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DIRECTIONS IN DEVELOPMENT
Environment and Sustainable Development

The Future of Water in African Cities

Why Waste Water?

Urban Access to Water Supply and Sanitation in Sub-Saharan Africa: *Background Report*

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THE WORLD BANK

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AICD	Africa Infrastructure Country Diagnostic
JMP	Joint Monitoring Programme
m3	Meter cubic
PPIAF	Public-Private Infrastructure Advisory Facility
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
WRG	Water Resources Group
WHO	World Health Organization

Introduction

Rapid urbanization in Africa imposes a major challenge for the expansion of improved water supply sources and sanitation facilities. Despite increasing access rates to improved water supply and sanitation facilities since the middle of the 90's, urban population growth has outpaced the rate of expansion of improved services, in particular in those countries with the highest rate of urban population growth. As a consequence today more than 87 and 100 million people rely on unimproved sources of water supply and sanitation, respectively.

The main purpose of this paper is to explain the patterns of access to water supply and sanitation facilities in urban areas in Sub-Saharan Africa since the late 90's, and its relation with the performance of service providers in the case of improved water supply. It also seeks to explore the institutional context of the water supply and sanitation sectors.

The paper concludes that services providers in Sub-Saharan Africa have been unable to keep up with urban population growth. Service providers are overwhelmed by the pace of urban population growth as they face high distributional losses, low billing collection, overstaffing, and under recovery of costs. The institutional frameworks are yet to be completed as there is vast political inference in service provision and regulation, as well as obstacles for effectively undertake public private partnerships.

Looking forward, the greatest challenges for boosting access to sustainable services in urban are increasing water demand, rehabilitating and expanding infrastructure assets, tackling inefficiencies of service providers, furthering institutional reforms, and easing access to local and external financing . In addition, the region faces complex challenges associated with climate change.

The paper is organized as follows. Section 1 presents definitions of water supply sources and sanitation, as well as the sources of data used for the analysis. Section 2 discusses the current and projected trends of urbanization, and introduces the country clustering used for analytical purposes. Section 3 and 4 present pathways of access to water supply sources and sanitation facilities –respectively– in urban areas in Sub-Saharan Africa, and discusses trends in access by country cluster. Section 5 explains the operational and financial performance of services providers in the region. Section 6 explores the existing institutional arrangements for the urban water supply and sanitation service provision. Finally, section 6 presents the main challenges for the future expansion of sustainable improved water supply and sanitation services.

1. Definitions and sources of data

1.1. Definitions

This study classifies sources of water and sanitation in two categories: improved and unimproved. An improved water supply source is defined as "one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with fecal matter" (WHO and UNICEF 2011). An improved sanitation facility is defined as "as one that hygienically separates human excreta from human contact" (WHO and UNICEF 2011).

For the purposes of this paper piped water connections and public taps are considered improved water supply sources. Other sources of water, such as wells and boreholes, water from vendors and surface water are considered unimproved sources of water supply (Table 1). This classification differs from the one established by the Joint Monitoring Programme (JMP) for tracking progress on Millennium Development Goals1 as the former considers wells and boreholes as unimproved sources. The main reason for considering these forms as unimproved is that data on access from household surveys does not provide information on whether or not wells and boreholes are improved or unimproved. By contrast the JMP uses an estimate of 50 percent to delineate protected (i.e. improved) and unprotected wells and boreholes (i.e. unimproved). Hence, the estimates on access to improved water supply sources presented here differ from the ones estimated by the JMP.

Table 1. Water supply ladder

Classification		**Definition**
Improved water supply	• Piped water	Household connection located inside the user's dwelling, plot or yard.
	• Public taps	*Public tap* is a water point from which people can collect water. A public tap is also known as a public fountain or standpipe.
Unimproved water supply	• Wells or boreholes	A *well or boreholes* is a deep hole that has been driven, bored or drilled, with the purpose of reaching groundwater supplies. Water is delivered from a well or borehole through a pump, which may be powered by human, animal, wind, electric, diesel or solar means. Wells and boreholes can be either protected or unprotected. Protection is usually provided by a platform around the well, which leads spilled water away from the borehole and prevents infiltration of run-off water at the well head.
	• Vendors	Vendors can provide water using tanker-truck or carts with small tank/drum.
	• Surface water	Surface water is water located above ground and includes rivers, dams, lakes, ponds, streams, canals, and irrigation channels

Source: Author's elaboration based on WHO and UNICEF (2011) definitions

Flush toilets, septic tanks, and improved latrines are considered types of improved sanitation facilities. Traditional latrines and open defecation are considered types of unimproved sanitation. Sanitation facilities shared between two or more households are considered unimproved. For the purposes of this study, sanitation comprises only disposal of excreta (Table 2). Due to data constraints, this study does not analyze how treatment and disposal of wastewater is conducted; neither considers solid waste collection or disposal.

Table 2. Sanitation ladder

Classification		**Definition**
Improved Sanitation	• Flush toilets and septic tanks	This type of sanitation facility comprises flush to piped sewer system, pour flush toilet, septic tank, or flush to pit latrine. Flush toilet uses a cistern or holding tank for flushing water, and a water seal that prevents the passage of flies and odors. *Flush toilet to piped sewer* system is a system of sewer pipes designed to collect human excreta and wastewater and remove them from the household environment. A *pour flush toilet* uses water poured by hand for flushing (no cistern is used). *Septic tank* is an excreta collection device consisting of a water-tight settling tank, which is normally located underground, away from the house or toilet. The treated effluent of a septic tank usually seeps into the ground through a leaching pit. It can also be discharged into a sewerage system. Flush to pit latrine refers to a system that flushes excreta to a hole in the ground or leaching pit (protected, covered).

[1] The JMP classifies sources of water supply as follows: Improved: piped water into dwelling, piped water to yard/plot, public tap or standpipe, tube well or borehole, protected dug well, protected spring, and rainwater. Unimproved: unprotected spring, unprotected dug well, cart with small tank/drum, tanker-truck, surface water, and bottled water (WHO and UNICEF, 2011).

	• Improved latrines	This type of sanitation facility comprises ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilet. *VIP* is a dry pit latrine ventilated by a pipe that extends above the latrine roof. The open end of the vent pipe is covered with gauze mesh or fly-proof netting and the inside of the superstructure is kept dark. *Pit latrine with slab* is a dry pit latrine that uses a hole in the ground to collect excreta and a squatting slab or platform firmly supported on all sides, easy to clean and rose above the surrounding ground level to prevent surface water from entering the pit. *Composting toilet* is a dry toilet into which a carbon-rich material (vegetable wastes, straw, grass, sawdust, ash) is added to the excreta and conditions maintained to produce compost.
Unimproved sanitation	• Traditional latrines*	This type of sanitation facility comprises pit latrines without a slab or platform, bucket and hanging latrines. *Pit latrine without slab* uses a hole in the ground for excreta collection and does not have a squatting slab, platform or seat. *Bucket latrine* refers to the use of a bucket or other container for the retention of feces, which are periodically removed for treatment, disposal, or use as fertilizer. Hanging latrine is a toilet built over the sea, a river, or other body of water, into which excreta drops directly.
	• Open Defecation	When human feces are disposed of in fields, forests, bushes, open bodies of water, beaches or other open spaces or disposed of with solid waste.
Source: Author's elaboration based on WHO and UNICEF (2011) definitions		

1.2. Data on access to water supply and sanitation facilities

Data on access to water supply and sanitation in urban areas is mainly taken from the AICD water supply and sanitation database (available at www.infrastructureafrica.org). AICD compiled data on access from several secondary sources such as household surveys, demographic and health surveys, multiple indicator cluster surveys, world health surveys, and censuses. Data was updated by the authors based on more recent demographic and health surveys conducted by USAid (available at www.measuredhs.com) and the data published by the WHO and UNICEF's JMP (available at www.wssinfo.org). Data includes 36 Sub-Saharan Africa countries, which account for around 99 percent of the urban population in 2009. Characteristics of included countries are presented in annex 1. As data points on access to water supply and sanitation facilities varies by country aggregations are presented in three time periods. Late 90's refers to the period from 1995 to 1999. Early 2000's refers to the period from 2000 to 2004. Late 2000's refers to the period from 2005 to 2009.

Data on piped water service providers includes quantitative and qualitative indicators. The main source of the data is the AICD's water supply and sanitation database (available at www.infrastructureafrica.org). Data has been updated by the authors based data from service providers' annual operational and financial reports, and the International Benchmarking Network for Water and Sanitation Utilities (IBNET) database (available at www.ib-net.org). Quantitative indicators for 116 providers of piped water include conventional infrastructure performance measures of access, efficiency, quality, and financial performance, and include data from 2000 to 2009 (aggregations are averages over this period otherwise noticed). A detailed list of service providers is presented in annex 2.

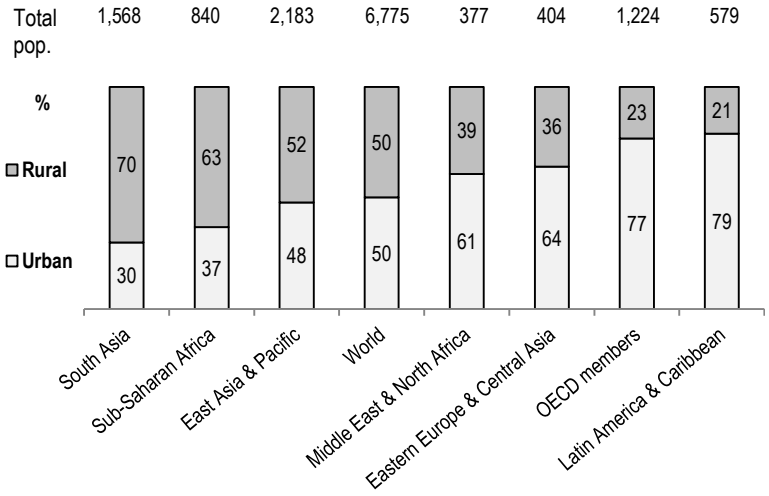
Due to the lack of data on access or service provision the following countries were not included in the analysis: Burundi, Cape Verde, Comoros, Equatorial Guinea, The Gambia, Guinea-Bissau, Mauritius, Sao Tome and Principe, Seychelles, and Swaziland. Therefore all the figures presented in this paper referred only to the countries in the sample, otherwise noticed.

2. Urbanization in Sub-Saharan Africa

2.1. Current trends of urbanization

Sub-Saharan Africa is the second least urbanized region in the world, after South Asia. The region is home for 840 million people, from whom around 37 percent (or 310 million) live in cities. The percentage of population living in Sub-Saharan Africa cities is below the global average. In 2009 50 percent of the global population (6,775 million) lived in cities (Figure 1).

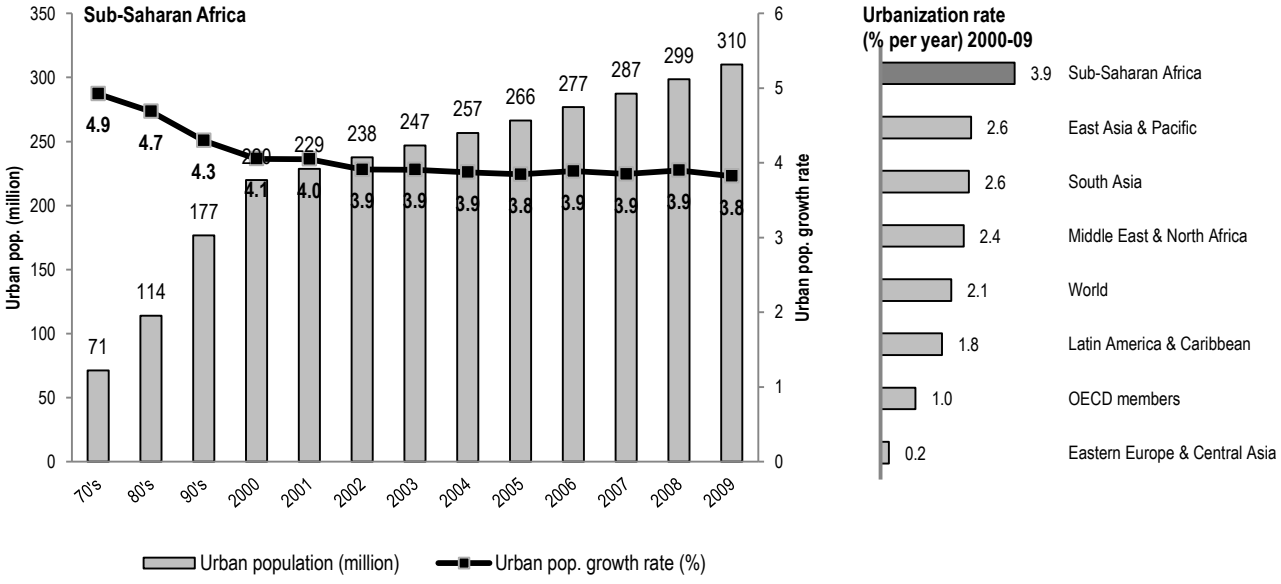
Figure 1. Share of urban versus rural population, by region (2009)



Source: World Bank, 2011
Notes: pop=population, expressed in million

But whereas the region is one of the least urbanized, Sub-Saharan Africa experiences the highest rates of urban population growth in the world. In the last decade, urban centers in Sub-Saharan Africa were growing, on average, at 3.9 percent per year. East and South Asia are the regions with rates of urbanization closest to Sub-Saharan Africa (2.6 percent per year) (Figure 2).

Figure 2. Sub-Saharan urban population growth



Source Author's calculations based on World Development Indicators (World Bank, 2011)
Note: Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects.

While Sub-Saharan Africa collective urban population growth is high, there are wide differences across countries. To understand how population growth has shaped the trend of expansion of water supply sources and sanitation, this paper classifies countries according to their urban population growth rate (i.e. urbanization rate), as presented in Table 3. This classification is based on statistical analyses that cluster countries by identifying similarities/differences across them, such as level of urbanization or GDP growth rate. Within this framework, Sub-Saharan African countries fall into one of three band clusters based on the rate of urban population growth (urbanization rate[2]): low urbanizing countries (0-3 percent); medium urbanizing countries (3-4 percent); and, high urbanizing countries (greater than 4 percent) (Table 3). This framework is useful to assess patterns of access to water supply and sanitation, and to identify challenges in service delivery.

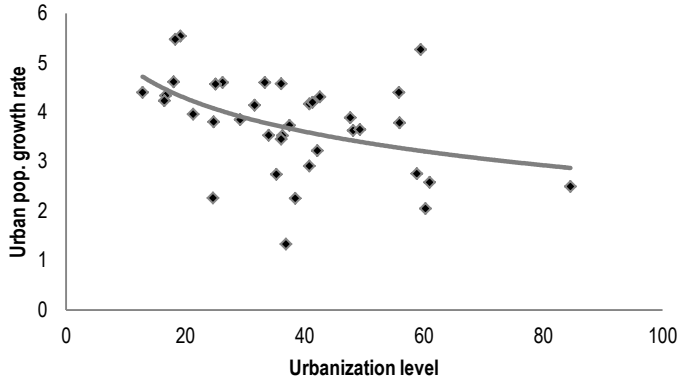
Table 3. Classification of countries, by urban population growth rate

Classification	Urban population growth rate (% per rate)	Countries
Low	**<3%**	Botswana, CAR, Congo, Rep., Gabon, Mauritania, South Africa, Swaziland, Zambia, and Zimbabwe
Medium	**3% to 4%**	Cameroon, Cote d'Ivoire, Ghana, Guinea, Kenya, Lesotho, Madagascar, Namibia, Nigeria, Senegal, Sierra Leone, and Somalia
High	**>4%**	Angola, Benin, Burkina Faso, Chad, Congo, Dem. Rep., Ethiopia, Liberia, Malawi, Mali, Mozambique, Niger, Rwanda, Sudan, Tanzania, Togo, and Uganda

Note: Sudan refers to the former Republic of Sudan (i.e. today's Sudan and South Sudan).
Source: Author's classification based on World Bank 2011

Based on the statistical analysis used for country clustering, there are key differences across the three clusters. The higher the urban population growth rate the lower the level of urbanization (Figure 3). Indeed, in those countries with an annual urban population growth rate higher than 4 percent, on average only 32 percent of the population lives in urban centers, vis-à-vis 40 and 53 percent in countries with medium and low urban population growth rates.

Figure 3. Correlation between urban population growth rate and urbanization level



Source: Author's calculations based on UN, 2010

[2] Averaged between 2000 and 2009

Another difference emerging from the country clustering is that the fastest urbanizing countries in Sub-Saharan Africa have achieved the highest GDP growth rates, averaging 6.7 percent per year between 2005 and 2009. Finally, the countries with urban population growth rates higher than 4 percent per year with about 409 million people account for half of the Sub-Saharan Africa population (Table 4).

Table 4. Characteristics of country clusters, by urban population growth rate

Classification of countries by urban pop. growth rate	Urban population growth rate (% per year) Average 2000-2009	Percentage urban 2009	Population (million) 2009		Population growth rate (% per year) Average 2000-2009	GDP growth rate (% per year) Average 2005-2009
			Urban	Total		
Low (< 3%)	2.4	53	47	90	1.7	2.4
Medium (3%-4%)	3.7	40	140	320	2.3	4.0
High (>4%)	4.7	32	118	409	2.9	6.7
Sub-Saharan Africa	3.9	39	306	819	2.5	4.9

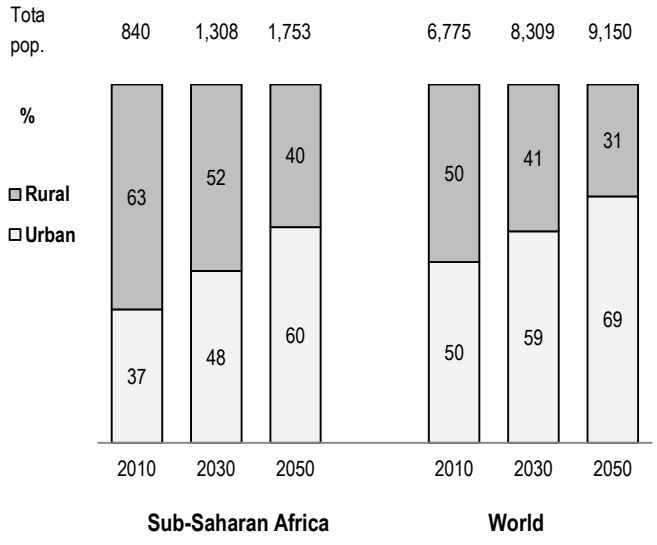
Source: Authors' own calculations based on World Bank, 2011

Note: These calculations are based on the sample of countries included in the study, and therefore Burundi, Cape Verde, Comoros, Equatorial Guinea, The Gambia, Guinea-Bissau, Mauritius, Sao Tome and Principe, Seychelles, and Swaziland are not included in the calculations.

2.2. Projected trends of urbanization

Sub-Saharan Africa population is projected to more than double by 2050, growing faster than the world population. The region's population is expected to growth from 840 million in 2010 to 1.3 billion in 2030, and further to 1.7 billion in 2050. World population is projected to reach 8.3 billion in 2030, up from the current 6.8 billion, and surpass 9 billion people by 2050. Thus Sub-Saharan Africa will be responsible for about 30 percent (or 468 million) of the global population growth between 2010 and 2030, and for about 53 percent (or 445 million) between 2030 and 2050 (Figure 4).

Figure 4. Sub-Saharan Africa and World population projections



Source: UN, 2010

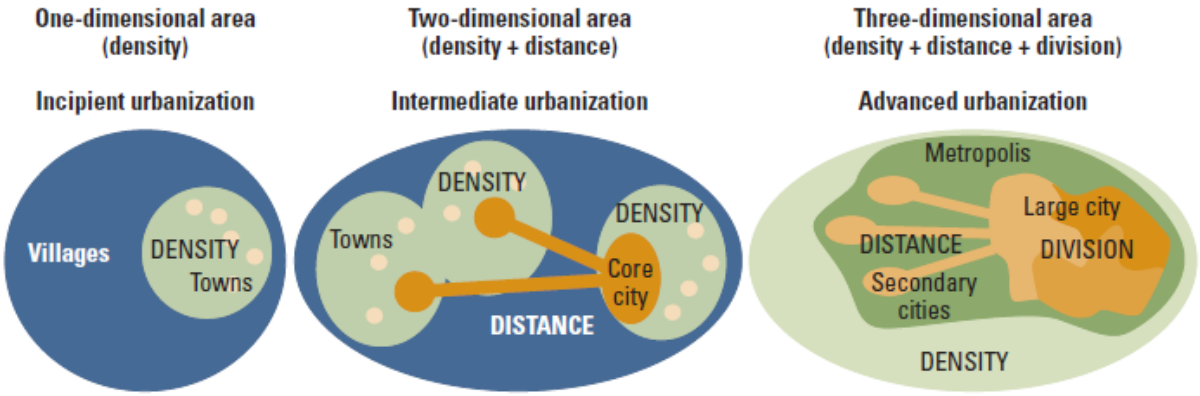
Most of the population growth of Sub-Saharan Africa will take place in cities. By 2050 Sub-Saharan Africa will be largely urbanized. Overall, as of 2010, Sub-Saharan Africa was transitioning from an incipient to an intermediate level of urbanization with 37 percent of population living in cities. Projections suggest that by 2030 this figure will increase to 48 percent. By 2050 the region will be moving to an advanced stage of urbanization as it is estimated that around 60 percent of the population in the region will be urban, close to the expected

global urbanization level of 69 percent (Figure 4). According to the World Development Report "Reshaping Economic Geography" this transition would shape the sequencing and priority-setting of urban policies (Box 1).

Countries with high urban population growth rates will experience the greatest transition from incipient urbanization to intermediate urbanization. Between 2009 and 2050 the level of urbanization will almost double in countries with high urban population growth rates: the percentage of the population living in urban areas will increase from 32 to 57 percent. By 2050 countries with low and medium urban population growth rates will have 73 and 66 percent –respectively–of their population living in cities.

Box 1. Shaping policies to respond to different stages of urbanization

According to the 2009 World Development Report "Reshaping Economic Geography", the spatial dimensions of density, distance, and division associated with each level of urbanization spotlight the policy challenge in each of these types of place.
Incipient. Areas of incipient urbanization— with urban shares of about 25 percent— are predominantly agricultural or resource based, with low economic density. The priority is simply to facilitate agglomeration forces and to encourage internal economies of scale for plants, mills, and factories in towns. Because it is not yet clear which places will be favored by markets and for what purposes, neutrality between places should be the watchword for policy makers.
Intermediate. As urbanization progresses, economic alliances strengthen within and between urbanized areas. Many firms and plants in the same sector colocate to take advantage of sharing inputs and knowledge spillovers. In such areas—with urban population shares of about 50 percent—the promotion of localization economies is the highest priority. Efficiency in production and transport is the watchword.
Advanced. For highly urbanized areas, productivity and consumption benefits arise from urbanization economies associated with the diversity and intensity of economic activity. While functionality is the goal for industrial towns and cities, the watchword for postindustrial metropolises, with urban shares of about 75 percent, is livability.

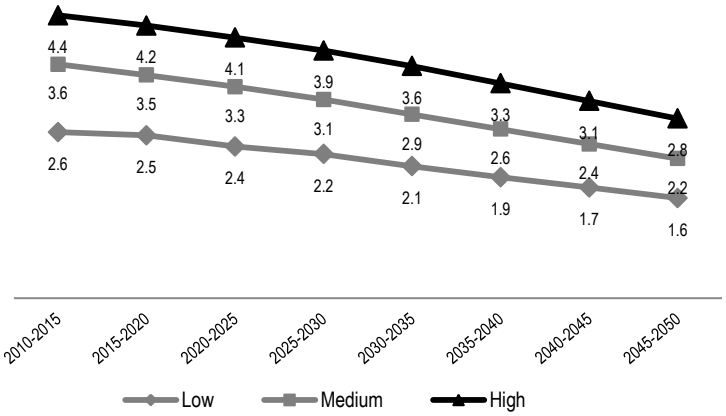


Source: World Bank, 2009

As Sub-Saharan Africa moves towards an advanced state of urbanization the urban population growth rate will decline. Between 2010 and 2015 urban population is projected to growth 3.6 percent per year. By 2050 this rate is expected to drop to 2.3 percent per year. The decline follows the world trend: urban annual population growth is projected to drop from 1.8 between 2010 and 2015, and to 1.1 between 2045 and 2050.

Whereas the process of urbanization for each country cluster is des-accelerating, the sharpest change will take place in countries with high urban population growth rates. Urban population growth in the latest is expected to drop from 4.4 to 2.8 percent per year between today and 2050 (Figure 5). This growth, in turn, will continue to be significantly higher than in the other two cluster groups.

Figure 5. Urban population growth rate in Sub-Saharan Africa, by country clusters



Note: Low= Urban growth rate <3% per year; Medium: Urban growth rate between 3 to 4% per year; High: Urban growth rate > 4% per year.
Source: Author's calculations based on UN, 2010

3. Pathways of access to water supply

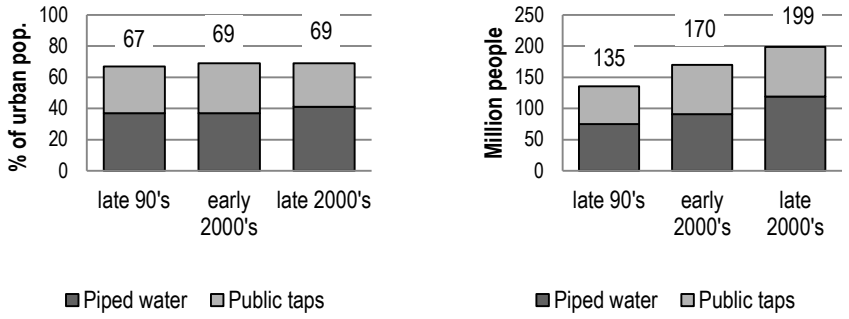
Since the late 90's urban access to improved water supply in Sub-Saharan Africa has expanded, albeit slowly. Efforts to increase access to improved water supply were not enough to cope with population growth. As a consequence, the number of urban dwellers that gained access to unimproved sources of drinking water such as wells, boreholes and vendors increased. Reliance on surface water – such as rivers, dams, lakes, ponds, streams, canals, irrigation channels– declined in both relative and absolute terms.

In the same track of the Sub-Saharan Africa trend, the expansion of improved water supply services in countries with high urban population growth rates is lagging behind urban population growth. As these countries are generally in an incipient level of urbanization the rate of access to improved water sources is lower than in the other country clusters. These countries are making the greatest efforts in the region to expand access to improved water supply, but they find harder to surpass urban population growth. Increasing number of urban dwellers are gaining access to wells and boreholes as the main source of drinking-water. Reliance on water from vendors and surface water has declined in these countries.

3.1. In urban Sub-Saharan Africa

Access rate to improved water supply sources hardly increased in urban Sub-Saharan Africa in since the late 90's. The percent of the urban population that had access to improved water supply only increased from 67 in the late 90's to 69 percent in the late 2000's. This represented an increase of 63 million urban dwellers gaining access to improved water supply from 135 to about 199 million since late 90's (Figure 6), versus a total urban population growth of 130 million.

Figure 6. Urban access to improved water supply



Source: Authors' calculations based on household survey data

Two opposite forces are driving the slow increase in the access rate to improve drinking water: increasing access rate to piped water and decreasing access rate to public taps. Access to piped water increased from 37 to 41 percent in urban areas since late 90's. But there was an important decline in access rate to public taps in urban areas from 30 to 28 percent since late 90's (Table 5). These figures could be even lower as many public taps are in poor condition or not working at all.

Table 5. Urban access to water supply, by technology

Type of water supply source	% of urban population			million urban people		
	late 90's	early 2000's	late 2000's	late 90's	early 2000's	late 2000's
Piped water	37	37	41	74.7	91.0	119.1
Public taps	30	32	28	60.7	79.0	79.5
Wells and boreholes	20	21	22	40.4	52.0	62.3
Vendors	7	5	5	14.9	11.0	14.7
Surface water	5	4	3	10.8	9.0	10.0

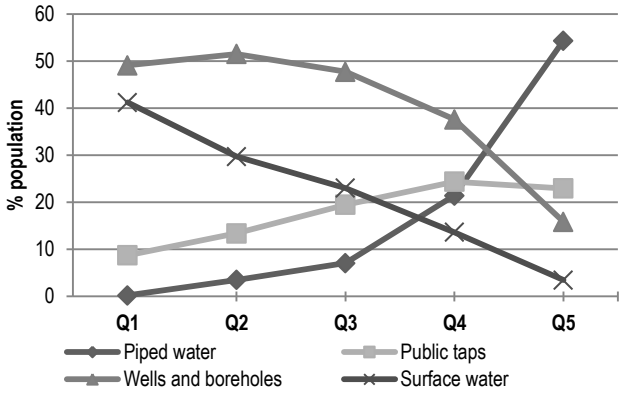
Source: Authors' calculations based on household survey data

Note: late 90's=1995-1999; early 2000's= 2000-2005; late 2000's=2005-2009

Further expansion of piped water in Sub-Saharan Africa is constrained by supply and demand factors. On the supply side, insufficient production capacity and inefficiencies of service providers in the region hamper reaching universal access to improved water supply sources. On the demand side, high connection fees –averaging $265 in Sub-Saharan Africa– and lack of land tenure prevent households to get connected (Banerjee and Morella, 2011).

Expansion of piped water in urban centers in Sub-Saharan Africa has been unequal. Existing tariff structures benefit the most the richest quintiles (i.e. quintile 5 and 4) as these are the ones who have the highest levels of access to piped water and public taps (Figure 7), reflecting the limited coverage of water utilities in the slums and informal settlements where poor people live. For instance, in Accra while 80 percent of richest neighborhoods have connections to the public supply, this figure falls to 16 percent in low income neighborhoods. As the public water supply does not reach all areas, a large part of Accra is supplied by water tankers and other small water enterprises or water vendors (WaterAid, 2008). In Uganda, water payments represent as much as 22 percent of the average income of urban households in the poorest 20 percent of the income distribution (UNDP, 2006) .Also, in the case of block tariffs structures the size of the first block of water consumption could have important distributive impacts (Box 2. Impact of the first block of consumptionBox 2).

Figure 7. Unequal distribution of access to water supply



Source: Author's calculations based on AICD Database
Note: National data for the last available year was averaged to obtain Sub-Saharan Africa averages. Data constraints do not allow for the separation between surface water and water from vendors. Hence, the surface water line includes water from vendors.

Box 2. Impact of the first block of consumption

Whether this kind of tariff structure actually helps the poor is the subject of considerable debate: analysts have pointed out that in some cases, this type of tariff structure can harm the poor because they would tend to consume more water (either through collective connections or standpipes) or would often be unconnected, therefore unable to benefit from this kind of cross-subsidy ("exclusion risk"). If the size of the first block is very large (i.e. a relatively large monthly consumption gets subsidized), the error of inclusion then becomes high, with a large number of relatively well-off people benefiting from the subsidy. In a recent review of tariff structures in seven African countries (Kenya, Tanzania, Uganda, Zambia, Senegal, Mali and Burkina Faso), it was found that all countries had an increasing block tariff except Uganda. The size of the social block varied from 5 m3 in DAWASA (Tanzania) to 20 m3 in Mali or Senegal. It was also in those two countries that there was the sharpest difference in tariff level between the first block and the second block. Because the size of the first block is high, the risk is that the significant subsidy provided to consumers in the first block would benefit quite a lot of consumers who are well-off. This would partly depend on the size and consumption patterns of poor families versus rich families, which is a factor to taken into account when deciding on the tariff structure.

Source: Trémolet and Halpern, 2006

In spite of these developments urban population growth rate has outpaced the expansion rate of access to improved water supply sources. On average, in the late 2000's urban population in Sub-Saharan Africa was growing 3.7 percent per year, but only 2.9 percent of urban population gained access to improved water supply. As urban population growth overwhelmed the capacity of water supply networks around 20 million urban dwellers were added to the urban population that access to non-improved water supply sources between the late 90's and the late 2000's (Table 5).

As urban population growth rates outpaced expansion of improved water supply sources, more urban dwellers turn to unimproved source of water supply, such as wells and boreholes. Access to well and boreholes increased from 20 to 22 percent, that is 22 million urban dwellers gained access to this source of water supply (Table 5). But the dilapidation of access and lack of maintenance of wells and

boreholes had rendered many of them unsuitable to secure safe drinking-water. For instance, in the Central African Republic only 10 percent of the wells and boreholes provide safe water (Dominguez and Foster, 2011) in spite of these being the main source of water for urban dwellers. This trend underscores the limited capacity of services providers in the region to expand access to drinking water-sources.

Alternatively some urban dwellers turned to water from vendors as the main source of drinking-water. Even though that reliance on water vendors decreased from 7 in the late 90's to 5 percent in the late 2000's, additional 14 million urban dwellers relied on water from vendors (Table 5). But in some cities, such as Accra (Ghana) and Luanda (Angola), were peri-urban and slum areas expanded significantly in the last decade, vendors were the only alternative to cope with lack of access to improved drinking water. In Accra, the rate of urbanization outstrips current levels of urban water supply. Water is rationed to many consumers with only a few customers able to get 24-hour supply. In the peri-urban areas and the densely populated poor urban areas customers receive supplies once a week or none at all. Among the urban poor, water can be a critical resource in short supply. The Ghana Living Standards Survey, Round 4 reported that approximately forty percent (40 percent) of urban families were relying on neighbors and vendors for their water. With rapid expansion of new housing developments, often ahead of utility services, more and more urban residents will depend on vendors and tanker services, at costs far in excess of utility rates (Government of Ghana, Ministry of Water Resources, Works and Housing, 2007).

Against the trends of access to wells, boreholes and water from vendors, reliance on surface water diminished in relative and absolute terms. In late 2000's 3 percent of urban population relied on surface water compared to 5 percent in 1990's. This represents a slight decline in the number of people using surface water from around 10.8 million to 10 million between the late 90's and the late 2000's (Table 5).

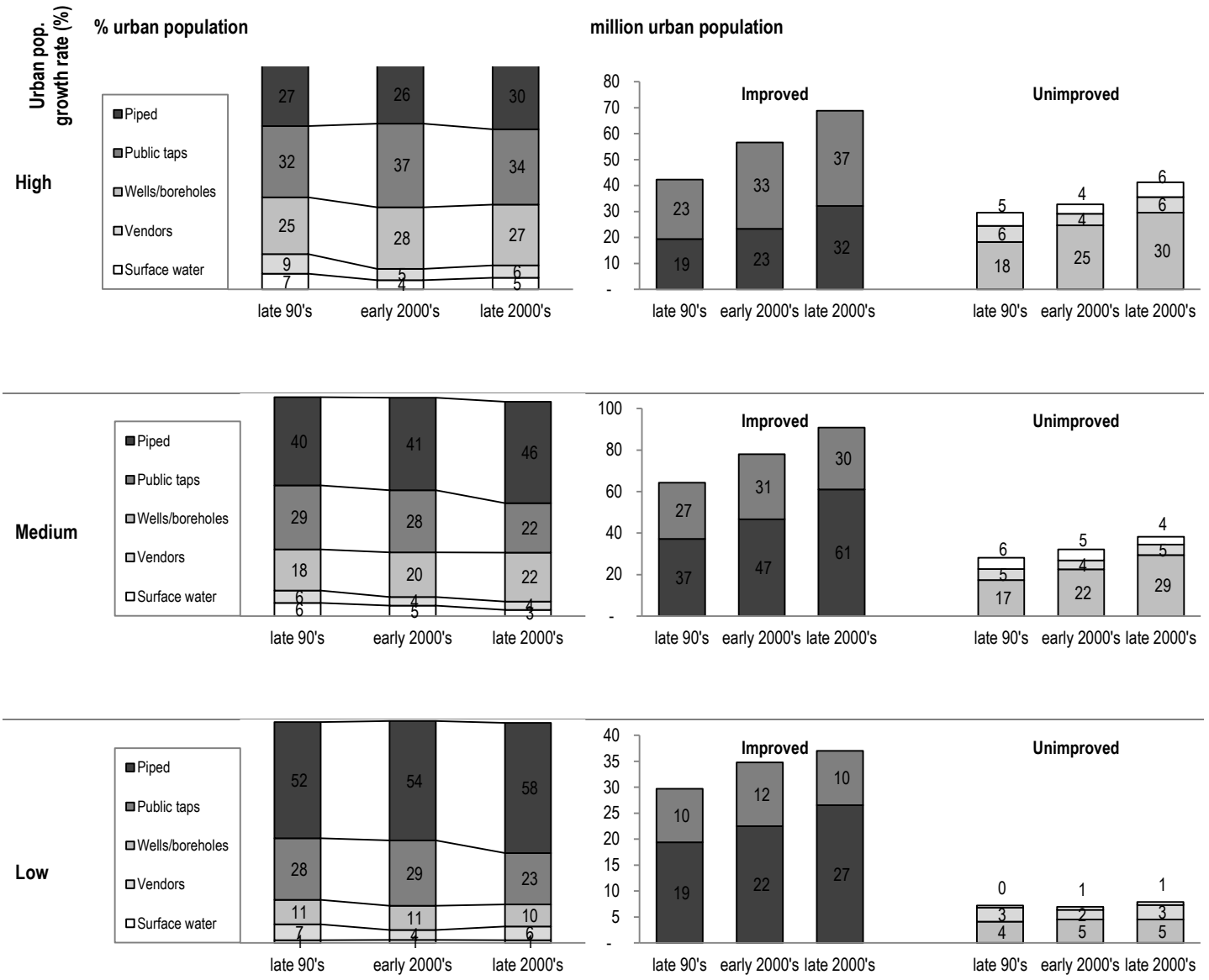
3.2. The case of countries with high urban population growth rates

Countries with high urban population growth rates have relatively lower levels of access to improved water supply in urban centers. On average, these countries provided access to improved water sources to 64 percent of the population compared to 68 percent in countries with medium urban population growth rates and 82 in countries with low urban population growth rates (Figure 8).

In particular, countries with high urban population growth rates have lower levels of access to piped water: 29 percent compared to 48 and 56 percent in countries with medium or high urban population growth rates, respectively (Figure 8). But access to public taps in countries with high urban population growth rates is higher: 34 percent compared to 22 and 56 percent in countries with medium or high urban population growth rates, respectively.

At the same time countries with high urban population growth are the ones where the strongest expansion of improved water services has taken place. On average, 3.3 percent of the urban population living in these countries gained access per year to improved water in the late 2000's, twice as much as in countries with low urban population growth rates (1.6 percent per year). In particular, the expansion was driven up but the growth in public taps, a relatively inexpensive alternative to cope with population growth.

Figure 8. Access to water supply over time, by country clusters



Source: Authors' calculations based on household survey data
Note: late 90's=1995-1999; early 2000's= 2000-2005; late 2000's=2005-2009

But the rate of expansion of improved water supply in countries with high urban population growth rates was not enough to outpace urban population growth. On average, urban population growth in these countries was 4.5 per year vis-à-vis 3.3 percent of population gaining access to improved sources of water supply. In particular, Burkina Faso, Democratic Republic of Congo, Angola, and Liberia faced the greatest gaps between urban population growth and the rate at which populations gained access to improved water. On the other hand, Benin and Ethiopia managed to expand access to improved water at a rate greater than the rate of urbanization.

As city population grows faster than access to improved water supply, countries with high urban population growth rates expanded access to wells and boreholes. Reliance on wells and boreholes in

countries with high urban population growth rates increased from 25 percent of urban population to 27 percent between late 90's and late 2000's. At this level, reliance on wells and boreholes was almost three times that of countries with low urban population growth rates (27 versus 10 percent of the urban population). In the late 2000's in countries with high urban population growth rates 1.4 percent of the urban population per year (or 843,000 people) gained access to wells and boreholes.

As opposed to the trend of expansion of wells and boreholes, over time access to water from vendors declined in countries with high urban population growth rates. In the late 2000's, 6 percent of the urban population relied on water from vendors – the same rate of countries with low urban population growth rates–, versus 9 percent in the early 2000's. Even though in some countries, such Angola, urban population was reverting to use water from vendors over time (Box 3).

As it happened to water from vendors, reliance on surface water declined over time in countries with high urban population growth rates. Surface water declined from 7 to 5 percent of the urban population in these countries from early 2000's to late 2000's. But the reliance on surface water is 5 times as much as the reliance of low urbanizing countries (1 percent in late 2000's).

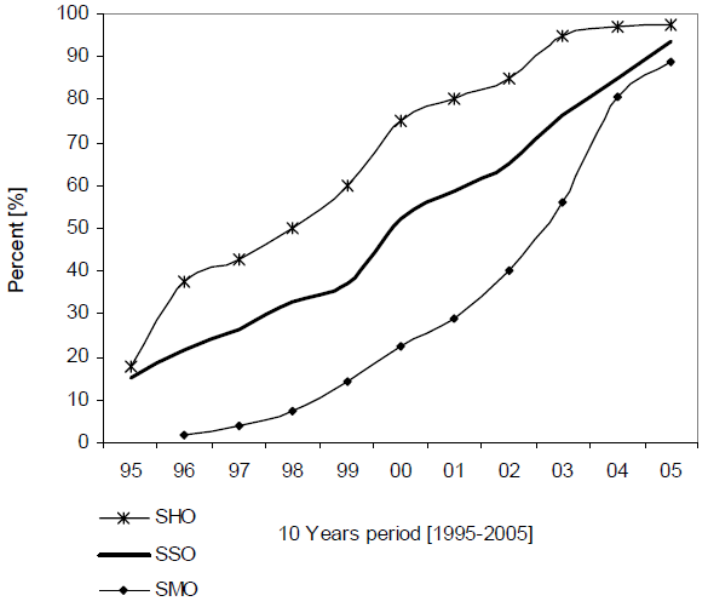
Box 3. Angola: Increasing reliance on water from vendors in urban centers

Angola's urban population is growing at 4.7 percent per year, but the precarious piped and standpipe water supply systems cannot cope with the increasing water demand. As a consequence, reliance on water from vendors has increased. Supply of water from tankers rose from 10 in 2001 to 37 in 2007 percent in urban areas, with prices varying from US$4 per meter cubic in an area close to the distributional area of the water tank to US$20 in more distant areas (Cain, Allan; Mary Daly and Paul Robson, 2002), leading to a significant rise in the number of small scale operators. In peri-urban areas of Luanda, 70 percent of the dwellers purchased their water from water vendors. The way looking forward looks promising as the government is currently implementing an aggressive capital investment program to rehabilitate the major works including treatment facilities, pumping stations, transmission mains and distribution networks in major urban areas throughout Angola, which will be complemented by the institutional reforms proving for water supply utilities able to deliver sustainable services (World Bank, 2008).

Source: Based on DW Angola, 2007

Evolution of water truck operators

Cumulative increase in the number of STOs in the period between 1995 and 2005



Source: Development Workshop – Angola, 2007

Note: SHO= Small scale high size operator; SSO= Small scale single operator; SMO= Small scale medium size operator

4. Pathways of access to sanitation facilities

Since the late 90's the access rate and the number of urban dwellers in Sub-Saharan Africa with an improved sanitation facility increased. But the rate of expansion of improved sanitation facilities lagged behind urban population growth rate. Urban dwellers that were unable to gain access to an

improved sanitation added to the people already relying on traditional latrines. Yet urban areas in Sub-Saharan Africa excelled at reducing their reliance on open defecation (Table 6).

Table 6. Urban access to sanitation, by technology

Type of sanitation	% of urban population			million urban people		
	late 90's	early 2000's	late 2000's	late 90's	early 2000's	late 2000's
Flush toilets and septic tanks	23	24	28	46.2	59.4	81.4
Improved traditional	28	34	34	59.2	82.8	96.7
Traditional latrines	35	32	30	69.5	76.1	84.4
Open defecation	13	10	9	25.5	24.3	24.6

Source: Authors' calculations based on household survey data

Note: late 90's=1995-1999; early 2000's= 2000-2005; late 2000's=2005-2009

Similarly, countries with high urban population growth rates expanded access to improved sanitation and reduced reliance on unimproved sanitation. But overall, access to flush toilets, septic tanks, and improved latrines in these countries was below the access in countries with medium or low urban population growth rates. Efforts to expand access to improved sanitation facilities in countries with high urban population growth rates, albeit being the highest in the region, were below urban population growth. Consequently, more urban dwellers relied on traditional latrines. As the general trend, practice of open defecation was reduced over time in these countries.

4.1. In urban Sub-Saharan Africa

Access to improved sanitation increased in cities in Sub-Saharan Africa since late 90's. Access to improved sanitation increased from 51 percent of the urban population in the late 90's to 57 percent in the early 2000's to 61 percent in the late 2000's. As a result, the number of urban dwellers having access to improved sanitation increased from 103 million in the late 1990's to around 176 in the late 2000's (Table 6).

The increase in access to improved sanitation was mainly due to the expansion of flush toilets and septic tanks. In the late 90's around 23 percent of the urban population has access to this form of sanitation. The greatest effort of expansion took place beginning the 2000's: access to flush toilets and septic tanks increased from 24 to 28 percent in the late 2000's. This is, around 1.8 percent of urban population per year (or 6 million) gained access to this form of improved sanitation. By the end of the decade, around 79 million of urban dwellers relied on flush toilets and septic tanks as the main source of sanitation (Table 6).

Expansion of improved latrines also contributed to the expansion of improved sanitation. The greatest effort of expansion of traditional latrines took place in between decades (between the late 1990's and the early 2000's) from 28 to 34 percent of the urban population. Since then, access to improved latrines has remained at the same level. In the late 2000's about 97 million urban people has access to improved latrines. Population growth outpaced rate of expansion of improved sanitation in urban areas in Sub-Saharan Africa, making more people reliant on unimproved forms of sanitation. Population living in urban areas was growing 3.7 per year (average between 2000 and 2009), but the expansion of improved

sanitation was only 3.3 percent over the same period. Thus, the gap was filled by the expansion of unimproved forms of sanitation.

The number of urban dwellers using traditional latrines expanded substantially despite a declining rate of access. The number of people using traditional latrines increased from 70 million to 86 million. This is, around 1.2 million urban dwellers per year gained access to this form of sanitation. But in relative terms, access to traditional latrines declined from 35 percent to 30 percent.

Urban Africa made significant progress in reducing reliance on open defecation in relative and absolute terms. Reliance on opened defecation declined from 13 to 9 percent of urban population between early 1900's and late 2000's. Consequently, the number of urban dwellers relying on open defecation slightly declined from 26 to 24 million.

4.2. The case of countries with high urban population growth rates

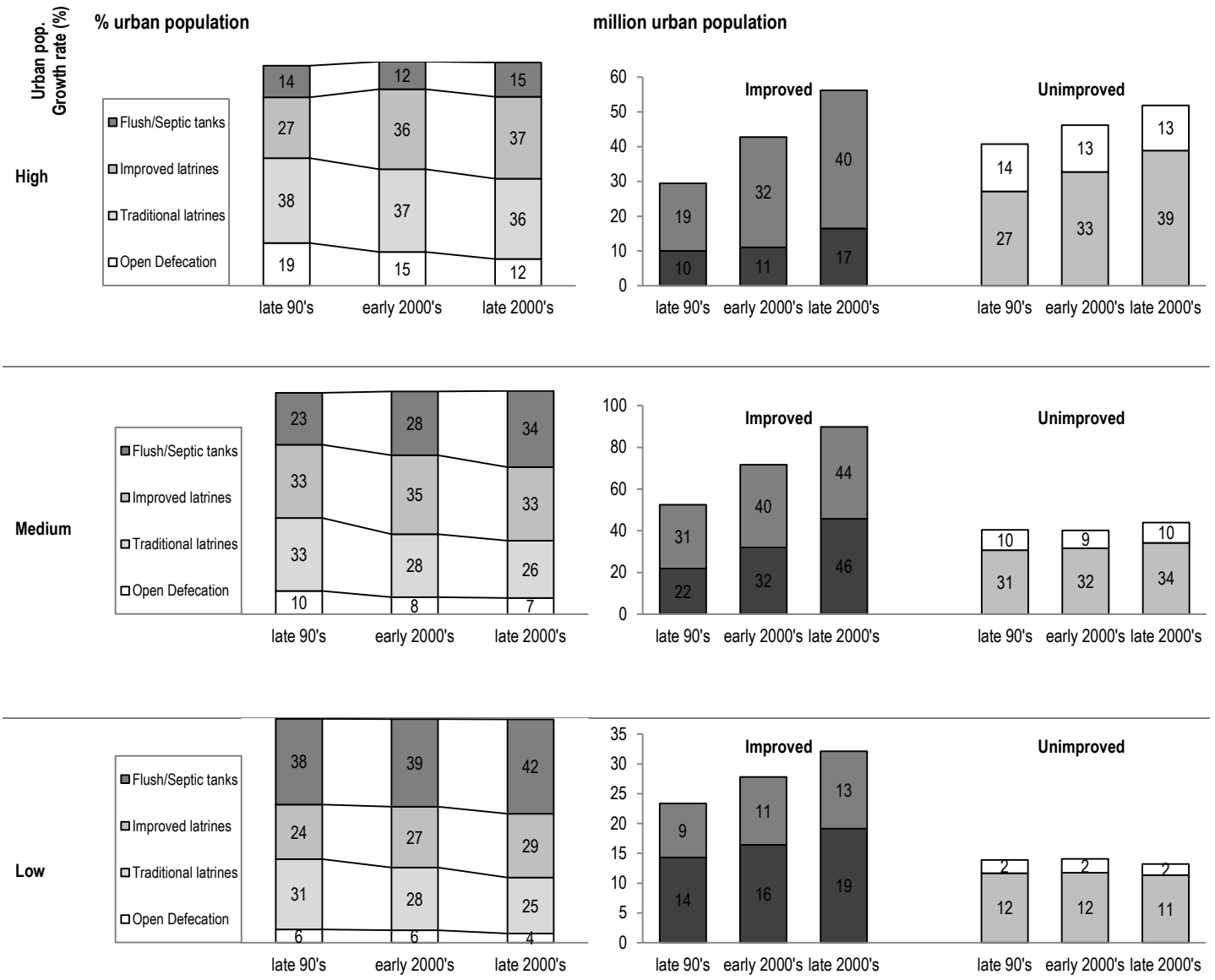
Countries with high urban population growth rates have relatively lower levels of access to improved sanitation. In the late 2000's, on average 52 percent of the urban population in these countries had access to improved sanitation, compared to 67 and 71 percent in countries with medium and low urban population growth rates, respectively (Figure 9).

Among forms of improved sanitation, countries with high urban population growth rates have relatively lower access to flush toilets and septic tanks and higher access to improved latrines. In the late 2000's about 15 percent of urban population has access to flush toilets and septic tanks versus 42 percent countries with low urban population growth rates. In the same period about 37 percent of urban dwellers had access to improved latrines compared to 29 percent countries with low urbanization rates (Figure 9).

In spite of relatively lower levels of access to improved sanitation, countries with high urban population growth rates are expanding sanitation services the fastest in urban areas. In the late 2000's 2.3 percent of the urban population per year in these countries gained access to improved sanitation, compared to 0.6 and 1.7 percent in countries with medium and low urbanization rates, respectively. In particular, there was a greater expansion of improved latrines than flush toilets of septic tanks (1.8 versus 1.3 percent of the urban population gained access per year).

But, similar to the case of water supply, efforts to expand improved sanitation in countries with high urban population growth rates were not enough to cope with population growth, leading to more people to rely on unimproved sanitation. Whereas 3.1 of urban people per year gained access to improved sanitation facilities in these countries, urban population grew on average 4.5 percent per year. To fill the gap, urban dwellers relied in unimproved forms of sanitation, such as traditional latrines. Indeed, 2.1 percent of urban population per year gained access to traditional latrines since late 90's.

Figure 9. Access to sanitation facilities over time, by country clusters



Source: Authors' calculations based on household survey data
Note: late 90's=1995-1999; early 2000's= 2000-2005; late 2000's=2005-2009

Reliance on open defecation decreased notably. In the late 2000's reliance on open defecation was 12 percent versus 19 percent in the late 90's in countries with high urban population growth rates. In absolute terms, about 360,000 people were moving from open defecation up in the sanitation ladder in countries with high urban population growth rates (Figure 9).

5. Characteristics of piped water supply service provision

Water supply service provision in urban centers in Sub-Saharan Africa is handicapped by the significant inefficiencies of service providers. These section looks at the performance of service providers using the indicators detailed in Table 7.

Table 7. Indicators used to measure efficiency

Indicator	Unit	Definition
Non-revenue water	% of production	Percentage of the water produced that is not consumed
Collection ratio	% of billings	Percentage of total billings for water and wastewater that are recovered
Labor productivity	Connections per employee	Number of water connections per employee
Operating cost recovery	% of operational cost	Percentage of operating costs that are recovered by operational revenues
Water consumption per capita served	Liters per day	Volume of water consumption per capita served per day (i.e population served by the utility
Continuity	# hours per day	Number of hours per day of water supply provision

Source: AICD, 2011
Note: Averages between 2000 and 2010

5.1. Operating performance

To assess the operational performance of service providers several indicators have been selected: Non-revenue water, labor productivity, water consumption per capita served and continuity of piped water (see Table 7 for definitions).

Non-revenue water

A major challenge facing water supply providers in Sub-Saharan Africa is high levels of non-revenue water. On average, a service provider in the region loses 39 percent of its water production, almost as twice as much as the best practice of 20 percent. There is a wide range, with some utilities presenting losses as high as 68 percent of their revenues, while some South African and Namibian utilities register levels of non-revenue water of only 12 percent of their revenues. Countries with high urban population growth rates report the highest levels of non-revenue water (40 percent), above the average for countries with medium and low urban population growth rates (39 and 36 percent, respectively).

The high level of non-revenue water in Sub-Saharan Africa is explained by limited and dilapidated infrastructure that creates physical losses. Physical losses include leakage from the system and overflows from storage tanks. Water supply assets in the region lack proper maintenance and rehabilitation, and many were dilapidated during the civil wars that affecting the country. The persistence of civil conflict in Africa during the last two decades has lead to neglecting adequate operation and maintenance of the water and sanitation facilities, which hinder effectively, serve the population and increase the spending needs on rehabilitation and construction of new assets. For instance, most urban centers in Angola are served by precarious water supply system unable to cope with urbanization trends. Luanda's utility provider, EPAL[3], is struggling with aging infrastructure built to support much smaller

[3] Empresa Pública de Água de Luanda

populations, which puts is deteriorating performance behind the level of comparable utilities in resource rich countries. The water supply system in Luanda was built in colonial times for a population of 500,000 people but in 2007 population was estimated to be over 5 million.

The high level of non-revenue water is also explained by poor metering and customer management systems that generate commercial losses. Commercial losses include under-registration on customers' meters, errors in data handling, and water theft. In Sub-Saharan Africa only two out of three piped private connections are metered and most public taps are not metered at all.

But also unbilled authorized consumption increases the level of non-revenue water. This included water used by the utility for operational purposes, water used for firefighting, and water provided free to certain groups such as the government, schools, and charities.

Labor productivity

In general service providers in Sub-Saharan Africa are heavily overstaffed. Labor productivity is a major problem as the number of connection per staff of service providers is only 96 connections per employee, less than half the benchmark of 200 connections per employee. State-owned enterprises may retain more employees than is strictly necessary to discharge their functions, often because of political pressure to provide jobs for members of certain interest groups, the involvement of elected officials, and lack of independence of services providers concerning staffing issues.

Labor productivity of service providers in countries with high urban population growth rates is relatively poorer. On average, service providers in rapid urbanizing countries have only 85 connections per employee, well below the labor productivity of countries with medium and low urban population growth rates, with 117 and 141 connections per employee, respectively.

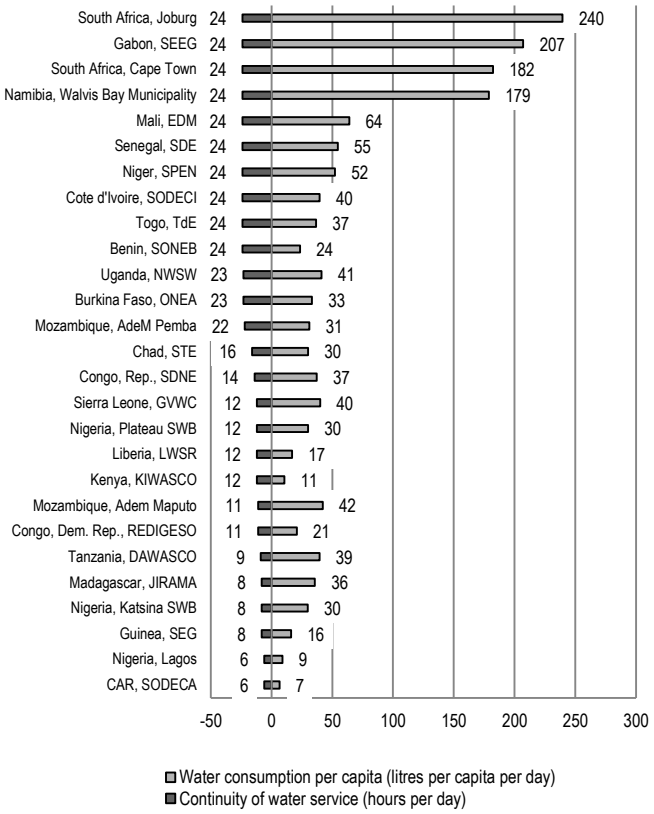
These striking results for labor inefficiencies underscore the importance of strengthening external governance mechanisms that can impose discipline on the behavior of state-owned enterprises. Over employment partially explains why in African countries with a publicly owned operator the share of spending allocated to capital spending frequently remains below 25 percent despite the increasing investment needs.

Continuity and water consumption per capita served

The daily water consumption per capita in Sub-Saharan Africa is exceptionally low. Water consumption per capita served by piped connections is estimated at 138 liters per capita per day, but this average masks significant variations among countries with different urban population growth rates. In some countries availability of utility water in urban areas is extremely low relative to subsistence benchmarks, partly due to deficiencies in water treatment infrastructure. Urban dwellers that are not served by piped water supply receive even smaller amounts of water.

In countries with high urban population growth rates, users of piped and consume about 99 liters of water per day, below countries with medium and low urban population growth rates (105 and 249 liters per capita served per day, respectively. Domestic water consumption is urban centers in Central African Republic averages 6.5 liters per capita per day, an insufficient amount to satisfy absolute subsistence at 25 liters per capita per day. Whereas in Bangui the consumption is around 10 liters per day, in the other seven urban centers served by SODECA (Societé de Distribution d'Eau de Centrafrique) the daily consumption is limited to 5 liters. It is estimated that only 21 percent and 4 percent of the population living in Bangui and the other seven urban centers, respectively, consume the levels required to satisfy basic needs (Dominguez and Foster, 2011).

Figure 10. Water consumption per capita and continuity of piped water supply



Note: Data is for the latest available year
Source: AICD, 2011

In Sub-Saharan Africa there is a correlation between water consumption per capita and continuity of water supply. Countries with few hours of piped water supply usually have lower consumptions per capita compared to those countries with higher continuity of service (Figure 10). For instance, customer of Lagos Water Corporation (Nigeria) consume as low as 39 liters per capita per day vis-à-vis customers of Johannesburg Water (South Africa) that consume 240 liters per capita per day. Intermittent supply leads to many problems including, severe supply pressure losses and great inequities in the distribution of water (see Box 4).

Box 4. The cost of non-permanent water supply

A critical look at the findings of consumer surveys is always needed. The poor quality of the piped water supply forces many customers to heavily invest in substitutes to complement their supply and mimic a permanent water service, the demand for a "24/7" public piped water service may not be overwhelming. This could give inefficient and somewhat complacent WSS service providers the level of comfort they need to justify poor performance and opposition to service standards they believe to be an unaffordable imported concept. Intermittent water supply has significant externalities, such as wastage of water, need to over-design the distribution infrastructure, obligation to develop and operate expensive substitutes, and incidence of water borne diseases due to questionable bacteriological quality of distributed water. Causing WSS service providers to take measures, including the sub-contracting of distribution operations to professional operators, with the objective of improving the permanence of piped water service makes full sense from the economic point of view, even more so that WSS infrastructure is often designed to meet generous per capita consumption, inflated by tariffs that do not even recover O&M costs. So far, little analytical research has been carried on the cost of non-permanent water supply.

Source: Adapted from Locussol and Fall, 2009

5.2. Financial performance

The analysis cost recovery and collection ratio indicators provides an overview of the major factor affecting the financial health of service providers in Sub-Saharan Africa.

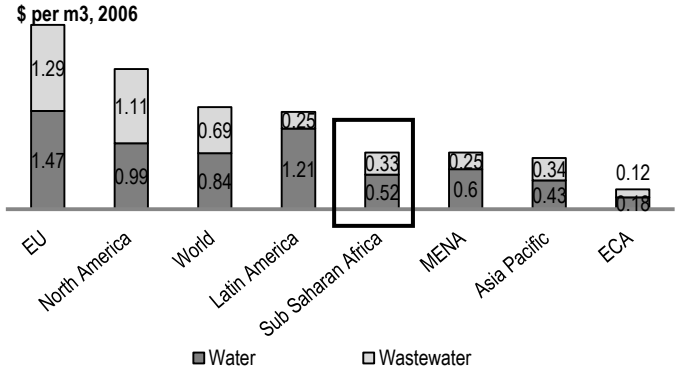
Cost recovery

There is a wide variation of cost recovery ratios across water utilities in Sub-Saharan Africa. Whereas some utilities have an average operating cost recovery ratio as low as 0.20 cents of revenues per dollar of operation expenses, others have cost recovery ratios of 3.46 cents. However, these numbers do not account for capital cost recovery, which in many cases is not included in the tariffs.

Service providers in countries with high population urban growth rates barely recover operational costs. With a cost recovery ratio of 1.05, services providers in these countries only recover operation costs but revenues are not high enough to cover capital costs. Also, it is below the cost recovery of service providers in countries with medium and low urban population growth rates, with cost recovery ratios of 1.09 and 1.11, respectively.

As urban service providers in Sub-Saharan African barely recover operational costs, revenues need to be complemented by government subsidies. Overall, the cost recovery ratio of service providers in Africa is only 1.07. This ratio is lower than the 1.3 benchmark level identified for developing countries (Banerjee and Morella, 2011). The stream of revenues is only just enough to recover operational and other variable costs of production but insufficient to recover depreciation, taxes and cost of capital. This leads to poor operation and maintenance of service providers, lack of capital to finance rehabilitation of existing assets, and expansion of infrastructure. The stream of revenues coming from consumers charges is often complemented by other forms of transfer payments (national or regional governments). Service providers that depend on such subsidies risk to be highly politically interfered. Also, they might be subject to substantial financial volatility when streams are not sustained over time.

Figure 11. Water and wastewater tariff, 2006



Source: AICD, 2011, Wolrd Bank, 2011

Increasing revenues is part of the solution that would lead to better financial performance of service providers in the region. Operational revenue per meter cubic of water averages $0.5 among sampled providers, which could be amplified by increasing collection ratios. This could also be attained by adjusting tariffs to cost recovery levels based on analyses of the distribution of consumers across income quintiles. Almost half of African water utilities apply residential tariffs that cover actual operating costs and only one-fourth set tariffs high enough to recover full capital costs (using effective tariff per cubic meter at 10 cubic meter) (Figure 11).

Still cost recovery ratio raise might be difficult given the large consumption through public taps. Most of the utility water is supplied through public taps, which often is free or charged in a flat rate per cubic meter. Also, many of the public taps do not have meters and therefore consumers paid a fixed rated for the use regardless of the quantity of water consumed.

Collection ratio

Piped water supply services providers in Sub-Saharan Africa only recover 75 percent of the billings, well below the 100 percent best practice. In addition, service providers in countries with high urban population growth rates fail to collect a significant percentage of its billings. With an average collection rate of 72 percent, these countries perform worse than service providers in countries with medium and low urban population growth rates where collection rates are 76 and 81 percent of the billings, respectively.

6. Institutional framework for urban water supply and sanitation service provision

Three areas of institutional arrangements are analyzed: reform, regulation and governance. Due to data constraints, the reform and regulation analysis includes 25 countries and the governance analysis 51 utilities. This sample does not allow for a meaningful clustering, and therefore results are presented only at the regional level.

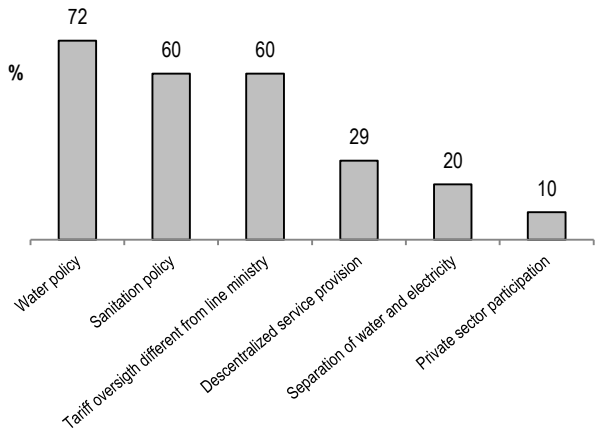
6.1. Reform

Institutional reforms are essential to improve the performance providers and expand access to service, in particular to poorest customers that heavily rely on expensive alternatives to piped water to meet their minimum water consumption demands. Countries pursuing comprehensive reforms in the water supply and sanitation sectors are better equipped to deal with performers' inefficiencies as well as with the political interference that hinders progress. The potential dividend is large as addressing the inefficiencies in the sector could contribute to close the sector funding gap.

Sub-Saharan Africa has made important progress on reforming urban water supply and sanitation sectors. More than 70 percent of the countries sampled have adopted a water policy and about 60 percent a sanitation policy. Tariffs oversight has been place under an authority different from the line ministry in 60 percent of the sampled countries (Figure 12). The case of Niger illustrates a successful process of comprehensive reform that has brought about expansion of water supply services and improvement of the financial and operational performance of the service provider (Box 5).

Figure 12. Key dimensions of reform of urban water supply and sanitation sectors

Share of Sub-Saharan African countries sampled



Source: AICD
Note: This figure is representative only of 25 countries in Sub-Saharan Africa

Establishing a regulatory framework with

clear separation of the regulatory and service delivery functions reminds a pressing challenge. Albeit the recent reforms in the water supply and sanitation regulatory framework, service providers are still not independent from the government and are unable to operate in a commercial basis and carriage adequate levels of investment and maintenance.

Box 5. Niger: Comprehensive reform of the urban water supply sector

In 1999 the government introduced an ambitious urban water sector reform aimed at improving the operational and financial performance of the sector by reducing operating costs, introducing private sector commercial management, achieving financial autonomy, and expanding access. The new institutional framework involved four main actors: the government, which was responsible for defining sector policy, managing water resources, and developing tariff policy; a multisector regulatory agency (Autorité de Regulation Multi-Sectorielle, ARM), responsible for developing a regulatory framework and monitoring urban water services and contractual arrangements among stakeholders; a public asset-holding company (Société de Patrimoine des Eaux du Niger, SPEN), responsible for investments; and a private operator selected by competitive bidding (Société d'Exploitation des Eaux du Niger, SEEN), in charge of delivering services. In March 2001 SPEN and the government granted SEEN a 10-year performance concession to operate the water supply systems of 51 urban centers—representing 72 percent of the population.

The urban water reform resulted in significant increases in access to piped water and public taps, and improvements in the sector's operational and financial performance and service quality. In 1998 the access to piped water and public taps in urban areas was 27 and 37 percent of the population, respectively. The national water utility (SNE) was overstaffed and its financial situation undermined by inadequate cost-recovery policies and the accumulation of arrears from public customers—by 2000 about $12 million, equivalent to 125 percent of its revenue. The lack of investment resulted in a substantial backlog, leading to frequent water shortages. In 2006 piped water and public taps were expanded to 35 and 56 percent of the population, respectively. In the 10 years following the concession, systems losses declined progressively from 22 percent in 2001 to 16 percent in 2010, not only below the average of other LICs but even below the international benchmark of 20 percent of a well-performing utility. Collection ratios increased from 80 percent of all bills to 97 percent over those years, about the average collection ratio of other LICs (tables 6 and 7). Connections per employee rose from 116 to 184. Until 2006 regular tariff adjustments were made, helping compensate the increase in the unit total cost of production from 58 cents in 2001 to 82 cents in 2009 (table 11). The continuity of water supply was augmented from 18 hours to 24 hours between 2001 and 2009.

Evolution of operational indicators associated with SPEN, Niger

Year	Water delivered	System losses	Collection ratio	Average total cost	Average effective tariff
	(million m3/year)	(%)	(%)	($/m3)	($/m3)
2001	32	22	80	0.58	0.27
2002	35	17	89	0.57	0.30
2003	36	17	94	0.8	0.36
2004	39	17	92	0.8	0.41
2005	42	19	88	0.82	0.47
2006	43	17	97	0.82	0.5
2007	47	17	90	0.82	0.55
2008	49	15	92	0.82	0.55
2009	52	16	97	0.82	0.55

Source: Dominguez and Foster, 2011b

Private sector participation in urban water supply has been scarce. Only about 10 percent of the countries in the sample have attracted some form of private sector participation. Results of private sector participation widely vary from remarkable experiences such as the ONEA (Burkina Faso) performance-based contract (Box 6) to cases were the contracts were cancelled such as the case of AdeM in Maputo (Mozambique). In fact, private sector contacts for urban water supply in the region present a relatively high failure rate of 25 percent, rising to 50 percent for lease and concession contracts (Banerjee and others, 2008). Further reforms could allow greater private sector participation in the operator's operation and managing benefiting the sector in terms of efficiency gains and technological innovation, and a better connection between the managerial decision and the business needs of the communities.

Box 6. ONEA, Burkina Faso: A successful use of performance-based contracting

ONEA (Office national de l'Eau et de l'Assainissement) was established in 1985 and by the early 1990s the sector had made little progress. Service quality was poor, and ONEA was unable to cope with the growing demand that came with urban expansion. A decade after its corporatization in 1994 ONEA's operational performance had improved. Non- revenue water stood at a low 16 percent of water production. Water rationing was limited, with service averaging 21 hours a day nationwide. Thanks to a high average tariff (close to €1 per cubic meter), ONEA enjoyed a healthy financial situation. But ONEA remained a small utility, essentially devoted to serving the richest part of the urban population. Urban water coverage through household connections stood at a mere 32 percent. Water resources in Ouagadougou were becoming severely stretched, to the point that service interruptions and rationing had become the norm during the dry season. Commercial management was weak.

In 2001 ONEA contracted a private operator (Veolia) under a 5-year management contract. The operator was paid a fixed monthly fee for management services along with a bonus or penalty based on its achievement of contractual targets, plus a fixed price for each specified output. Progress against contractual targets was regularly monitored by an independent consultant so as to calculate the variable remuneration, set at a maximum of 5 percent of revenues corrected by yearly bill collection target ratios. This created a strong incentive for the professional operator to improve performance. Another feature of the contract was an operating investment fund (about $3 million) to provide the private operator with the flexibility to rapidly acquire equipment and meters. In addition, the performance-based service contract was supported by an investment program of about €200 million financed by a pool of donors. The financial situation of ONEA under the management contract improved markedly (see table below). Revenues increased by 50 percent. Efficiency gains, especially in bill collection and labor productivity, were passed on to customers through a gradual decrease in average tariffs in real terms of about 8 percent. The total cost of the service contract proved reasonable: €3.9 million over five years. The cost for management services of the private consortium was just €2.6 million, equivalent to less than 3 percent of average yearly revenues during the contract.

In 2008, two years after the end of the service contract, the performance of ONEA remained good, suggesting that the efficiency gains achieved with the international operator are sustainable. The bill collection ratio was still above 95 percent, and the level of nonrevenue water was only 17 percent. And further gains had been made in labor productivity.

Indicator	2001	2002	2003	2004	2005	2006	2008
Household connections (#)	72,500	78,500	84,000	90,000	100,000	125,500	168,000
Connection coverage (%)	32	33	33	32	36	43	50
Improved coverage (%)	53	54	54	54	56	63	73
Estimated pop. Served (million)	1.2	1.3	1.4	1.5	1.6	1.8	2.4
Non-revenue water (% prod.)	16	14	15	17	18	18	17
Collection ratio (%)	85	83	78	88	93	95	95.4
Labor productivity	7/9	7.22	7.1	7.2	6.4	5.0	4.5

Source: Marin, Fall and Ouibiga, 2010

6.2. Regulation

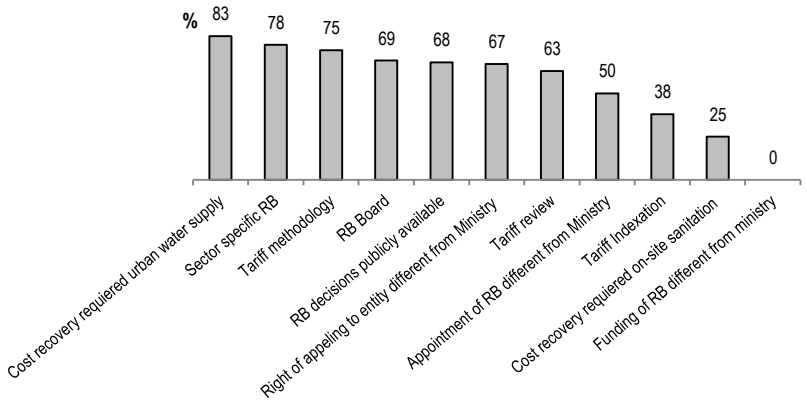
Most of the countries in the region had advanced in key regulatory areas. A good number of countries have adopted a multisectoral o sector specific regulatory body aiming at putting in place some level of economic regulation (Figure 13). Regulation, in some cases, has taken place though contracts, in particular when service provision has been delegated in a private operator.

The legal framework provide for the establishment of independent regulatory bodies in most of the countries. In more than two third of the analyzed countries, the regulatory body has an independent board representing the interests of the government, the utilities, and the consumers; their decisions are publicly available and they can be appealed to an entity different from the Ministry.

Whereas countries in Sub-Saharan Africa have advanced at establishing sector specific regulatory bodies but their independence is compromised. Independency is somehow diminished as the regulatory body is almost always 100 percent financed by the line Ministry (Figure 13). Even though that in 69

percent of the cases there is a provision for the existence of regulatory body board, only in 50 percent of the cases its members are appointed by an entity different from the line ministry.

Figure 13. Key dimensions of regulation of urban water supply and sanitation sectors
Share of Sub-Saharan African countries sampled



Note: Due to data constraints, comprise 25 countries in Sub-Saharan Africa urban population. RB= Regulatory body
Source: AICD

However, the basis for tariff setting and cost recovery are laid down in the majority of countries in the region but automatic tariff indexation is not the rule. On one hand, around 75 percent of the countries sampled have established tariff methodologies and 83 percent required tariff to recover operating costs of water supply production. On the other hand, only 38 percent of the regulations provided for automatic tariff indexation. In addition, whereas most service providers in the region do not have autonomy to set tariffs, a significant number of regulations allow them to put forward tariff revisions. In about 63 percent of countries sampled service providers are able to propose tariffs that are consistent with their financial circumstances (Figure 13).

6.3. Governance

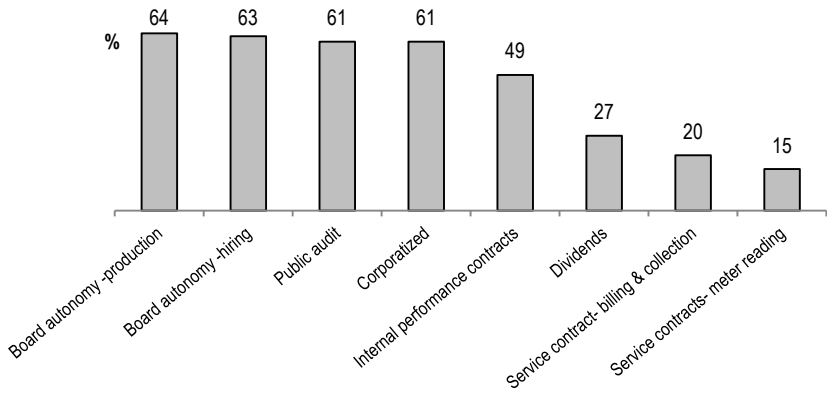
Service providers in the region are advancing towards corporatization. About 61 percent of service providers in the sample are corporatized (Figure 14). Corporatization is the process of service provider restructuring and reform that results in a utility being guided by management practices and internal incentives similar to those of private businesses. Whereas this process might be implemented through different approaches, its ultimate goal is making service providers function as commercial entities, making them autonomous, and introducing improved governance and transparency (USAID, 2005a).

As part of the process of corporatization services providers in Sub-Saharan Africa are given some level of autonomy. Establishing appropriate managerial authority and autonomy involves giving boards of directors and management greater responsibility and authority for accomplishing utility objectives within the commercial parameters set by the government as shareholder. But some services providers in Africa are not insulated from political interfered as key internal operating decisions, such as hiring and laid-off employees, production decisions, are made by authorities external to them. Around 64 percent of services providers in the sample have autonomy regarding production management and 60 percent can decide on staff numbers, remuneration and recruitment (Figure 14). In some cases service providers in the region continue being dependant on government annual budgetary decisions, their accounts are cash-based

accounting rather than accrual accounting, and boards have modest stakeholders' representation and staff is part of public service.

Audited annual reports are not yet a generalized practice among utilities in the region, lowering accountability. Only about 61 percent of the utilities have annual audited annual reports but there a tendency to be published some year after the year of reporting (Figure 14). There are, therefore useless as management tools. Annual reports play a central role on increasing accountability as they give managers the opportunity to report on achievements and allow customers to get involved. Increasing accountability is an alternative for improving and accelerating access to water services (Estache and Kouassi, 2002).

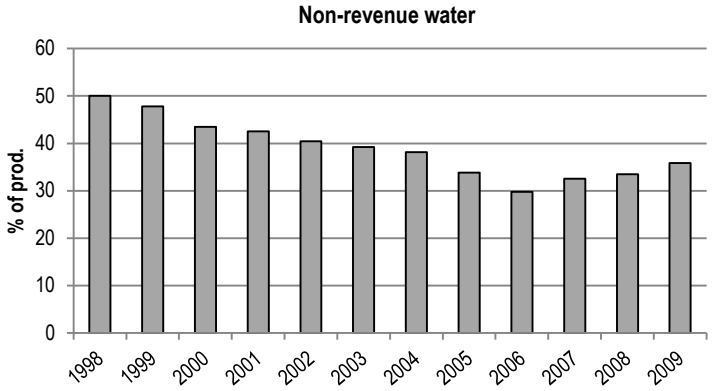
Figure 14. Key dimension of governance of piped water supply service providers
Share of Sub-Saharan African utilities sampled



Source: AICD
Note: Due to data constraints, comprise 51 utilities in Sub-Saharan Africa

Less than half of services providers have adopted internal performance contracts. There are few cases in the region where salaries have been linked to performance enhancement as in general in public owned service providers the staff are public servants and therefore under rigid labor laws. The adoption of internal delegation management contracts by the National Water and Sewerage Corporation (NWSC) in Uganda is a remarkable example of using internal delegation linked to performance fees to pay staff that has brought about notable efficiency gains (see Box 7). Service contracts are barely used by service providers in Sub-Saharan Africa. In the sample of utilities, only 20 percent were using service contracts for billing and collection and 20 percent for meter reading (Figure 14). While service contracts do not address core management problems or contribute directly to investment financing, they provide a means for the service provider to focus its time and energy on its core responsibilities (USAID, 2005a). About 20 percent of the service providers in the sample have service contracts for billing and collection and 15 percent for meter reading. Performance-based service contracting could also be an effective tool to reduce non-revenue water.

Box 7. NWSC, Uganda: A successful experience using internal management performance contracts



Over the past years there has been remarkable improvement on the performance of the NWSC (National Water and Sewerage Corporation), responsible for the provision of water supply and sewerage in the main urban centers (>20 urban town with about 2.1 million population). Revenue collection increased from 48 percent of the bills in 1996 to 99 percent of the bills in 2009, above the average in Sub-Saharan Africa. Distributional losses were reduced from 65 percent of the production in 1996 to 36 percent in 2009, but still higher than the 20 percent benchmark calculated for well performed water supply utility. Labor productivity more than tripled from 45 connections per employee in 1996 to 148 connections per employees in 2009, a level still below the benchmark of 200 connections per employee calculated for a well run utility in Africa.

But there have not been systematic adjustments of water. Despite the fact that NWSC's revenues cover operating cost they do not cover capital costs, which have been financed by the government through donor debt.

Much of the progress made by NWSC over the past 15 years is due to the introduction of different management models; in particular, the articulation of innovative internal delegation contracts in 2004. In 1998, the government reformed the utility's management structure aimed at its modernization and granted a concession to a private operator for the water distribution, billing and collection in Kampala. NWSC continued serving secondary cities and towns where established area performance contracts to remunerate local managers based on results. This model was successful at reducing non-revenue water and increasing collection ratios in the areas under NWSC management but not significant change was achieved in Kampala. Greater improvements were achieved in 2004 after NWSC expanded the internal delegation approach to all NWSC systems, including Kampala.

Based on Marin and others, 2010. Data from AICD, 2011

7. Challenges for service provision

Provision of urban water supply and sanitation services is likely to become more challenging in the future due to several change pressures. Looking forward, the goal is to improve access and quality of services by means of enhancing operating and financial performance of services providers in a context of persistent urbanization. In addition, the objective is to develop urban water supply and sanitation systems that are more robust and resilient against these uncertain future pressures.

7.1. Increasing water demand

The annual total water withdrawal for Africa[4] is 215 km3, or barely 5.5 percent of the renewable water resources on the continent and less than 6 percent of world withdrawals. On a continental scale, 86 percent of inventoried withdrawals are used for agriculture, 10 percent for domestic use, and 4 percent for industrial purposes.

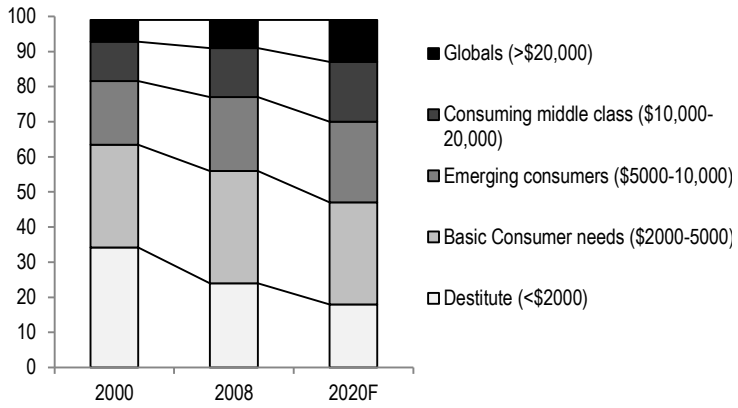
Economic and population growth have increased the demand of water for agriculture, domestic, and industrial uses. In Africa total withdrawals have grown by 43 percent between 1984–1994 and 1994–2004, but proportions of water withdrawals among water uses have remained almost unchanged with

[4] Include North African countries, which accounted for 56 percent concentrated of total water withdrawals in Africa

agriculture remaining the main water consumer. Withdrawals per inhabitant have also increased by 35 m3. This growth, which is much larger in Sub-Sahara Africa than in the North Africa, reflects both the increase in the population and an increase in per-capita consumption (FAO, 2005) and is expected to continue driving up water demand. The symptoms of overuse are disturbingly clear: rivers are drying up, groundwater tables are falling and water-based ecosystems are being rapidly degraded (UNDP, 2006).

Increasing spending power puts more pressure on water demand and consumption. As of 2008, about 85 million African households earned $5000 or more, measured in terms of purchasing power parity (McKensey Global Institute, 2010). The proportion of households earning more than $5000 is expected to increase from 43 percent in 2008 to 52 percent in 2020 (Figure 15).

Figure 15. Existing and forecast distribution of households
By income bracket



Source: McKensey Global Institute., 2010

These forces, among others, will lead to significant gaps in water demand by 2030. Water withdrawals are expecting to growth globally by 400 percent (McKensey and WRG, 2010), but patterns will differ across regions and countries. For instance, demand in South Africa is projected at 17.7 billion m3, with household demand accounting for 34 percent of the total, but current supply in South Africa amounts to 15 billion m3 and is severely constrained by low rainfall, limited underground aquifers, and reliance on significant water transfers from neighboring countries (McKensey and WRG, 2010).

Increasing water demand calls for using water efficiently. It is urgent non-revenue water from a regional average of about 39 percent of water produced. Also, the adoption of flexible and innovative technologies aiming at reducing water withdrawals and recycling water is a critical to cope with sudden and substantial changes in water demand in urban areas.

7.2. Rehabilitating and expanding existing infrastructure

In order to improve quality of services and expand access appropriate infrastructure needs to be in good working condition. Protecting the infrastructure used to treat and transport water (including sources, treatment plants, and distribution systems) is an important step in ensuring the safety of drinking water. However, in the region there has been years of neglected maintenance to water storage, treatment, and distribution systems caused by insufficient funding to the sector and/or protracted civil conflict. This deterioration in the water infrastructure threatens the quality and reliability of all water services, increasing the level of non-revenue water and decreasing continuity of water supply.

The cost of rehabilitation and expanding the urban water infrastructure system is substantially. Rehabilitation and expanding costs account for about 60 percent of the funding needs to meet the Millennium Development Goals. Fixing the backlog of rehabilitation of existing assets would cost Sub-

Saharan Africa about $1.6 billion. Further estimated capital need to expand the existing urban water supply infrastructure would require about $2.4 billion (AICD, 2011). If investment are not made these figures would be increased significantly over the coming years due to the combined effect of infrastructure ageing and increasing number of urban dwellers without access to improved water supply.

7.3. Reducing operational and financial inefficiencies

Tackling service providers' inefficiencies constitutes an alternative of expanding their budget envelops. Efficiency gains from reducing non-revenue water, and increasing collection ratios and labor productivity might potentially translate into lower operational costs and higher operation revenues. Thus, by means of improving performance the service provider could enjoy better financial health by increasing cost recovery ratios. The AICD estimated that the operating inefficiencies of utilities deprive the region of about $0.9 billion in revenues each year and prevent water from being made available to the poor (AICD, 2010). This, in turn, translates into greater resources for needed asset rehabilitation, quality improvement and infrastructure expansion.

As the budget envelop expands, the need for tariff increases might not be as high as sometimes argued. For instance, Estache and Kouassi (2002) found that the efficiency savings from increasing the performance of 21 African utilities exceeds revenue from user fees, which implies that average tariff levels continue to be too high as compared to what they would be if firms were operated efficiently.

7.4. Furthering reforming the urban water supply and sanitation sectors

The reforms agenda is still to be completed. Improving the sector's accountability framework and implementing best practices, highly increases the chances of providing access to a reliable, sustainable and affordable service to larger segments of the urban population (Locussol, Alain R., and Matar Fall. 2009) and will help service providers catch up with urban population growth. In addition, undertaking needed reforms to reduce or eliminate the inefficiencies of the system will help get the greatest impact from existing resources and create a more attractive investment climate for external finance.

7.5. Raising financial local and external resources

Reforming the sector and improving the performance of service providers would boost their ability to access to financial markets and make the sector more attractive to private sector investment.

Local capital markets are a minor source of infrastructure finance of the water and sanitation in Sub-Saharan Africa, except for few countries such as South Africa. Local infrastructure finance consists primarily of commercial bank lending, some corporate bond and stock exchange issues, and a nascent entry of institutional investors. These markets remain underdeveloped and small. Long-term financing with maturities commensurate with infrastructure projects is scarce. The capacity of local banking systems remains too small and constrained by structural impediments to finance infrastructure. Most countries' banks have significant asset-liability maturity mismatches for infrastructure financing. Bank deposits and other liabilities still have largely short-term tenors. More potential may exist for syndicated lending with local bank participation (AICD, 2010).

Sub-Saharan Africa could tap on private sector investment to enhance the performance of service providers. There are several mechanisms to tap of public private partnerships to improve the performance of service providers, such as service contract and management contracts. The successful experiences of management contracts in ONEA in Burkina Faso (Box 6) and in Johannesburg Water (Marin and others, 2009) illustrate how private sector participation could bring about improvement on performance of state-owned service providers.

7.6. Climate change

Climate change is predicted to cause significant changes in precipitation and temperature patterns, affecting the availability of water. Sub-Saharan Africa already has a variable and unpredictable climate and is extremely vulnerable to floods and droughts. A third of the people in the region live in drought-prone areas, and floods are a recurrent threat in several countries. With climate change large parts of the region will become drier, increasing the number of people at risk of hunger and poverty by the tens of millions (UNDP, 2006).

Climate change will affect provision of water supply services in different ways as some cities experience more frequent droughts and water shortage and others have more intense storm events with subsequent flooding issues. Flexible and adaptable solutions on the design and development of water supply infrastructure are hence required to reduce the vulnerability of systems to these changes.

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Annex 1. Country characteristics

Country Name	GDP growth (% per year) 2005-2009	% urban 2005-2009	Urban population (million) 2009	Total population (million) 2009	Urban population growth rate(% per year)								
					2005-2009	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050
Angola	14.69		10.7	18.5	4.4	4.0	3.5	3.1	2.8	2.5	2.3	2.1	1.9
Benin	4.10	56	3.7	8.9	4.2	4.0	3.9	3.7	3.5	3.3	3.0	2.7	2.4
Botswana	2.21	41	1.2	1.9	2.7	2.3	2.0	1.7	1.5	1.3	1.2	1.1	1.0
Burkina Faso	4.79	59	3.1	15.8	5.5	6.2	5.5	4.9	4.4	4.0	3.7	3.3	3.0
Cameroon	2.78	19	11.2	19.5	3.8	3.3	2.9	2.6	2.3	2.1	1.9	1.8	1.6
CAR	0.40	56	1.7	4.4	2.3	2.5	2.6	2.7	2.7	2.6	2.4	2.2	2.0
Chad	3.15	38	3.0	11.2	4.6	4.6	4.7	4.5	4.2	3.9	3.6	3.3	3.1
Congo, Dem. Rep.	5.34	26	22.8	66.0	4.6	4.5	4.2	3.9	3.5	3.2	2.9	2.6	2.4
Congo, Rep.	5.10	33	2.3	3.7	2.6	3.0	2.8	2.3	2.1	1.9	1.8	1.6	1.4
Cote d'Ivoire	1.89	61	10.4	21.1	3.6	3.7	3.4	3.1	2.8	2.5	2.3	2.1	1.9
Ethiopia	10.72	48	14.3	82.8	4.3	3.8	3.9	4.1	4.2	4.1	3.8	3.5	3.2
Gabon	2.22	17	1.3	1.5	2.5	2.1	1.9	1.7	1.5	1.3	1.2	1.0	0.9
Ghana	6.37	85	12.1	23.8	3.6	3.4	3.1	2.8	2.6	2.4	2.2	2.0	1.8
Guinea	2.38	49	3.5	10.1	3.5	4.3	4.2	4.0	3.7	3.4	3.2	2.9	2.6
Kenya	4.68	34	8.7	39.8	4.0	4.2	4.2	4.2	4.0	3.8	3.5	3.2	3.0
Lesotho	3.06	21	0.5	2.1	3.8	3.4	3.1	2.7	2.4	2.1	1.9	1.8	1.6
Liberia	6.84	25	2.4	4.0	5.3	3.4	3.3	3.1	3.0	2.8	2.6	2.3	2.1
Madagascar	3.87	59	5.9	19.6	3.8	3.9	3.9	3.8	3.7	3.4	3.2	2.9	2.6
Malawi	6.46	29	2.9	15.3	5.5	5.3	5.2	4.9	4.5	4.2	3.9	3.6	3.3
Mali	4.98	18	4.3	13.0	4.1	4.4	4.1	3.8	3.4	3.2	2.9	2.7	2.5
Mauritania	4.35	32	1.4	3.3	2.9	2.9	2.9	2.9	2.8	2.6	2.4	2.2	1.9
Mozambique	7.49	41	8.6	22.9	4.6	4.0	3.7	3.3	3.1	2.8	2.6	2.3	2.1
Namibia	3.69	36	0.8	2.2	3.5	3.3	3.2	3.0	2.7	2.4	2.2	2.0	1.8
Niger	4.82	36	2.5	15.3	4.2	4.7	5.0	5.3	5.6	5.7	5.4	5.0	4.6
Nigeria	5.93	16	75.9	154.7	3.9	3.5	3.1	2.8	2.6	2.4	2.2	2.0	1.7
Rwanda	7.86	48	1.9	10.0	4.6	4.4	4.3	4.2	4.2	4.0	3.8	3.6	3.3
Senegal	3.71	18	5.3	12.5	3.2	3.3	3.2	3.1	3.1	2.9	2.7	2.4	2.1
Sierra Leone	6.09	42	2.2	5.7	3.7	3.3	3.4	3.4	3.3	3.2	3.0	2.8	2.5
Somalia	nav	37	3.4	9.1	3.4	4.1	4.1	4.1	3.9	3.7	3.4	3.1	2.8
South Africa	3.65	36	30.2	49.3	2.0	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.6
Sudan	7.83	60	18.7	42.3	4.3	3.7	3.4	3.1	2.8	2.5	2.3	2.0	1.8
Tanzania	6.94		11.4	43.7	4.6	4.7	4.6	4.4	4.2	4.0	3.7	3.4	3.1
Togo	2.26	25	2.8	6.6	4.2	3.9	3.5	3.2	2.9	2.7	2.4	2.2	2.0
Uganda	8.26	41	4.3	32.7	4.4	4.8	5.1	5.3	5.3	5.0	4.6	4.3	4.0
Zambia	5.97	13	4.6	12.9	2.7	3.2	3.4	3.5	3.5	3.3	3.1	2.8	2.6
Zimbabwe	(4.93)	35	4.7	12.5	1.3	3.4	3.5	2.9	2.7	2.5	2.3	2.2	2.0
Sub-Saharan Africa	4.9	37	304.9	818.9	3.8	3.6	3.4	3.2	3.1	2.9	2.7	2.5	2.3

Source: World Bank, 2011. UN, 2009

Annex 2. List of service providers

Country	Service Provider Acronym	Service Provider Name	Market
Angola	EPAL	Empresa Pública de Água de Luanda	Luanda and adjacent districts
Benin	SONEB	Société Nationale des Eaux du Bénin	National
Botswana	DWA	Department of Water Affairs	National
	WUC	Water Utility Corporation	National
Burkina Faso	ONEA	Office National de l'Eau et de l'Assainissement	National
Cameroon	CDE	Camerounese des Eaux	National
	SNEC	Société Nationale des Eaux du Cameroun	Doula
CAR	SODECA	Societé de Distribution d'Eau de Centrafrique	Bangui and 7 urban centers
Chad	STE	Société Tchadienne des Eaux	Ndjaména and 9 urban centers
	STEE	Societé Tchadienne d'Eau et d'Electricite	National
Congo, Dem. Rep.	REDIGESO	Regie de Distribution d'Eau de la Republique Democratique du Congo	National
Congo, Rep.	SDNE	Societé Nationale de Distribution d'Eau Republique du Congo	Secondary cities
Cote d'Ivoire	SODECI	Societé de Distribution d'Eau de la Côte d'Ivoire	National
Ethiopia	ADAMA	Adamawa State	Adama / Narareth
	AWSA	Awassa Town Water Board	Addis Abbaba
	DIRE DAWA	Dire Dawa Water Supply and Sewerage Authority	Dire Dawa
Gabon	SEEG	Societé d'Energie et d'Eau du Gabon	National
Ghana	GWC	Ghana Water Company Limited	National
Guinea	SEG	Société des Eaux de Guinea	National
Kenya	KIWASCO	Kisumu Water and Sewerage Company	Kisumu
	MWSC	Malindi Water and Sewerage Corporation	Malindi
	NWASCO	Nanyuki Water & Sewerage Company Ltd	Nanyuki
Lesotho	WASA	Water and Sewage Authority	National
Liberia	LWSR	Liberia Water and Sewer Corporation	National
Madagascar	JIRAMA	Jiro Sy Rano Malagasy	National
Malawi	BWB	Blantyre Water Board	Blantyre
	CRWB	Central Region Water Board	Central Region
	LWB	Lilongwe Water Board	Lilongwe
	NRWB	Northern Region Water Board	Northern Region
	SRWB	Northern Region Water Board	Southern Region
Mali	EDM	Energie du Mali	National
Mauritania	ANEPA	Agence Nationale de l'Eau Potable et de l'Assainissement	23 urban centers
	MSNE	Mauritania Société Nationale des Eaux	National
Mozambique	AdeM Beira	Aguas de Mozambique Beira	Beira
	Adem Maputo	Aguas de Mozambique Maputo	Maputo
	Adem Nampula	Aguas de Mozambique Nampula	Nampula
	AdeM Pemba	Aguas de Mozambique Pemba	Pemba
	AdeM Quilimane	Aguas de Mozambique Quilimane	Quilimane
Namibia	Oshakati	Oshakati Municipality	Oshakati
	Walvis Bay	Walvis Bay Municipality	Walvis Bay
	Windhoek	Windhoek Municipality	Windhoek
Niger	SEEN	Societe d'Exploitation des Eaux du Niger	National
	SPEN	Societe de Patrimoine des Eaux du Niger	National

Nigeria	Abia SWB	Abia State Water Board	Umuahia
	Adamawa SWB	Adamawa State	Yola
	Anambra SWC	Anambra State Water Corporation	Awka
	Bauchi SWB	Bauchi State Water Board	Bauchi
	Benue SWB	Benue State Water Board	Benue
	Borno	Borno Lagos Water Board	Borno
	Cross River SWB	Cross River Water Board	Calabar
	Edo State UWB	Edo state Urban Water Board	Benin City
	Ekiti SWC	Ekiti State Water Corporation	Ado-Ekiti
	FCT	Federal Capital Territory Water Board	Abuja
	Gombe SWB	Gombe State Water Board	Gombe
	Imo State WC	Imo State Water Corporation (Owerri)	Owerri
	Kaduna	Kaduna State Water Board	Kaduna
	Katsina	Katsina State Water Board	Katsina
	Lagos	Lagos Water Corporation	Lagos
	Nasarawa SWB	Nasarawa State Water Board	Lafia
	Niger SWB	Niger State Water Board	Minna
	Ondo WC	Ondo State Water Corporation	Akure
	Osun WC	Osun State Water Corporation	Osogbo
	Plateau	Plateau State Water Board	Plateau
	River SWB	Rivers State Water Board	Port-Harcourt
	Sokoto SWB	Sokoto State Water Board	Sokoto
	Taraba SWSA	Taraba State water Supply Agency	Jalingo
	Yobe SWC	Yobe State Water Corporation	Damaturu
	Zamfara SWB	Zamfara State Water Board	Gusau
Rwanda	ELECTROGAZ	ELECTROGAZ	National
Senegal	ONAS	Office National de l'Assainissement du Sénégal	National
	SDE	Senegalaise des Eaux	National
Sierra Leone	GVWC	Guma Valley Water Company	Freetown
	SALWACO	Sierra Leone Water Company	Urban
South Africa	Cape Town	Cape Town Metro	Cape Town
	Drakenstein	Drakenstein Municipality	Drakenstein
	eThekwini	eThekwini Municipality	Durban
	Joburg	Johannesburg Water	Joburg
Sudan	G-SWC	Gadarif State Water Corporation	Gadarif
	H.WC	Hawata Water Corporation	Hawata
	Khartoum Water Corporation	Khartoum Water Corporation	Khartoum
	South Darfur Water Corporation	South Darfur Water Corporation	Nyala
	Upper Nile Water Corporation	Upper Nile Water Corporation	Malakal
Tanzania	Arusha	Arusha Urban Water Supply and Sewerage Authority	Arusha
	Babati	Babati Urban Water Supply and Sewerage Authority	Babati
	Bukoba	Bukoba Urban Water Supply and Sewerage Authority	Bukoba
	DAWASCO	Dar es Salaam Water Supply and Sewerage Company	Dar es Salaam
	Dodoma	Dodoma Urban Water Supply and Sewerage Authority	Dodoma
	Iringa	Iringa Urban Water Supply and Sewerage Authority	Iringa
	Kigoma	Kigoma Urban Water Supply and Sewerage Authority	Kigoma

	Lindi	Lindi Urban Water Supply and Sewerage Authority	Lindi
	Mbeya	Mbeya Urban Water Supply and Sewerage Authority	Mbeya
	Morogoro	Morogoro Urban Water Supply and Sewerage Authority	Morogoro
	Moshi	Moshi Urban Water Supply and Sewerage Authority	Moshi
	Mtwara	Mtwara Urban Water and Sewerage Authority	Mtwara
	Musoma	Musoma Urban Water Supply and Sewerage Authority	Musoma
	Mwanza	Mwanza Urban Water Supply and Sewerage Authority	Mwanza
	Shinyanga	Shinyanga Urban Water Supply and Sewerage Authority	Shinyanga
	Singida	Singida Urban Water Supply and Sewerage Authority	Singida
	Songea	Songea Urban Water Supply and Sewerage Authority	Songea
	Sumbawanga	Sumbawanga Urban Water Supply and Sewerage Authority	Sumbawanga
	Tabora	Tabora Urban Water Supply and Sewerage Authority	Tabora
	Tanga	Tanga Urban Water Supply and Sewerage Authority	Tanga
Togo	TdE	Société Togolaise des Eaux	National
Uganda	NWSC-Uganda	National Water and Sewerage Corporation	National
Zambia	AHC-MMS	Asset Holding Company-Mining Municipal Services Ltd.	
	Chambeshi WSC	Chambeshi Water and Sewerage Company Ltd.	Chambeshi
	Chipata WSC	Chipata Water and Sewerage Company Ltd.	Chipata
	Kafubu WSC	Kafubu Water and Sewerage Company Ltd.	Kafubu
	Lukanga WSC	Lukanga Water and Sewerage Company Ltd.	Lukanga
	Lusaka WSC	Lusaka Water and Sewerage Company Ltd.	Lusaka
	Mulonga WSC	Mulonga Water and Sewerage Company Ltd.	Mulonga
	Nkana WSC	Nkana Water and Sewerage Company Ltd.	Nkana
	North Western WSC	North Western Water and Sewerage Company Ltd.	North Western
	Southern WSC	Southern Water and Sewerage Company Ltd.	Southern
	Western WSC	Western Water and Sewerage Company Ltd.	Western
Zimbabwe	ZINWA	Zimbabwe National Water Authority	National