFD	quasifiscal deficit

REGIDESO	Régie De Production Et De Distribution D'eau
SDE	Senegalaise Des Eaux
SEEN	Société de Exploitation des Eaux du Niger
SNEC	Société National des Eaux du Cameroon
SODECI	Société De Distribution D'eau De Côte D'ivoire
SOE	state-owned enterprise
SONEB	Société Nationale des Eaux du Benin
SPEN	Société de Patrimoine des Eaux du Niger
SSSP	small-scale service provider
STEE	Société Tchadienne D'eau Et D'électricité
SWB	State Water Board
UNICEF	United Nations Children's Fund
WASA	Water and Sanitation Authority, Lesotho
WDI	World Development Indicators
WHO	World Health Organization
WSP	Water And Sanitation Program
WSS	water supply and sanitation

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Summary

With only 56 percent of the population enjoying access to safe water, Sub-Saharan Africa lags behind other regions in terms of access to improved water sources. Based on present trends, it appears that the region is unlikely to meet the target of 75 percent access to improved water by 2015, as specified in the Millennium Development Goals. The welfare implications of safe water cannot be overstated. The estimated health and time-saving benefits of meeting the MDG goal are as much as $3.5 billion, or about 11 times as high as the associated costs.

Monitoring the progress of infrastructure sectors such as water supply has been a significant by-product of the MDGs, and serious attention and funding have been devoted in recent years to developing systems for monitoring and evaluating in developing countries. Thanks to the efforts of the WHO-UNICEF Joint Monitoring Program (JMP) on water supply and sanitation (WSS), access trends are now comparatively well understood. However, there is still relatively little understanding of how African water utilities actually *perform*, and the state of the reform process in the sector. This study draws on a new WSS database compiled as part of the Africa Infrastructure Country Diagnostic. The database collects primary data on institutional development and sector performance in 50 utilities across 23 countries in Sub-Saharan Africa. We use it here to present a snapshot of the current situation.

Declining coverage of utility water

Piped water reaches more urban Africans than any other form of water supply—but not as large a share as it did in the early 1990s. The most recent available data for 32 countries in the AICD DHS/MICS database[1] suggests that some 39 percent of the urban population of Sub-Saharan Africa is connected to a piped network, compared with 50 percent in the early 1990s (table A). Public standposts, also supplied by utilities, are the second most widely used source, serving 24 percent of the population. Analysis suggests that the majority of those who lack access to utility water, live too far away from the distribution network, although some fail to connect even when they live close by.

Table A The evolution of urban water supply sources in Africa

Percentage of urban population accessing various water sources

	Piped water	Standposts	Wells/boreholes	Surface water	Vendors
1990-–95	50	29	20	6	3
1996–2000	43	25	21	5	2
2001–05	39	24	24	7	4

Source: Banerjee et al (2008).

Most city dwellers who do not obtain their water from a utility get it from wells and boreholes, which are the primary source of water for 24 percent of Africa's urban population. In some countries, such as Chad, Mali, Nigeria, and Sudan, wells and boreholes constitute the principal source of urban water

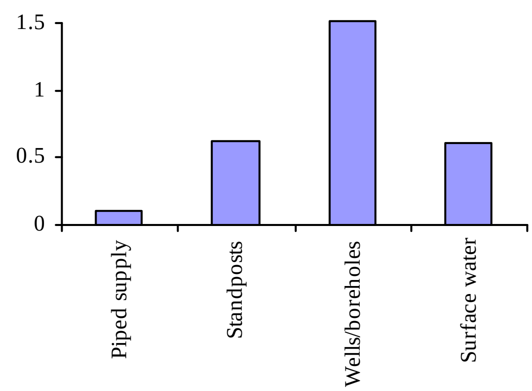
[1] This database, which includes surveys from 1990 to 2006, incorporates 32 countries, of which 24 have more than two time points, allowing analysis of trends. The 32 countries overlap broadly with the 24 focus countries of the Africa Infrastructure Country Diagnostic.

supply. Only about 7 percent of urban residents rely for drinking water on lakes, ponds, springs, or other forms of surface water. Vendors currently serve about 4 percent of the urban market, but the percentage is much higher in some countries, including Mauritania (32 percent), Niger (21 percent), Chad (16 percent), and Nigeria (10 percent).

Why has piped water coverage declined in urban Africa? Rapid population growth and rampant urbanization have put enormous pressure on utilities. Most of the population growth has occurred in unpiped peri-urban slum neighborhoods, and utilities have not been able to extend their networks fast enough.

The decline in the share of urban residents with access to improved water sources is primarily made up by the rise in coverage of wells and boreholes and by slight increases in surface water and vendor coverage in urban areas. Each year, the share of the urban population that gets its water through wells and boreholes rises by 1.5 percent, compared to 0.6 percent for public standposts and a mere 0.1 percent for piped water (figure A). Alarmingly, an additional 0.6 percent of the urban population turns each year to surface water.

Figure A: Annualized change in coverage (%)



The situation is not all grim. Some countries are making remarkable progress in expanding the coverage of piped-water systems. Ethiopia stands out as having the largest average annual gain in piped-water coverage, adding almost 5 percent of its population each year, immediately followed by Côte d'Ivoire (table B). In the case of public standposts, Uganda stands out as achieving the fastest expansion, followed closely by Burkina Faso. Nigeria has experienced by far the most rapid expansion in wells and boreholes, which reach an additional 4 percent of its population each year, even as coverage of piped water and standposts declines. Uganda and Ethiopia stand out as the countries that have been most successful in curtailing reliance on surface water in urban areas.

Table B Annual increases in access of urban residents to various water sources, 1995–2005

Percent

Piped water		Public standposts		Wells/boreholes		Surface water	
Ethiopia	4.77	Uganda	4.67	Nigeria	3.99	Uganda	–1.98
Côte d'Ivoire	3.81	Burkina Faso	4.00	Malawi	3.10	Ethiopia	–1.08
Benin	3.58	Tanzania	3.91	Rwanda	3.03	Lesotho	–0.66
Burkina Faso	3.40	Rwanda	3.67	Ghana	2.65	Madagascar	–0.41
Mali	3.00	Malawi	3.01	Mozambique	2.31	Ghana	–0.21

Source: AICD DHS/MICS Survey Database, 2007.

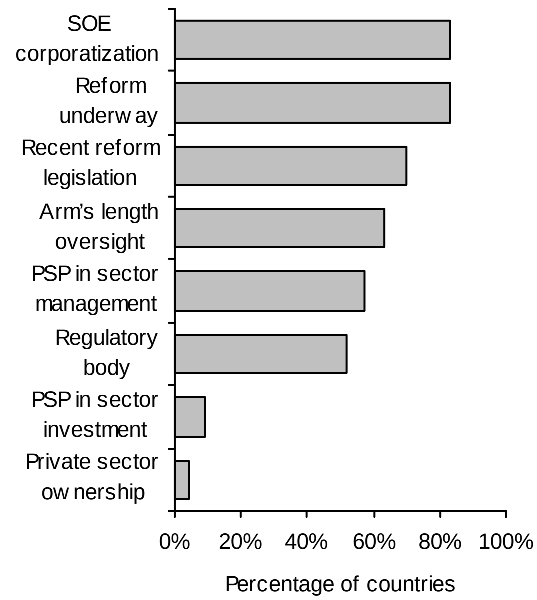
Directions of reform

Water-sector institutions follow no consistent pattern in Sub-Saharan Africa. One important dichotomy is with respect to decentralization, with about one-third of countries (primarily francophone) retaining a single national water utility, and the remaining two-thirds (primarily anglophone) having undergone some process of decentralization to local jurisdictions. Where service is centralized, a significant minority has chosen to combine power and water services into a single national multi-utility.

Widespread urban water sector reforms were carried out in the 1990s, with the aim of creating commercially oriented utilities and bringing the sector under formal regulation. One goal of the reforms was to attract private participation (investment and management) in the sector. Around 80 percent of the countries surveyed have initiated a major sector reform, in most cases underpinned by major new sector legislation. Corporatization is by far the most widely adopted reform measure (figure B). In about half of cases, some degree of private sector participation has been adopted, but only 10 percent of countries achieved private sector investment in the sector and even then only at a very low level. Almost half of the private sector experiences in water concern multi-utilities that provide both power and water services. Private sector contracts for water services have a relatively high failure rate of 25 percent overall, rising to 50 percent for lease and concession contracts.

Figure B Key measures in reform of the urban water supply sector in the 1990s

Percentage of countries having taken each measure



Source: AICD WSS Survey Database 2007.

SOE = state-owned enterprise; PSP = private sector participation.

Around half of the countries established regulatory bodies for the sector during the last decade. However, many of the francophone countries developed quite advanced regulatory frameworks without having recourse to an agency. The nascent regulators face the challenge of gaining stature, establishing a track record of sound decision-making, and acquiring competent staff. Around half of the countries have made reasonable progress in improving transparency of regulatory decisions based on the adoption of well-defined technical tools for regulation, while also achieving some degree of accountability (figure C). Nevertheless, very few countries—even among those that have established regulatory agencies—can claim to have achieved any degree of autonomy in regulatory decision making.

The limited success of private sector participation has led to a renewed focus on strengthening the corporate governance of public utilities. The prevalence of good governance practices remains relatively low, with little more than half of the utilities having some formal performance monitoring framework (such as a performance contract), a reasonably autonomous board of directors (including at least one independent member), and some level of managerial freedom in hiring and firing decisions (figure D). Water utilities make relatively limited use of outsourcing.

Figure C Prevalence of good regulatory practice

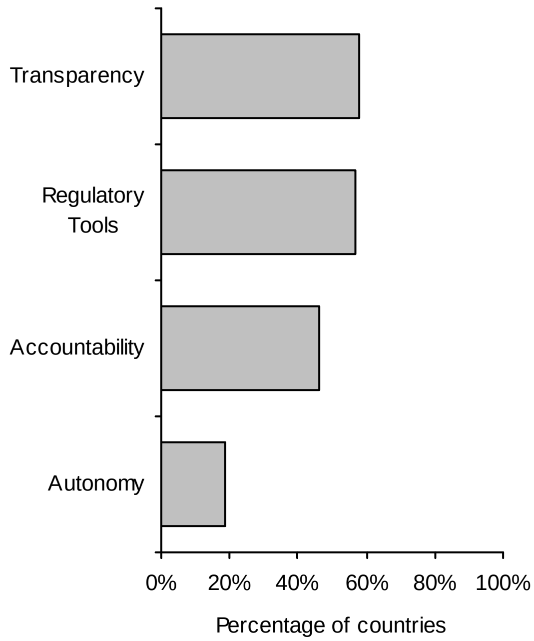
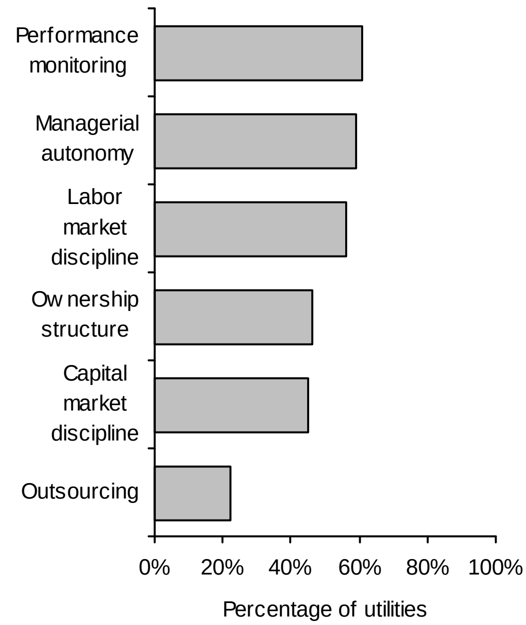


Figure D Prevalence of good governance of state-owned enterprises



Source: AICD WSS Survey Database 2007.

Room for improvement

Table C Utility performance by country typology

	Water consumption	Employees per 1,000 water connections	Nonrevenue water	Collection ratio	Operating cost coverage
Unit	liters pc pd	#/1000 conn	%	%	Ratio
Low income, aid-dependent	72	8	32	74	1.1
Low income. resource-rich	169	14	41		0.9
Middle income	201	3	27	72	0.8
Scarce water resources	168	6	30	70	1.0
Abundant water resources	76	7	33	87	0.9
Small utility	97	14	36	65	1.0
Large utility	164	5	29	75	1.0
Overall average	155	6	30	73	1.0

The performance of water utilities in the sample countries is generally low. Water that is supplied but that cannot be billed (known as nonrevenue water) averages around 30 percent (table C), compared to a good-practice benchmark of 23 percent for developing countries. Labor productivity averages just over six employees per thousand connections, compared to a good-practice benchmark of five for developing countries. On average utilities just cover their operating costs, with an operating-cost-coverage ratio of

1.0, compared to a good practice benchmark of 1.3 for developing countries. Collection efficiency is estimated at just over 70 percent.

Water consumption in the region is relatively modest, at just over 150 liters per capita per day. No clear relationship is found between metering ratios, water pricing, and water consumption. Neither do higher rates of metering seem to contribute to lowering nonrevenue water, suggesting the importance of losses for nontechnical reasons (such as theft). Overall, there is no evidence to suggest that utilities are making effective use of demand management tools, although neither can current levels of popular water consumption be regarded as wasteful.

Across the surveyed countries one finds systematic differences in utility performance according to the macroeconomic and hydrologic characteristics of the country. Utilities in middle-income countries perform substantially better on just about every measure, except for operating-cost coverage, where they are handicapped by relatively high operating costs. Within the low-income bracket, utilities in aid-dependent countries perform substantially better than those in resource-rich countries, suggesting that the former achieve greater discipline in the use of financial resources. Utilities in countries where water resources are scarce provide much higher levels of water to their customers, who probably have little alternative to utility water. Probably for the same reason, collection efficiency is much more lax in these cases. There is also a marked tendency for large utilities to perform better than smaller ones. The largest difference, however, is to be found in labor productivity, where large utilities outperform the small by a factor of three to one.

Do utilities in countries that have undertaken institutional reforms perform systematically better than those that have not? There is evidence that countries undertaking standard reforms—such as corporatization of state-owned enterprises, creation of regulatory bodies, private participation, and decentralization—achieve substantially higher collection ratios than those that do not (table D). They also perform somewhat better in recovering operating costs. However, when it comes to nonrevenue water and labor productivity, one finds no such pattern. If anything, countries that have undertaken institutional reforms do worse on these indicators. Overall, therefore, the evidence is mixed.

Table D Utility performance by institutional category

	Employees per 1,000 water connections	Non-revenue water	Collection ratio	Operating cost coverage
unit	#/1000 conn	%	%	ratio
SOE corporatization	12	33	51	0.8
Not corporatized	8	28	37	0.6
Existence of a regulatory body	13	40	69	0.9
No regulatory body	10	25	29	0.7
Private participation	11	35	52	0.8
No private participation	12	29	42	0.8
Decentralized	10	35	58	0.8
Centralized	15	28	30	0.6
Overall average	6	30	73	1.0

The economic burden of inefficient utilities

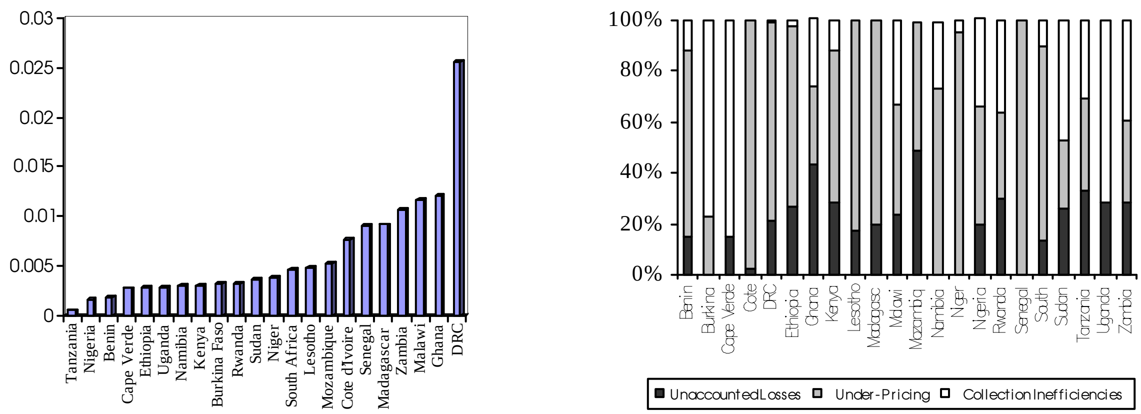
Underpricing of water by utilities, and their operating inefficiencies, place a significant burden on the economy. They also distort the incentives open to utilities and consumers, leading to overconsumption and waste of scarce resources. These practices can be measured as a quasi-fiscal deficit (QFD), or hidden cost, that adversely affects optimal resource allocation and financial sustainability in the sector. The notion compares the amount of nonrevenue water, the degree of underpricing, and the rate of collection of the utility with an ideally functioning utility in the African context, and calculates the associated loss in revenue.

Together, the average QFD or of the utilities in the countries studied amounts to fully 0.6 percent of GDP—a startlingly high amount. The worst offenders are Democratic Republic of Congo, Ghana, Malawi, and Zambia, where more than 1 percent of GDP is drained off by underpricing and technical inefficiencies (figure E1). Underpricing accounts for almost 55 percent of the total accumulated QFD figure E2), an indication that water tariffs are set well below full cost recovery. Technical and collection inefficiencies make up the rest of the deficit. Overall, utilities are recovering only about a third of the revenues owed to them.

Figure E Volume and composition of quasi-fiscal deficits, 2005–06

1. Share of GDP

2. Composition



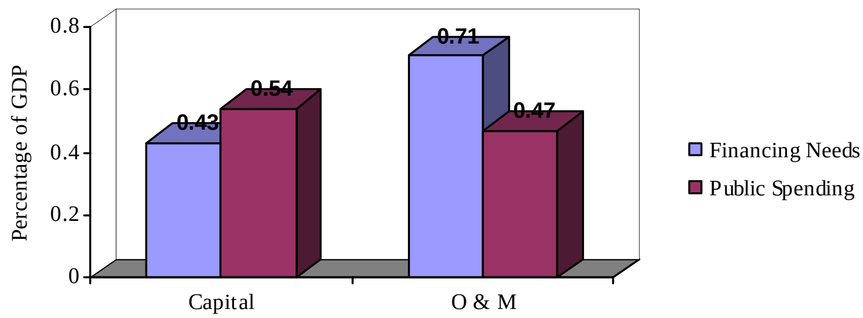
Source: Briceno-Garmendia, 2008.

Note: All the utilities in countries with decentralized multi-utility structure are not represented here, so it is an underestimation for countries such as Nigeria, Sudan, South Africa, Tanzania, and Zambia.

Average tariffs for water in Sub-Saharan Africa are already comparatively high by global standards. At around US$0.60 per cubic meter, the average is just about enough to cover the region's relatively high operating costs. However, it is estimated that to reach full capital cost recovery and thereby address the underpricing problem identified above, tariffs would need to approach US$1 per cubic meter. Given the modesty of household budgets, such tariffs would be manifestly unaffordable to the vast majority of the population in all but a handful of the middle-income and better-off low-income countries.

A modest financing gap

Figure F Gap between financing needs and available resources in the urban water sector



Source: Briceno-Garmendia and Smits (2008), Mehta et al. (2005).

The annual cost of achieving the Millennium Development Goal for access to improved water is estimated at 1.3 percent of GDP—0.43 percent of GDP for capital investment and 0.71 percent for operations and maintenance (figure F). These estimates assume a basic level of service and make minimal allowance for rehabilitation requirements. In that sense, they should be considered a lower bound..

Comparing investment requirements to historic public investment in the water sector suggests that, in the aggregate, there is no major shortfall with respect to capital spending. This means that the current resource envelope has the potential to meet investment requirements if appropriately allocated and efficiently spent. With regard to operations and maintenance expenditure, however, there does appear to be a significant shortfall, on the order of 0.2 percent of GDP, or about US$1 billion per year. The size of the financing gap for operations and maintenance is broadly equivalent to the magnitude of the hidden costs of utility inefficiencies in collection and distribution described above.

Different paths to success

It is hard to generalize about the water sector in Sub-Saharan Africa. Different countries have adopted a wide array of institutional models and are at varying stages on the path to reform. Judged against the ultimate goal of accelerating access to the MDGs, seven countries stand out as moving more than 3 percent of their population each year closer to this target (table E).

Table E Making sense of strong performance on access

	Outcomes	Efficiency		Spending		Institutions		
Country	Annual change in coverage (%)	Utility efficiency	Utility cost recovery	Annual expenditure per capita	Annual ODA per capita	Regulation score	Reform score	Governance score
Burkina Faso	7.40	low	high		high	high	low	high
Uganda	5.51	low	high	low	low	high	high	low
Ethiopia	4.50	low	low	low	low	low	low	low
Benin	4.38	high	high	high	high	low	low	high
Chad	3.63			low	high	low	low	low
Côte d'Ivoire	3.30	high	low	low	low	low	high	high
Rwanda	3.01	low	high	low	low	low	low	low

But contrary to what might be expected, none of these countries performs systematically well, either on efficiency of utilities, allocation of public spending, or quality of institutional reforms. In most cases several, though by no means all, of these factors are present; and the factors present differ from case to case. The case of Ethiopia, in particular, stands out because a major expansion in access has taken place in spite of inefficient utilities, low spending, and little institutional reform. Clearly, there are different paths to success in the water sector. The important thing is that some countries are managing to find them.

1 The challenge of the MDGs

The international adoption of the Millennium Development Goals (MDGs) created a new framework for focusing local and international development efforts on the indicators that are most meaningful for economic development, either directly or through an add-on effect. To focus their attention on achieving the MDGs, countries require a range of new and improved tools including (a) reliable benchmark data against which to measure MDG progress; (b) policies and programs to enhance, reinforce, and sustain development activities; (c) sustainable institutional and sector structures that are both strong enough to inspire confidence and flexible enough to adapt to changing environments; and (d) investments appropriately focused on overcoming constraints to MDG achievement. With a target date of 2015, MDG no. 7 calls for ensuring environmental sustainability and—core to this analysis—reducing the number of people without sustainable access to safe drinking water by half.

How far are African countries from achieving the MDGs?

With only 56 percent of the population enjoying access to safe drinking water, Sub-Saharan Africa lags behind other regions, and is falling even further behind as the population becomes increasingly urban and places a greater strain on existing service providers (table 1.1). While the rest of the world is on track to achieve the water MDG, in Sub-Saharan Africa the number of people without access to water increased by 23 percent between 1990 and 2004 (Joint Monitoring Program, JMP, 2006).

Table 1.1 Africa is lagging behind . . .

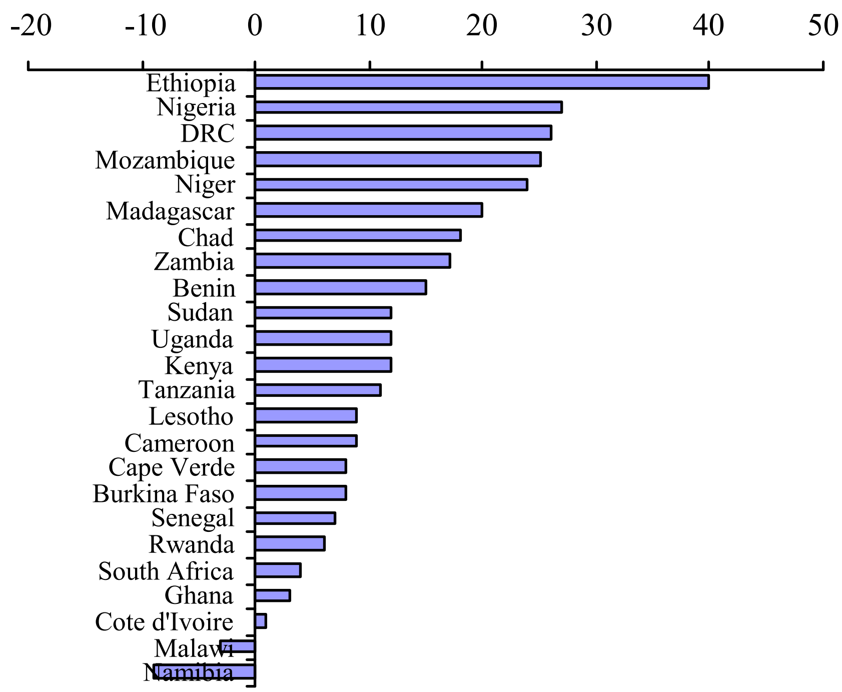
Region	Improved water source (% of population with access) 2004	MDG target 2015	Population growth (annual %) 2005	Urbanization growth (annual %) 2005
East Asia and Pacifiic	78.54	86	0.82	3.1
Europe and Central Asia	91.91	96	0.08	0.2
Latin America and Caribbean	90.98	92	1.35	1.9
South Asia	84.41	86	1.66	2.6
Sub-Saharan Africa	**56.24**	**75**	**2.15**	**3.6**
Middle East and North Africa	89.49	95	2.00	2.5

Source: World Development Indicators (WDI), JMP 2006.

Notes: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin American and the Caribbean; SA = South Asia; SSA = Sub-Saharan Africa; MENA = Middle East and North Africa.

Of the 24 countries included in the Africa Infrastructure Country Diagnostic (AICD), some are closer to meeting their MDG targets than others. At one end are Ethiopia, Nigeria, and the Democratic Republic of Congo, which are the furthest behind; at the other are Namibia and Malawi, which have already met their MDG targets. If the former are to have any chance of meeting their MDG targets, significant efforts are required to attract financing, improve utility performance, ensure better sector coordination, and implement sector reforms.

Figure 1.1 The MDG gap*



Source: www.childinfo.org.
Note: * MDG gap = difference between the Millennium Development Goals 2015 target, and 2004 rates of access to improved water.

A significant by-product of the MDGs is greater monitoring of services such as water supply and sanitation (WSS). An example is the institutional attempt to monitor progress toward the MDGs by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), who sponsored a Joint Monitoring Program (JMP) on WSS that systematically tracks access to improved WSS and is considered the official data source. The data are collected from two main sources: (a) assessment questionnaires sent to UNICEF field representatives and (b) household survey data. The methodology for estimating improved water and sanitation access by JMP often includes adopting special rules when the exact disaggregation is not available in the survey. For instance, the categorization of wells and boreholes is unclear, because protected ones fall under "improved," and unprotected ones are considered "unimproved." Such disaggregation is usually not available in household surveys, so JMP uses an estimate of 50 percent to delineate protected and unprotected wells/boreholes. Another rule is that, in high-income desert states, tanker or vendor water is considered "improved"; otherwise, vendor water is reported as "unimproved." In the AICD analysis, we have not adopted any special rule, and estimate coverage using only the information available in the survey. Therefore, the JMP data are presented as a point of reference but should not be assumed to be the same as AICD's.

The lack of reliable and comprehensive data on water services, on both national and regional levels, means that there is limited understanding of the contributing factors to successful performance within the sector—a shaky platform upon which to build reform and investment. Often, even the well-performing service providers are unrecognized outside their immediate environments, and lessons learned are not widely shared. Without such information, or the local capacity to monitor and evaluate improvements, the donor community and client governments do not have the baseline data needed to structure and prioritize infrastructure finance.

Table 1.2 Definition of access to or coverage of improved water

Primary source of water supply	JMP category	AICD category
Piped water into dwelling or yard	Improved	Improved
Public tap or communal standpipe, standposts or kiosks	Improved	Improved
Wells or boreholes, hand pumps, or rainwater	Improved/unimproved	Unimproved
Surface water (for example, lake, river, pond, dam, spring)	Unimproved	Unimproved
Vendors or tanker trucks	Unimproved	Unimproved
Others (for example, bottled water)	Unimproved	Unimproved
Access to improved water (%)		
Total	56	29
Rural	42	14
Urban	80	63

Source: Banerjee and others 2008a.

Therefore, significant attention and funding has been devoted in recent years to develop monitoring and evaluation (M&E) systems in all the countries. In spite of these efforts, the data constraints are great, and many factors undermine the ability to gather comprehensive data. First are the inherent complexities of the sector, such as varied sources of improved water and people's use of both primary and secondary water sources to meet their needs; the debatable number of people actually accessing improved sources such as standposts; household surveys' general failure to disaggregate sources of primary water supply that can easily align with improved sources; and recent decentralization trends that have increased the number of service providers and made data collection challenging at local government levels. Second, water service providers have historically been public agencies or government-owned enterprises, reflecting the enduring perception that water is a public good and its provision a public service. As such, water providers may not have the governance or regulatory structure that mandates the production of performance indicators or the external monitoring of performance against specified performance targets. Third, water providers may not be commercially oriented to the extent that billings, revenue, and expenditures are reported and analyzed on a regular basis. Rather, the provider may still operate within an environment where water is provided to consumers at concessional rates and where water-related operations and investments are subsidized, making the true financial profile of the provider more difficult to discern. Fourth, governments and regulators often lack the capacity and the mechanisms to collect—on an ongoing and systematic basis—the data required to develop a holistic picture of the sector.

The AICD analysis of the urban water sector

All these data challenges are manifested in Sub-Saharan Africa and potentially exacerbated by the relatively limited history of water reform and MDG-related M&E efforts, as well as by the broader context of weak institutional capacity. Despite decades of concern for the status of Africa's water and sanitation infrastructure, there is no central and integrated repository of information on sector performance, structure, governance, and regulation. A limited effort has been made under the auspices of the AICD to collect sector organization and performance information. This is collected in the AICD WSS Survey Database, 2007, referred to throughout this report.

This paper reflects the results of initial data collection and analysis for 24 Sub-Saharan Africa countries,[2] including data on 50 water utilities that operate in the urban water space. It further examines possible links between sector and service provider characteristics and WSS performance, highlighting implications for future reform and investment initiatives.

In each country, the intent was to collect data on the services of formal urban service providers as well as information related to other aspects of WSS services. One immediate question that may arise from the analysis presented in the rest of the report is how representative the utilities are—in other words, whether country inferences can be drawn based on the utilities surveyed for this study. This concern is mainly pertinent in countries with multiple utilities, such as Ethiopia, South Africa, Tanzania, and Nigeria. A very rough estimate of (a) the proportion of connections originating from each utility surveyed in this study to (b) the total urban household connections in the country served by that utility can be computed integrating data from the AICD DHS/MICS Survey Database, 2007,[3] and the AICD WSS Survey Database, 2007. From the former, the total urban household connections can be obtained using the urban coverage figure of the latest available year, urban population, and household size. The average representation is 65 percent; the lowest, 22 percent, is in Ethiopia. Representation is high because the largest utilities—those that contribute to the bulk of residential connections—were chosen for each country.

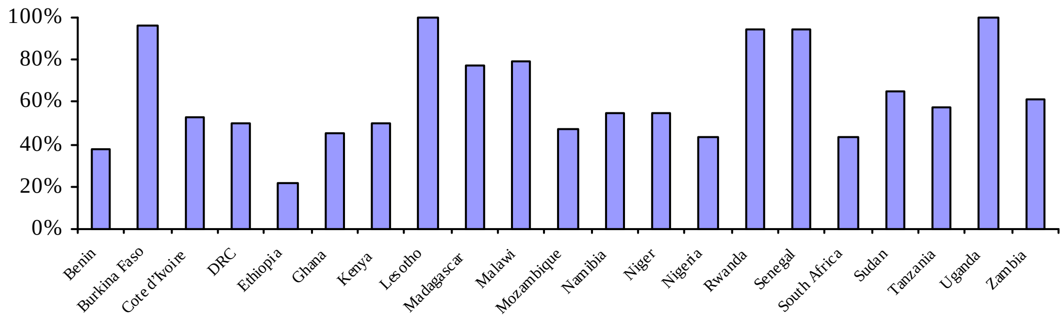
Eleven of the countries examined had a single national water provider. Data were not collected on bulk suppliers or asset holders without a role in distribution. In this report, the term *utility* includes the range of service providers examined, including municipal departments, corporate entities, and private contractors.

Utilities are functioning in service areas of varying sizes. They can operate in a service area of only about 30,000 people, as in Oshakati in Namibia, or 18 million residents, as in the Democratic Republic of Congo and Ghana. In terms of operating within the urban environment, Lagos is furthest ahead, operating in an area that holds about 15 million people.

[2] Benin, Burkina Faso, Cameroun, Cape Verde, Chad, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania, Uganda, and Zambia. Data on Cameroon was not available during the timeframe of this report and will be included in the Phase II of the AICD data-collection project.

[3]AICD Demographic and Health Surveys/Multi Indicator Cluster Surveys Database. This database, which includes a universe of DHS (and MICS) surveys in Africa from 1990 to 2006, incorporates 32 countries, 24 with more than 2 time points, allowing analysis of trends over time. These 32 countries broadly overlap with the 24 AICD focus countries. The surveys are presented in detail in Annex 1.1

Figure 1.2 Percentage of total urban household connections covered by water utilities studied under the AICD WSS survey database



Source: AICD WSS Survey Database 2007.

Table 1.3 List of utilities included in the AICD WSS survey database

No.	Country	Utility	Population in service area	Coverage of service area
1	Benin	SONEB	2,900,000	National
2	Burkina Faso	ONEA	2,779,875	National
3	Cameroon	SNEC	n.a.	National
4	Cape Verde	ELECTRA	231,882	National
5	Chad	STEE	n.a.	National
6	Côte d'Ivoire	SODECI	8,892,850	National
7	Congo, Dem. Rep.	REGIDESO	18,000,000	National
8	Ethiopia	ADAMA	218,111	Urban
9	Ethiopia	AWSA	2,887,000	Urban
10	Ethiopia	DIRE DAWA	284,000	Urban
11	Ghana	GWC	17,199,942	National
12	Kenya	KIWASCO	465,613	Urban
13	Kenya	MWSC	826,000	Urban
14	Kenya	NWASCO	2,496,000	Urban
15	Lesotho	WASA	540,500	National
16	Madagascar	JIRAMA	4,885,250	National
17	Malawi	BWB	833,418	Urban
18	Malawi	CRWB	288,705	Urban
19	Malawi	LWB	634,447	Urban
20	Mozambique	AdeM Beira	580,258	Urban
21	Mozambique	AdeM Maputo	1,778,629	Urban
22	Mozambique	AdeM Nampula	385,809	Urban
23	Mozambique	AdeM Pemba	131,980	Urban
24	Mozambique	AdeM Quilimane	288,887	Urban
25	Namibia	Oshakati Municipality	31,432	Urban
26	Namibia	Walvis Bay Municipality	54,025	Urban

No.	Country	Utility	Population in service area	Coverage of service area
27	Namibia	Windhoek Municipality	300,000	Urban
28	Niger	SEEN / SPEN	2,240,689	National
29	Nigeria	Borno	n.a.	Urban
30	Nigeria	FCT	6,000,000	Urban
31	Nigeria	Kaduna	3,126,000	Urban
32	Nigeria	Katsina	2,845,920	Urban
33	Nigeria	Lagos	15,367,417	Urban
34	Nigeria	Plateau	1,334,000	Urban
35	Rwanda	ELECTROGAZ	2,010,000	National
36	Senegal	SDE / ONAS	7,808,142	National
37	South Africa	Cape Town Metro*	3,241,000	Urban
38	South Africa	Drakenstein Municipality*	213,900	Urban
39	South Africa	Ethekwini* (Durban)	3,375,000	Urban
40	South Africa	Johannesburg*	3,753,900	Urban
41	Sudan	Khartoum Water Corporation	7,602,000	Urban
42	Sudan	South Darfur Corporation	2,051,000	Urban
43	Sudan	Upper Nile Water Corporation	250,000	Urban
44	Tanzania	DAWASCO	n.a.	Urban
45	Tanzania	DUWS	279,000	Urban
46	Tanzania	MWSA	458,493	Urban
47	Uganda	NWSC	2,284,000	National
48	Zambia	LWSC	1,564,986	Urban
49	Zambia	NWSC	990,806	Urban
50	Zambia	SWSC	294,000	Urban

Source: AICD WSS Survey Database 2007.
Note: n.a. = not available.

To give a sense of the extent of the market covered by the utilities surveyed, figure 1.3a shows the percentage of the population served through either direct or shared connections in their service areas. A number of utilities, particularly in Namibia and South Africa, manage to serve all or a majority of the residents in their service areas. At the other end of the spectrum are utilities in Tanzania, Mozambique, and Rwanda, which serve a minuscule portion of the population in their service areas. The absolute size of the consumer group varies widely as well (figure 1.3b). The South African service providers—in Johannesburg, Cape Town, and eThekwani—serve about 1 million residential and nonresidential consumers each. At the other end are utilities in Mozambique—such as Pemba, Nampula, Quilimane, and Beira—and Oshakati municipality in Namibia, which serve about 5,000 consumers each. In fact, the ratio of the consumer base of Johannesburg to Quilimane is about 400 to 1. This has significant implications for economies of scale and efficiency because small utilities, which serve only a handful of consumers, operate at a high cost when compared with large utilities.

Figure 1.3a Percentage of total population in service area covered by water utilities

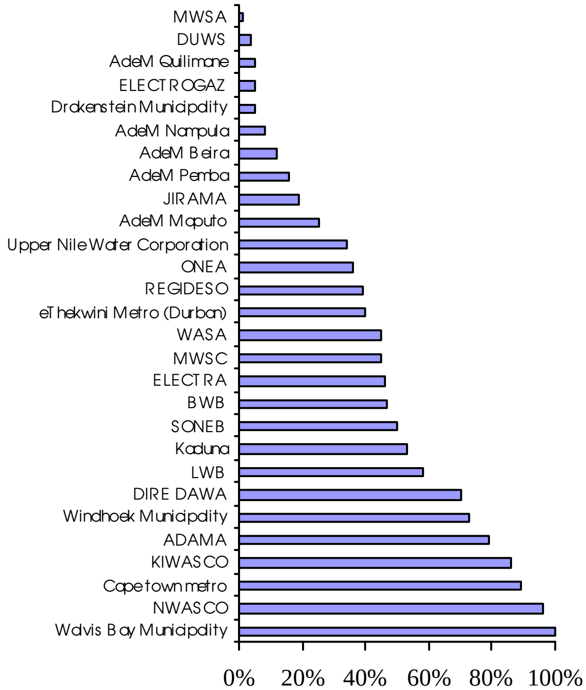
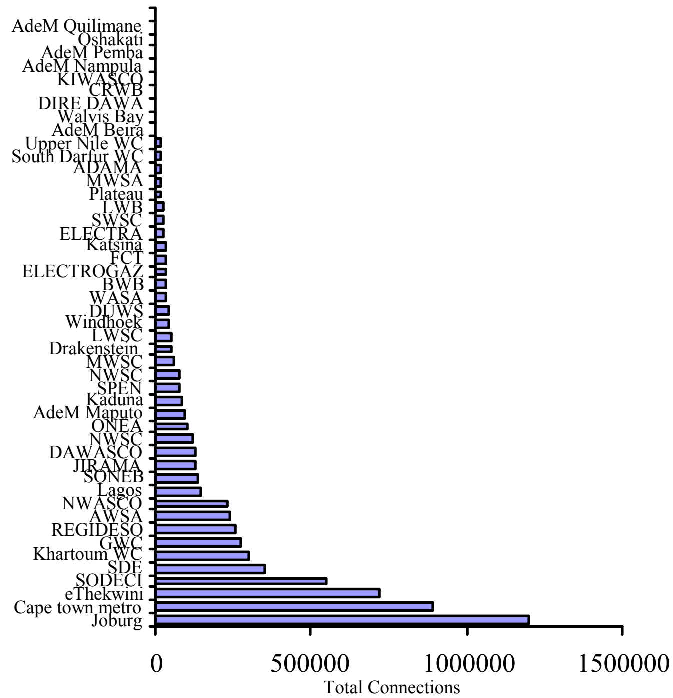


Figure 1.3b Total connections (residential and nonresidential)



Source: AICD WSS Survey Database 2007.

Five modules of qualitative data were collected for each country, covering the institutional and regulatory framework for water provision (module 1), governance arrangements for specific water utilities (module 3), the status of the sanitation sector (module 4), the status of the rural water sector (module 2), and the prevalence and characteristics of small-scale service providers (SSSPs) in specific cities (module 5). The qualitative data aims to systematically document the institutional arrangements in the WSS sector.

Quantitative data were captured to develop an understanding of the financial, technical, and operational performance of the identified utilities. While utilities were asked to provide data for the ten years from 1995 to 2005, this was rarely achievable. The emphasis was placed on collecting data from the five-year period 2000–2005. Information on water rates were collected in each country, including the effective tariff schedules for residential and nonresidential consumers, the connection rates, and rates paid at standposts and to small-scale providers.

Table 1.4 Overview of data collection

Data type	National data	Utility-specific data
Qualitative	Module 1: Institutions and regulation Module 2: Urban sanitation Module 4: Rural water services Module 5: SSSPs	Module 3: Governance
Quantitative		Module 6: Operations and finances Module 7: Tariff schedules

Source: Authors.

The institutional sources of data differ for each module. In most cases, the line ministry was the main source of information on the institutional and regulatory framework, rural water, sanitation, and some issues related to small-scale providers. But in countries where regulatory agencies exist, those were the preferable source of information on the institutional and regulatory framework. Similarly, in countries where rural water agencies exist, those agencies were the desirable source of information on rural water issues. In all cases, the water utility remained the main source of information on modules 6 and 7, related to operational and financial performance data and tariff schedules (table 1.5).

Table 1.5 Overview of institutional data sources for various modules

	Line ministry	Regulatory agency	Water utility	Rural water agency	Fieldwork
Qualitative					
Module 1: Institutional and regulatory	√	√			
Module 2: Rural water	√			√	
Module 3: Governance			√		
Module 4: Sanitation	√				
Module 5: SSSPs	√				√
Quantitative					
Module 6: Operational and financial			√		
Module 7: Tariff schedules			√		

Source: Authors.

The sanitation module has been reviewed in a companion AICD working paper by Morella and others (2008). The SSSP module was evaluated at length in a complementary background paper—by Keener and others (2008)—on informal water provision in Africa. The rural water supply has been examined in a related working paper, Banerjee and others (2008c), and an overview of tariff schedules has been provided in Banerjee and others (2008b). The report also draws upon companion studies under AICD, primarily Briceño-Garmendia and Smits (2008) and Banerjee and others (2008a).

The data were collected through fieldwork conducted by local consultants sourced by the WSP, International Benchmarking Network (IBNET), and PwC–Africa. A standardized set of questions and data requirements was delivered through these consultants to key sector and utility professionals in each country. The resulting data were reviewed, clarified with the original sources, and cross-checked by World Bank staff engaged in country operations. Where key data points were not obtainable or forthcoming from the utilities, secondary research was performed through utility and regulator Web sites and annual reports and through country reports. In general, secondary research has been kept to a minimum. The base data contained in this report, then, largely reflect the knowledge and understanding of the national stakeholders of the WSS scenarios in their respective countries.

The lack of data in some countries and for some topics was indicative of the low capacity of information management in African utilities. In some cases, such as Rwanda, data gaps could be attributed to conflict years. In countries such as Tanzania, and for Dar es Salaam in particular, recent and dramatic changes in the sector structure led to difficulties in collecting data.

Study objectives

Each year, as the MDG year of 2015 nears, it becomes more critical to understand the performance output of the water sector in Sub-Saharan Africa, the achievements and shortcomings, and the sector characteristics that either stimulate or inhibit the population's ability to access service. In the next chapter we present the progress toward an important MDG challenge facing the African economies—expanding access toward improved water supply. Some countries have focused their attention on extending piped networks, some have placed standposts and kiosks in dense periurban areas, and some have dug wells and boreholes in urban neighborhoods. The potential effects on health and productivity, not to mention the financial consequences, of these strategies are significant. Meanwhile, some countries have moved in the other direction, and now see greater use of unhealthy surface water and high-cost vendor water.

What factors make some countries the leaders in coverage expansion? Tangible efforts such as inflow of financial resources, implementation of far-reaching sector reforms, and operation of highly efficient utilities are all hypothetically significant. Successful countries could have adopted one or more of these strategies, or any number of unobserved heterogeneous variables could have assisted them in charting their way forward.

The objective of this report is therefore threefold: (a) present a quantitative snapshot of the state of the sector including institutional and governance structures, utility performance, and volume and quality of financing available relative to investment needs; (b) deepen understanding by focusing on utility-specific performance data in the context of the institutional, governance, and regulatory environment within which the utility operates (where possible, links are drawn between better-performing utilities, the characteristics of their operating environments, and access to water services); and, finally, (c) identify factors that might have affected coverage expansion—the most important outcome variable, given the focus on achieving MDGs.

2 Expanding coverage of water services in urban areas

Africa faces significant challenges to supplying safe drinking water to its people, and the present situation is rather grim. Rapid population growth and rampant urbanization negatively impact utilities that are the primary providers of improved urban water services such as piped networks and standposts. Most of this growth has occurred in the periurban slum neighborhoods. For the 24 Sub-Saharan Africa countries analyzed in this study, total population grew at an annual average of 2.5 percent, with urban and slum population growth almost double that, experiencing 4.39 percent and 4.43 percent annual growth rates, respectively. Illegal housing and the haphazard layout of informal settlements are also perceived as risks to network expansion in these areas (Keener and others 2008).

How has water service delivery evolved in urban Africa?

Piped water coverage has declined. Utilities have been unable to keep pace with the rising demands, and coverage of piped water in urban areas in Africa has declined in the past decade. In the mid–1990s, more than 40 percent of Africans had piped supply; by the early 2000s, this coverage had declined to 39 percent. The situation with standposts is similar, with a decline from 29 to 24 percent over the past 15 years. This decline in improved water sources is made up by a rise in coverage of wells and boreholes and slight increases in surface water and vendor coverage in urban areas.

Table 2.1 Evolution of urban water supply

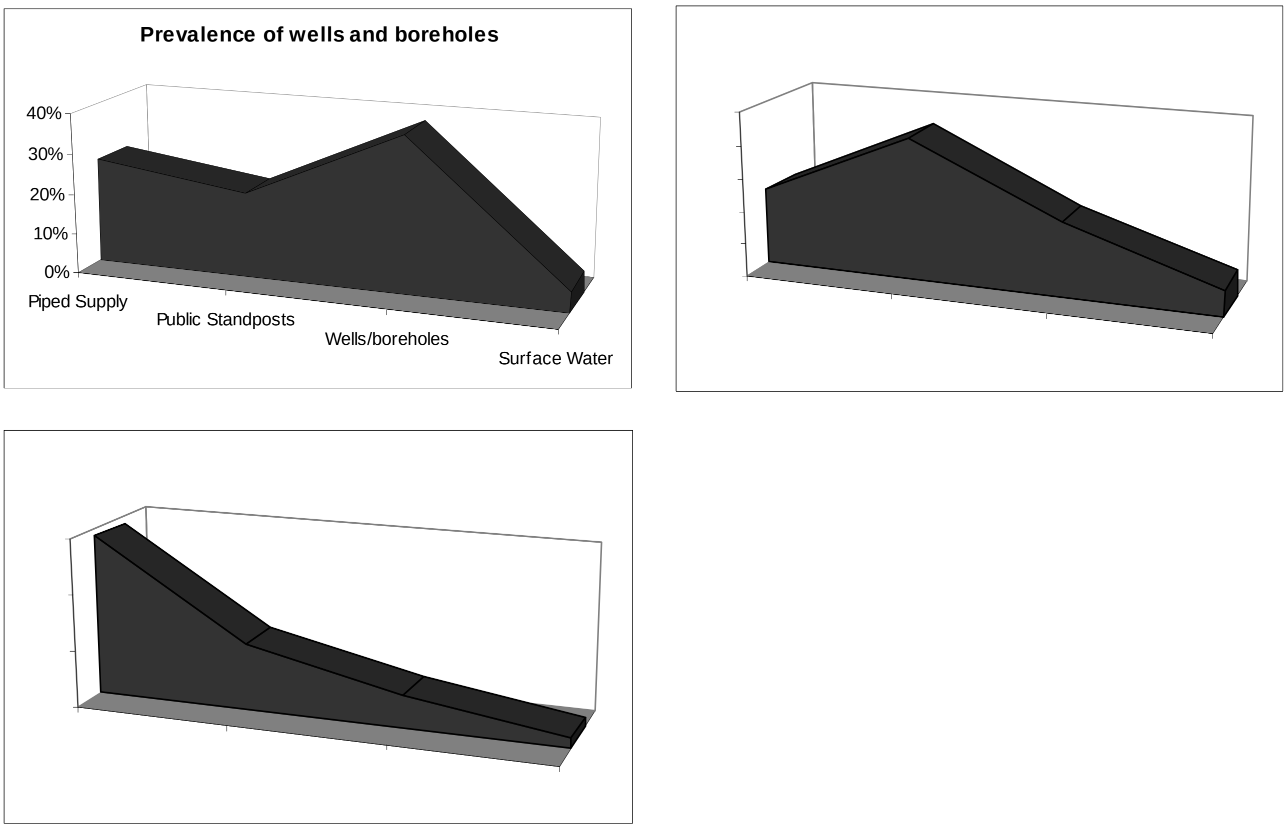
	Piped water (%)	Standposts (%)	Wells and boreholes (%)	Surface water (%)	Vendors (%)
1990–1995	50	29	20	6	3
1996–2000	43	25	21	5	2
2001–2005	39	24	24	7	4

Source: Banerjee and others 2008a.

Piped supply is the most widely used source, followed by standposts. Information for the latest available year for 32 countries in the AICD DHS/MICS database suggests that only 38 percent of Africa's population is connected to piped networks. The unconnected population depends on a range of paid and free alternatives. About 25 percent relies on public standposts, and wells and boreholes constitute the next-most-prevalent modality in the urban areas, being the primary source of water for 24 percent of Africa's urban population. Only about 8 percent resort to surface water in the form of lakes, ponds, and springs to meet their drinking water needs. Existence of a formal network system has beneficial spillover effects. Countries with high piped-connection rates also have high standpost coverage. On the other hand, some countries with minimally developed piped network systems exhibit high vendor and tanker incidence. The analysis of access patterns at the urban level delineates three categories of countries. The first includes countries with a large part of their urban population accessing water through wells and boreholes, but also with substantial coverage by other improved sources. This is the case with Mali, Nigeria, and Chad. The second comprises countries where the majority of the urban population depends on standposts, such as Burkina Faso, the Central African Republic, Cameroon, Ghana, the Democratic Republic of Congo, Guinea, Madagascar, Malawi, Mozambique, Niger, Rwanda, Tanzania, Uganda, and

Sudan. The third group comprises countries where the majority of the urban population is provided with piped water. This is the case with Benin, Côte d'Ivoire, Kenya, Namibia, Comoros, the Republic of Congo, Ethiopia, Gabon, Lesotho, Mauritania, Senegal, South Africa, Togo, Zambia, and Zimbabwe.

Figure 2.1 Patterns of urban access



Source: AICD DHS/MICS Survey Database 2007.

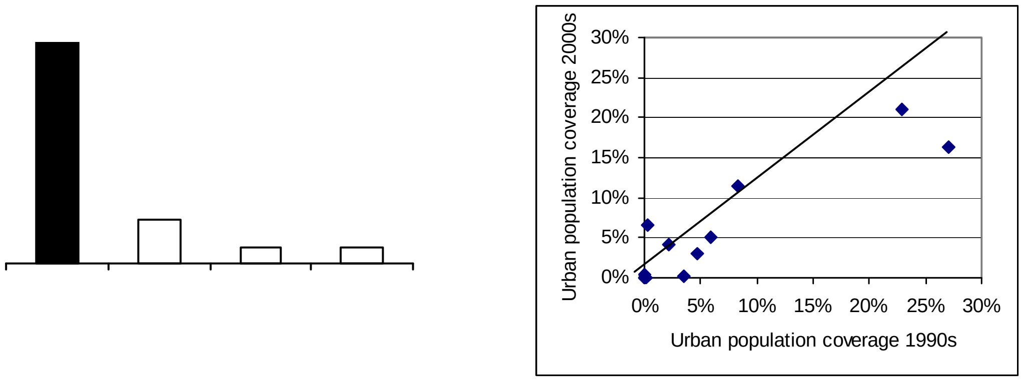
Vendors are important providers in several countries. Small-scale private providers (SSPPs), which in some countries operate as vendors or tanker trucks and in others as small piped systems, are emerging as significant players in the urban water market in Africa. For instance, in Mauritania, 32 percent of urban residents are dependent on vendors to meet their water demands. Vendors serve more than 5 percent of urban households in Burkina Faso, Chad, Niger, Nigeria, and Tanzania. In a study of 10 cities in Sub-Saharan Africa, Collignon and Vézina (2000) find that $5.4 million is generated in each of these local markets, which amounts to 1–3 percent of the cities' total domestic product.

The vendor incidence can be skewed across countries. Whereas in two-thirds of the countries surveyed vendors account for less than 1 percent of the urban population, in a small minority of countries vendors account for more than 20 percent of the urban population. A comparison of vendor prevalence in the 1990s with that in the early 2000s reveals that the market share of vendors has changed significantly in some countries. Thus, vendors' market shares have fallen substantially in Chad (27 to 16 percent) and Rwanda (3 to 0.1 percent). At the same time, vendors' market shares have increased substantially in Nigeria (8 to 11 percent) and Tanzania (0.3 to 6 percent). These findings suggest that vendors constitute a fairly flexible segment of the market that reacts quite rapidly to changes in broader market conditions such as conflict, urbanization, and natural population growth.

Figure 2.2 Dependence on water vendors in urban Africa, 1990–2005

a. Frequency distribution of urban population coverage 2000s

b. Evolution of urban population coverage from 1990s to 2000s



Source: Banerjee and others 2008a.

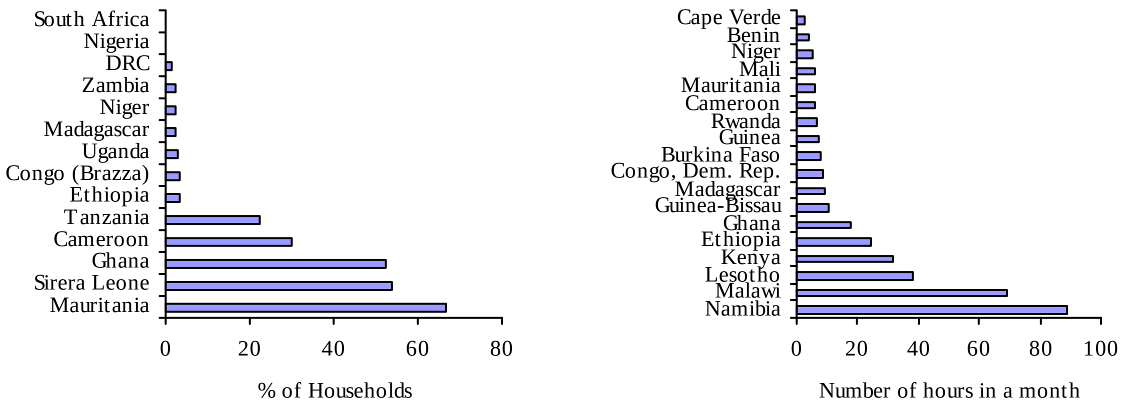
Household resellers are emerging as important players. Standposts, though a source of improved water supply, provide unreliable and infrequent service, have middlemen and high “unofficial” prices, and require long travel and waiting times. In such situations, household resellers are filling the space left by inadequate service provision by standposts. The presence of household resellers, however, is usually hidden in the household surveys, because it is illegal to sell water in many countries, and households are unwilling to admit to using that source. But the AICD WSS Survey, 2007, reveals that household reselling is a common occurrence in 70 percent of the countries studied. For instance, in Maputo, one-third of the unconnected obtain their water from neighbors (Boyer 2007). Similarly, in Maseru, household resellers provided water to 31 percent of the population and to almost half of the unconnected (Hall and Cownie 2002).

Nonavailability of safe water constrains long-term productivity. Household members, primarily women and children, traveling outside the home to fetch water suffer the opportunity cost of time and lost educational prospects. For instance, Blackden and Wodon (2006) compute that out of 6 million hours spent fetching water in Ghana in 1992, more than two-thirds was spent by women. Bringing water closer provides enormous time savings for these households, even when time is valued at a discounted wage rate for unskilled labor or at the minimum wage rate. Although the situation is worse in rural Africa, reaching a water source is a struggle for urban households in many countries. In urban Mauritania, 66 percent of households live more than 2 kilometers from their water sources, and in urban Ghana and Sierra Leone, 53 percent of households live more than 2 kilometers from their water sources. In comparison, all urban households in South Africa and Nigeria are located within 2 kilometers of their primary water sources. Similarly, quality of water access affects firms. Although not as severe as the impact of power shortages, water shortages nevertheless have a bearing on the total factor productivity of African firms. Results from investment climate assessment (ICA) surveys, which tracked the quality of service indicated by average duration of insufficient water supply to firms over one month, suggests that Namibia and Malawi are worst off. Even getting a water connection can be a challenge for new firms, which translates into lost outputs and revenues. It takes more than two months to connect in Benin, Cameroon, Lesotho, and Malawi. On the other hand, most firms receive a water connection in less than 20 days in Ghana, Ethiopia, and Namibia.

Figure 2.3 Quality of water access

(a) Percentage of urban households located more than 2 km from their primary water sources

(b) Firm responses on average duration of insufficient water supply (hours) in a month



Source: AICD Expenditure Survey Database 2007; AICD ICA Survey Database 2007.

Which countries have best expanded coverage?

Notwithstanding the sobering conclusion that the African continent is not on track to reach the MDG on water, it is important to acknowledge that a handful of Sub-Saharan African countries have made remarkable gains since the 1990s, as measured by the rate at which coverage has expanded. While the improvements in these countries may still be too little, too late to meet the MDGs, it is important to identify the successful cases to promote a deeper analysis of their experience and a distillation of lessons for other countries in the region. To analyze the growth of coverage of different forms of service, two factors are analzyed:

Annual average growth rate (AAGR) in population covered by each service in the 18 countries for which coverage information is available for 1995–2000 and 2001–5

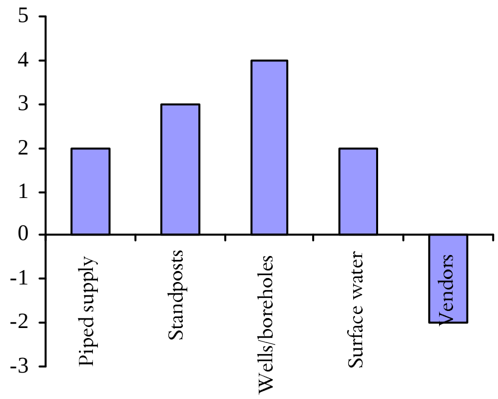
Annualized change in coverage (ACC) of each service—the number of people that on average gain coverage to each water modality every year, divided by the population in the end year; includes the 24 countries for which information is available for any two periods out of 1990–95, 1995–2000, and 2001–05

Wells/boreholes have registered the highest AAGR in the past decade, followed by standposts. Growth in the supply of piped water has been similar to that of surface water. Populous countries such as Kenya, Nigeria, Tanzania, and Cameroon have registered either negative or zero growth in piped water supply in the past decade. Likewise, smaller countries such as Rwanda, Zambia, and Mozabique have not experienced growth. On the other hand, countries such as Ethiopia, Burkina Faso, Lesotho, and Mali have experienced a piped water AAGR of more than 4 percent since 1995. Ethiopia's performance is particularly laudable, since it is the furthest from meeting its MDG goal.

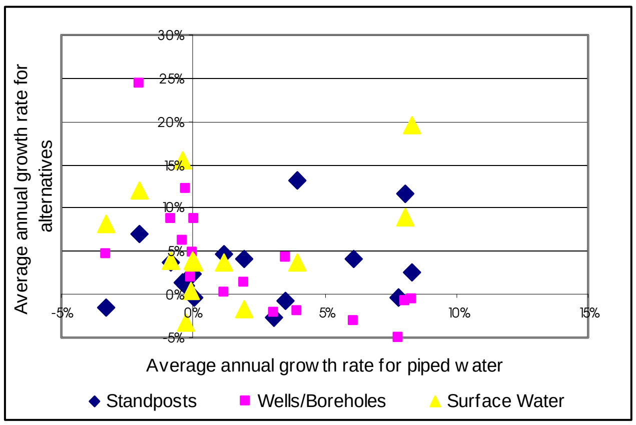
To examine the extent to which countries may be shifting between alternate forms of water service over time, a crossplot is made between the average annual rate of growth of piped water and the average annual rate of growth of standposts, boreholes, and surface water (figure 2.4b). Countries can be grouped in three clusters. In the first cluster, which lies well below the 45-degree line, are countries such as Burkina Faso, Ethiopia, Lesotho, and Mali, which have rapid expansion of piped water but substantially slower progress on standposts. In the second cluster, which lies well above the 45-degree line, are countries such as Guinea, Madagascar, Mali, Rwanda, and Zambia, which register much faster expansion in standposts than in piped water, and Ethiopia, Lesotho, and Rwanda, which register much faster expansion in boreholes than in piped water. In the third cluster are countries such as Burkina Faso, Ghana, and Ethiopia, which are registering simultaneous rapid expansions of piped water and standposts. In the third cluster, which lies close to the origin, are countries such as Kenya, Nigeria, and Zambia, which are not experiencing rapid expansion in any area. In fact, Nigeria has witnessed negative growth in both piped supply and standposts, and this gap has been filled by the relatively high growth of wells, boreholes, and surface water.

Figure 2.4 Annual average growth rate of water alternatives

(a) Urban annual average growth rate

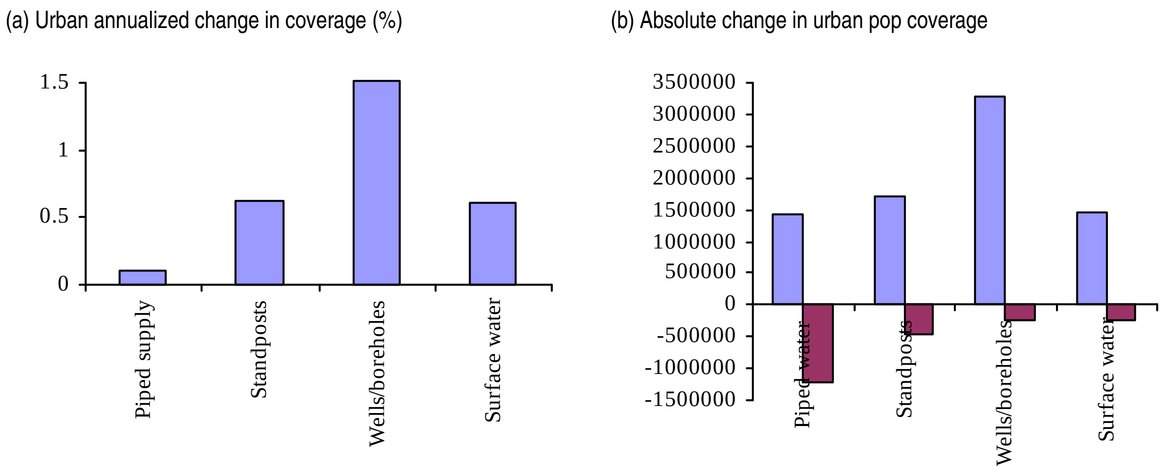


(b) Annual average growth rate of piped water versus the alternatives



primarily due to Nigeria and the Democratic Republic of Congo, which have redistributed more than 500,000 people into this service annually.

Figure 2.5 Annualized change in coverage



Source: AICD DHS/MICS Survey Database.

Nevertheless, a few outliers emerge. Ethiopia stands out as having the largest average annual gain on piped water coverage, adding almost 5 percent of its population each year, immediately followed by Côte d'Ivoire. By contrast, Tanzania, Nigeria, Rwanda, the Democratic Republic of Congo, Zambia, and Malawi show declining coverage between the late 1990s and the early 2000s. In the case of public standposts, Uganda has achieved the most accelerated expansion, followed closely by Burkina Faso. In fact, Burkina Faso has experienced remarkable growth in both piped water and standpost coverage. On the opposite side of the spectrum, Nigeria, Côte d'Ivoire, and Lesotho show declining access to standposts. Nigeria is by far the leader in enhancing well and borehole coverage, adding 4 percent of its population per year.

Uganda stands out as moving almost 2 percent of its population away from surface water every year, immediately followed by Ethiopia. Another way to assess performance is to point out which countries have made the most rapid reductions in their populations' reliance on surface water. From this angle, the progress is less dramatic. In most countries, less than 2 percent of the population has moved away from surface water every year. Reliance on surface water has risen in more than half the countries. The Democratic Republic of Congo, for instance, has rearranged an additional 3.4 percent of the population toward surface water dependence.

Table 2.2 Annualized change in coverage by modality and by country, 1995–2005 (%)

Piped water		Public standposts		Wells/boreholes		Surface water	
Ethiopia	4.77	Uganda	4.67	Nigeria	3.99	Uganda	-1.98
Côte d'Ivoire	3.81	Burkina Faso	4.00	Malawi	3.10	Ethiopia	-1.08
Benin	3.58	Tanzania	3.91	Rwanda	3.03	Lesotho	-0.66
Burkina Faso	3.40	Rwanda	3.67	Ghana	2.65	Madagascar	-0.41
Mali	3.00	Malawi	3.01	Mozambique	2.31	Ghana	-0.21
Zimbabwe	2.93	Congo, DR	2.56	Uganda	2.01	Niger	-0.12
Lesotho	2.69	Guinea	2.10	Kenya	1.49	Namibia	-0.08
Senegal	2.28	Chad	2.07	Tanzania	1.37	Côte d'Ivoire	-0.04
Namibia	1.75	Madagascar	2.03	Cameroon	0.90	Senegal	-0.03
Chad	1.56	Cameroon	1.34	Lesotho	0.63	Zimbabwe	0.00
Niger	1.49	Mali	1.25	Zambia	0.42	Zambia	0.01
Uganda	0.85	Namibia	1.15	Côte d'Ivoire	0.36	Malawi	0.10
Guinea	0.47	Zambia	1.09	Madagascar	0.33	Burkina Faso	0.13
Madagascar	0.39	Niger	0.93	Niger	0.28	Guinea	0.16
Kenya	0.03	Benin	0.80	Guinea	0.10	Chad	0.27
Cameroon	-0.01	Mozambique	0.80	Zimbabwe	-0.19	Mali	0.28
Zambia	-0.05	Ghana	0.60	Namibia	-0.21	Benin	0.30
Mozambique	-0.12	Zimbabwe	0.46	Ethiopia	-0.23	Kenya	0.35
Ghana	-0.18	Kenya	-0.12	Senegal	-0.25	Mozambique	0.39
Congo, Dem. Rep. of	-0.31	Ethiopia	-0.27	Chad	-0.34	Tanzania	0.70
Malawi	-0.64	Senegal	-0.42	Mali	-0.37	Cameroon	0.72
Rwanda	-0.66	Lesotho	-0.47	Congo, DR	-0.67	Nigeria	1.06
Nigeria	-1.37	Côte d'Ivoire	-0.52	Burkina Faso	-1.01	Rwanda	3.15
Tanzania	-3.50	Nigeria	-0.63	Benin	-1.09	Congo, DR	3.43

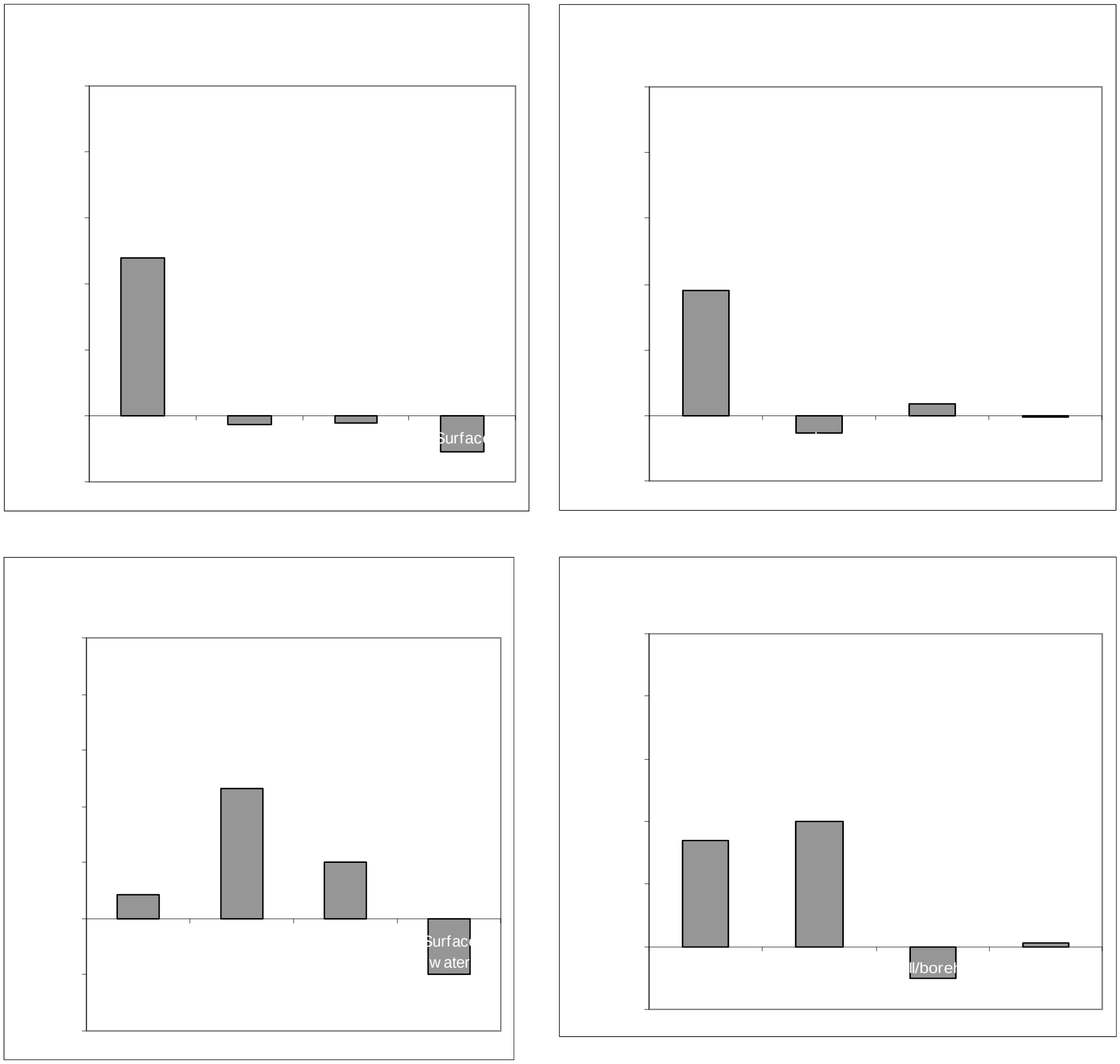
Source: AICD DHS/MICS Survey Database 2007.

In sum, Sub-Saharan Africa has made modest progress in expanding access to piped water and more substantial progress in the use of standposts and wells and boreholes, but the population dependent on surface water to meet its drinking needs has also increased. Wells and boreholes have experienced the fastest growth between the late 1990s and the early 2000s in the urban areas. Despite the evidence that most of the Sub-Saharan Africa countries are not on track to reach the MDG on water, a handful have made remarkable progress in expanding access, and at a rate that substantially exceeds their peers. This group includes Ethiopia, Côte d'Ivoire, Uganda, and Bukina Faso, which have moved a substantial share of their urban population to improved sources of piped connection or standposts. Nigeria and Malawi have experienced the largest gains in expanding well and borehole coverage.

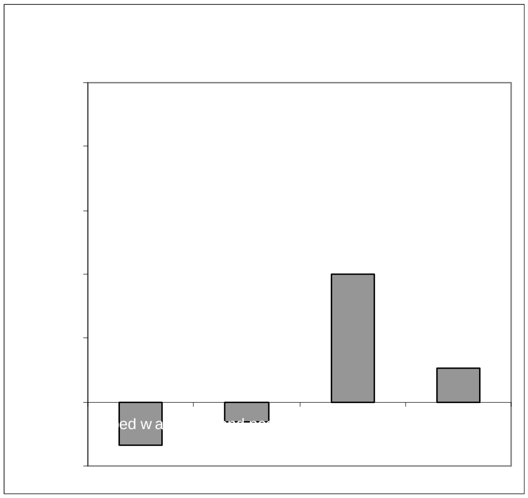
Figure 2.6 Six remarkable performers

Ethiopia

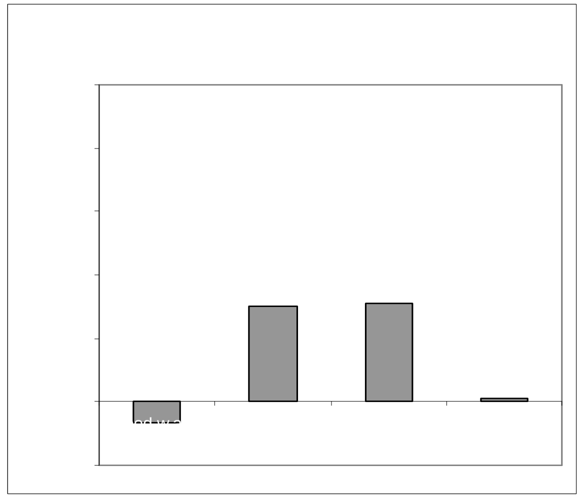
Côte d'Ivoire



Nigeria



Malawi



3 Institutional, regulatory, and governance framework of water services

To attract the sizeable resources required to put the water sector in Africa on a secure path, the sector must be able to demonstrate a reasonable regulatory and governance framework at two levels—national and service provider—with the necessary institutional support and staff.The national and provider-level frameworks should be complementary and mutually reinforcing, but they should also each be sufficiently defined—and transparent—to inspire confidence in a range of investors and stakeholders, including consumers (who invest through connection fees and tariffs). These frameworks constitute the environment in which a utility operates and should ideally play a facilitating role in improving its performance.

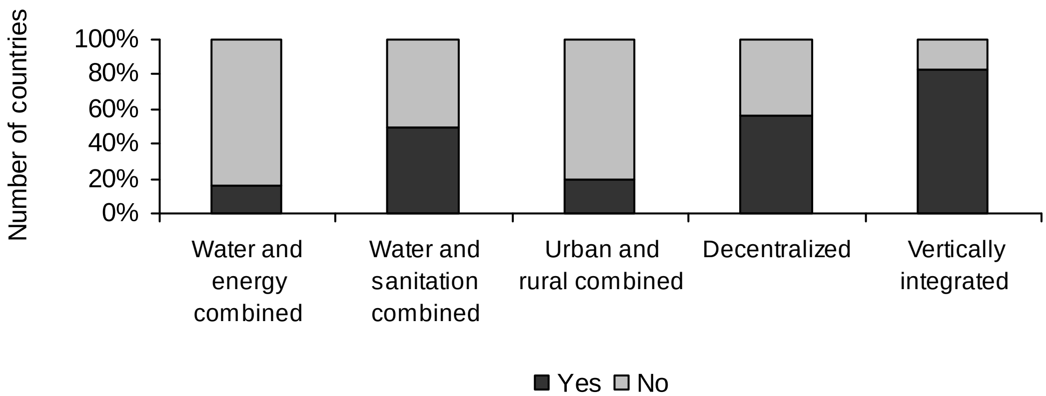
In this chapter, we examine the institutional and regulatory arrangements in the Sub-Saharan water supply and sanitation (WSS) sector, including utilities' internal governance frameworks.

How is the urban water sector organized?

There is no consistent set of institutional arrangements across Sub-Saharan Africa; however, any existing arrangement might be effective if it conforms to the appropriate policy, legal, and regulatory framework. An appropriate framework is one that clearly allocates authority and resources commensurate with assigned responsibilities. Institutional structures range from national-level utilities responsible for entire countries to those with limited jurisdictions. The urban water sector is most likely to be a central government responsibility, but services are delivered by a range of providers that includes municipal agencies, public-private partnerships, and corporate utilities.

Likewise, some utilities are responsible for both water and sanitation—and even energy—while some handle only water distribution. Generally, water utilities are dedicated to providing water and, in some cases, wastewater facilities. Half of the countries sampled have utilities that jointly provide water and wastewater services. Only ELECTRA in Cape Verde, Société Tchadienne D'eau Et D'électricité (STEE) in Chad, ELECTROGAZ in Rwanda, and Jiro sy Rano Malagasy (JIRAMA) in Madagascar provide water and energy together. Unbundling bulk-water generation and distribution is still a rarity in Africa. Only Namibia, Niger, Senegal, and South Africa have separated the two functions. Utilities in the other countries operate as a vertically integrated company. Most utilities primarily cover the urban service space, and the service provision arrangements in the rural areas are aligned very differently. In Benin, Kenya, Tanzania, Rwanda, and South Africa, utilities provide services to both urban and rural dwellers. But that does not preclude different arrangements for the rural space. It may be that the utilities provide water to rural areas within the service area, but there may be additional rural neighborhoods outside the service area (figure 3.1).

Figure 3.1 Range of institutional arrangements in water service provision



Source: AICD WSS Survey Database 2007.

Decentralized service delivery has been one of the most strategic actions undertaken by many countries to create an environment of greater accountability and responsiveness to the consumer. By shifting authority and responsibility to subnational units of government, where the need for infrastructure can be more readily identified and the conditions for expansion are better known, service efficiency improves. Nine countries have single national providers, while the remaining countries have multiple water providers. For instance, Ethiopia, Kenya, and South Africa report about 150 suppliers operating in the service area. In all the countries that consider water supply to be a local responsibility, there has been a decentralization process. Lesotho and Zambia began its decentralization process in the early 1990s, and the rest of the countries decentralized in the past decade. But five countries that undergone the decentralization process—Cape Verde, Mozambique, Niger, Tanzania, and Uganda—still see urban water supply as a central government responsibility.

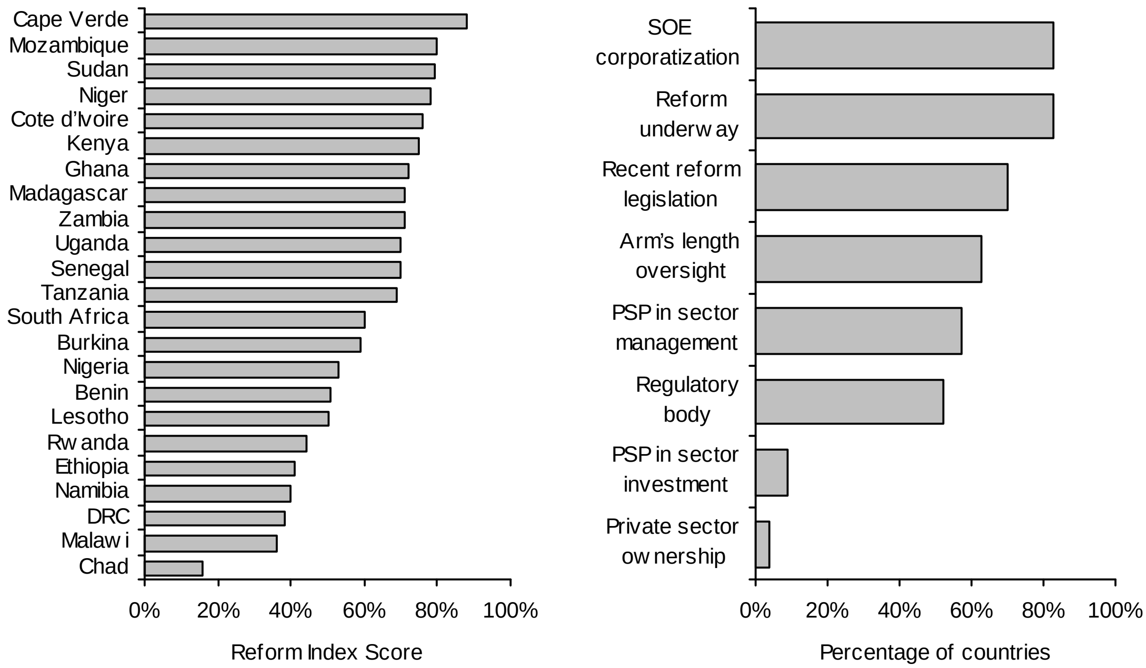
How and when has urban water reform progressed in Africa?

Water sector reforms are considered critical in creating the appropriate institutional structure for improved service delivery. Reforms can often be difficult and painful, affecting a wide group of stakeholders. Benefits accrue in the long term, while costs are immediate. Privatization, once complementary to the reform process, is no longer integral. In addition, water-privatization transactions have prompted conflict in countries around the world, including the large-scale protests in Cochabamba, Bolivia, in 2000. Most countries have proceeded with the reform process gradually, cautiously weighing the benefits and costs.

In Africa, reform has been integral to efforts to improve water access over the past decade. Reform initiatives in urban areas affect both the external and internal environment in which utilities operate; in rural areas, they significantly improve service delivery.

For the purpose of this study, urban water sector reform is studied on the basis of four factors: (a) legislation, (b) restructuring, (c) policy oversight, and (d) private sector involvement (Vagliasindi 2008). Each is composed of indictors, detailed in Annex A.2. Each subindex is expressed as a percentage of positive responses to the binary questions to total number of indicators. The overall urban reform index is an average of these four subindexes, and each has the same weighting.

Figure 3.2 Country ranking and prevalence of key reform activities



Source: AICD WSS Survey Database 2007.
SOE = state-owned enterprise; PSP = private sector participation; DRC = Democratic Republic of Congo.

The majority of African countries have undertaken a key reform step. Only Chad, the Democratic Republic of Congo, Rwanda, and Nigeria have not yet embraced reform. No country has adopted all the components of effective water reform, but many have taken a number of positive steps. In most countries, reform was recently begun—only eight countries report sector legislation more than five years old.

One important means of establishing a transparent framework for service provision is a water policy setting out the government's sector goals and institutional commitments. Côte d'Ivoire passed a water law in 1973, but most countries did not implement such an initiative until the past decade. Now only five countries lack a water policy, and in two of these a draft is in progress. Chad and the Democratic Republic of Congo are the only countries that neither have a water policy nor have passed any new sector legislation in the past ten years.

The most common reform steps are corporatization and the passing of a private sector participation law. But the gap between private participation on paper and in fact is large. While 83 percent of countries have made private participation legal, only 63 percent have attracted private participation in any of the three largest utilities; in only half have private providers responded by taking part in management contracts and concessions, and in only 5 percent have private providers invested in water sectors. There is only one instance of private ownership in the water sector in Africa (figure 3.1). Though it is commonly believed that private involvement in the water sector is a relatively new phenomenon, the private contracts in Côte d'Ivoire and the Democratic Republic of Congo became operational in 1960 and 1968, respectively. All the other contracts have been implemented in the past decade. The original contracts have been renegotiated in Côte d'Ivoire, Kenya, Senegal, and Mozambique. In the Democratic Republic of Congo, Rwanda, and Tanzania, the original contracts were cancelled.

The policy oversight of different aspects such as tariff approval, investment plans, technical standards, regulation monitoring, and dispute arbitration are relatively well defined in Africa. In at least half the countries studied, the institutional responsibilities for each of these functions are clearly allocated to bodies other than the line ministries, such as special entities within the ministries, interministerial committees, or regulators. Oversight of economic regulation and tariff setting by bodies other than the line ministries exists in 78 percent and 65 percent of the countries, respectively. In countries where regulators exist, these functions are usually performed by them.

Continent-wide trends mask the heterogeneity of country experiences in adopting reforms and moving ahead with more difficult measures. Some countries, such as Mozambique, Niger, Sudan, Kenya, Côte d'Ivoire, Ghana, Tanzania, Senegal, Uganda, and Madagascar, have embraced 70 percent of the reform measures. Meanwhile, countries such as Chad, Malawi, Namibia, and the Democratic Republic of Congo have achieved less than 40 percent on the total reform score (figure 3.2). Chad is the furthest behind in implementing water sector reforms; the only steps it has carried out so far are STEE corporatization and a relatively robust policy oversight structure with respect to tariff approval and regulation monitoring.

Progress in restructuring has been relatively slow. The majority of the countries have corporatized and set up regulatory agencies, but unbundling is still a challenge. Only five countries—Burkina Faso, Namibia, Niger, South Africa, and Uganda—have separated bulk water production from distribution function. In the other countries, the functions are performed in tandem, by the same utility. The country that has proceeded the furthest is Niger, which reports a score of more than 80 percent on the restructuring subindex. In 2000, the water company SNE in Niger was separated into the asset-holding company Société de Patrimoine des Eaux du Niger (SPEN) and a private operator Société de Exploitation des Eaux du Niger (SEEN) responsible for production, transmission, and distribution in the urban areas. Of shares in the lease contract, 51 percent are held by international operators, 34 percent by Nigerian local investors, 10 percent by employees, and 5 percent by the government. The contract governs the production and distribution of water in urban areas for a period of 10 years (World Bank 2007).

Most countries have achieved 40–80 percent in the urban reform index. The subindexes indicate which countries have concentrated on water reform. Most countries score high on certain subcomponents but not on others. For instance, Benin scores very high on legislation and policy oversight but very low on restructuring and private sector involvement, and Rwanda scores high on restructuring and private sector involvement but low on policy oversight and legislation. Côte d'Ivoire, Kenya, Mozambique, Sudan, Tanzania, and Uganda have realized more than 50 percent in each of the subindex scores, suggesting a balanced evolution of the reform process.

How are the service providers regulated and monitored?

Line ministries (or subentities) continue to play a strong role in the regulation of water services. Line ministries have the greatest role in granting licenses or charters, approving investment plans, and establishing technical standards. Other ministries with important regulatory roles include the ministry of finance/economy and the ministry of health/environment. Parliaments, state water corporations, or asset-holding companies are also involved in setting tariffs or approving investment plans. In some cases the allocation of regulatory responsibilities is efficient. For instance, different skill sets are needed to monitor water quality than those needed to review tariff adjustment proposals. In other cases the fragmentation might contribute to inefficiencies in the sector and a lack of depth in regulatory capacity. The regulatory entities also have a designated responsibility for monitoring and enforcing the license/charter provisions as well as setting customer service regulations. The gaps in water regulation fall more within the area of customer service and quality standards.

Table 3.1 Regulatory roles in the urban water sector

Percent

	Line ministry	Entity within ministry	Regulatory body	Interministerial committee	Other	Unregulated or nobody
Granting licenses and/or assigning service obligations	57	22	13	9	0	0
Approving investment plans	52	13	13	4	17	0
Establishing technical standards and minimum service levels	40	24	20	8	4	4
Arbitrating in a dispute	36	12	20	12	16	4
Approving tariffs	35	13	22	0	30	0
Setting water quality standards	27	18	23	9	18	5
Monitoring and enforcing compliance with economic regulation	26	17	30	9	13	4
Customer service regulations	26	13	26	9	17	9
Monitoring water quality	26	22	13	9	26	4
Proposing/advising on tariffs	13	25	13	17	33	0

Source: AICD WSS Survey Database 2007.

How regulatory functions are accomplished is less clear than the assigned responsibilities. Ideally, regulatory activities and decisions would be accomplished against a set of guidelines and regulations that are well known to service providers, investors, and consumers. Decisions would be reached through a transparent process and would be publicly available and defensible. That is, the regulatory system would be accountable and transparent. These ideals hold whether the regulatory powers are vested in an independent regulator, a ministerial agency, or a contract (table 3.1).

Half of the countries studied have set up regulatory agencies to govern the sector and bring it in the purview of formal rules on tariff and service standards. In the 11 countries where distinct economic regulatory bodies exist, all but one was created between 1995 and 2003 (figure 3.4). In Côte d’Ivoire, the regulatory agency Direction de l’Hydrolique was set up in 1973–4. Among the eleven stand-alone regulators, five (Cape Verde, Ghana, Niger, Rwanda, and Tanzania) have jurisdiction over multiple sectors. In Côte d’Ivoire, Kenya, Lesotho, Mozambique, Sudan, and Zambia, the regulators are responsible for only WSS activities. The nascent regulators face the challenge of gaining stature, establishing a track record of sound decision making, and acquiring competent staff.

Figure 3.3 Year of establishment of regulatory agencies

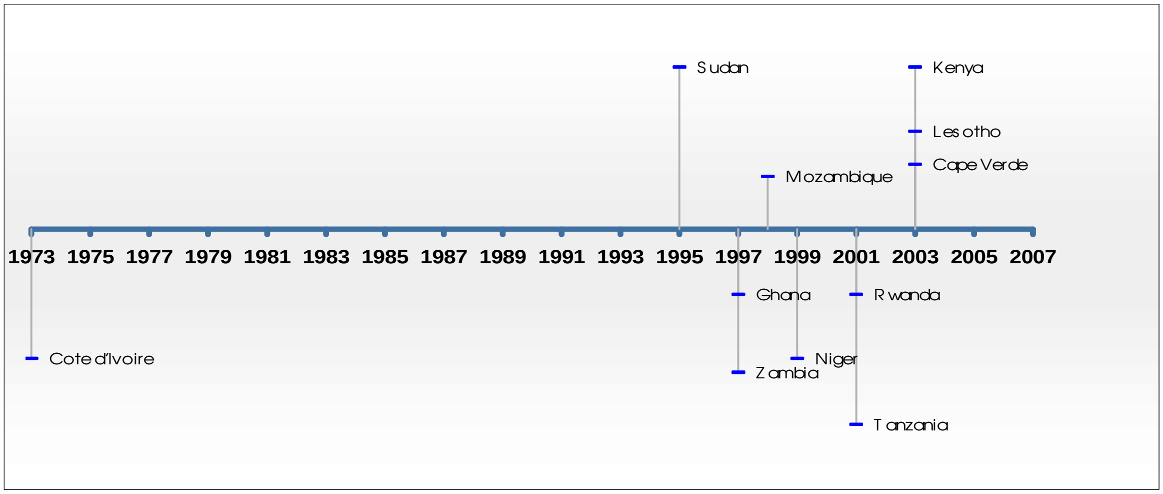
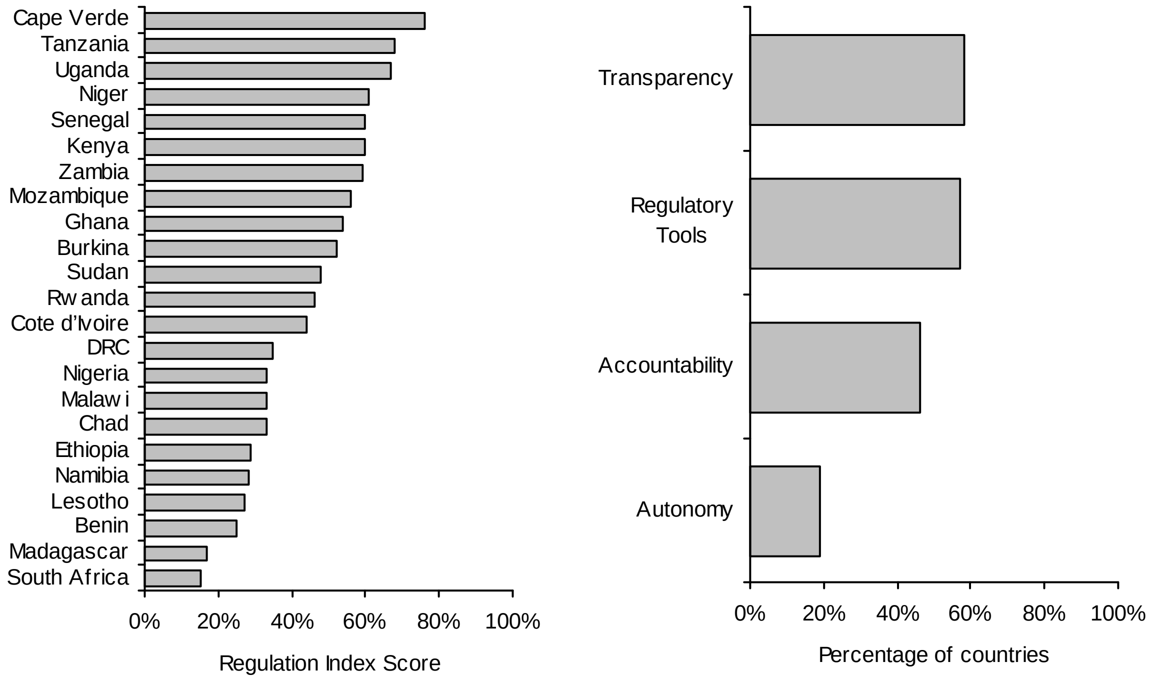


Figure 3.4 Country ranking and prevalence of key attributes of regulation



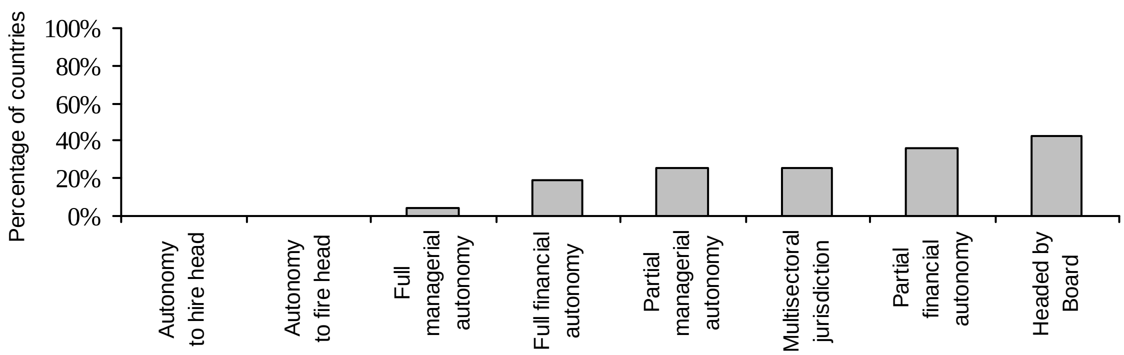
Source: AICD WSS Survey Database 2007.

Most countries are adequately equipped with proper tools. Tariff methodology and periodic tariff reviews appear to be established practices across the regulatory framework in African countries. Madagascar is the only country where regulatory institutions report having none of these tools. The tariffs in Sub-Saharan Africa are largely regulated—to the degree that proposals are made and approved. A specific methodology for tariff increases, as well as the triggers of increases, is sometimes unclear. In regard to the process of adjusting tariffs, more countries employ the price cap methodology of adjusting tariffs than other forms, but the "other" responses ranged from "reasonableness" to comments that tariffs reflected actual costs. Periodic and extraordinary tariff adjustments are typically allowed, but fewer countries index tariffs on an annual basis. In the twelve countries where periodic tariff reviews are in place, the time between reviews ranges from one to five years. The annual periodic reviews might, in fact, be more comparable to annual indexation. Every country reported that there was some known process for adjusting tariffs, although the methodology was not always clear.

The regulatory agencies are likely to be headed by boards; only in Côte d'Ivoire and Lesotho are regulators headed by individuals. Apart from Mozambique and Rwanda, the president or the line minister has the authority to appoint the head or commissioners of the regulatory agencies. Clearly the president and the line ministry retain strong roles in the governance of the regulator, with the judicial and legislative branches of government playing more limited roles. The term for the office of head or commissioner can vary between 3 and 6 years, with an average of 3.3 years. With the exception of Niger, the heads of these institutions can be reappointed.

A number of regulatory agencies have achieved partial financial autonomy. The agencies are most commonly funded by sector levies or license fees or by the central government. The use of sector levies or license fees to fund the regulatory agencies is evident in Mozambique, Niger, Rwanda, and Cape Verde. In Côte d'Ivoire and Lesotho, the reliance on the central government is complete. Donors play a substantial role in funding the regulators in Ghana, Tanzania, and, to a lesser extent, Sudan. Although the bulk of the funding for the Nairobi Water and Sanitation Company (NWASCO) in Zambia is derived from sector levies or license fees, it also relies on donors and the central government.

Figure 3.5 Understanding performance in regulatory autonomy



Source: AICD WSS Survey Database 2007.

Use of a standardized format for reporting to the regulatory entity is almost universal. Regulatory entities are less likely, however, to make their findings and decisions available to the general public. In some cases there is no mechanism to make decisions public, but where decisions are public they are most often available as published reports (as in 81 percent of the countries studied). Public hearings are less frequent and only available in 50 percent of countries. Similarly, publishing the hearings on the Internet is rare. Chad, the Democratic Republic of Congo, Madagascar, Namibia, and South Africa report that regulatory decisions are not made public. In other countries, at least one method of public disclosure was used.

Consumer participation in the regulatory process is relatively limited. Where consumers have a role in the actual regulatory process, they are most often part of the appeals process rather than reviewers of regulatory proposals or as board representatives. A social accountability index for the four indicators[4] represents consumer influence in the regulatory process. Burkina Faso, Ghana, Malawi, Tanzania, and Zambia have the most socially accountable regulatory framework. In these countries, the consumer representation exists in the regulatory body, consumers have an option to comment on draft regulations and review tariff proposals, and consumers have the right to appeal regulatory decisions. But there are countries at the other end—such as Benin, Côte d'Ivoire, Ethiopia, Kenya, Madagascar, and Rwanda—that have a regulatory structure not aligned to social accountability and consumer inputs. Consumer

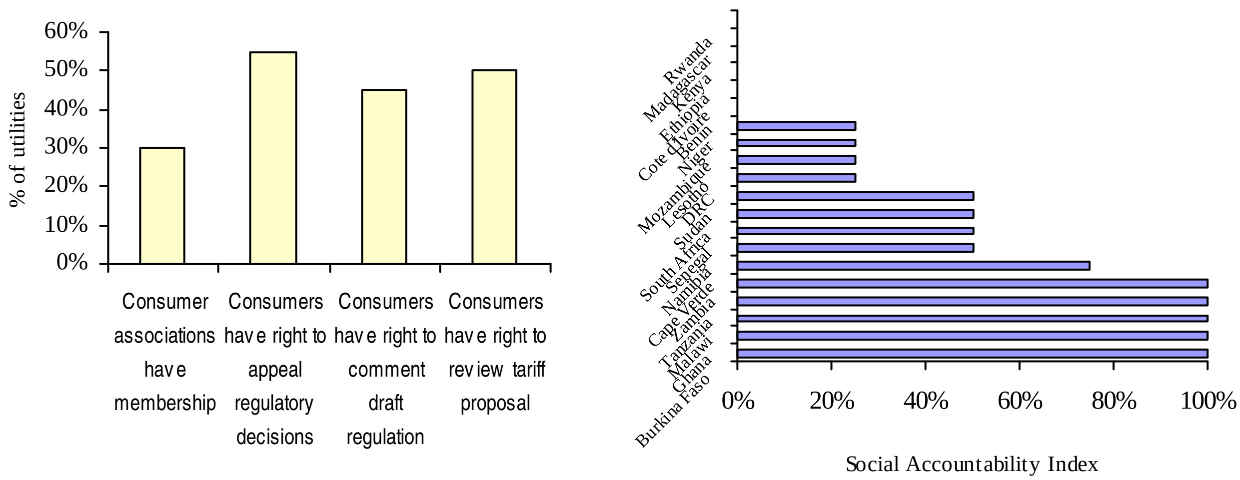
[4] Including 'consumer associations have membership', 'consumer associations have right to appeal regulatory decision', 'consumers have a right to comment on draft regulations', 'consumers have a right to review tariff proposals'.

representation is even less frequent within the regulatory body itself. Only in Burkina Faso, Ghana, Namibia, Tanzania, and Zambia are consumers represented in the regulatory agency.

Figure 3.6 Consumer participation in regulatory decisions

(a) Components of social accountability index

(b) Social accountability index



Source: AICD WSS Survey Database 2007.

Finally, the existence of a regulatory agency makes a significant difference in regulation quality, even though only half of the countries have functioning agencies. Attributes such as autonomy and accountability are unambiguously benefited by the presence of a regulatory agency. The same is not true, however, for the transparency and tools subindexes. The design of the regulatory index primarily captures the attributes of the regulatory agency in the "autonomy" subindex, which is, not surprisingly, negligible for countries without regulatory agencies. It is evident that regulatory tools are available to any authority mandated to perform a regulatory function, and which can carry out its function in a transparent fashion. The implication is that a country can have regulation by contract, and a relatively well-developed policy oversight and regulatory environment, even without a formal agency (table 3.3).

Table 3.2 Regulatory attributes and existence of a regulatory agency

	Regulatory index %	Autonomy subindex %	Transparency subindex %	Accountability subindex %	Tools subindex %
Regulatory agency	53*	37*	67	47*	61
No regulatory agency	31	2	44	27	52
Total	41	19	53	36	55

Source: AICD WSS Survey Database 2007.
Note: * implies significant relationship based on t-test.

How did utilities' internal governance structures evolve?

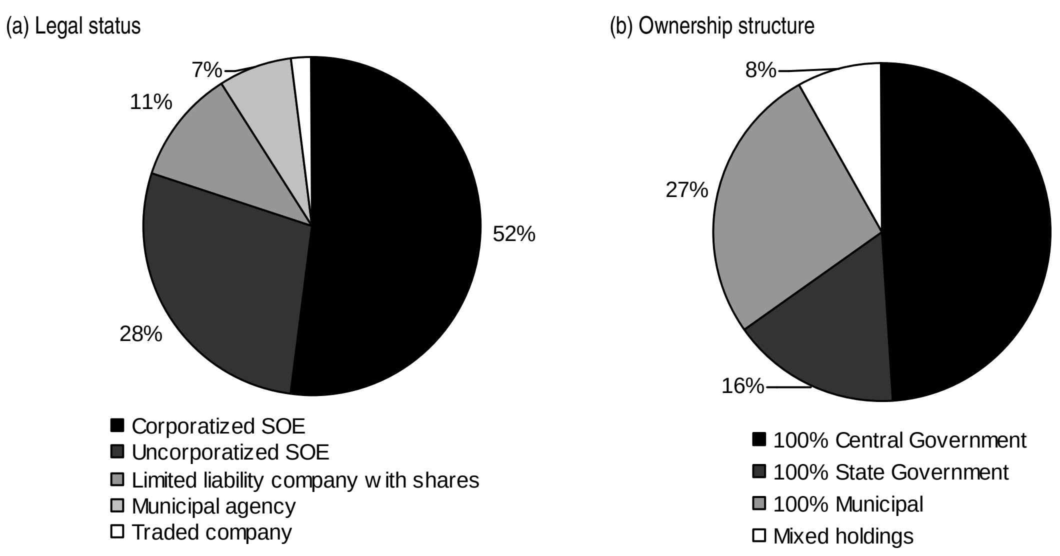
Corporate governance is intrinsically related to the performance of state-owned enterprises (SOEs). Related deficiencies—namely, numerous and conflicting objectives, political interference, and lack of transparency—need to be addressed in order for SOEs to emerge from the low-level equilibrium they often find themselves in. Unlike private companies, which exclusively focus on profit maximization, SOEs are subject to political whims that can derail the core business of service provision (Wong 2006).

Given existing gaps in their policy, legal, and regulatory environments, to what extent are utilities (and regulators) self-regulating through the establishment of sound corporate governance and accountability? Even where accountability has not been properly allocated throughout the sector (for instance, policies that separate governance, regulation, or oversight from service provision), services may be improved through the establishment of a distinct entity for service provision, with separate oversight. Oversight provided can be either a statutory body (established under public law) or an SOE (established under commercial law).

About 62 percent of the utilities are corporatized entities, meaning that the public sector service provider emulates a private company in terms of efficiency, productivity, and financial sustainability. A corporatized utility would accomplish this through implementing some or all of a series of changes, including establishment of a distinct legal identity; segregation of the company's assets, finances, and operations from other government operations; and development of a commercial orientation and of managerial independence while remaining accountable to the government or electorate. While other utilities are not corporatized, they are still able to practice improved corporate governance through the adoption of some or all of these corporate characteristics. The heart of corporate governance is to protect and enhance the long-term value of the company for shareholders (government and other) by increasing sales, controlling costs, and increasing revenues.

Nearly half of the African water utilities are SOEs, majority-owned by the central government. Others are owned at the state or municipal level (figure 3.7). In a few countries—such as Kenya, Namibia, South Africa, and Zambia, where water service delivery has been decentralized to the local level—utilities are majority-owned by municipalities. Only Namibia still provides service through municipal departments. But only the utilities engaged in active PPPs such as Cape Verde, Côte d'Ivoire, Niger, and Senegal have diversified shareholding.

Figure 3.7 Legal status and ownership structure of water utilities



Source: AICD WSS Survey Database 2007.

A simple scoring system called the SOE governance index determines whether SOEs are governed using sufficiently commercial principles to allow for their exclusion from the primary balance estimation, widening fiscal constraints to borrowing (Vagliasindi 2008). Several aspects of SOE management are examined, including (a) ownership and shareholder quality; (b) managerial and board autonomy; (c) accounting, disclosure, and performance monitoring; (d) outsourcing; (e) labor market discipline; and (f) capital market discipline. Using a simple scoring system, it is possible to see the degree to which these characteristics of good governance and commercial orientation have been more widely adopted throughout Sub-Saharan Africa, as well as the specific utilities that have adopted them.

A majority of the entities score between 40 and 80 percent on the SOE governance index. Firms do well on “capital market discipline” and “accounting, disclosure, and performance monitoring” subindexes, with more than 60 percent of the utilities scoring between 40 and 60 percent in the subindex. Use of outsourcing is almost negligible among African water utilities. A majority of entities are a long way from achieving managerial and board autonomy; less than one-fourth score more than 80 percent on this subindex. It is interesting to note that the correlation between the SOE governance index and the earlier reform and regulation index is very low, which is to say that some countries do much better on SOE governance than on reform and regulation, and vice versa.

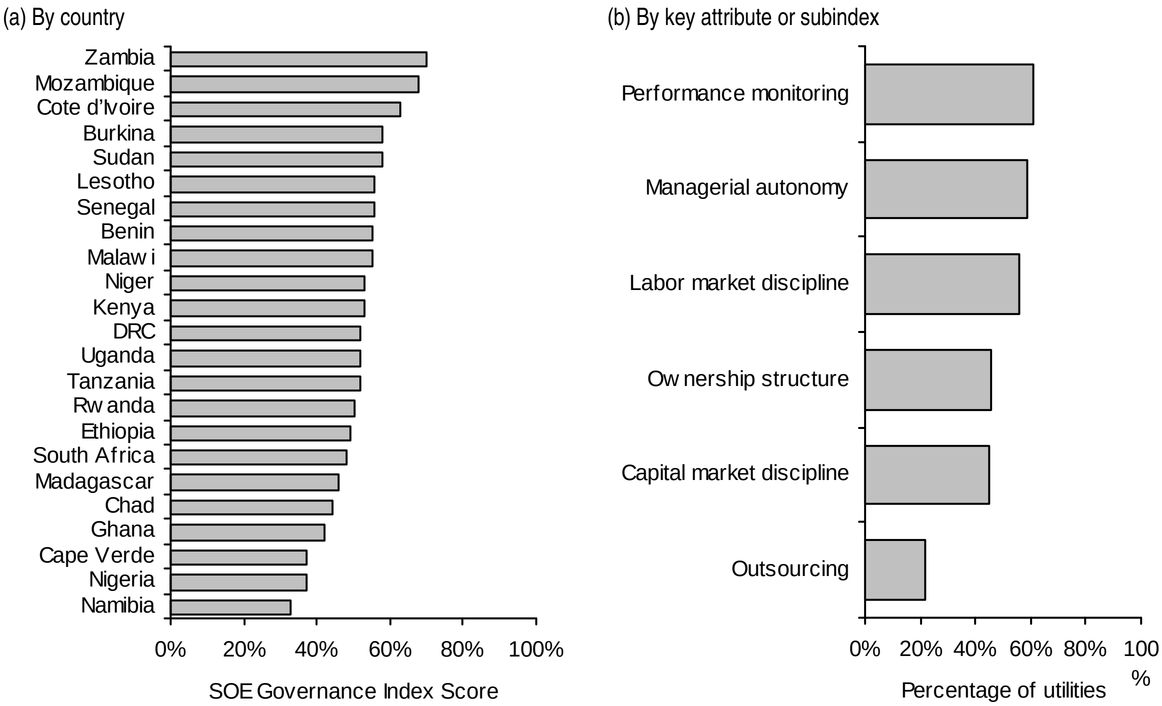
The Zambian and Mozambican utilities have the best internal governance structures to respond to the needs of their consumers, regulators, governments, and other stakeholders. They have adopted modern management methods and operate on commercial principles. None of the utilities score higher than 80 percent on the SOE governance index. Lusaka Water and Sewerage Company (LWSC) in Zambia, which emerges as the best-governed utility in Africa, scores 73 percent. In addition, Johannesburg, SEEN, and Senegalaise Des Eaux (SDE) have also aligned their governance structures to achieve superior performance. At the other end are the Upper Nile, Oshakati, and Dire Dawa, which are struggling to establish robust accountability structures. It is interesting to note that while Johannesburg is among the best governed, the other three South African utilities are among the worst-ranked. This reveals the level of heterogeneity in management structures within the same country.

The use of external financial and independent audits is common. Similarly, the management or board has decisive influence on wages and bonuses in the majority of entities. But indicators such as public listings, outsourcing functions, and dividend payments are rare. SODESI in Côte d’Ivoire is the only water utility that is listed on the stock exchange, its shares publicly traded. Similarly, only 27 percent of the utilities are required to pay dividends to their shareholders.

About 84 percent of the entities have boards of directors, though few are well represented or benefit from the presence of independent directors. Only FCT in Nigeria, the firms in Namibia and South Africa, and Khartoum in Sudan do not have a board structure. A board has more than five members in only half the entities; the rest are not endowed with a broadly representative board. In only 40 percent of the entities—notably in Kenya, Zambia, Tanzania, and Uganda—is at least one independent director on the board. Further, boards are appointed by their governments in 60 percent of the utilities. Obviously, the interests of the owners are well represented on the boards, and political interests are entrenched in the managerial decision-making process. For instance, in the National Water and Sewerage Company (NWSC), the Ministry of Water, Lands, and Environment appoints the board of directors; in the Office

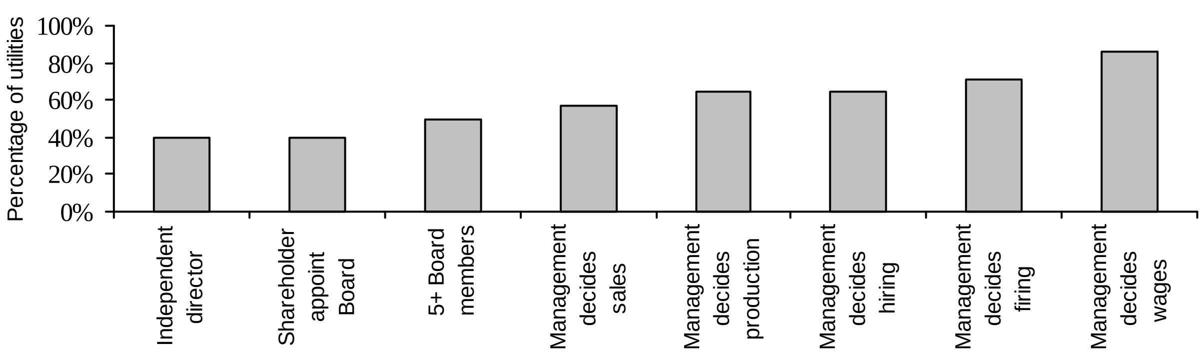
Nationale des Eaux et d'Assainissement (ONEA), the board is appointed by the Council of Ministers (Baietti and others 2006). Only SEEN in Niger has a representative board appointed by shareholders, with independent directors.

Figure 3.8 Country ranking and prevalence of key attributes of SOE governance



Source: AICD WSS Survey Database 2007.

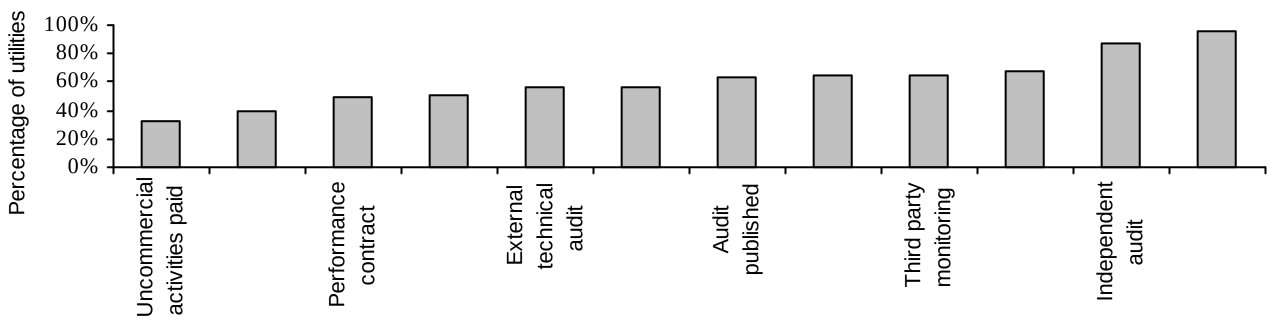
Figure 3.9 Performance in managerial autonomy



Source: AICD WSS Survey Database 2007.

Half the entities have performance contracts with defined and monitorable targets present. Management through such contracts takes a systematic approach to performance improvement through an "ongoing process of establishing strategic performance objectives; measuring performance; collecting, analyzing, reviewing, and reporting performance data; and using that data to drive performance improvement" (PA Consulting 2008). Such contracts exist in all entities in Uganda, Zambia, Tanzania, and South Africa. NWSC engages in annual and multiyear performance contracts (Baietti and others 2006). Third-party monitoring is applied in 65 percent of the firms, which reveals serious attention to enhancing external accountability for results. Adequate implementation of such performance contracts depends on how the internal incentive mechanisms are established. More than half the utilities have performance-based management systems, and 39 percent enforce penalties for poor performance. As part of a robust system for assessing performance efficiency, staff is subject to periodic performance evaluation in about 57 percent of the utilities. Only KIWASCO in Kenya and the Blantyre Water Board (BWB) in Malawi are subject to performance contracts and well-defined internal accountability frameworks.

Figure 3.10 Performance monitoring



Source: AICD WSS Survey Database 2007.

Outsourcing is relatively new and still not widespread. Outsourcing allows an entity to focus on its core business and has the potential to significantly lower costs. Utilities in Mozambique and Khartoum in Sudan are the only utilities that report outsourcing billing and collection, meter reading, human resources, and IT. In fact, 88 percent of the utilities score less than 40 percent on the outsourcing subindex. The cost of outsourcing in operating expenses can be quite high. For instance, outsourcing as a share of operating expenses in NWSC in Uganda is in the range of 30–40 percent (Baietti and others 2006).

Société de Distribution d'eau de Côte D'ivoire (SODECI) scores the highest on capital market discipline. The South African utilities, LWSC in Zambia, ELECTROGAZ in Rwanda, FCT in Nigeria, SEEN in Niger, and Maputo in Mozambique also score high on capital market discipline. Many firms are conscientious in following labor market rules. About one-fourth of the utilities in Africa adhere to the highest levels of labor market discipline.

How prevalent is private participation in urban water supply?

PPPs introduce a new institutional player to WSS—the private sector. Under properly structured circumstances, a private partner introduces transparent responsibilities and accountability, new business practices, an output orientation, new technologies, access to capital, and improved efficiencies. Structuring the right partnership in the WSS sector, however, is difficult and involves creating an appropriate balance of authority with accountability, incentives with penalties, and social responsibility with corporate responsibility.

Some 23—almost half—of the countries in Sub-Saharan Africa have experimented with some form of private sector participation in the water sector since the early 1990s. Of these, the vast majority have included management contracts with no investment requirement. There have also been a limited number of concessions, and some contracts that require private investment. There has been just one divestiture (of Electra in Cape Verde) and one Build-Operate-Transfer (BOT) contract (for a wastewater plant in Durban).

A high percentage of the management contracts, and almost all of the concessions, were awarded in countries with combined water and power utilities. Overall, almost half of the cases of private sector participation in water were in combined utilities of this kind, in countries such as Cape Verde, Chad, Comoros, Gabon, Gambia, Guinea-Bissau, Madagascar, Mali, Rwanda, and São Tomé.

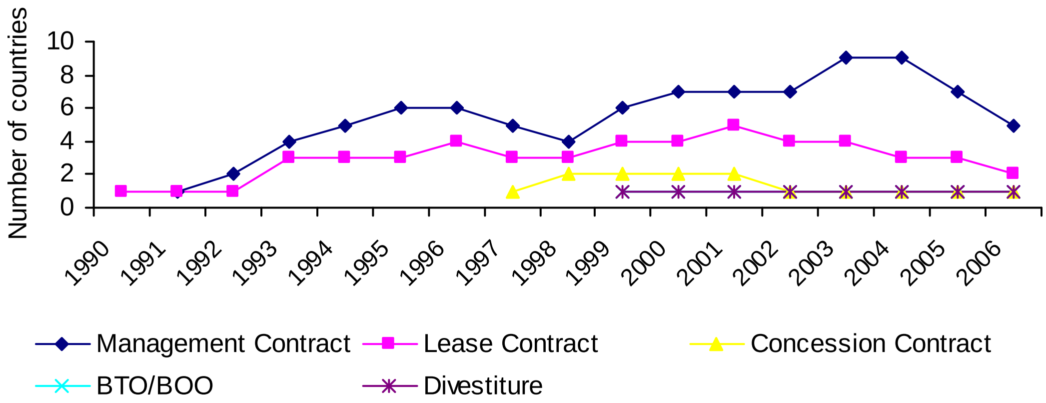
Table 3.3 Private investment in Sub-Saharan Africa, 1990–2005

Type	Number	Countries	Percentage multiutility	Percentage cancelled
Management contract	15	Chad, Congo, Dem. Rep. of, Gabon, Gambia, Ghana, Guinea-Bissau, Kenya, Madagascar, Mali, Mozambique, Rwanda, Sao Tome, South Africa, Uganda, Zambia	53	20
Lease contract	7	CAR, Gambia, Mozambique, Namibia, Niger, Senegal, South Africa, Tanzania	15	45
Concession contract	4	Comoros, Gabon, Mali, South Africa	75	50
BTO/BOO	1	South Africa	0	0
Divestiture	1	Cape Verde	100	0
Total	28	23	46	25

Source: World Bank PPI Database 2007.

Private sector contracts in Sub-Saharan Africa have a relatively high cancellation rate—25 percent overall. The failure rate is particularly high for lease contracts and concessions, where it reaches close to 50 percent. At present, the Gabon power and water concession is the only active concession contract in Sub-Saharan Africa, and even this has been experiencing recent difficulties. There are only two active lease contracts, in Namibia and Niger. As a result, many of the contracts have been curtailed long before their intended termination dates. In addition, there has been a tendency not to renew relatively short management contracts upon their expiration, let alone upgrade them to include greater private sector participation, as has sometimes been planned. As a result, the overall number of active private sector contracts on the continent has declined, from a peak of 16 in the early 2000s to only 10 today.

Figure 3.11 Evolution of private sector participation



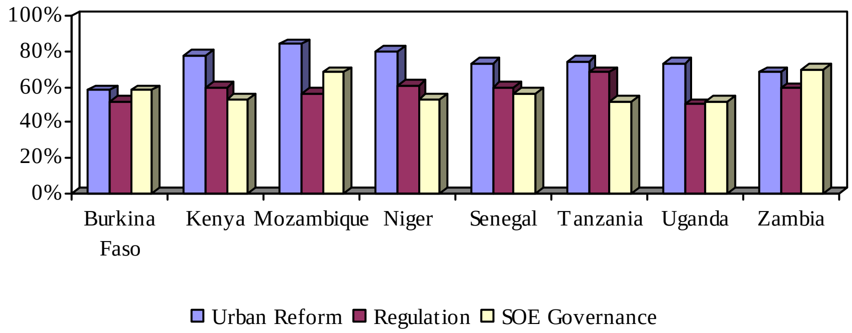
Source: World Bank PPI Database 2007.

Which countries have progressed furthest toward sector reform?

In summary, there has been significant change in the institutional organization in the water sector in Africa. Laws have been passed, regulatory agencies established, new companies have emerged and new players have entered the urban sector. Some countries have made far-reaching progress while others are still grappling with the initial steps. Mozambique, Niger, Sudan, and Kenya are in the former category, while the Democratic Republic of Congo, Namibia, Malawi, and Chad are still far behind. About half of the countries have also endeavored to set up a robust regulatory framework that is consistent with efficiency, cost recovery, and equity objectives; however, many are still not autonomous. In addition to sectorwide initiatives, there have been reforms to strengthen the internal governance structure of the urban utilities so that they can efficiently and sustainably serve the growing urban population. Experience suggests a gap between government and utility commitment to reform. It may be that strong governance is more aggressively sought by utilities or required by donors in their lending operations in order to counteract vacuums in sector reform programs. Or that many governments start a reform process at a higher level in order to establish sector expectations and obligations, before pursuing stronger internal governance.

Burkina Faso, Kenya, Mozambique, Niger, Senegal, Tanzania, Uganda, and Zambia are remarkable performers that have progressed at a steady pace on different aspects of urban sector reform. These countries have developed a robust regulatory structure, a market-oriented and accountable internal governance mechanism, and wide-ranging urban sector reforms.

Figure 3.12 Eight remarkable country performances



Source: AICD WSS Survey Database 2007.

4 Performance of water utilities

While chapter 2 looked broadly at water coverage across Sub-Saharan Africa, this chapter more closely examines the performance of the individual utilities that form the core of service provision. The low utility coverage rates in Sub-Saharan Africa reveal problems that are both the symptom and cause of different aspects of performance. A well-performing utility provides service to customers who demand it, at a level that meets their needs, and at a rate they are able and willing to pay (Tynan and Kingdom 2002).

Who has access to water and how?

While discussion of access trends typically and properly focuses on national coverage statistics derived from household surveys (and reviewed briefly in chapter 1), it is also interesting to examine the access trends that emerge directly from the utility data. These statistics focus on the access within the utility service area only, and clarify how utility water is distributed to different segments of the population. There is no reason to expect utility-based coverage statistics to coincide with those derived from household surveys. In general, coverage statistics based on household surveys tend to reveal higher access rates because they pick up the full gamut of informal and illegal connections.

With regard to piped water service, comparing household survey access rates with those that emerge from the utility data is complicated by the fact that utility service areas do not always neatly correspond to the national or urban geographic spheres covered by household surveys. For the handful of countries where a reasonable match can be made between geographic areas, the population coverage rates reported by the household surveys are 4–16 percent higher than those that emerge from the utility coverage data. Moreover, the additional served population documented by the household surveys represents 15–30 percent of the total population with access.

Table 4.1 Comparison of coverage statistics for water, based on utility data versus household surveys

	Coverage rate derived from household surveys (A)	Coverage rate derived from utility data (B)	Difference in coverage rates (A–B)	Potential rate of informality (A–B)/(A) %
SONEB (Benin)	29	25	4	14
SDE (Senegal)	77	66	11	15
ONEA (Burkina Faso)	33	25	8	25
JIRAMA (Madagascar)	17	13	4	25
Electrogaz (Rwanda)	16	11	5	30
WASA (Lesotho)	50	34	16	33

Source: AICD WSS Survey Database 2007; AICD DHS/MICS Database 2007.

In the middle-income countries (MICs), 99 percent of the population in the utility service areas receives utility water somehow, whether through private piped connections, shared connections with neighbors, or through standpost service. But in the low-income countries (LICs) only 68 percent of residents in the service area are accessing utility water, leaving a sizeable minority that must rely on other sources, such as ground or surface water. The percentage of the population in a utility service area that benefits from utility water is substantially lower in Central and Southern Africa (excluding MICs) (41 percent and 45 percent, respectively) than it is in West and East Africa (74 percent and 83 percent, respectively). But the largest difference in utility service coverage arises between countries that are water abundant (where only 48 percent of the urban population depends on utility water), and countries that are water scarce (where 92 percent of the urban population depend on utility water). The difference can be understood in terms of the limited availability of substitutes for utility water in the latter case.

Table 4.2 Overview of access patterns in the utility service area

	Access by private residential piped water connection (%)	Access by standpost (%)	Access by sharing neighbors' private connection (%)	Access to utility water by some modality (%)
By income				
LIC	30.4	19.3	14.7	68.3
MIC	88.7	9.5	0.1	99.0
By region				
Central	19.0	1.8	19.9	40.6
East	33.0	26.9	22.1	82.9
Southern*	28.3	17.7	6.8	44.7
West	31.5	17.6	6.9	74.2
By water availability**				
Scarce	66.2	14.3	4.6	92.4
Abundant	28.7	9.6	16.2	48.3
By utility size***				
Small	39.1	19.9	7.3	63.7
Large	61.1	12.6	6.1	89.8
Average	58.1	13.7	6.3	86.3

Source: AICD WSS Survey Database 2007.
Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).
**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.
***Large utilities are defined as those serving more than 100,000 connections.

In MICs, the vast majority of people who access utility water do so through private residential connections. But in LICs only around half of those who receive utility water do so via private piped connections, with the remainder relying on communal modalities such as utility standposts or informal sharing of connections among neighbors.

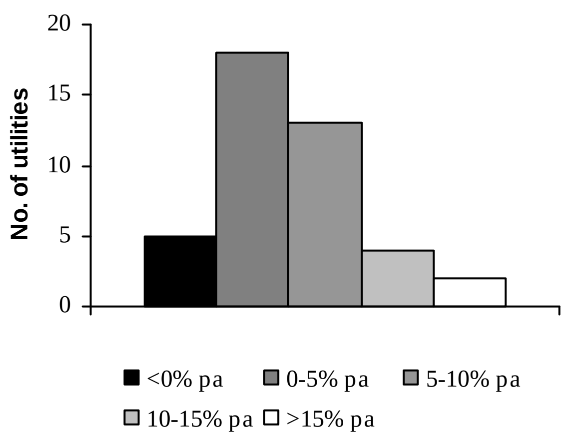
Informal sharing of connections is hardly practiced in the MICs in the sample. But among the LICs this practice is almost as common as formal utility standposts, albeit with substantial regional variations. In Central Africa, informal sharing is the dominant mode of communal access, whereas in Southern and West Africa, standposts are more prevalent. In East Africa, standposts and informal sharing of connections are practiced to an equal extent. While the median number of people served by each standpost averages 230 (which rises to 770 if only the functioning standposts are considered) in the sample as a whole, the actual number of standpost connections reported by the utilities is typically less than 1 percent of overall connections.

In addition to servicing formal clients, utilities in some countries also take the responsibility of servicing "off-grid" consumers when their service area is bigger than network area. These off-grid interventions can take the form of off-grid system boreholes, with networks or water quality checks. Lusaka and Dar es Salaam are two service areas with community partnerships to manage large off-grid systems.

How rapidly are utilities expanding water coverage?

While utilities might differ substantially in their current access rates for private piped water connections, a key issue is how quickly the coverage gap is being closed. This can be gauged by looking at the average annual growth rate of connections over recent years, which takes an average value of 5 percent across the sample. There is, however, considerable dispersion (figure 4.1). Five utilities (in the Democratic Republic of Congo, Kenya, and Nigeria) actually report an absolute decline in the number of customers connected. By contrast, the ten fastest-expanding utilities (in Benin, Cape Verde, Ethiopia, Malawi, Uganda, Zambia) are growing at an average annual rate in excess of 7 percent, a pace that would allow a doubling of the absolute number of connections if it were to be sustained over a full decade. But given an urban demographic growth rate of 3.5 percent in Africa, more than one-third of the utilities in the sample are not expanding rapidly enough to achieve positive improvements in coverage levels. In absolute terms, the largest number of new connections are being made in the largest cities; Cape Town, Johannesburg, and Lagos each add between 30–50 thousand new connections each year.

Figures 4.1 Annual average rates of expansion for private piped water connections



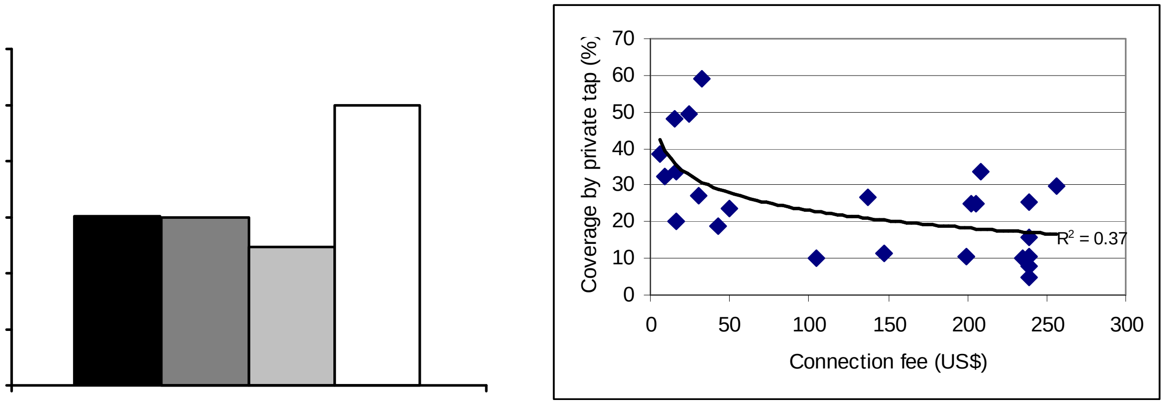
Source: AICD WSS Survey Database 2007.

One factor that might constrain the expansion of connections is the size of the connection charge. The average connection charge for piped water service, among the 26 utilities able to supply this data point, is $265. But there is huge variation in values ranging from less than a dollar in Sudan to more than $240 in Niger and Mozambique. Average connection charges in LICs, at $220, are substantially lower than those in MICs, at $320. Confining attention to LICs, there is significant negative correlation between the level of the connection charge and the coverage of private taps in the utility area (figure 4.2b).

Figure 4.2 Sources of access in relation to connection charges

(a) Frequency distribution of connection charges

(b) Coverage against level of connection charge



Source: AICD WSS Survey Database 2007.

Do utilities produce enough water to go around?

The concepts of access discussed in the preceding section focus on the reach of the distribution network. But, ultimately, the possibility of expanding coverage depends on availability of sufficient water production capacity in the service area, relative to the resident population. In the MICs, the volume of water produced is around 279 liters per day for each resident in the service area, indicating that there is already enough water available to provide a reasonable level of consumption if the distribution networks could be expanded to reach the entire population in the service area.

By contrast, in the LICs, utilities produce only 149 liters per capita per day, even just for those customers who are already connected to the system. If these utilities were to connect their entire unserved populations overnight, the availability of water would drop to only 74 liters per capita per day, suggesting that these utilities need to invest both in water production capacity and water distribution networks in order to reach universal coverage. Water availability is particularly low in Central and Western Africa, where utilities produce only 87 and 85 liters per capita per day, respectively, even for those receiving utility service. Once again, there is a striking difference in water production between water-scarce and water-abundant countries, with the former producing more than four times as much water per capita resident in the service area as the latter. This reflects the higher level of dependence on utilities as a source of water in arid environments.

Table 4.3 Water production per capita in the utility service area

	Water production per capita resident in the utility service area (per/cap/day)	Water production per capita served by utility in service area (per/cap/day)
By income		
LIC	74	149
MIC	272	277
By region		
Central	35	87
East	95	195
Southern*	126	195
West	50	85
By water availability**		
Scarce	191	238
Abundant	77	138
By utility size***		
Small	104	165
Large	179	233
Average	167	224

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

Overall, a dozen utilities (in Ethiopia, Kenya, Malawi, Mozambique, Namibia, South Africa, Zambia) have more than 100 liters per capita per day of water production available for the entire service area population if the physical infrastructure to distribute the water to them were available. At the other end of the spectrum, four utilities (in Ethiopia, Kenya, Rwanda, Sudan) produce less than 50 liters per capita per day even for their currently served population.

How well do utilities manage demand?

An assessment of demand management among water utilities can only be reliably performed for those with high metering coverage, which could therefore be expected to have relatively meaningful estimates of water consumption and nonrevenue water (NRW). The sample utilities are in four categories. The first category comprises 15 utilities that do not report on meter coverage. The second category comprises eight utilities (mainly in the Democratic Republic of Congo, Nigeria, and Sudan) with low meter coverage (less than 50 percent of residential connections), averaging 17 percent for the group. The third category comprises six utilities (mainly in South Africa) with moderate meter coverage (50–70 percent of residential connections), averaging 65 percent for the group. The fourth and final category comprises a further 19 utilities (mainly in Burkina Faso, Cape Verde, Côte de Ivoire, Ethiopia, Mozambique, Lesotho, Namibia, Niger, Rwanda, Senegal, and Uganda) with high meter coverage (greater than 70 percent of residential connections), averaging 97 percent for the group. Throughout this section, attention will be confined only to the latter three groups.

While measurements of water consumed are not necessarily very accurate available evidence suggests that end-user water consumption in the African utilities reviewed is far from excessive. On the contrary, the overall average consumption is a fairly modest 167 liters per capita per day, ranging from 201 liters per capita per day in the MICs to 79 liters per capita per day in the LICs. Among the latter, consumption is particularly low in West Africa (at 62 liters per capita per day) compared to East and Southern Africa (at 87–102 liters per capita per day). In some countries, the actual consumption per capita might be lower due to widespread prevalence of resale, particularly in periurban areas with intermittent supply.

Pricing is the main tool of demand management available to any utility, and entails both the availability of metering to support volumetric charging and the application of metered tariffs to provide an adequate cost signal to customers. The overall reported rate of water metering in sample African countries whose utilities report medium to large metering ratios stands at 74 percent, which would decline to 69 percent if utilities with low water metering ratios are considered.

The average revenue per cubic meter of water billed ranges from around $0.50 in LICs to over $1.10 in MICs. There is a similar divergence between average revenues in water-abundant countries, which are only about half that found in water-scarce countries. Within the low-income category, the highest average revenues at close to $0.65 per cubic meter are to be found in West Africa, compared with only $0.35–0.50 elsewhere in Africa. Although such levels are unlikely to cover full capital costs in most cases, they are nonetheless quite high by the standards of other developing regions. Overall, there is evidence that significant price signals are getting through to a substantial share of the customer base.

Nevertheless, the cross-regional patterns suggest that demand management does not tell the whole story. For example, the difference in water consumption between East and West Africa is small even though the former has much lower tariffs and meter penetration than the latter. One reason for this difference could be variations in the availability of supply. On the other hand, MICs with the highest tariffs also have the highest level of consumption. This may reflect the greater purchasing power of their populations.

Among utilities with metering level of about 50 percent of residential connections, a fairly strong negative correlation is found between metering levels and average residential water consumption (figure 4.3a). Essentially, these utilities divide into two groups. Those with metering ratios of 50–60 percent tend to have average water consumption around 150 liters per capita per day, and those with metering ratios of 90–100 percent tend to have average water consumption around 50 liters per capita per day. Curiously, those utilities with very low levels of meter coverage report similar values of less than 50 liters per capita per day for water consumption—though these figures cannot be regarded as entirely reliable. One possible explanation is relatively low levels of supply continuity in these utilities.

Table 4.4 Indicators of demand management calculated across utilities with metering ratios above 50 percent

	Water consumption per capita served by utility (liters per capita per day)	Metering ratio (%)	Average revenue per cubic meter of water (%)	Nonrevenue water (%)
By income				
LIC	79	97	0.48	28
MIC	201	60	1.09	27
By region				
Central	–	–	0.45	–
East	87	85	0.34	38
Southern*	102	88	0.51	44
West	62	100	0.65	21
By water availability**				
Scarce	173	69	0.83	26
Abundant	102	95	0.59	32
By utility size***				
Small	92	78	0.62	40
Large	188	69	0.81	26
Average	168	74	0.78	27

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

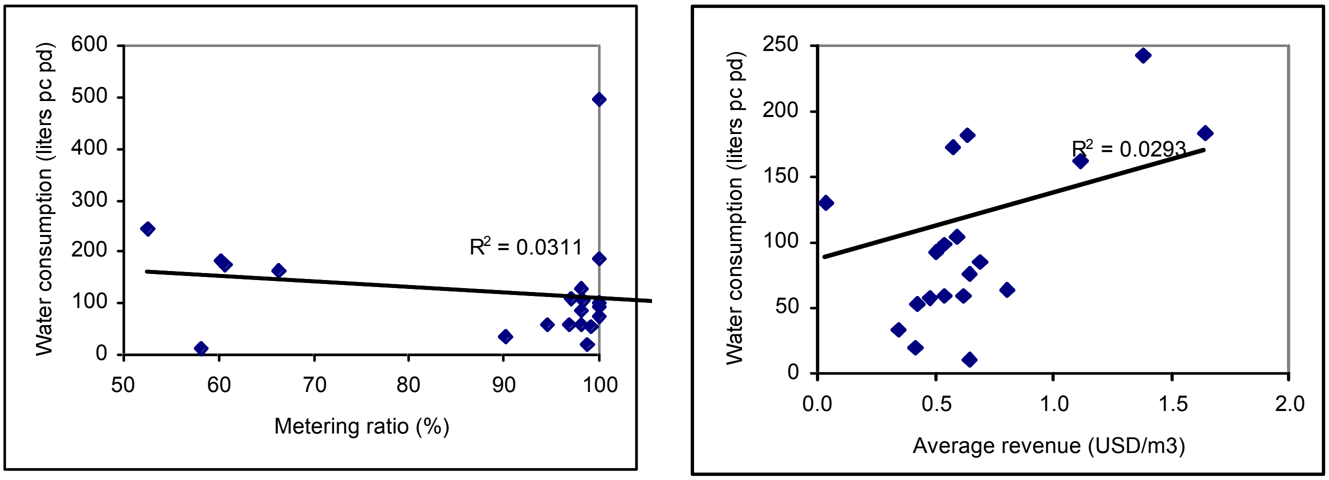
Surprisingly, consumption and price as measured by average revenue ($ per cubic meter) are positively correlated. This is because the tariff rates are near cost-recovery levels at high levels of consumption. Particularly for high-volume nonresidential consumers, utility clients pay a substantially higher price per unit of consumption.

Thus, there is no evidence of wasteful overuse of water in Africa, nor that relatively modest levels of consumption could be further reduced by more aggressive use of demand management tools.

While end-user water use can be characterized as modest, a substantial volume of water is lost during the distribution process. The average level of NRW in the sample is close to 30 percent, and well above good practice levels (below 23 percent) for developing countries (Tynan and Kingdom 2002). It is striking that there is no systematic variation in NRW between income groups. But within the low-income category there is a wide range—from little over 20 percent in West Africa, to around 40 percent in East Africa, to almost 45 percent in Southern Africa. This reflects the wide variation that exists in the sample countries (figure 4.4), from rates below 20 percent in Burkina Faso, Niger, and Namibia to rates above 50 percent in some of the utilities in Kenya, Mozambique, and Nigeria.

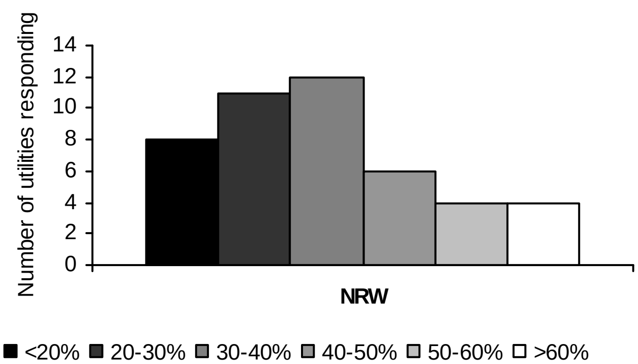
Figure 4.3 Crossplot between water consumption and other variables

(a) Against metering (b) Against average revenue



Source: AICD WSS Survey Database 2007.

Figure 4.4 Frequency distribution of nonrevenue water (NRW)



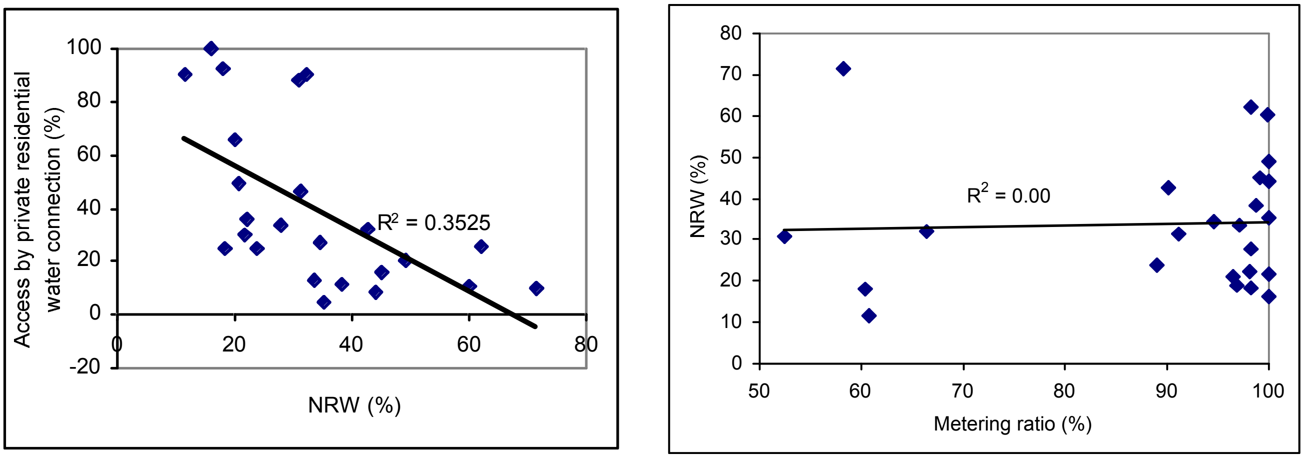
Source: AICD WSS Survey Database 2007.

NRW measures combine both technical and nontechnical losses. Experience in Asia suggests that NRW tends to be inversely proportional to access rates, since lower rates of access invite higher rates of informal and clandestine use both by households and small-scale providers (McIntosh 2003). This relationship clearly holds for the African utilities where a negative correlation of close to 30 percent is found between access rates and NRW (figure 4.5a).

Figure 4.5 Crossplots between nonrevenue water and other variables

(a) Against access

(b) Against metering



Source: AICD WSS Survey Database 2007.

In principle, higher rates of metering should help to reduce NRW by enabling utilities to pinpoint the location of losses on the network. But no evidence of such a relationship was found in the sample of African utilities considered here (figure 4.5b). In fact, among utilities claiming 100 percent meter coverage, the level of NRW ranges between 20–60 percent. Moreover, an equal range for NRW is found among utilities reporting moderate levels of meter coverage. This suggests that utilities are not making effective use of metering as a tool for controlling NRW.

How good is the quality of service?

There is only limited evidence of the quality of service provided by African utilities. Regarding water quality, the only indicator available is the percentage of samples—taken from a water treatment plant—that pass the chlorine test. This provides some indication of the effectiveness of the treatment process but says nothing about the quality of water received at the tap. The scores indicate a substantial difference in performance between utilities in MICs, which score close to 100 percent on this variable, and those in LICs, which score only 83 percent. In fact, the average for LICs is being pulled down by weak performance in the Central African utilities, where only 36 percent of samples pass the chlorine test; whereas, for the other regions the averages are close or above 90 percent.

Regarding continuity, the weighted average value for the sample is close to 21 hours. But LICs provide, on average, five hours less service per day than MICs. The worst performance on continuity is found among the Central and Southern African utilities (excluding in MICs) which report 11 and 13 hours of service per day on average. While the average statistics are relatively good, there are 10 utilities in the sample that report continuity of 12 hours or less in countries such as the Democratic Republic of Congo, Ghana, Kenya, Madagascar, Mozambique, and Nigeria.

Finally, the indicator of complaints lodged by customers is a somewhat ambiguous one since low levels of complaints could either indicate poor service or a poor system for recording complaints. Overall, the indicators show much higher levels of complaints in LICs, where almost one in five consumers lodged a complaint in the preceding year. This is driven largely by particularly high volumes in Southern and West Africa.

Table 4.5 Indicators of service quality

	Percentage of samples passing chlorine test (%)	Continuity of service (hours per day)	Complaints (per thousand connections)
By income			
LIC	83	19	149
MIC	99	24	26
By region			
Central	36	11	–
East	86	21	62
Southern*	93	14	212
West	88	20	198
By water availability**			
Scarce	86	22	79
Abundant	79	18	200
By utility size***			
Small	81	19	151
Large	84	22	79
Average	83	21	92

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

How efficiently do utilities operate?

Comparisons of labor productivity rates can be somewhat blurred due to differing reliance on contracting via service contracts. Nevertheless, a frequently used international benchmark for labor productivity is two employees per thousand connections, which has been modified to five employees per thousand connections for developing countries (Tynan and Kingdom 2002). Overall, African utilities in the sample report an average of five employees per thousand connections, which is right around the developing country benchmark cited above. The variation between low- and middle-income countries is large, ranging from nine employees per thousand connections in the former to just over three employees per thousand connections in the latter. By far the lowest levels of labor productivity are found in Central Africa, which reports 18 employees per thousand connections on average.

A commonly used international benchmark for average operating costs of water utilities is around $0.40 per cubic meter (GWI 2004). The costs reported by the African utilities are substantially above this level, ranging from $0.51 per cubic meter in LICs to $1.41 per cubic meter in MICs. The latter result largely reflects the high cost of water in Namibia and South Africa. Even within the low income group, the average operating cost ranges from $0.3 per cubic meter in East Africa to around $0.7 in Central and West Africa. Water-scarce countries face average operating costs almost double those of water-abundant countries.

The rate of bursts per kilometer of water main provides some indication of the condition of the underlying infrastructure, and hence the extent to which it is being adequately operated and maintained. Once again there is a huge variation between low- and middle-income countries, with the rate of bursts ranging from five per kilometer in the latter to just over one per kilometer in the former. The utilities in Eastern and Southern Africa report particularly high rates of bursts, exceeding 12 incidents per kilometer per year.

Table 4.6 Indicators of operational efficiency

	Labor productivity (employees per thousand connections)	Water pipe bursts (number per kilometer)	Average operating cost ($ per cubic meter)
By income			
LIC	9.1	6.4	0.51
MIC	3.2	0.9	1.41
By region			
Central	18.0	3.3	0.7
East	11.2	12.0	0.3
Southern*	8.7	11.7	0.4
West	7.3	2.4	0.6
By water availability**			
Scarce	6.0	6.1	1.03
Abundant	7.3	6.9	0.66
By utility size***			
Small	14.0	7.1	0.55
Large	5.0	6.0	1.01
Average	6.3	6.3	0.95

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

Overall, African utilities allocate just over 20 percent of their operating expenses to labor, and just under 20 percent to energy. The structure of operating expenses differs substantially across the different utility groups. In particular, the utilities in LICs allocate almost twice as high a share of their operating expenses to labor and energy and almost three times as high a share of their operating expenses to service contracts than do the utilities in MICs. One simple explanation for this is that in both Namibia and South Africa water-distribution utilities are not engaged in production, but instead purchase their water from bulk-supply utilities. As a result, a significant share of their operating expenses go to bulk water purchase, and their direct labor and energy costs are correspondingly reduced. Utilities in West Africa appear to rely on service contracts to a far greater degree than in the other regions, allocating more than 20 percent of their operating expenses to this item. This may also explain why West African utilities have a significantly lower labor cost share than those in other geographical regions.

Table 4.7 Utility cost structures

	Share of labor costs in operating expenses (%)	Share of energy costs in operating expenses (%)	Share of service contracts in operating expenses (%)
By income			
LIC	29.3	19.7	16.7
MIC	16.5	11.4	6.4
By region			
Central	27.9	10.3	–
East	36.3	31.9	5.0
Southern*	32.5	19.2	8.8
West	22.7	14.4	22.1
By water availability**			
Scarce	21.5	24.5	14.9
Abundant	27.3	12.7	5.6
By utility size***			
Small	27.3	22.7	12.2
Large	22.2	18.7	12.7
Average	22.8	19.6	12.7

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

The average operating ratio for the sample is just above unity, indicating that operating costs are covered with a narrow margin that likely falls short of what is needed to recoup capital expenditures. This is still somewhat below the benchmark level of 1.3 for developing countries identified by Tynan and Kingdom (2002). Paradoxically, the operating ratio reported for MICs is below unity and below that reported by LICs. One reason for this may be the exceptionally high operating costs (in excess of one dollar per cubic meter) that are reported by utilities in MICs. The utilities in West, East, and Southern Africa report substantially higher operating ratios than those in Central Africa.

The African utilities surveyed report on average high collection ratios of over 96 percent on average. The lowest levels of collection efficiency are reported in Central (70 percent) and East (83 percent) Africa. The rates reported for West Africa exceed 100 percent, which may simply reflect a drive to collect arrears from earlier periods.

Government entities feature among the most important consumer groups for water utilities, capturing a significant portion of total billings. For instance, in Régie de Production et de Distribution D'eau (REGIDESO) in the Democratic Republic of Congo, 42 percent of total billings is represented by government entities, followed by ONEA, SODESI, Lilongwe Water Board (LWB), and NWSC, which have government agencies encapsulating 20–30 percent of total billings. They can be the worst offenders in paying bills as well. Though direct evidence on government arrears is not available, it is worth noting that the highest collection period—in REGIDESO—lasts about 2000 days.

Owing to the absence of consistent standardized accounting standards, data on asset values can be taken as only broadly indicative. Replacement cost accounting is not widely practiced, and hence reported values likely reflect historic costs of investment. The average value of gross fixed assets per water connection works out at $555. But there is a variation of about four to one in the average values reported for different subgroups for reasons that cannot be easily explained.

Few coherent data points were obtainable on utility debt, and the debt service profile is unclear. From the limited information available, it appears that long-term debt is not on utility balance sheets. There are a number of potential explanations for this including underreporting of debt, grant financing of capital, or postponement of investments. But based on information collected elsewhere for this study the most likely explanation appears to be that debts for the water sector are incurred and held at the central government level, with utilities simply acting as recipients of capital grants. As a result, the derived debt-service ratios (for eighteen utilities) indicate that levels of debt are so minimal as to be easily covered by the utilities through operating revenue. More likely is the scenario that debt is held at the government level and so does not appear on the utility accounts.

Table 4.8 Utility financial ratios

	Collection efficiency (%)	Operating ratio	Debt service ratio	Value of gross fixed assets per connection ($)	Implicit collection efficiency (%)
By income					
LIC	96	1.1	18.2	706	74
MIC	99	0.8	4.4	315	72
By region					
Central	70	0.6	11.2	266	75
East	83	1.3	32.3	321	65
Southern*	96	1.0	9.3	1,090	77
West	120	1.0	13.0	750	79
By water availability**					
Scarce	86	1.0	14.2	452	70
Abundant	110	0.9	8.6	784	87
By utility size***					
Small	89	1.0	13.3	1,033	65
Large	99	1.0	13.0	445	75
Average	96	1.0	13.1	555	73

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

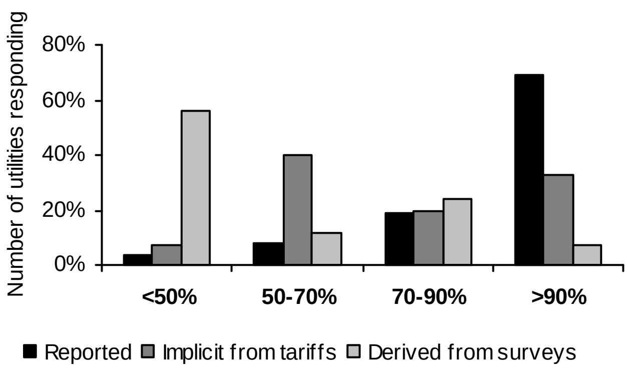
**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

The collection-efficiency ratios reported by the utilities are very high relative to the experience of practitioners in the sector. A number of cross-checks were therefore carried out on the data. First, it is possible using household survey data to calculate the percentage of households with water service that do not report paying a utility bill. This provides a first-order estimate of the extent of undercollection from the residential sector; although it is likely to overestimate the phenomenon since it does not distinguish between formal connections that do not pay for service, and informal connections that are not billed for service. Second, it is possible to compare the average revenue that the utility collects per cubic meter with the average tariff charged based on the tariff schedule; this indicates the extent to which revenues fall short of the tariffs that have been charged. Figure 4.6 below compares the distribution for these three measures of collection efficiency. Whereas the vast majority of utilities report collection ratios above 90 percent, almost half of the utilities present implicit collection rates below 70 percent, while more than half of utilities collect tariff revenues from fewer than 50 percent of their customers according to household surveys.

Figure 4.6 Reported versus implicit collection ratios



Source: AICD WSS Survey Database, 2007; AICD DHS/MICS Survey Database, 2007

The questionable information on collection ratios in Africa leads to the comparison of cost recovery under optimal collection vis-à-vis reported cost-recovery ratios. Simply explained, it is the difference between what full-cost recovery should be and what it is. Under an optimal scenario, the cost-recovery ratio is defined as the average effective tariff at 10 cubic meters of consumption to the average cost recovery tariff. The water-abundant countries and large utilities have a very low cost-recovery ratio under optimal collection compared to water-scarce countries and small utilities, maybe because it becomes critical to design a tariff structure to achieve cost recovery in such circumstances.

Ideally, cost-recovery ratios under optimal collection should be higher than current cost-recovery ratios. This is not true in Africa. African utilities are expected to recover 43 percent of their total cost based on their tariff structure, but in reality they cover about 49 percent of the total cost of supply, driven by a few utilities that are raising more per unit of water sold compared to the average effective tariff of each unit. These utilities have tariff structures that are designed to charge low prices at initial volumes of consumption to assist the poor consumers. Consequently, the average effective tariff at 10 cubic meters ends up being lower than average revenue per cubic meter of consumption, when coupled with relatively high collection rates in these utilities.

Table 4.9 Utility cost-recovery ratios

	Average operating cost ($/m3)	Average operating revenue ($/m3)	Cost-recovery ratio (%)	Cost-recovery ratio under optimal collection (%)
By income				
LIC	0.5	0.5	40.0	46.5
MIC	1.4	1.1	61.0	39.6
By region				
Central	0.7	0.4	40.6	5.7
East	0.3	0.3	41.0	62.7
Southern*	0.4	0.4	23.0	45.4
West	0.6	0.7	48.1	47.6
By water availability**				
Scarce	1.0	0.8	50.8	48.8
Abundant	0.6	0.5	42.0	19.0
By utility size***				
Small	0.6	0.6	47.0	66.8
Large	1.0	0.8	49.6	39.5
Average	0.9	0.8	49.2	43.4

Source: AICD WSS Survey Database 2007.

Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC=low-income country; MIC= middle-income country.

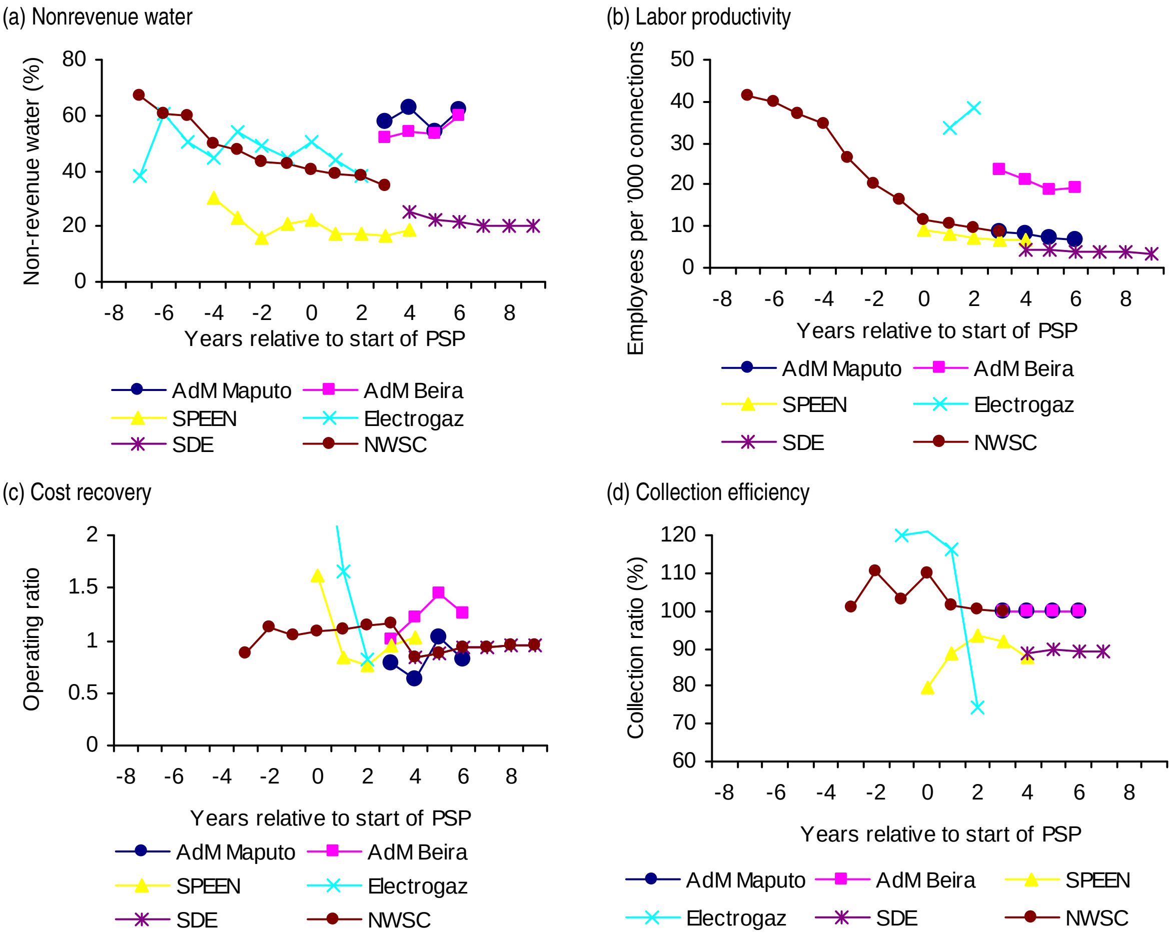
How do utilities fare with private participation?

Approximately fifteen utilities surveyed for this study had experienced some kind of private sector participation. But only for three of these—Electrogaz (Rwanda), NWSC (Uganda), and SPEN (Niger)—was it possible to compare key performance variables across the periods before and during private participation. In a number of other cases—SDE (Senegal) and the Mozambican utilities—data were available only for the period of private participation, without the possibility of comparing long-term performance trends.

There are four performance variables on which private participation could have an impact in the short to medium term. These are: cost recovery (since prices are often adjusted in the run-up to private participation); collection efficiency (often the first focus of private management efforts); labor productivity (since the private sector typically has greater freedom to fire excess labor force); and NRW (another area where private management attention tends to focus, although typically one that takes longer to impact).

The available evidence for cost recovery and collection efficiency is not conclusive, particularly given the problems already noted with the collection efficiency variable. But in the case of labor productivity and NRW, there is a discernible downward trend in many cases of private participation. Labor productivity appears to converge in the range of 5–10 employees per 1,000 connections; however, this is no better than the overall sample average of 5 employees per 1,000 connections. Nonrevenue water appears to converge in the 20–40 percent range; but, once again, this is no better than the overall sample average of 30 percent for NRW. The most impressive gains can be seen in the case of NWSC (Uganda)—also the utility with the longest time series of data—but most were made in the period prior to private participation.

Figure 4.7 Performance trends in utilities with private participation



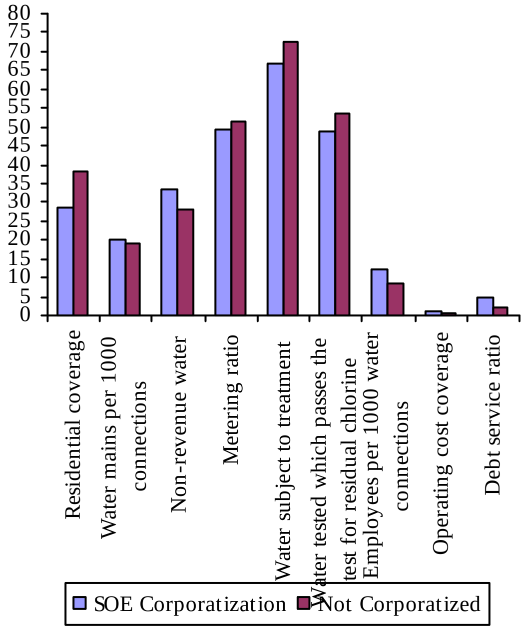
Source: AICD WSS Survey Database 2007.

How do decentralized and corporatized utilities fare?

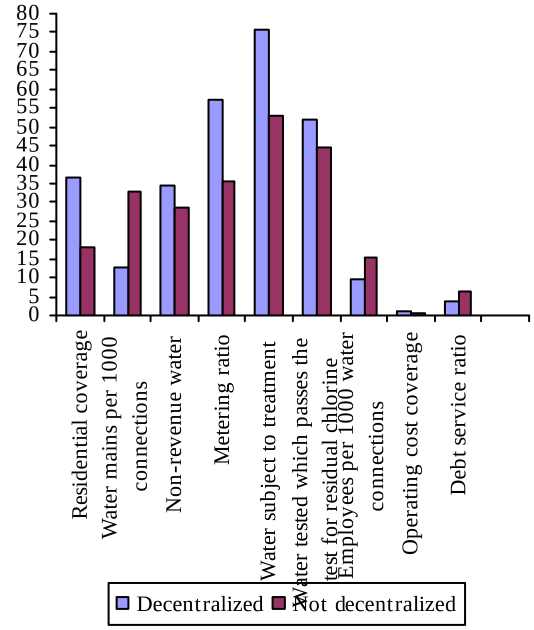
Decentralization and corporatization were the most important cornerstones of the water reform agenda of the 1990s, which aimed to attract private participation to utility operations. In many countries, almost a decade has passed since these initiatives. Have they made a difference to utilities' technical and financial performance? The results that emerge from an assessment of about 10 indicators, divided by corporatization and decentralization status, suggests mixed results. There is no evidence that decentralization or corporatization have proved to be better alternatives to noncorporate or centralized status.

Figure 4.8 Utility performance, by corporatization and decentralization status

(a) By corporatization status



(b) By decentralization status



Source: AICD WSS Survey Database 2007.

Which are the most efficient utilities overall?

Some utilities perform better on some dimensions and worse on others, making it difficult to reach any overall conclusions on performance. One way of presenting a global measure of utility efficiency is to estimate the financial losses associated with undercollected revenues, distribution losses, and underpricing—and to express these as a percentage of the utilities' overall turnover. The best utilities are Walvis Bay and Oshakati in Namibia, ELECTRA in Cape Verde, and Société Nationale des Eaux du Benin (SONEB) in Benin, measured in terms of minimal hidden losses expressed as share of revenues. On average, utilities' overall inefficiencies are equal in value to around 80 percent of their turnover. Another way of putting this is to say that, on average, the utilities are able to capture little more than half of their potential revenue, given the volumes of water they produce.

On average, underpricing is the most important form of inefficiency, as tariffs are set far below cost recovery. Among the endogenous sources of utility inefficiency, about half derive from undercollection and half from unaccounted-for water. But the relative weight of these two types of inefficiencies varies substantially across the sample.

There is a huge performance range apparent across the sample of 29 utilities, for which the calculation on endogenous inefficiencies (unaccounted-for water and undercollection) could be made (figure 4.9). At one end of the spectrum, there are utilities such as Drakenstein (South Africa), SPEN (Niger), SODECI (Côte de Ivoire), Dire Dawa (Ethiopia), and SONEB (Benin), which are losing less than 10 percent of their revenues to inefficiencies. At the other end of the spectrum, there are utilities such as FCT and Plateau (both Nigerian), LWSC, Nkana Water and Sewerage Company (NWSC), and SWSC (all Zambian), as well as the utilities serving Khartoum and Mombasa, which are losing more than 100 percent of their revenues to inefficiencies. In the worst cases, the utilities are capturing barely a third of the revenues that correspond to their level of water production. Finally, it is important to note that these efficiency measures do not take into account any excess costs associated with overmanning, which was not possible to gauge from the available data, but simply the inefficiencies associated with distribution and collection.

Utilities in LICs are inefficient by several orders of magnitude compared to middle-income countries. The total hidden cost or quasifiscal deficit (elaborated in chapter 5) captures almost 200 percent of utility revenues in LICs, and more than half is due to underpricing. Among the regions, the utilities in Central Africa perform remarkably well on undercollection but worst on underpricing. Small utilities perform consistently worse on accumulating hidden costs and its components compared to larger utilities.

Table 4.10 Utility efficiency cost-recovery ratios

	Total hidden costs as % of total revenues	Unaccounted for water as % of total revenues	Undercollection as % of total revenues	Underpricing as % of total revenues
By income				
LIC	186	34	34	118
MIC	68	5	8	55
By region				
Central	207	44	2	161
East	154	39	48	67
Southern*	184	60	42	82
West	202	22	27	153
By water availability**				
Scarce	171	33	41	97
Abundant	200	32	15	152
By utility size***				
Small	267	46	66	155
Large	149	28	21	100
Average	180	33	33	115

Source: AICD WSS Survey Database 2007.

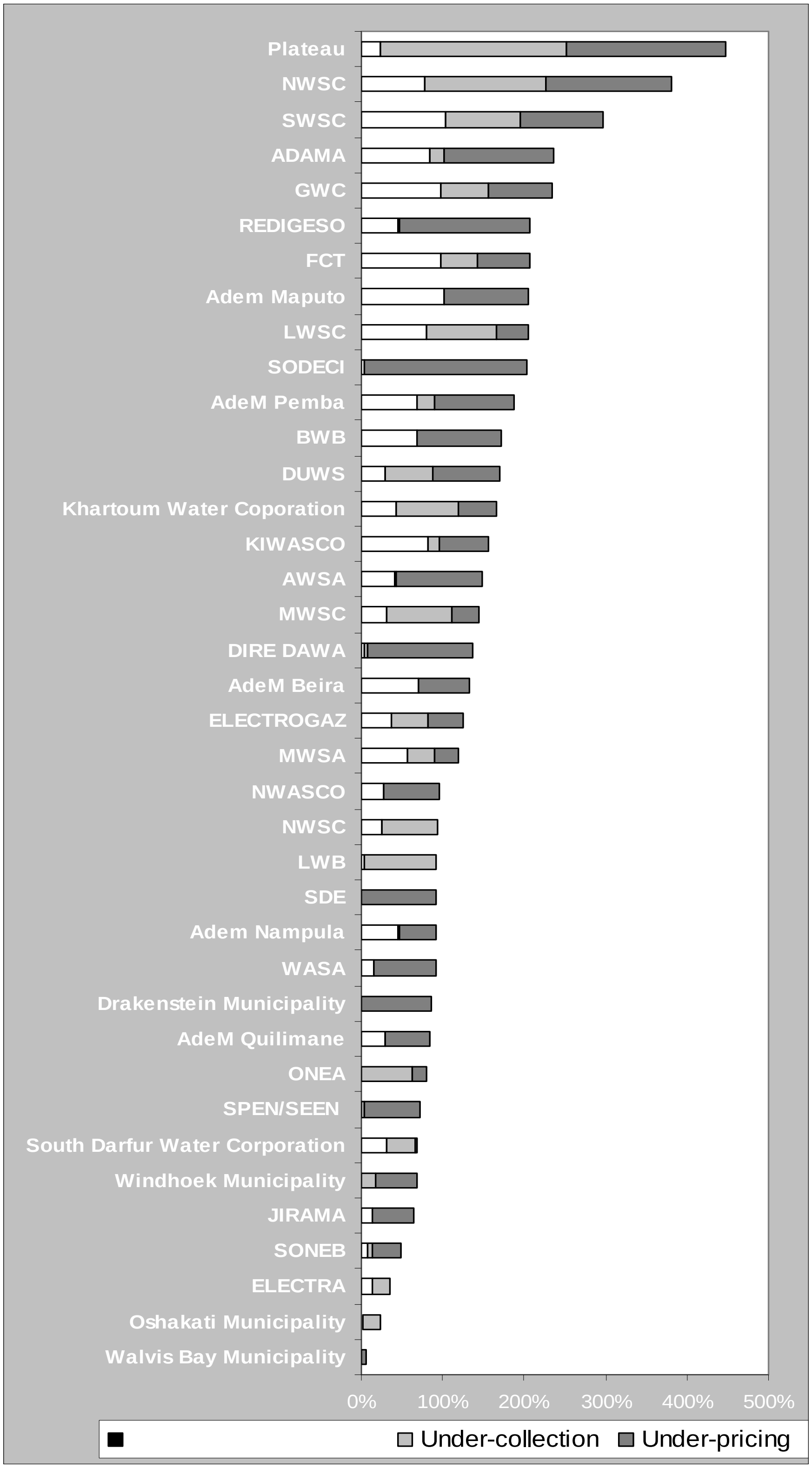
Note: *Southern Africa regional average excludes MICs (Lesotho, Namibia, and South Africa).

**Water abundance defined as renewable internal freshwater resources per capita in excess of 3,000 cubic meters.

***Large utilities are defined as those serving more than 100,000 connections.

LIC = low-income country; MIC = middle-income country.

Figure 4.9 Utility inefficiencies as percentage of total utility revenues



5 Water sector resources

The welfare implications of safe water sources cannot be overstated. In fiscal terms, the benefit of providing universal water and sanitation facilities is estimated at $23.5 billion per year (HDR 2006). Ensuring adequate service delivery requires not only the establishment of effective institutional structures but the securing of long-term financing. Compounding the challenge of financing water supply and sanitation (WSS) in Africa are the rising capital and rehabilitation costs needed to meet the Millennium Development Goals (MDGs) in the short term and to ensure a secure water future in the long term. To understand water-supply performance in Africa, it is critical to look not only at the outputs in terms of financial and operating indicators, but at the overall resources utilized by the sector, whether explicit or not. These resources are necessary to generate revenue, leverage additional resources, and build the sector's financial sustainability.

The inherent nature of the WSS sector lends itself to public funding, but the resources needed to meet the MDGs has compelled African countries to search for new financing sources. The possible and ideal way to increase resource availability—aside from continued dependence on public and overseas flows—would be to enhance utilities' financial viability and attract the international and local private sector using risk-mitigation and insurance instruments. In this chapter, we explore different resource flows to the WSS sector vis-à-vis investment needs, and analyze the obstacles to achieving cost recovery. Finally, we arrive at an estimate of investment needs after accounting for the different financing flows that epitomize the challenge of financing water supply in Africa.

The financing requirements of Africa's WSS sector

There have been a number of efforts to cost the water MDG effort. Fonseca and Cardone (2005) present and compare the nine original cost estimates to reach the water MDG, but find making comparisons difficult because of the varied assumptions adopted in the estimations. The assumptions relating to the definition of "proportion of people," "sustainable access to improved water supply," and "appropriate technologies and basic level of service" are open to interpretation. In addition, most estimate only capital needs, not the rehabilitation and maintenance expenditure requirements. Estimates of WSS global investment needs range from $6.5 billion (the UN MDG Task Force on Water and Sanitation in 2004) to $75 billion (the World Water Vision in 2000). Toubkiss (2006) compares eleven cost estimates from various international and regional institutions. These vary from $1 billion to $7 billion per year till 2015 to meet the water MDG.

A comprehensive needs assessment exercise of the Water and Sanitation Program (WSP), outlined in Mehta and others (2005), pegs water investment needs at 1.3 percent of Africa's gross domestic product (GDP), with operations and maintenance (O&M) costs slightly higher. It is necessary to not only estimate the costs of expansion to serve new customers, but also the O&M of existing networks to provide adequate service to both new and existing customers. This method employs unit cost estimates from the Joint Monitoring Program (JMP) and assumes O&M expenditures to be 10 percent of the replacement value of assets, and sector development to be 2 percent of total needs. The annual cost in Africa's countries is estimated at $3.3 billion—55 percent in O&M expenditures and the rest in capital investment and sector management.

Financing requirements of the MDGs are also articulated using macroeconomic models. Estache (2005) estimates that to meet the MDGs in 2015, Africa needs to grow by 7 percent, which in turn implies a expenditure of 0.7 percent in water and 1.1 percent in sanitation. The funding requirements for the water sector are lower than other infrastructure sectors such as energy, telecommunications, and transport. Together, annual investment needs in infrastructure are estimated at $22–24 billion over the next ten years. For the water sector specifically, Africa needs to spend approximately $2.5 billion annually in the same period. The disaggregated investment needs for capital and O&M is approximately similar for water supply and sanitation (WSS) overall.

In summary, water-financing needs estimates vary from 0.7 percent to 1.3 percent of GDP, based on Mehta and others (2005) and Estache (2005), which are the only two to present a continent-wide picture. The capital needs are similar at 0.4 percent of GDP in both estimation procedures, however, financing needs for O&M is more than double in the estimate of Mehta and others (2005). Neither account for rehabilitation expenditures, which can be substantial in many countries given the prevalence of old capital assets. Mehta and others (2005) note that financing needs are therefore an underestimate as they assume low service in their model and a low end of rehabilitation costs (integrated with O&M). For the purposes of this chapter, Mehta and others (2005) estimates will be employed to compare against existing financing sources.

Table 5.1 Annual financing required to meet the MDGs, 2005–15 (% of GDP)

	Capital	O&M	Sector management	Total
Mehta and others (2005)	0.4	0.7	0.2	1.3
Estache (2005)	0.4	0.3		0.7

Source: Estache 2005; Mehta and others 2005.

Sources of funding available to the WSS sector

Public spending

Public spending on water is the most important source of funding for the WSS sector, though it captures a minuscule proportion of GDP. Despite being considered a crucial sector for productivity and welfare, spending on WSS in developing countries has been a low priority and ranges between 1 percent in Africa to 3 percent in Latin American and the Caribbean. There are approximations that peg the spending at higher levels of GDP. For instance, Muhairwe (2006) notes that African governments spend about 3–10 percent of national budgets on water infrastructure. Some countries have increased emphasis on water spending over time. For instance, in Uganda, budget allocations to the sector increased from 0.5 percent to 2.5 percent of public expenditure between 1997 and 2004 (DATA report 2007).

Based on recent work by Briceño-Garmendia and Foster (2007), who present public expenditure data for four East African countries—Kenya, Tanzania, Rwanda, and Uganda—it is evident that these countries spend about 6–8 percent of GDP on infrastructure, and sectoral allocation is heavily skewed toward the power sector, which consumes 40–60 percent of total infrastructure budget. Measured as a share of GDP, the spending on water is by far the lowest at about 1 percent compared to power, transport, or telecommunications.

According to new evidence from AICD, which examines infrastructure spending in 20 countries in Africa,[5] average capital spending is estimated at 0.54 percent of GDP. The maximum capital spending—almost 2 percent of GDP—is found in Niger. The other countries where capital spending constitutes more than 1 percent of GDP are Senegal and Zambia. At the other end of the spectrum are countries such as Lesotho, Côte d'Ivoire, and South Africa where capital spending is a minimal share of GDP. In 12 of the 20 countries for which detailed information is available, the capital spending is more than 50 percent of total spending. In Madagascar, Chad, Mozambique, and Nigeria, capital spending composes almost all of the spending on water. For the rest, the O&M including wages constitute the bulk of the total spending. In Lesotho, Malawi, Namibia, and South Africa, the capital spending is less than 20 percent of total spending on water (Briceño-Garmendia and Smits 2008).

On average, O&M spending is lower than capital spending, at about 0.44 percent of GDP. Namibia, for instance, spends about 3 percent of its GDP on water utilities' operating expenditures. Excluding Namibia, which appears to be an outlier in its spending structure, the average O&M expenditure falls at 0.3 percent of GDP. Ethiopia is the only other country that spends more than 1 percent of GDP on the O&M of utility assets. In eight countries, operating expenditure is higher than the capital expenditure as a share of GDP. The notion that African utilities are not spending on O&M is not factual in all countries; more than one-third are spending the equivalent of capital spending or higher on maintaining their assets.

Public spending on WSS is primarily channeled through the central government and utilities themselves. While local governments are responsible for water supply in a number of economies, data on their spending are scant. In South Africa, for instance, the local governments spend 0.7 percent of GDP on water, more than the central government or state-owned enterprises (SOEs). Wages and salaries and other current expenditure constitute a relatively small proportion of the central government spending. But investing in capital assets does not seem to be the prerogative of SOEs that spend primarily nonwage current expenditure. There are a few exceptions such as Benin, Burkina Faso, Cameroon, and Namibia, where SOE investment constitutes more than 80 percent of the total capital spending on water. Compared to water utilities, capital investments by power sector parastatals represent 60–70 percent of total spending (Briceño-Garmendia and Foster 2007).

[5] AICD Fiscal Database 2008. The database does not yet include data on Sudan, the Democratic Republic of Congo, Burkina Faso, and Cape Verde. Not that there can be significant underreporting of expenditures since the budget systems are not adequately developed. Also, spending at the subnational levels important to the water sector are more difficult to capture.

Table 5.2 Public investment in capital and O&M

	Total expenditures	Capital Expenditures	Current expenditures	Share of capital expenditure	Capital execution ratio	Operating execution ratio
Benin	0.62	0.27	0.36	0.43		
Cameroon	0.79	0.46	0.33	0.59	45	113
Cape Verde	0.86	0.86	0.00		42	97
Chad	0.35	0.35	0.01	0.98		
Côte D'Ivoire	0.39	0.04	0.34	0.11		
Ethiopia	2.02	0.74	1.28	0.37	16	73
Ghana	1.16	0.35	0.81	0.30	38	62
Kenya	0.29	0.21	0.08	0.72	58	79
Lesotho	0.85	0.10	0.75	0.12	64	67
Madagascar	0.20	0.20	0.01	0.97		
Malawi	0.99	0.18	0.80	0.18		
Mozambique	0.99	0.97	0.02	0.98		
Namibia	2.88	0.27	2.61	0.09	79	60
Niger	2.55	2.14	0.42	0.84		98
Nigeria	0.59	0.56	0.02	0.96		
Rwanda	0.85	0.56	0.29	0.66		
Senegal	1.45	1.19	0.26	0.82		
South Africa	0.74	0.06	0.69	0.07		
Tanzania	0.39	0.24	0.15	0.62	70	86
Uganda	0.77	0.58	0.18	0.76		
Zambia	1.58	1.05	0.53	0.66		
Average	**1.01**	**0.54**	**0.47**	**0.56**		

Source: Briceño-Garmendia and Smits 2008.

Foreign aid

The WSS[6] sector has traditionally attracted significant volumes of overseas development assistance (ODA) and is usually channeled to the sector through the budget. ODA, offered by both bilateral and multilateral donors, includes grants and concessionary loans and, in essence, represent cheap money for its recipients. The ODA flows in the WSS sector have been relatively modest compared to other regions and sectors. About half of donor funding is directed to Asia, with only 15 percent allocated to Africa. Among the African countries, only Senegal and Burkina Faso feature in the top ten aid recipients for WSS in the world. Even within the total DAC members' sector-allocable aid, the share of WSS fell from 9 percent in 1999–2000 to 6 percent in 2001–2002 (Benn 2006).

International Development Association (IDA) credits and bilateral ODA represent the most important sources of aid in Africa and significantly contribute to public spending in the sector. For instance, Kenya and Ghana receive 62 percent and 90 percent, respectively, of their WSS financing from donors (WSP 2006). The main bilateral donors are Japan, the United States, France, and Germany (Benn, 2006). The reasons for donor attention are manifold—facilitating the achievement of MDGs is in the agenda of multilateral and bilateral donors and MDG no. 7 is the only one with direct relevance to infrastructure.

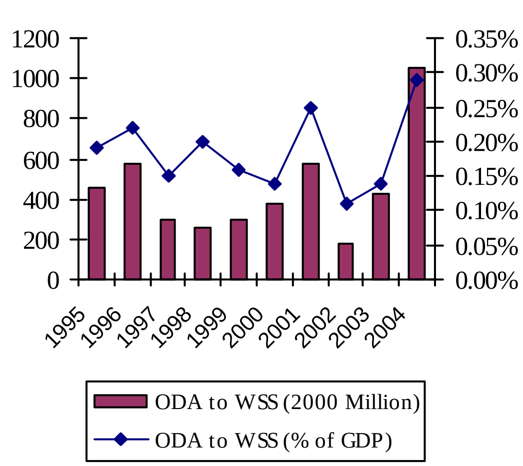
[6] ODA is reported as an aggregate number for WSS. Sanitation constitutes a minuscule proportion of the total aid.

The lack of private capital in water has meant that donors have had to step in. The competitive nature of other services such as telecommunications, transport, and energy has attracted significantly higher volumes of private capital, leaving the water sector to be financed primarily by public expenditure and ODA.

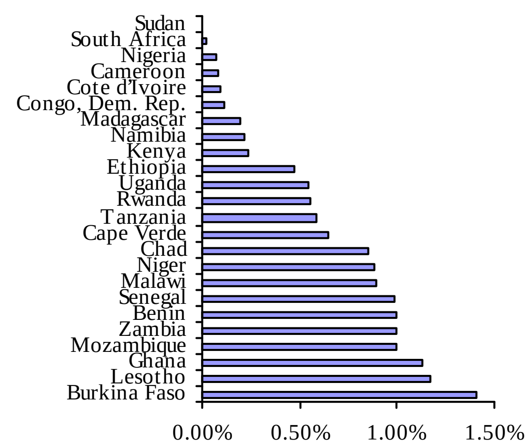
An annual average of $800 million in ODA has flowed into African WSS since 2000. Ethiopia, Tanzania, and Mozambique are the highest recipients of aid in the past five years. On the other hand, Sudan and Côte d'Ivoire have received less than $10 million each year for water services. OECD (2001) estimates an annual per capita aid of $0.62 to developing countries. In comparison, the annual per capita WSS aid in Africa between 1990 and 2004 is $3.4. Mauritius, Gabon, and Cape Verde received aid of more than $10 per capita. At the other extreme are poor countries such as the Democratic Republic of Congo and Sudan, which have received about $0.2 per capita in WSS aid in the past 15 years. As share of GDP, donor funding to WSS represents more than 1 percent of GDP in Burkina Faso, Lesotho, Ghana, Mozambique, Zambia, Benin, and Senegal (figure 5.1b).

Figure 5.1 Magnitude and share of ODA for WSS

(a) Volume of ODA to WSS



(b) ODA as Share of GDP



Source: Own calculations from OECD DAC database.

Aid inflows into Africa have been inconsistent and unpredictable (figure 4.1a). It is therefore difficult to plan for ODA in the national budget allocations to the sector. At the heart of the problem is the discrepancy between commitments and disbursements of aid inflows. The commitments can be cancelled, reduced, or delayed. Information garnered for 20 development assistance committee (DAC) bilateral donors by OECD suggests that disbursements can actually be a fraction of commitments. For instance, in 1998–99 and 2000–2001, disbursements were a little above half of the commitments. This is often a result of the water project cycle, in which disbursements peak with a time lag after the initial commitment.

The bilateral and multilateral donors will continue to remain key stakeholders in the water sector in Africa in the future years. Their role needs to expand from that of only a financing vehicle. Currently, ODA's role in increasing private sponsor and community resources is underutilized. Tighter mechanisms to monitor the effectiveness of aid inflows and more cohesive donor efforts are needed to avoid waste and fragmentation and impose fiscal discipline and accountability (GWP, 2003).

In recent years, there has been a push toward sector coordination, pooling donor resources together, moving away from piecemeal project-level funding, channeling resources through the budget, and, finally, aligning with government priorities for the sector. Benin, Burkina Faso, Ghana, Malawi, Mozambique, Rwanda, Tanzania, and Uganda have budget-support donor groups. Of these countries, six have a formal mechanism of donor coordination.[7] The poverty reduction support credits (PRSCs) have emerged as an instrument that brings the WSS programs of different donors under one platform and improves the predictability of aid flows. In Uganda, for instance, general budget support has raised the budget allocations to WSS from 0.5 percent of GDP in 1999 to 2.8 percent in 2002.

Nongovernmental organizations (NGOs) have also been active in the water sector, particularly in periurban and rural areas. They are often involved in financing and maintaining standposts and kiosks in the rapidly growing periurban areas or building small piped systems and boreholes in rural areas. They often partner with the domestic private sector in these interventions and build capacity at the community level to ensure project sustainability in the long run. The approach is usually demand driven and projects are designed based on community needs in the immediate and long term. International NGOs such as Wateraid and CARE are active in a number of African countries installing local technologies and working with communities to serve the poor. For instance, Wateraid focuses on hand-dug wells and also provides nylon water filters to prevent the spread of guinea worms, helping over 50,000 people annually in Ghana. Similarly, CARE is very active in installing and maintaining kiosks in periurban areas in Lusaka. In Malawi, rural water points have been mapped for 24 of the 28 districts to evaluate how these points are distributed across the rural areas. In many countries such as Uganda, Wateraid has also taken an advocacy position to integrate the work of many NGOs active in the sector and also to raise the profile of NGOs in the sector. The magnitude of NGO funding in Africa is not exactly known, but NGOs' role in sector management and capacity building and developing innovative local solutions is widely recognized in Africa.

Water expenditure data is deficient. There are serious problems with accounting and recording of financing flows at all levels of government. The decentralization of water service delivery in many countries has meant local governments are responsible for the budget process, and spending at the subnational levels has become important to capture, but the capacity to manage budgets declines at the subregional level. In addition, the NGO financing is usually not captured in the budget and recording of ODA inflows in the national budget can be ad hoc and incomplete. Further, the discrepancies between commitments and disbursements of aid inflows make the budgeting for WSS activities unpredictable. Therefore, there is significant underreporting of resources flowing to the sector and, in all probability, public spending is higher than actually captured in the data.

The crucial ingredient to attract financiers is to have an appropriate project-screening process that puts forth only the economically and financially viable projects. Examining capital execution ratios and delays in project investment portfolio provides a snapshot of project efficiency. Projects in the WSS sector have a budget execution ratio of 50–60 percent in capital expenditure, and about 87 percent in current expenditures. The capital execution ratio in the water sector is similar to that of other infrastructure sectors. But the operating expenditure budget-execution ratio is significantly lower for water than other infrastructure sectors. In addition, there is some scanty evidence from Kenya that

7 http://www.spa-psa.org/resources/2005/summaryfinal.pdf

externally financed projects proceed more rapidly than domestically financed ones. In summary, the institutional mechanisms required for economically viable projects to emerge and for public investment to be adequately spent are still nascent in Africa (Briceño-Garmendia and Foster 2007).

Efficiency of public resources spent on WSS

Quantity and quality of resource flows are complementary. In addition to the volume of resources flowing into the sector, it is critical to examine how these resources are spent and whether countries are getting value for their money. In the past ten years, thousands of Africans have moved into the fold of improved water coverage and governments have spent millions of dollars for this purpose. The investment effectiveness depends on where and how resources are spent. How much does it cost to move one person into improved utility coverage and how does it differ across countries?

For the purposes of this analysis, the focus is on the number of people who have moved annually from unimproved sources to utility water and how much resources were spent. The number of people gaining access each year is derived from at least two demographic and health surveys (DHSs) in the past 15 years. The difference in piped water and standpost coverage in the two time periods is smoothed across time results in the variable "number of people gaining access each year." The number of people gaining access to utility water every year stretches from only about 0.2 percent of the population in Zambia to about 4 percent in Benin. In terms of the absolute number of people gaining access every year, Ethiopia and Tanzania have been remarkably successful. They have annually provided 1.5 million people with utility water.

A crossplot is created between this variable and total expenditure on WSS. The annual total expenditure on WSS varies widely, from $10 million in Madagascar to almost $200 million in Ethiopia, depending on the population size and coverage gap. Considering the total spending as share of GDP, Namibia, and Niger are spending close to 3 percent of GDP on WSS. In terms of total spending per capita, Namibia spends about $80 per person on WSS. Aside from Namibia, other countries spend anywhere between $1 and $10 per person. Therefore, total expenditure per capita in water is compared with the number of people who have annually gained access to utility water.

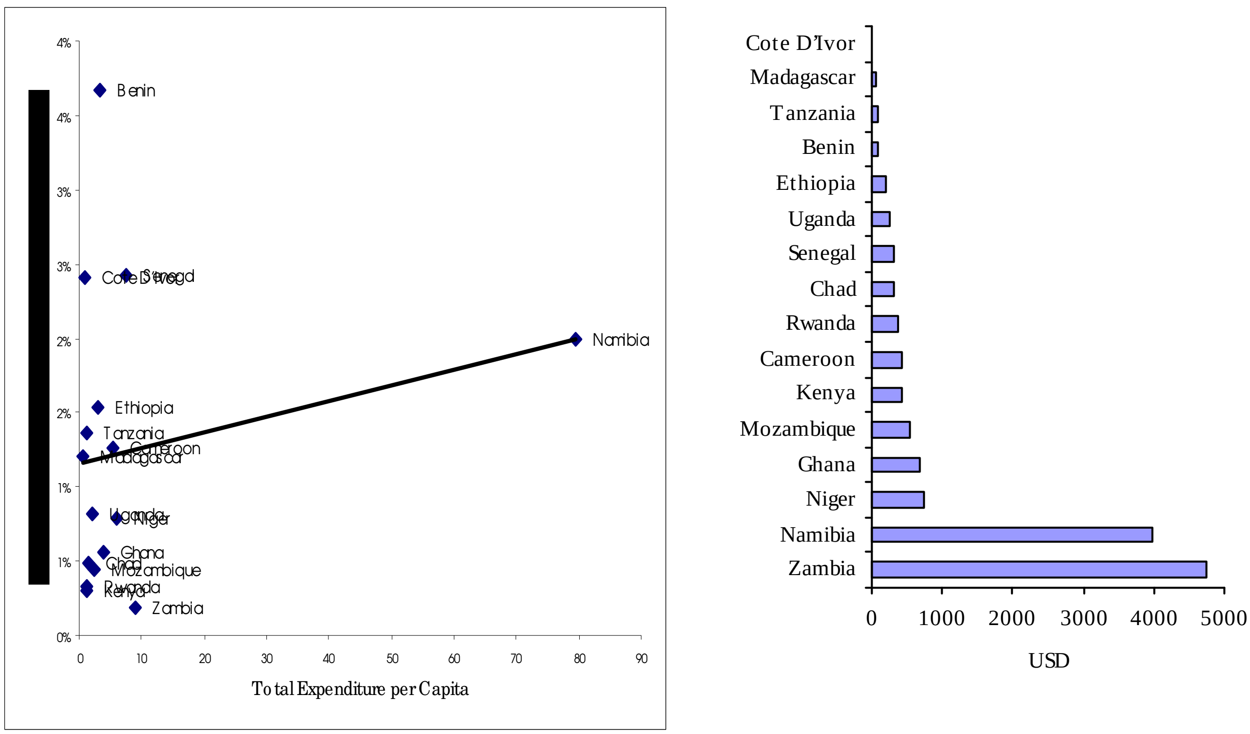
The trend line is upward-sloping, suggesting spending, and the two variables are correlated in the positive direction (figure 5.2a). But this result is driven by Namibia. Without Namibia, the trendline is flat and barely positive. On average, higher spending and additional access to new utility connections are positively aligned in Africa, but barely so. Countries can be grouped into three clusters based on their position against the trend line. The first group placed above the trend line has achieved a high level of coverage to utility water compared to the volume of resources spent per capita. It comprises Benin, Côte d'Ivoire, Senegal, Ethiopia, and Tanzania. The second group includes countries that are below the trend line and have spent a disproportionately higher level of resources judged against the coverage achieved. They are Zambia, Rwanda, Kenya, Mozambique, Chad, Uganda, and Niger. The third group of countries—including Namibia, Cameroon, and Madagascar—are situated on or very near the trend line, with spending per capita and annual additional coverage to utility water proportionately aligned.

The value for money can be computed by dividing the annual total spending on WSS by the total number of people who have gained access to utility water. From this statistic, it is possible to evaluate how much money it has taken to provide one person with utility water, either through house connections or standposts. It is noticeable that while Benin and Ghana have spent similar volume of resources per capita, it cost Ghana eight times more to move one person along the water ladder compared to Benin. Zambia's spending has been the most inefficient—it took close to $5,000 per capita to provide access to utility water. At the other end are countries such as Côte d'Ivoire, Madagascar, and Tanzania, where the cost per capita of improved coverage has been nominal (figure 4.2b).

Figure 5.2 Efficiency of WSS investments

(a) Total spending and population gaining access to utility water

(b) Per capita expenditure of providing access to utility water



Source: AICD DHS/MICS Survey Database 2007; AICD Fiscal Database 2007.

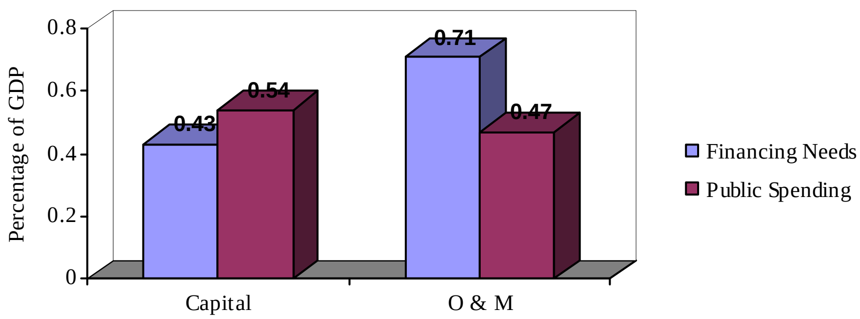
Available public financing does not meet spending requirements

There is still a sizeable financing gap which will have to converge for Africa to meet the MDGs. Again, it is important to bear in mind that both financing needs and public spending are underestimated in Africa. The financing gap does not appear to be a problem in capital expenditure, but the gap between O&M needs and available resources stands at about 0.3 percent of GDP for each component. This translates to about $1.6 billion in 2005 for O&M investments. This magnitude of annual need for resources brings into focus the financing challenge that Africa faces in the future years to meet the MDGs and to build a secure water future.

How will Africa attract this additional volume of resources? The immediate follow-up question is, what about the internally generated resources of the utilities? The investment requirements of Africa are necessitating a rigorous examination of the degree to which service providers are able to cover their operating and maintenance (O&M) costs and to potentially contribute toward investment requirements. Enforcing cost-recovery tariffs also enables the utilities to leverage resources from other sources—donors and, particularly, the private sector.

Are there other sources of finance, either realized or potential, that the sector can tap into? Private participation in new investments is a desirable trend, but it remains to be seen to what extent private sponsors can step up their contribution to Africa's investment needs in the sector. The new initiatives to introduce internal and external accountability structures in Africa's utilities and regulatory framework are a welcome change to attract the private sector. The past few years has also seen the arrival of new players, including Chinese, Indian, and Arab donors. Driven by their rising demand for natural resources, these actors have also invested in infrastructure, sometimes to facilitate their entry into the new market and sometimes to reduce the cost of doing business.

Figure 5.3 Gap between financing needs and available resources



Source: Briceño-Garmendia and Smits 2008; Mehta and others 2005.

The cost of inefficiencies and underpricing in utilities

The reality is that in Africa, unlike other regions, the numbers of unserved are growing through a combination of urbanization, failure of existing systems, and past underinvestment, often in the periurban areas. To service these unserved areas requires investments in new networks ideally funded from internally generated revenues of service providers. The continuing enforcement of below-cost-recovery tariffs has created a spiraling cycle of low equilibrium, low cost recovery, low revenue, low financial sustainability, low investment, and poor service quality. Further, the appropriate maintenance spending through the life cycle of assets depletes the assets faster. Consequently, not only are the utilities not contributing to new investment, but they are draining resources from the economy. The inefficiencies have exacerbated the urgency of resource flows to the WSS sector (Estache 2005).

The inefficient functioning of the service providers and considerable mispricing in the water sector constitutes a significant burden that adversely affects optimal resource allocation and the financial sustainability of the sector. This wastefulness and ineptitude can be captured in a concept called quasifiscal deficit (QFD), which estimates hidden costs and inefficiencies and indicates the cost of inefficient production and partially quantifies opaque transfers from producers to consumers (Mackenzie and Stella 1996). QFD also provides distorted incentives to the utilities and consumers leading to overconsumption and waste of scarce resources (Briceño-Garmendia and Smits 2008). Even without explicitly revealing itself in the budget, it affects the macroeconomic stability and underreports the size of the public sector.

Measuring QFD and untangling its sources is critical to imposing financial discipline and identifying the focus areas in the policy agenda. By nature, QFD is difficult to measure and simple assumptions need to be made to establish any ballpark estimates. We follow the approach of Ebinger (2006) and Saavalainen and ten Berge (2006) in evaluating the QFD of water utilities. They assume that (a) these utilities impose tariffs in a similar way as government imposes taxes and (b) collection losses, underpricing, and technical losses determine the volume of public subsidy to the sector. In a nutshell, this approach computes the difference between revenues collected at regulated prices and those that could be collected at cost-recovery prices (Saavalainen and ten Berge 2006).

For the ideal scenario, there is a need to ascertain three norms:

- *NRW as an indicator of technical losses*—an internationally accepted benchmark of 20 percent NRW is employed.
- *Full cost-recovery tariff*—the O&M cost is available from the AICD WSS Survey and a capital premium of $0.4 per cubic meter is employed to estimate the capital cost. The magnitude of capital premium follows from an internationally established Global Water Intelligence estimate of $0.80 per cubic meter, considered as a full cost-recovery tariff, half of which is given to capital costs and the rest to O&M costs.
- (c) *The collection ratio*—instituted as 100 percent.

Against these ideal benchmarks, we can understand the magnitude of QFD and its sources in African utilities.

The reported performance data on utilities can be questionable. For instance, the AICD WSS Survey present an average collection rate of 77 percent across African utilities, with very few reporting collection rates below 10 percent. This is at odds with the responses from household surveys, which predict widespread noncollection. Almost 40 percent of the households do not pay their water bills. Consequently, an implicit collection rate was computed. From this refined calculation, it is evident that only about 45 percent of water utilities have implicit collection ratios higher than 90 percent, and two-thirds collect 60 percent of their billed revenues (Briceño-Garmendia and Smits 2008).

Together***, the average QFD or the hidden cost of these utilities constitutes 0.6 percent of GDP.*** The worst offenders are the Democratic Republic of Congo, Ghana, Malawi, and Zambia, which drain more than 1 percent of GDP due to their pricing and technical inefficiencies. REGIDESO in the Democratic Republic of Congo is draining 2.6 percent of GDP, followed by GWC at 1.2 percent. The primary cause of QFD accumulation in African utilities is underpricing, which constitutes almost 55 percent of the total accumulated QFD. More than 75 percent of QFD in Côte d’Ivoire, the Democratic Republic of Congo, Lesotho, Madagascar, and Senegal is contributed by underpricing. Technical and collection inefficiencies make up the rest. Ghana and Mozambique are the only countries where unaccounted losses constitute more than 40 percent of QFD. The collection inefficiencies are relevant in Cape Verde, Sudan, Burkina Faso, and Uganda, which are unable to recover a large share of the billed volumes from collected revenues.

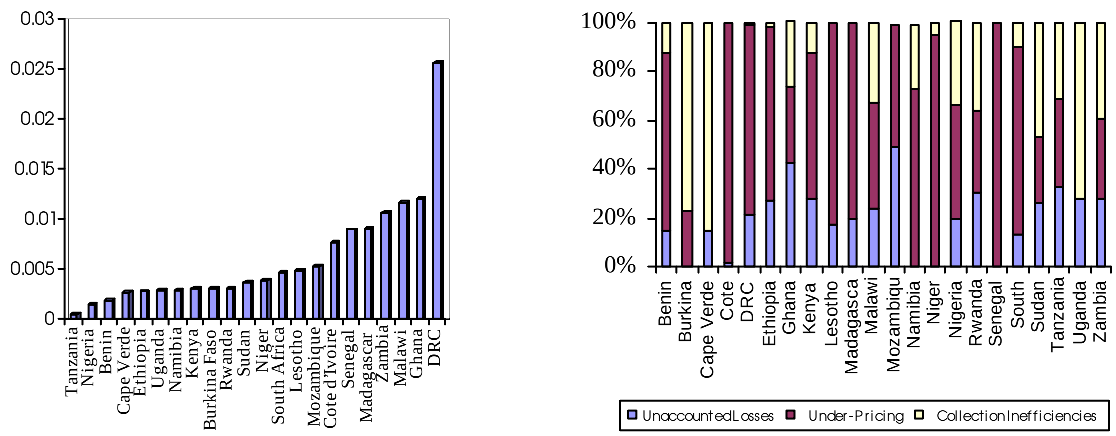
The middle-income countries (MICs) boast substantially lower QFD at 0.4 percent compared to low-income countries (LICs) at 0.7 percent. The underpricing component of QFD is more important in LICs.

It is apparent that in the MICs, there is room for efficiency dividends while the LICs would need to incorporate both commercial efficiency measures and price changes and associated subsidy measures to protect the poor to increase the resource envelope. But the panacea is country specific, depending on the magnitude and composition of QFD accumulation.

Figure 5.4 Volume and composition of QFD, 2005–6

(a) Share of GDP

(b) Composition



Source: Briceño-Garmendia and Smits 2008.

Note: All the utilities in countries with decentralized multiutility structure are not represented here, so it is an underestimation for countries such as Nigeria, Sudan, South Africa, Tanzania, and Zambia.

Some utilities are losing more than they are collecting by way of revenues. In nine utilities, the losses are more than twice of operating revenues. In summary, though the drain on GDP is relatively small compared to other infrastructure sectors such as power, these costs still represent a substantial burden on the economic size. Looking at the sources of QFD more closely, it appears that mispricing or noncost recovery tariff regimes are the driving factor. For many countries, this component constitutes more than two-thirds of QFD.

The average tariffs implemented in Africa are among the highest in the world, driven by the high cost structure. Most utilities recover the operating cost from serving their consumers. In spite of this, capital cost recovery is a distant goal. Thus, the challenge facing the African utilities is unique—not only do they operate in a high cost environment, they do not and cannot recover the capital premium. Consequently, African utilities are trapped in a low-level equilibrium with adverse impact on ability to assume new investments and enhance the quality of service delivery. But there are some examples of utilities generating enough resources to contribute to capital expenditure. For instance, internal sources of finance comprised 45 percent of total capital spending in NWSC in Uganda. Not only do the tariff revenues cover the O&M costs, they are also spent toward free connections, depreciation, secondary and tertiary networks, and some amount of primary mains (Muhairwe 2006).

Table 5.3 Category of countries, by source of QFD

		Mispricing	Collection inefficiencies	Unaccounted losses
More than 33% of QFD on		Kenya Mozambique Malawi Nigeria Tanzania Rwanda	Rwanda Sudan Zambia Malawi Nigeria	Ghana Mozambique Tanzania
	More than 66% of QFD	Senegal Côte d'Ivoire Niger Madagascar Lesotho South Africa Congo, Dem. Rep. of Namibia Benin Ethiopia	Uganda Burkina Faso Cape Verde	

Source: Briceño-Garmendia and Smits 2008.

Achieving capital cost recovery

Recovering the cost of providing service, at least for O&M, has been a stated objective of water utilities in Africa. The vast majority of the countries report that their water tariffs are set with the goal of cost recovery. Only Chad reports that tariffs are set without a specified cost-recovery mandate. Benin also states that there is no specified tariff policy, although in practice the utilities aim to recover O&M costs plus some investment costs. Including Benin, 19 countries are expected to fully recover O&M costs through tariffs as well as some amount of investment costs. Two countries, Sudan and Ghana, indicated that there was no requirement to recover investment costs, only O&M (table 5.4).

Table 5.4 Cost-recovery policy for WSS

Sector	% countries	% countries
Existence of cost recovery policy	91% (21)	55% (10)
Cost recovery policy		
All O & M and some investment	83% (19)	
All O & M and no investment	8% (2)	39% (7)
Partial O & M and no investment		16% (3)
Cost shortfall met by		
Central government	52% (12)	
Regional government	13% (3)	
Local government	4% (1)	
Donors	13% (3)	
Others	22% (5)	

Source: AICD WSS Survey Database 2007.

Note: Figures in parentheses refers to number of countries.

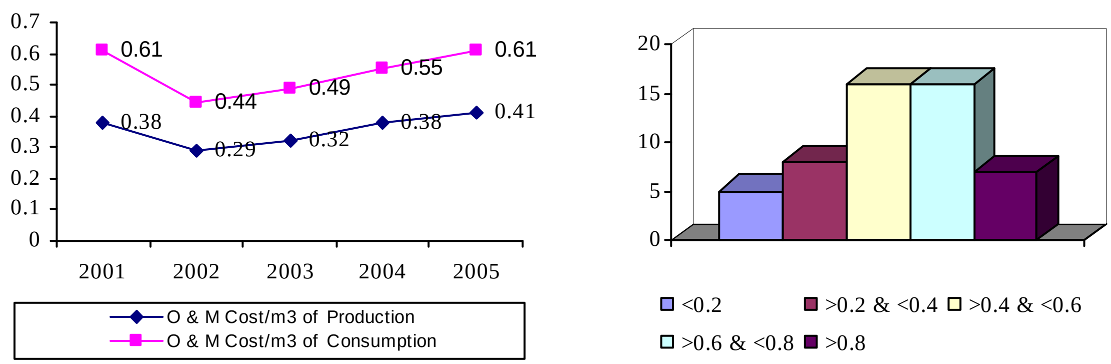
The burden of covering operating cost shortfalls was shared among levels of government and donors, sometimes with more than one contributing stakeholder. More countries reported that their central government would be responsible, while Ethiopia, Malawi, Nigeria, and Sudan saw a responsibility at the regional and local government level. Kenya, Lesotho, and Zambia responded that donors would have a shared responsibility. Interestingly, only half of countries stated that the costs and revenues related to the provision of water services were fenced off from the general budget. It is not clear whether this is because ringfencing was not being effectively implemented or whether institutional arrangements made it impossible to isolate and track costs and revenue related to water services.

Measuring the capital cost of providing services is difficult, while information on operating cost is more readily available. The operational expense per unit of water produced and sold is estimated to be $0.41 per cubic meter, and $0.62 per cubic meter, respectively, in 2005, and has continually increased in nominal terms since 2002. Two-thirds of the utilities operate within the operating cost band of $0.4–$0.8 per cubic meter. The average O&M cost per cubic meter is driven by the high cost of providing services in the MICs of South Africa and Namibia, which is more than a $1. In fact, in Windhoek, the operating cost of each unit of water is more than $2. The average O&M cost for utilities in MICs is $1.16 per cubic meter; in LICs it is $0.48. Particularly for MICs, the operating cost is high as it includes the cost of purchasing bulk water. Namibia and South Africa have Rand water and Nam water as bulk portable water suppliers; these sell to municipalities, who deliver water through reticulation networks. In 2006, the bulk water tariff for Rand water was $0.38 per cubic meter (Rand Water Annual Report 2007).

Figure 5.5 Dispersion of O&M cost

(a) O&M cost per cubic meter, 2002–5 (nominal $)

(b) O&M cost per cubic meter of consumption in 2005 ($)



Source: AICD WSS Survey Database 2007.

The operating-cost recovery in Africa is positive, with many utilities setting tariffs at levels high enough to recoup O&M costs. The operating ratio is very close to 1 for African countries. The operating revenue and cost per cubic meter of water is significantly higher in MICs than in LICs. Utilities in Cape Verde, Namibia, and South Africa are star performers in terms of generating the highest operating revenue per cubic meter. Revenues more than cover operating cost in MICs. The operating ratio is 1.10 in the LICs.

Table 5.5 Operating ratio of African utilities

County grouping	Operating revenue per m3	Operating cost per m3	Operating ratio
MICs	1.39	1.31	0.94
LICs	0.42	0.46	1.10
Total	0.64	0.61	0.95

Source: AICD WSS Survey 2007.

The capital cost can be construed using a capital premium on the operating cost. The industry benchmark for capital cost recovery is $0.8 per cubic meter, with half on O&M and half on capital. But the high operating cost and underpricing emerging as the primary cause of QFD; it is clear that the capital cost is higher than $0.8. For the purpose of this study, a capital cost based on operating cost and a capital premium of $0.4 per cubic meter is calculated. The average cost-recovery price is about a $1 per cubic meter in Africa. At this rate**,** capital-cost recovery is not feasible in most LICs in Africa. Only four utilities achieve their capital-cost-recovery threshold.

Affordability of cost-recovery tariffs for urban African consumers

It is clear that utilities are meeting only the O&M costs and not contributing to new investments in the sector. The ability to recoup this cost from consumers is limited by the constrained household budgets that most African consumers face. Utilities will not invest in expanding their networks before establishing demand for their services and ability to pay. From a practical and policy standpoint, therefore, it is important to know how much unserved beneficiaries can afford to pay for infrastructure. Most African households live on very modest budgets and spend more than half of their resources on food. The average African household survives on no more than $180 per month; urban households are about $100 per month better off than rural households. The water spending is between 2 and 3 percent of household budgets, irrespective of geographical location (urban/rural) or income level.

An affordability analysis was conducted for the urban areas in Africa (as piped water services are primarily concentrated there) to estimate the percentage of African households possibly unable to afford modern infrastructure services. The true cost of infrastructure services is compared with an affordability threshold such as 3 or 5 percent of income. The former reference point is calculated using the minimum or average consumption for a family of five and O&M or full-cost recovery tariff. This suggests a range for monthly spending of $2 at the O&M tariff and subsistence consumption, and $8 at the average consumption and capital cost tariffs.

It is possible from this analysis to report results at the country level, calculating the percentage of households in each country that would fall beyond the 3 percent affordability threshold at any particular absolute monthly cost of service such as $2 or $8. The countries divide into three groups. At one extreme is group 1, where a significant proportion of all urban households can afford a cost-recovery monthly expenditure of $8. At the other extreme is group 3, where the vast majority of urban households (at least 90 percent) would be unable to afford a monthly expenditure of $8. All the remaining countries fall into group 2, where a substantial share of the urban population—between 65 and 85 percent—would face difficulties covering a monthly expenditure of $8 (Banerjee and others 2007).

Table 5.6 Average urban affordability of different levels of cost recovery

3 percent budget threshold

	Operating cost recovery – $2	Capital cost recovery – $8
Group 1	0%	10%
Group 2	0%	78%
Group 3	4%	97%

Source: Banerjee and others 2007.

In sum, the consumers are contributing toward O&M cost recovery but not toward full-cost recovery. Though there is demand and willingness to pay for improved services, African households are strapped by their limited income and high share of food spending. The prohibitive connection cost, which can constitute up to 75 percent of GNI per capital and high cost of service provision do not help, particularly for the households in the poorer quintiles. Therefore, even if utilities raise prices, it will not necessarily translate into increased collected revenues. Not only will it continue to keep a significant proportion of population beyond network coverage, but it will also impose hardships on the majority of the urban population in a number of countries. Possibly, nonpayment and disconnections will increase, which can be alleviated if price hikes are accompanied by significant improvements in the quality of service provision and associated subsidies to protect the poor.

Private sponsors and nontraditional donors

In the 1990s, utilities looked toward private participation in infrastructure (PPI) as a potential vehicle for cost recovery and new investment. The premise was that private management and operation of utilities would generate improved efficiencies and enhance service quality, thereby attracting additional financing to the provider, both through direct investment and through an augmented ability to access market financing.

The water utilities in Africa are up against two inherent biases when trying to attract private investment. First, they are located in Sub-Saharan Africa which, over the period 1990–2005, has attracted the least amount of investment of any region; second, the utilities are in WSS, which attracts the least investment of any sector. The cumulative investment in Africa has been only $146 million—ten times lower than in Latin American and the Caribbean, which has attracted the highest amount of investment. In other words, WSS in Africa is at the lowest end of the spectrum when it comes to attracting private participation. The participation of the private sector in WSS has taken the form of management and lease contracts without any substantial investments. Concessions are the only form of contract where the private provider commits to investment in assets. There have been five concessions in Africa, three of which covered water and electricity in Gabon, Cape Verde, and Mali. The two others are in South Africa. In all these cases, the private sector has reportedly fallen short of making the promised investments. The number of connections financed by the private sector in Gabon and other African countries is a negligible proportion of the needs of the sector (Hall and Lobina 2006).

Table 5.7 Private investment in Africa in 1990–2005

	WSS as primary sector	WSS as secondary sector (to energy)
Number of projects	30	16
% of management contracts	90	56
% of concessions	7	31
% of projects in "distressed" or "canceled" status	10	44
% of projects in "operational" status	47	31
Payment commitments to the government ($ million)	34.8	
Investment commitments in physical assets ($ million)	110.8	
Total investment commitments ($ million)	145.6	

Source: World Bank PPI Database 2007

There have been 30 water projects with private participation in Africa since 1990, with 8 of them located in South Africa. In addition, there are 16 energy projects with WSS as the secondary sector. These projects involved integrated utilities that provide both power and water services. There are two projects in Namibia and South Africa that infused private capital in sewerage-treatment plants. Private operators in Africa have also benefited from the participation of multilateral development banks. Of the 30 private WSS projects since 1990, 18 have received support in the form of loans. Though the international water operators have generally shied away from heavy investments in Africa, local water operators have stepped in many countries in an attempt to fill the gap between utility provision and rising demand from periurban areas and small towns. They have set up small piped systems and participate in the operations management of water systems as well (Muhairwe 2006).

During this period, there have been 10 private projects in canceled or distressed status. Among the projects with WSS as the primary sector, only three projects—Dar es Salaam in Tanzania, Fort Beaufort in South Africa, and SODECA in Central African Republic were cancelled. The rate of cancellation or distress is significantly higher when projects include both power and WSS. There are seven projects that have met this fate in this period. Private investment in physical assets in the water sector is relatively low, at just about $110 million. Investment in combined water and energy project assets is much higher at $605 million (spread over only two projects) but the share of investment allocated to the water sector, rather than energy, is low. In the case of Gabon, only 20 percent of private investment was estimated to have been directed toward the water sector, although the original strategy had been a 60/40 allocation to energy/water (Environmental Resources Management, ERM, 2002).

New players such as China, India, and Arab countries finance infrastructure in Africa. They are more active in energy and transport sectors, and have invested minimal amounts in water supply. The only countries that have attracted funding from the nontraditional donors are the Republic of Congo and Niger, who have received about $11 million since 2000. Considering the only AICD country, Niger, only $4 million has flown into the water sector. This source of funding is nascent, but has the potential to contribute more.

The risk profile and the unique nature of the sector have limited the use of project finance for new investments. For instance, Guasch (2006) reports from a sample of WSS concessions and sales in Latin

America between 1990–2002 that the internal rate of return, including management fees, was 11 percent compared to the cost of equity, calculated at 15 percent at the time of transaction. This is the worst performance among the infrastructure sectors. The risks of the sector in Africa are even more pronounced. The nature of assets in water production and distribution entails the need for long-term financing, which is often denominated by dollar. The local capital markets in Africa are often not equipped to supply long-term credit to support the creation of water assets (Matsukawa and others 2003). Africa's ability to raise long-term infrastructure finance is also restricted by lack of sovereign credit ratings. Only one-third of the countries have debt ratings and only four have an investment grade of BB- or higher (Sheppard and others 2006). For the financier, the resources are captured for a long time in building the water assets before the revenue generating stream begins to flow. Further, the revenues are earned in local currency and the mismatch between dollar-denominated debt and local currency revenues leaves the financier very vulnerable to exchange rate fluctuations.

In a nutshell, from the project finance point of view, there are not enough bankable projects in WSS in Africa. The prevalence of commercial entities that will be attractive to the private sector and credit enhancements in the form of international guarantees (for instance, from World Bank Group or other international agency) is comparatively limited in WSS. Africa does not have any instance of guarantee instruments in the WSS sector from the World Bank, though there are some examples, such as the guarantee from the International Finance Corporation of the Johannesburg bond. There have been recent cases of local currency financing for long-term projects in Africa, primarily in the telecommunications sector, and these have required significant credit enhancements. But the WSS sector has not encountered any local currency financed project. But increasingly, there are agencies such as IFC opening facilities for local currency lending in Africa.

A funding gap remains in O&M

Public resources leave a financing gap that needs to be filled to meet not only the MDGs but also to provide sustainable WSS services to Africa's populace. Following figure 5.4, the financing gap is measured, adding the new sources of finance and including the QFD components of inefficiency and underpricing. The inclusion of QFD is important as it provides a sense of how much can be added to meet the financing gap if underpricing and inefficiencies are adequately addressed. Reduction of the QFD has the potential to release a significant volume of capital to contribute to the sector needs.

It is evident that the new financing sources such as private and nontraditional donors are contributing minimally to the MDG challenge, leaving the sector continually dependent on financially strapped governments. The funding gap prevails even after the actual and potential funding sources are accounted for. While both the financing need and the public spending figures are underestimations, the message is clear. There is a need for additional resources, particularly in O&M, even if the utilities are run on a commercial basis. African needs to invest almost 0.2 percent of its GDP to fulfill its financing needs in the water sector. In dollar amounts, this translates to an annual spending of about $1 billion in 2005 prices. This is the nature of the financing challenge that the water sector in Africa faces. It remains to be seen how the service providers and international community respond in the future.

Table 5.8 Magnitude of remaining financing gap in water supply

Financing for capital expenditure		Financing for O&M expenditure	
Needs	Flows	Needs	Flows
0.43 %	Public spending: 0.54%	0.71%	Public spending: 0.47%
	PPI: 0.02%		Inefficiency component of QFD: 0.11%
	Nontraditional donors: 0.00%		
	Underpricing component of QFD: 0.19%		
GAP: 0.00%		**GAP: 0.13%**	
Total financing gap: 0.13%			

Source: Authors' calculations.

Though it seems nominal compared to the financing gap estimated for other sectors, particularly power, the international community has to make efforts to channel resources to this critical sector for human development. Even when compared against African governments' own MDG-costing exercises and available public resources, the gap is fairly small—at least for about 14 countries for which detailed budget information is available. These estimates have been jointly produced by the African Development Bank and the World Bank in their Country Status Overview (CSO) for these countries where these two development institutions are focusing their effort on the achievement of the MDGs. The annual financing gap between the required and planned public investment is in the order of $0.5 billion dollars (table 5.9).

Table 5.9 Country level estimates of financing gap

Country	Capital	Rehabilitation	Total	Public investment required	Planned public investment	Financing gap
Benin	18	9	27	23	33	-10
Burkina Faso	63.65	24.35	88	86.83	13.38	73.45
Congo, Dem. Rep. of	169	30	199	171	69	102
Ethiopia	182	16.8	198.8	297	100	197
Ghana	116	9	125	125	78	47
Kenya	65	73	138	124	110	14
Madagascar	38	16	54	33	73	-40
Malawi			12	6	6	0
Mauritania	40.8	15.9	56.7	48.9	36.6	12.3
Mozambique	56	34	90	82	67	15
Niger	52	26.2	78.2			
Rwanda	37	35	72	40	5	35
Senegal	46.6	10.2	56.8	50.2	13	37.2
Tanzania				219	219	0
Uganda	43	50	93	100	89	11
Zambia						
Total annual financing gap ($ million)						**494**

Source: WSP 2006.

The emerging results throw light on the challenge of financing water supply in Africa. MDGs pose an immediate objective, but the long-term goal is to ensure a secure water future for generations of Africans. WSS financing needs, while often underestimated, are substantial and will require increasing effort from key stakeholders. Presently, the water sector is almost completely funded by public spending, with ODA comprising the bulk of this total expenditure. Capital financing requirements appear to be adequately met by public investment, but there is still a financing gap in O&M, which will need to be met by other sources. The most natural sources are the utilities themselves, who ideally should be able cover their O&M expenditure and finance new capital assets using internally generated resources. On average, O&M cost in Africa is the highest in the world, driven, among other reasons, by diseconomies of scale and the high cost of importing capital equipment. Many of the African water utilities achieve O&M cost recovery but a considerable number do not meet O&M cost at average levels of consumption. Therefore, there is a need for imposing fiscal discipline in terms of O&M provisioning for public/ODA/NGO investment. There is also a need for coordination of strategy, investment plans, and O&M sustainability between the primary stakeholders such as the donors, government, NGOs, and communities.

While O&M cost recovery is still achievable, the goal of meeting capital costs is distant. Only a handful of utilities—located in South Africa, Namibia, and Cape Verde—are providing service at full cost recovery. The feasibility of raising tariffs to cost-recovery levels is also questionable given the limited budgets of majority of African households in LICs. Other sources of financing, such as private sponsors and nontraditional donors, are still negligible but have the potential to offer more in the future.

The utilities, instead of contributing to the financing needs of the sector, are draining resources due to underpricing and inefficiencies. While pricing is exogenous to the utility, in the sense that a regulator or government is responsible for setting it, efficiency improvements are not. Inefficiencies are straining the operating revenues; in many utilities, a combination of unaccounted for water and collection deficits is higher than the operating revenues by several orders of magnitude. Introducing modern management measures and commercial efficiency initiatives is needed for the utilities to achieve operational sustainability in the short run and financing sustainability in the long run. The financing gap is not daunting and a good deal will be achieved by utilities functioning in a commercial manner.

Creating a facilitating environment for these entities to run like companies is essential to meet the financing and service delivery predicament of Africa. The role of the private sector, both international and local, is critical in this respect. The inability to meet capital costs also explains the nature of private resource flows to Africa till now. The private sector has participated in the WSS sector primarily through management, leases, and service contracts, with minimal investments outside of South Africa. Private sector participation unambiguously allows expansion of firms' productive efficiency through improvements in labor productivity, commercial efficiency, and service quality. Even without directly investing in assets, the private sector can help in reducing the QFD and improving the service orientation and financial health of the sector.

6 Understanding sector performance

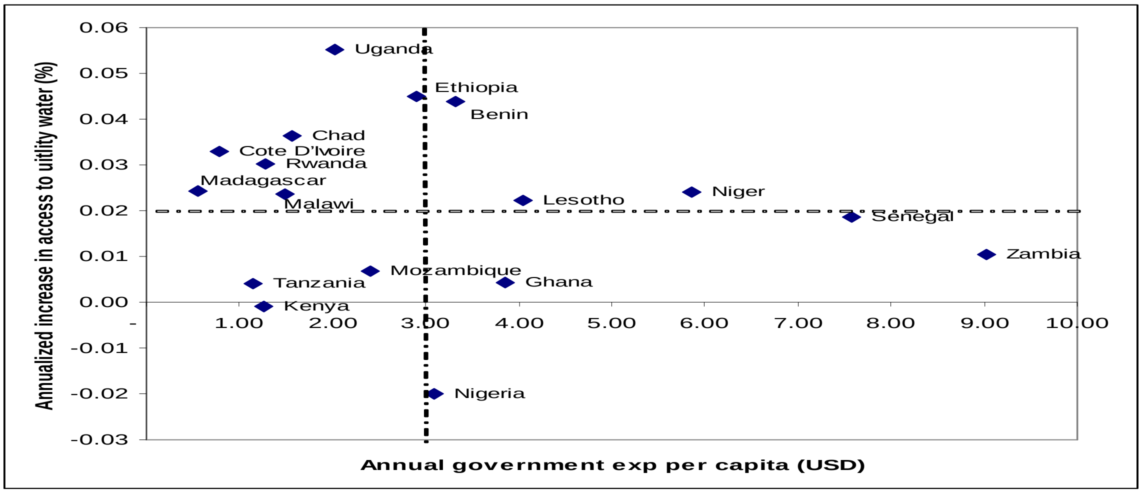
In the previous chapters, we have summarized attributes of sector performance such as financing; institutional, regulatory and governance frameworks; and utilities' operational and financial sustainability. The big question is: what does it all mean in terms of policy and can these factors be linked to expand access? At the outset, it is fair to say that clear answers are not available. There is no recipe book that neatly lays out the possible steps the each country should adopt to enhance coverage. The challenge of expanding access differs a great deal across Sub-Saharan Africa countries, and so does the explanation of their mixed performance. One-size solutions will not fit all. The analysis in this chapter is meant to augment our understanding of specific country experiences, help define barriers and constraints, measure resources and capacities, and identify opportunities and room for improvement.

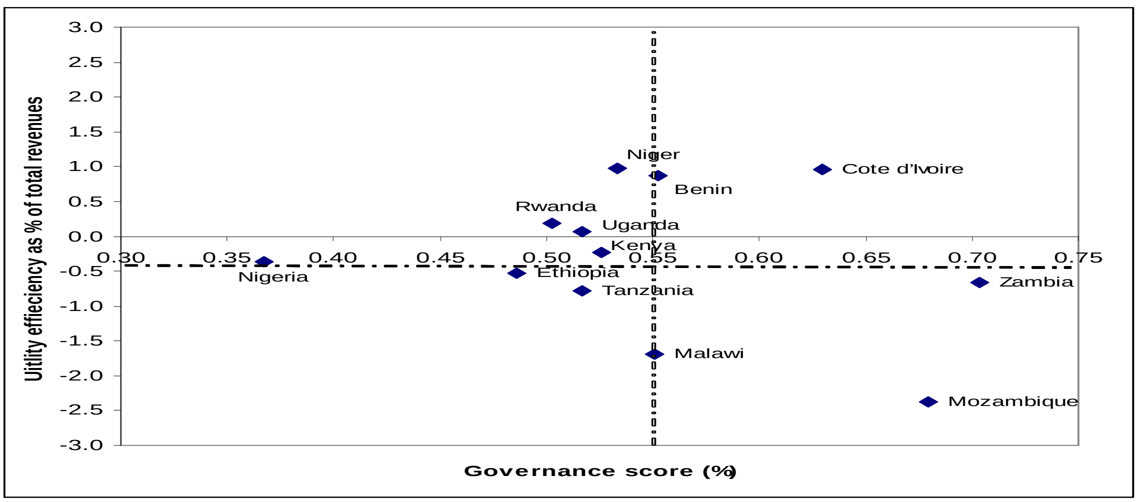
In order to understand the different challenges that countries face in providing water to urban areas and assess how well they are positioned given the resources and the institutional environment they face, two main dimensions are taken into account; (a) annualized change in coverage (ACC) or the share of urban population that has gained access to improved coverage (piped water or standposts) every year; and (b) utility efficiency, measured by the sum of financial losses associated with undercollection of revenues and distribution losses, and expressed as a percentage of the utility's overall turnover. These two dimensions are assessed against a different "main driver." For ACC, this is the annual per capita expenditure on water.[8] For utility efficiency, the state-owned enterprise (SOE) governance index is the "main driver" as it describes accountability structure and corporate patterns, and therefore the immediate institutional realm that shapes performance.

A scatter-plot between the annual government expenditure per capita on water and ACC divides the countries in four quadrants (figure 6.1). The countries located in the upper-left quadrant—Uganda, Chad, Côte d'Ivoire, Rwanda, Madagascar, Malawi, and Ethiopia—are achieving high ACC relative to the resources deployed. At the other extreme, in the lower right, is Zambia, which has spent huge volume of resources with barely any discernable difference in coverage. Similarly, Nigeria has registered a negative growth toward improved water sources while spending a relatively high volume of resources. Niger, Lesotho, and Benin—located in the upper-right quadrant—are spending more and achieving a relatively high ACC, but they are not realizing high value for the money invested. Similarly, utility efficiency and well=developed governance mechanisms are not perfectly aligned (figure 6.2). Côte d'Ivoire and Benin are the only countries which fall in the "high" band for both utility efficiency and governance. Mozambiqe, Malawi, and Zambia, while scoring high on governance, report severe utility inefficiencies. Nigeria, Ethiopia, Tanzania, and Malawi score low on both dimensions.

[8] But it is incorrect to assume a linear relationship in general as this depends on how the country is investing. A particular country might be spending on institutional infrastructure and production capacity in the first phase before spending in distribution networks to increase access in the later phases.

Figure 6.1 Crossplot between annual change in coverage and annual government expenditure per capita





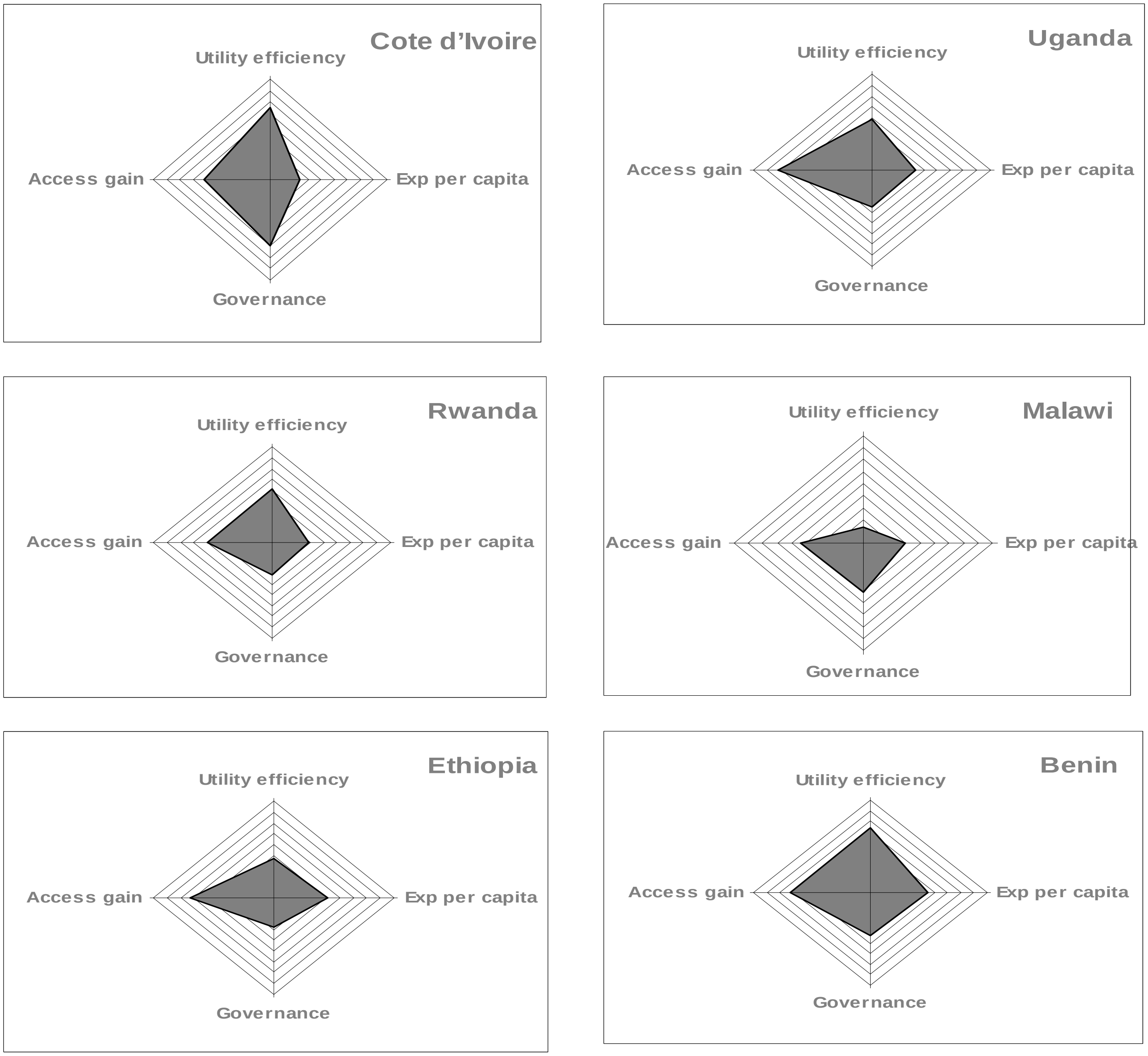
calculated as ratio between the ACC and the volume of government spending per capita deployed in the water sector.

The first group includes countries such as Côte d'Ivoire, Uganda, Rwanda, Malawi, Ethiopia, and Benin, classified as well performing as they realize high "value for money" relative to the rest of the sample. In this group of countries the share of urban population added to the improved water supply increases 3–6 percent per year given a government spending per capita of $1–3.5. Côte d'Ivoire shows the largest ACC given the volume of resources employed in the sector. Côte d'Ivoire also stands at the top of the spectrum in terms of utility efficiency, with financial losses associated with undercollection and distribution losses accounting for only 5 percent of total utility revenues. Benin follows suit on both dimensions; yet, it is also the country with the lowest "value for money" in this group.

The relationship between utility efficiency and governance level is mixed across the other countries. Uganda and Rwanda show very similar "value for money" despite the large inefficiency if their national utilities, respectively totaling 90 and 80 percent of overall turnover. Malawi and Ethiopia also share very similar value, but report high utility inefficiency. On average, Ethiopia's utilities report inefficiencies that exceed by more than 50 percent the overall turnover, while the inefficiencies of Malawi's utilities reach up to three times the overall turnover. In addition, Ethiopia lags behind in developing an functioning governance structure while Malawi has taken steps to enhance its internal and external accountability mechanisms.

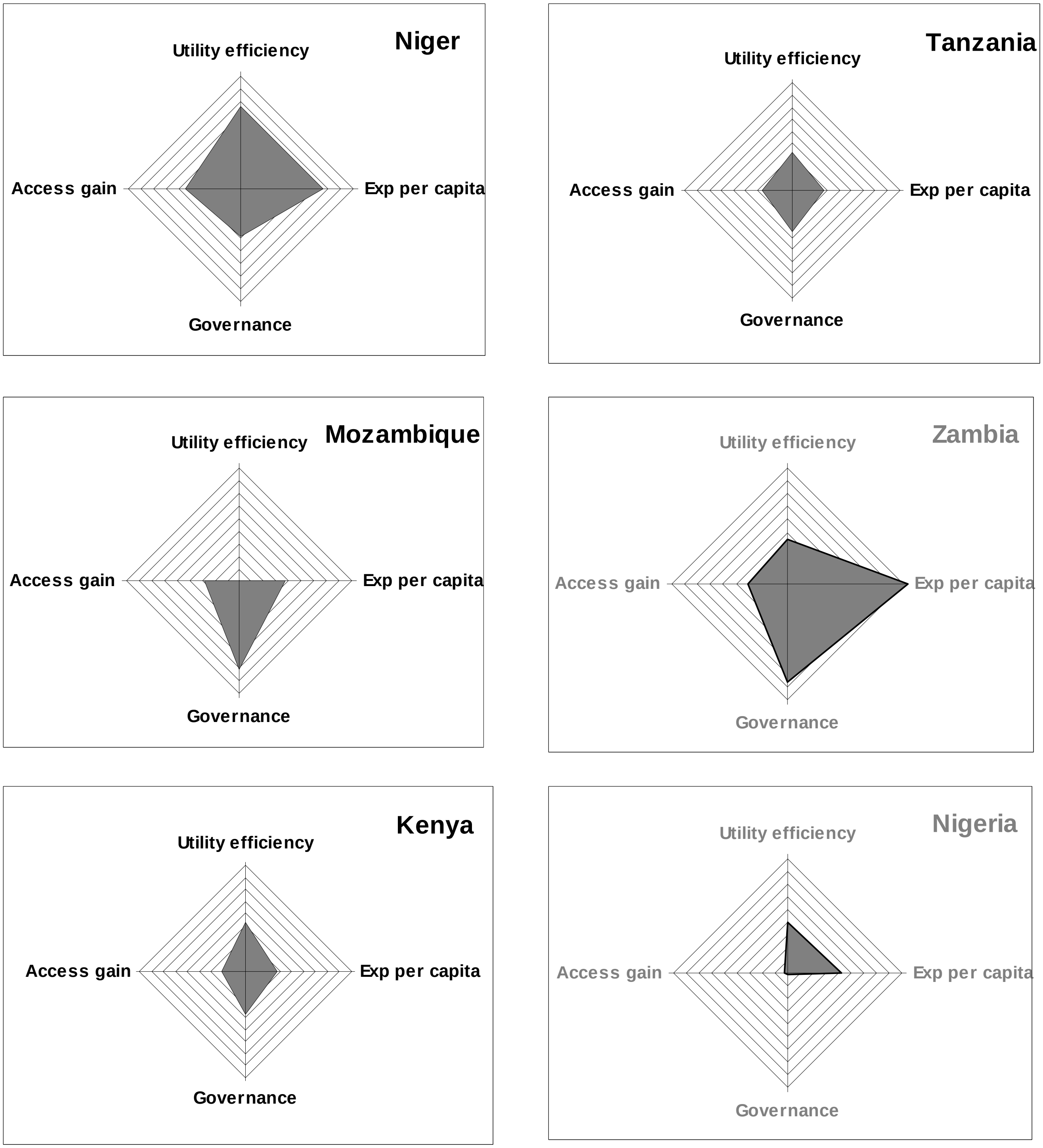
The second group of countries includes Niger, Tanzania, Mozambique, Zambia, Kenya, and Nigeria—classified as realizing low "value for money." In this group, the share of urban population added to the improved water supply every year ranges between a negligible 0.4 percent in the case of Tanzania, to a more substantial 2.4 percent in the case of Nigeria. Also, Kenya and Nigeria show negative ACC to improved water. The average government spending on water varies from $1 in Tanzania to $9 per capita in Zambia. Utility performance and governance also vary a great deal across this group. For instance, Zambia and Mozambique report the largest governance and yet their utilities show, on average, severe inefficiencies—above three times the overall turnover in the case of Mozambique. On the opposite side of the spectrum, Niger's SPEN is the most efficient utility, with financial losses associated with undercollection and distribution losses accounting for only 3 percent of total utility revenues with a relatively high governance score. Tanzania's utilities present, on average, inefficiencies up to twice their overall governance score, and remain close to the median. Kenya and Nigeria show similar levels of inefficiency across their utilities—well beyond total revenues—but their governance score varies substantially, with Kenya placed way ahead of Nigeria.

Figure 6.3 High value for public money



Source: Own calculations.

Figure 6.4 Low value for public money



Source: Own calculations.

In general, expanding coverage is positively correlated with efficiently operating utilities and a functioning governance and accountability framework, but the relationship with public spending is tenuous. Further, countries with efficient governance structures are not necessarily those with well-functioning utilities. Public spending in the sector is highly correlated with SOE governance index, possibly due to significant donor funding interventions in improving accountability mechanisms.

Table 6.1 Correlation matrix

	Utility efficiency	Governance score	Annual government expenditure per capita	Annual change in coverage
Utility efficiency	1.00	-0.23	0.07	0.39
Governance score	-0.23	1.00	0.35	0.14
Annual government expenditure per capita	0.07	0.35	1.00	-0.10
Annual change in coverage	0.39	0.14	-0.10	1.00

Source: Own calculations.

To further elaborate on the heterogeneous country experiences, ACC is mapped against eight salient characteristics, which include, in addition to those so far examined, utility cost recovery, reform and regulation score, and the volume of ODA flowing into WSS every year. Cost recovery is derived from the underpricing patterns of each country's utilities. While cost recovery is ideally critical to generate access, new investments are rarely financed out of revenues from existing consumers. As for the ODA, the average amount of aid resources received from 1995 to 2004 and in per capita terms is considered. Countries are attributed with a "high" or "low" score on each characteristic. As far as utility efficiency is concerned, countries score high if their utilities show, on average, undercollection and distribution losses not exceeding 50 percent of overall operating revenues. The threshold for cost recovery is lower; a high score signals, in fact, a level of underpricing across utilities up to 100 percent of operating revenues. For all the other characteristics, countries are attributed with a high or "low score depending on whether the value they report for that characteristic is above or below the median across the entire sample for which data are available.

It is clear that best performers do not score high on all attributes, suggesting that countries have adopted different routes within the domain of their political economy, internal capacity, and available financing. Burkina Faso, by far the best performer in expanding urban access to water, achieves such a result despite the low efficiency of its national utility, ONEA and low score on urban reforms. Such a remarkable performance may reflect the large availability of aid resources. Indeed, Burkina Faso is the top aid recipient in absolute terms, attracting a volume of assistance close to 1.5 percent of its GDP every year, which translates into more than $3.5 per capita every year, a level far beyond the median. Uganda, as much as Burkina Faso, shows contrasting patterns in the performance of its national utility, NWSC. NWSC does not report any underpricing, yet its inefficiencies, determined by water losses and under collection of revenues, reach 93 percent of its operating revenues. Moreover, the amount of government spending and ODA flowing into the water sector every year remain very limited, the former slightly exceeding $2 per capita, the latter standing at little more than $1 per capita.

The evolution of Ethiopia to the top of the list in expanding access is interesting given its low score on all the eight attributes. This access is primarily driven by new population added to piped water networks. Obviously, Ethiopia is evolving in a way that defies explanation based on known causal factors. The same applies to Chad, which has moved 3.6 percent of its urban population to improved coverage every year, leveraging a public expenditure of only $1.5 per capita. But Chad attracts aid resources up to 1 percent of its GDP every year, translating into nearly $2 per capita, which is still on the high side compared to the other countries included in the sample of countries. The case of Côte d'Ivoire also shows contrasting patterns. Its national utility, SODECI, is the most efficient in the group and shows a governance quality at the top of the distribution and has passed many of the critical reforms. Moreover, Côte d'Ivoire stands down the spectrum as far as funding is concerned. The amount of public spending per capita on water is the least and the volume of ODA nearly reaches 0.1 percent of GDP per year or $1 per capita. Conversely, underpricing is as much as the double of total utility revenues the regulation capacity remains weak. Rwanda achieves about the same gain as Côte d'Ivoire with slightly more public money and aid, a much less efficient utility, ELECTROGAZ, but also a much smaller underpricing burden. On reforms, regulation capacity, and SOE governance, Rwanda scores relatively low.

Table 6.2 Sector performance

Country	Annual change in coverage	Utility efficiency	Utility cost recovery	Annual expenditure per capita	Regulation score	Reform score	Governance score	Annual ODA per capita
Burkina Faso	7.40%	Low	high		high	low	high	high
Uganda	5.51%	Low	high	low	high	high	low	low
Ethiopia	4.50%	Low	low	low	low	low	low	low
Benin	4.38%	High	high	high	low	low	high	high
Chad	3.63%			low	low	low	low	high
Côte d'Ivoire	3.30%	High	low	low	low	high	high	low
Rwanda	3.01%	Low	high	low	low	low	low	low
Namibia	2.90%			high	low	low	low	high
Madagascar	2.42%			low	low	high	low	low
Niger	2.42%	High	high	high	high	high	high	high
Malawi	2.37%	Low	low	low	low	low	high	high
Congo, Dem. Rep.	2.25%	High	low		low	low	high	low
Lesotho	2.22%			High	low	low	high	high
Senegal	1.86%			high	high	high	high	high
Zambia	1.04%	Low	low	high	high	high	high	high
Mozambique	0.68%	Low	low	low	high	high	high	high
Ghana	0.42%			high	high	high	low	high
Tanzania	0.41%	Low	low	low	high	low	low	high
Kenya	–0.09%	Low	low	low	high	high	high	low
Nigeria	–2.00%	low	low	high		low	low	low

Source: Own calculations.

At the opposite end of the spectrum, Kenya and Nigeria show similar patterns in the technical and financial performance of their utilities. But Nigeria spends more than double what Kenya does on water every year in per capita terms despite the minimum level of ODA, totaling 25 cents per capita per year.

Moreover, Nigeria scores very poorly on reform and SOE governance, while Kenya has moved ahead with most of the key reform steps and developed its utility governance structures.

In spite of the divergent experiences, a few common patterns emerge:

Utility cost recovery is important. Countries that have managed to expand coverage usually score high on cost recovery. The enhanced ability of these service providers to generate enough revenues from their existing consumers enables them to expand networks to new consumers and puts them in a stronger financing position to cross-subsidize poorer consumers, bringing them into the fold of network coverage. Cost recovery also allows the utilities to leverage their internally generated resources with private and commercial funding.

Inefficient utilities are equally adept at delivering services. Given the structure of operations of water utilities in Africa, where the magnitude of explicit and implicit subsidies is high and systems of performance management are fragile, utilities deliver services irrespective of their inherent inefficiencies. But among the two instruments of cost recovery and efficiency enhancements that the utilities can embrace to improve their operational performance, the latter is endogenous and more in their control. Their ability to support an improved level of service delivery would rise if inefficiencies are curtailed.

The relationship between spending and access is tenuous. Pumping money into the system does not result in the intended outcomes if the quality of spending is not taken into account. It depends on how and where countries have managed to deploy their resources. Reported outcomes can oscillate between high value for money and low value for money based on efficiency of spending.

The governance improvements are relatively new in the utility horizon in Africa and has not translated into utility performance. These improvements, that form the core of internal utility reform, are still in the process of being adopted in many utilities. But there are a few countries where the relationship is positive and bodes well for sector as a whole.

ODA is important but not sufficient to guarantee coverage expansion; moreover, low ODA may be the result rather than the cause of continued underperformance. The effectiveness of development assistance, as much as of public money, hinges upon quality of spending. But while public money would continue to flow no matter how well this is spent, continued inefficiencies resulting from weak institutional governance, and technical capacity may disrupt donors' confidence and lead to a lower volume of ODA. Indeed, across this sample of countries, large governance scores are associated with high levels of ODA, while decreasing coverage is associated with low levels of assistance.

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