Providing Water to Poor People in African Cities Effectively:

Lessons from Utility Reforms

Chris Heymans, Rolfe Eberhard, David Ehrhardt, and Shannon Riley

August 2016

wsp water and sanitation program

The Water and Sanitation Program is a multi-donor partnership, part of the World Bank Group's Water Global Practice, supporting poor people in obtaining affordable, safe, and sustainable access to water and sanitation services.

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Table of Contents

Appendixes

Tables

Figures

Boxes

Acronyms and Abbreviations

AAWSA	Addis Ababa Water and Sewerage Authority
AFD	*Agence Française de Développement*
APC	Area Performance Contract
CEO	Chief Executive Officer
CRA	*Conselho de Regulação do Abastecimento de Água*
DAWASCO	Dar es Salaam Water and Sewerage Corporation
DHS	Demographic and Health Survey
DRC	Democratic Republic of the Congo
EWURA	Energy and Water Utilities Regulatory Authority
FCFA	West African CFA Franc
GDP	Gross Domestic Product
GIS	Geographic Information System
GIZ	German Corporation for International Cooperation
GWCL	Ghana Water Company Ltd
GTZ	Germany Agency for Technical Cooperation
HDPE	High-density polyethylene
HUWSUP	Hargeisa Water Supply Upgrade Project
HWA	Hargeisa Water Agency
IBNET	International Benchmarking Network for Water and Sanitation Utilities
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IDAMCs	Internally Delegated Management Contracts
IFI	International financial institution
ISO	International Organization for Standardization
JMP	UNICEF Joint Monitoring Programme
KANU	Kenya African National Union
KfW	German Development Bank
KShs	Kenyan Shillings
Lpcd	Liters per capita per day
LWSC	Lusaka Water and Sewerage Company
MD	Managing Director
MDG	Millennium Development Goal
MLD	Million liters per day
MOWASCO	Mombasa Water Supply & Sanitation Company
MPESA	M for mobile, *pesa* is Swahili for money (mobile money transfer service)
NCWSC	Nairobi City Water and Sewerage Company
NGO	Nongovernmental organization
NRM	National Resistance Movement
NRW	Nonrevenue water
NTU	Nephelometric Turbidity Unit
NWASCO	National Water Supply and Sanitation Council (Zambia)

NWSC	National Water and Sewerage Corporation (Uganda)
NYEWASCO	Nyeri Water and Sewerage Company
O&M	Operations & Maintenance
ONAS	*l'Office National de l'Assainissement du Sénégal*
ONEA	*l'Office national de l'eau et de l'assainissement*
PEMU	*Projet d'alimentation en eau potable en milieu urbain*
PPP	Public-private partnership
PS	*Parti Socialiste*
SDE	*Sénégalaise des Eaux*
SDG	Sustainable Development Goal
SEEN	*Société d'Exploitation des Eaux du Niger*
SONEES	*Société Nationale d'Exploitation des Eaux du Sénégal*
SONES	*Société Nationale des Eaux du Sénégal*
SPEN	*Société de Patrimoine des Eaux du Niger*
Tanga UWASA	Tanga Urban Water Supply and Sanitation Authority
UN-HABITAT	United Nations Human Settlement Program
UShs	Ugandan Shillings
USD	United States Dollars
WASH	Water, sanitation, and hygiene
WASREB	Water Services Regulatory Board (Kenya)
WHO	World Health Organization
WSP	World Bank's Water and Sanitation Program

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Definitions

Alternative service providers. There are no standard definitions to classify alternative or small-scale providers, due mainly to their informal nature. From the literature, captured most recently by Kariuki and Schwarz (2005), the independence of such providers is an important part of understanding of them, recommending that the concept should essentially describe providers who are physically delinked from formal utilities. Kariuki and Schwarz suggest that this term should refer to those providers producing and selling their own sources of water, but in this report this is somewhat qualified. For example, the case of Ouagadougou in this report shows that it is conceivable that such providers may purchase water from a formal utility to manage distribution in areas where the utility is not able to serve customers.

Good service (with respect to a city). A city in which at least 90 percent of the bottom 40 percent of households by income (or a proxy for income, such as asset ownership) have access to an improved water source, and water is available for at least 18 hours per day, on average. The word 'good' is used in the sense of 'good relative to the typical situation'.

Improved water. Improved water is classified according to the World Health Organization/United Nations Children's Fund Joint Monitoring Programme (WHO/UNICEF JMP) definition. It includes piped water into dwelling, piped water into yard or plot, public tap or standpipe, tubewell or borehole, protected dug well, protected spring, and rainwater.

Nonrevenue water. In this report, nonrevenue water (NRW) is primarily expressed as the percentage of water supplied into the distribution system that is not billed to consumers. It consists of physical losses through leaks in the distribution system and commercial losses from inaccurate metering and illegal or unbilled connections.

Other improved water. Other improved water includes tubewell or borehole, protected dug well, protected spring, and rainwater. In other words, it includes all sources of improved water other than piped water into dwelling, piped water into yard or plot, and public tap or standpipe (collectively known as piped water in this report).

Operating cost coverage ratio. The operating cost coverage ratio is defined as revenue divided by operating expenses. For the purposes of this report, operating cost coverage data were collected from utility accounts, regulator reports, IBNET, and directly from the utilities.

Poor people. Poor people are defined as the bottom 40 percent by income (or a proxy for income, such as asset ownership) of people living in cities. Poor people are the focus of this study, in line with the World Bank goal of promoting shared prosperity by fostering income growth of the bottom 40 percent of the population in every country. However, because urban incomes are typically higher than rural incomes, income of some of the urban poor (taken as the bottom 40 percent of the urban area income distribution) will be above the 40th percentile of income nationally.

Piped water service. Piped water service is classified as any form of piped water to premise (piped water to dwelling or piped water to the yard or plot), public tap or standpipe, and piped water from the neighbor.

Piped water to premise. Piped water to premise is classified as piped water into dwelling or piped water to the yard or plot. The definition does not interrogate the extent to which such a connection may in fact be shared, for example between different tenants renting on the premises.

Public tap. According to the JMP definition (used in this report), a public tap is a public water point from which people can collect water. Standpipes and water kiosks are also classified as public taps.

Professional. For the purposes of this report, professional is defined to mean a set of practices and behaviors that strive for continued improvement towards excellence as defined by sector or other widely agreed standards in utility management and governance (in other words, strategy, technical/engineering, customer services, financial, human resources, procurement, ethics, and so on). See, for example, *Effective Utility Management–A primer for water and wastewater utilities.* The discussion in the report emphasizes though that the application of such standards should be

relevant to the context, rather than assuming that universal "best practice" is possible.

Shared tap. A shared tap is defined as any piped water service that is *not* piped to premise. In other words, a shared tap is a public tap or standpipe, or piped water accessed from a neighbor's tap.

Utility. A utility is defined, for the purposes of this report, as an entity engaged in the provision of potable water to customers irrespective of its particular institutional form and ownership or management structure. This study found good service to the poor among utilities that were both publicly and privately owned and/or managed and which had various corporate identities, including being a department in a municipality. Institutional form and ownership are touched upon, but were not a focus of this study.

Executive Summary

Africa's urban population will triple by 2050. People in these rapidly growing cities need safe, convenient, and reliable water supplies. However, the proportion of Africa's urban population with improved water supply has barely grown since 1990. Research shows that water piped to the premises is the standard to ensure adequate health (families who rely on water carried from shared taps often do not get enough water for basic needs). Yet the share of the urban population with water piped to their premises has declined, from 43 percent in 1990 to 33 percent in 2015. Poor families are the least likely to have water piped to their premises, and the fact is that income levels remain low for many city-dwellers. The most vulnerable, therefore, will bear the brunt of the inadequacy of water supplies.

CITIES ANALYZED IN STUDY

City	Reliability (hours/day)	Access to improved water (poorest 40%)
eThekwini (Durban)*	24	100%
Lusaka*	20	99%
Ouagadougou*	23	98%
Dakar*	24	97%
Nyeri*	24	96%
Niamey*	24	94%
Kampala*	18	93%
Nairobi	20	86%
Hargeisa	20	76%
Tanga	24	75%
Accra	18	65%
Addis Ababa	16	100%
Maputo	12	97%
Kinshasa	11	93%
Mombasa	4	92%
Dar es Salaam	8	89%
Kaduna	14	29%

* City with relatively good service for the poor.

Notes:
'Poorest 40%' refers to households in the bottom 40 percent of income distribution in the city, or households in the bottom 40 percent of an asset ownership index if income data was not available.
'Access to improved water' is as defined by the Joint Monitoring Program (see Definitions section).

Sources: Household surveys (see Table D.1 for list of sources); Utility research (see Table D.2 for full list of sources).

However, in this challenging context, some cities ***are*** making significant strides in providing sustainable service to poor households. The table here shows seven cities (marked by asterisks) that provide relatively good service to the poor–with good service defined as at least 90 percent access to improved water, and supply reliability of at least 18 hours per day on average. This report aims to share lessons from these cities' achievements.

Five of the seven cities were analyzed in detail for this study. Ten cities that provide typical levels of service were also studied, to understand the range of service levels and contexts across cities in Africa.

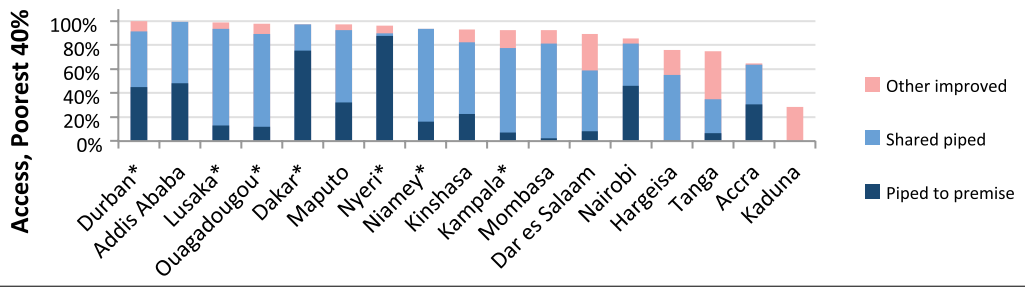
Access and service

The Sustainable Development Goals (SDGs) mark a notable shift from the access-focused Millennium Development Goals (MDGs) to a new international monitoring approach that places greater emphasis on the quality of that access. With quality of access in mind, two key measures stand out in the analysis. First, an average of 97 percent of the poor have access to improved water service in the seven cities. The average access to piped water by poor households is 90 percent. In four of these cities shared pipes are the main way of serving the poor, and in Dakar and Nyeri, 75 percent or more of poor customers have water piped to their premises. Second, in most of the cities, residents received piped water for more than 18 hours a day. Both accessibility (including the quantity of water) and reliability of water supply are important.

Remarkably, good water service for the poor is found in large, poor, and rapidly growing cities with arid climates, such as Ouagadougou and Niamey, and in countries with low governance effectiveness according to the World Bank's Worldwide Governance Indicators. Clearly, serving poor people in fast growing and poor African cities is possible, even in countries that are poor, arid, and suffer from governance problems.

How have these cities managed to provide widespread, reliable service to poor people in such challenging environments? The case studies of five cities show that improvements in service to the poor started with important changes in the general or specific political economy in

ACCESS TO DIFFERENT LEVELS OF SERVICE, POOREST 40 PERCENT



* Relatively good service to the poor.

Source: Household survey data. Full list of sources for each city is included in D.1.

the city or country. These changes allowed or enabled the turnaround of underperforming utilities. The utilities improved their financial performance, generating surpluses that supported investment in infrastructure to serve the poor. At the same time, the utilities adopted a range of pro-poor strategies to overcome the financial and nonfinancial barriers to serving the poor.

Political economy of turning around water service for the poor

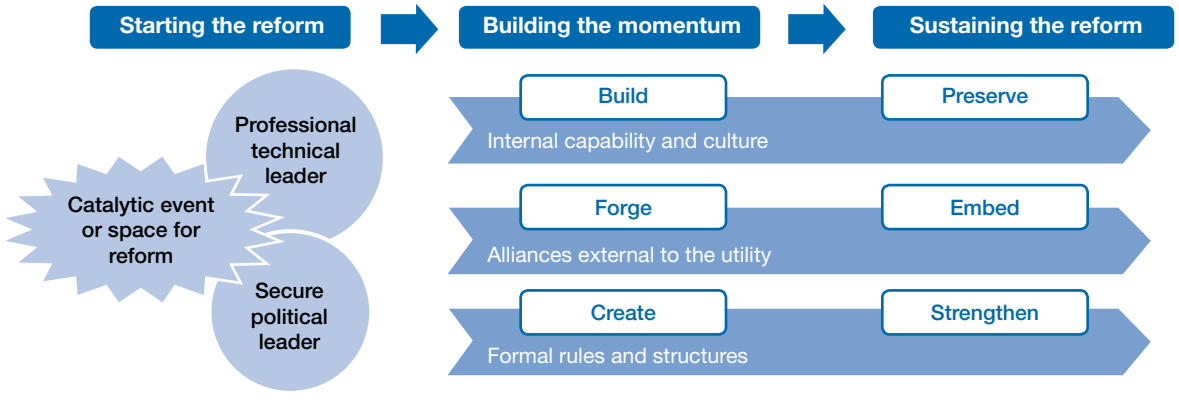
The ways in which political economy can obstruct the effective and efficient provision of services–through, for example, patronage and corruption or rent-seeking–have been discussed at length elsewhere and are not the subject of this report.[1] It is common cause that it is poor people that are most affected by an obstructive political economy and that this is experienced directly in the lack of access to reliable, safe, piped water sources.[2] This study sought to understand the opposite side of this equation–where and *how* water services are provided effectively to poor households living in cities in Africa. It is notable that, in all five of the case study cities, improvements in service to the poor *started* with improvements in the political economy of the sector and utility serving the city. Common features present in all cases were analyzed to understand how cities start reform, build momentum, and sustain reform (see figure below).

[1] Castalia Strategic Advisors. 2014. Barriers to Infrastructure Service Delivery in Sub-Saharan Africa and South Asia.

[2] Bratton, Michael, and Carolyn Logan. 2013. "Voters but not yet Citizens." In *Voting and Democratic Citizenship in Africa*, edited by Michael Bratton. Boulder: Lynne Rienner.

[2] Bratton, Michael, and Carolyn Logan. 2013. "Voters but not yet Citizens." In *Voting and Democratic Citizenship in Africa*, edited by Michael Bratton. Boulder: Lynne Rienner.

DRIVING AND SUSTAINING REFORM



SUMMARY: CITY AND SERVICE IMPROVEMENTS DATA

City	Dakar	Ouagadougou	Nyeri	Kampala	eThekwini
Country	**Senegal**	**Burkina Fasa**	**Kenya**	**Uganda**	**South Africa**
Utility	**SDE**	**ONEA**	**NYEWASCO**	**NWSC**	**eThekwini municipality**
Country and city context					
Country GDP/capita (US$ at PPP, 2014)	1,071	720	1,338	677	6,478
Fresh water resources (m^3 per capita, 2014)	1,758	711	461	1,032	829
City population (million)	3.1	2.5	0.150	1.6	3.6
Worldwide Governance Indicators – Government Effectiveness 1996 and 2014	0.02 (1996) -0.39 (2014)	-1.02 (1996) -0.56 (2014)	-0.34 (1996) -0.30 (2014)	-0.73 (1996) -0.40 (2014)	0.88 (1996) 0.33 (2104
Access to water services (Household surveys data))					
Access to improved water service (% of bottom 40%)	97% (2014)	98% (2010)	96% (2013)	93% (2011)	100% (2015)
Access to piped water service (% of bottom 40%)	97% (2014)	89% (2010)	90% (2013)	78% (2011)	92% (2015)
Access to water on premises (% of bottom 40%)	75% (2014)	12% (2010)	88% (2013)	7% (2011)	45% (2015)
Water reliability	23 (2014)	22 (2010)	24 (2013)	18 (2011)	24 (2015)
Network expansion					
Increase in connections (in city)	189,000 to 368,000 (2002 to 2013)	60,000 to 207,000 (2005 to 2014)	9,800 to 23,400 (2006 to 2015)	46,000 to 214,000 (2002 to 2015)	369,000 to 498,000 (2004 to 2015)
Connectedness index (connections per 100 people in city)	8.7 to 12.0 (2002 to 2013)	4.5 to 8.8 (2005 to 2014)	8.9 to 14.9 (2006 to 2015)	4.4 to 9.0 (2003 to 2013)	11.6 to 13.9 (2004 to 2015)
Utility management effectiveness (Utility data)					
Cash collection efficiency (%)	Averaged 97% (1996 to 2013)	78% to 97% (2002 to 2013)	98% to 100% (2006 to 2014)	85% to 95% (2001 to 2011)	81% to 98% (2004 to 2014)
Nonrevenue water %	30% to 20% (1996 to 2013)	Averaged 17% (2002 to 2013)	42% to 19% (2006 to 2014)	43% to 35% (2001 to 2011)	Averaged 38% (2004 to 2014)
Staff productivity (n / 1000 connections)	6.9 to 2.6 (1996 to 2013)	8.3 to 3.0 (2002 to 2013)	8.9 to 3.5 (2006 to 2014)	16.5 to 5.9 (2001 to 2011)	Averaged 3.6 (2005 to 2015)
Operating cost recovery ratio	1.01 to 1.33 (1998 to 2013)	Averaged 1.33 (2002 to 2013)	1.17 to 1.26 (2006 to 2014)	1.18 to 1.31 (2001 to 2011)	Averaged 1.33 (2010 to 2015)
Management effectiveness index	77 to 99 (1998 to 2013)	83 to 94 (2002 to 2013)	70 to 100 (2006 to 2014)	58 to 85 (2001 to 2011)	Averaged 90 (2010 to 2014)

The start of successful reforms in the case studies displayed three mutually reinforcing conditions (1) a catalytic event or space for reform; (2) a skilled technical leader motivated to improve service; and (3) a relatively stable political leader who supported and protected the reform. In Ouagadougou, the catalytic event was a water resources crisis. In eThekwini (Durban), the end of apartheid in South Africa created the political impetus to redress water service inequalities. In both cases, a capable utility manager was able to chart the way to addressing an urgent need, combining technical and financial strategies with institutional reform, and winning the support of a political leader (Burkina Faso's Minister of Water and eThekwini's mayor, respectively) who felt secure enough politically to be able to risk change in pursuit of service improvement.

The political economy conditions that set these cities on the path to reform cannot be created by outsiders. However, outsiders were crucial to the success of the reforms in some cases, providing financing and technical assistance to the utility. In the case of Dakar, for instance, the World Bank and other development partners provided the finance needed for major increases in production capacity, and for expansion of the distribution network into poor communities. Equally important was technical assistance for the design and implementation of new institutional arrangements. In Nyeri (Kenya) technical assistance from the German development agency helped the municipal utility to corporatize and commercialize. A loan from KfW (the German development bank) then financed a new treatment works and network expansion. These investments provided the water and distribution needed to increase service in poor areas, and reduced operating costs.

Institutional reforms in the five cities studied differed widely from case to case, but in all cases they were motivated by solving pressing problems first. Institutional reforms did not follow a 'best practice blueprint'. While in Dakar the institutional reforms were planned out in detail and implemented early, the other cities took a more adaptive, evolutionary approach. Uganda's National Water and Sewerage Corporation (NWSC) started with foreign management contractors for service in Kampala. Drawing on the experience from those contracts, it then developed Internally Delegated Management Contracts (IDAMCs). The IDAMCs successfully applied the principles of incentivized management to the utility's area managers. The utility leader in eThekwini innovated constantly, saying that at some points he felt like he was 'just trying to run faster than everyone else' in coming up with institutional and management solutions to an ever-changing set of challenges.

Making reforms sustainable is as much a challenge as getting them started. As utilities succeed in providing better service, they gain more resources and become more tempting targets for predation, whether for personal or political gain. Yet, while success might be a double-edged sword, it could also be the first line of defense against such predation. Proven competence in service delivery can win support from external stakeholders and raise the political costs of predation. Uganda's NWSC makes the point that "In Kampala, the poor vote." Nyeri's water utility describes how, when allegations of political meddling surfaced, citizens called to ask how they could prevent it.

In the cases studied, utilities consciously embed themselves in networks of relationships with external stakeholders who benefit from their success–especially their customers. The NWSC and Nyeri's utility each hold regular *barazas* (consultation with communities) to find out what service the community needs, and also to educate the community on its responsibilities. eThekwini Water established a consultative committee with low income communities. The committee became more engaged and supportive when the utility addressed requests to increase the free basic water allowance. The utility leader who drove eThekwini's turnaround credits the continued renewal of his contract by the elected city council to eThekwini's success in serving poor communities.

Formal structures, such as independent boards and regulators, are not sufficient to ensure effective service provision because they are not immune to predation or capture. However, these structures can be useful for bolstering professional corporate cultures, and coordinating supportive relationships with external stakeholders. The *affermage* and related contracts in Senegal provide clear rules that are costly to change. Provided the utility keeps doing a good job, the contracts support success. In Burkina Faso, ONEA is publicly owned and operated. Its performance contract with

government is supervised by a multistakeholder committee comprising representatives of customers, nongovernmental organizations, and the development partners who finance the sector. The committee monitors performance of both the utility and the government under the contract, on the basis of independently audited financial and technical reports. Such designs embed accountability to external stakeholders in formal structures that can also help mobilize support against predation.

Financing the extension of good service to the poor

In the cases analyzed, grant finance formed 5 percent (NYEWASCO), 28 percent (NWSC), 29 percent (SDE), and 52 percent (ONEA) of the total investments, with the rest financed through loans and internally generated cash. In Dakar, Kampala, Nyeri, and Ouagadougou, the utilities borrowed money (mostly from development partners via national governments) to finance their investment programs. They serviced these loans with cash they generated, and also invested cash surpluses directly in infrastructure expansion.

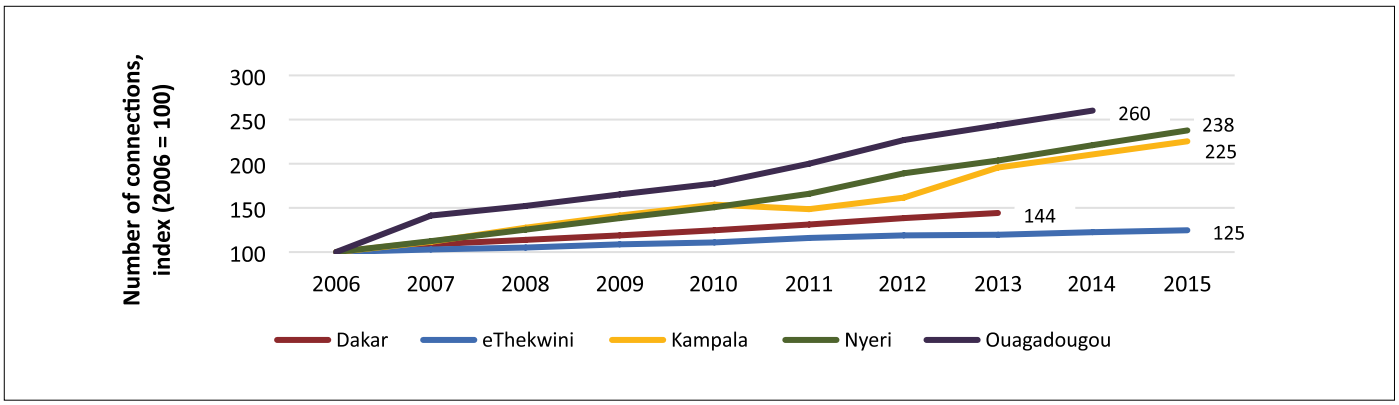
To generate the operating surpluses needed to finance investments, utilities in the five cities improved their management and cost effectiveness. They reduced nonrevenue water, increased collection efficiency and boosted labor productivity. Adequate tariffs were also important. Average tariffs in these cities range from US$0.82 (NWSC) to US$1.08 (SDE/SONES). Real tariff increases have been moderate, ranging from –8 percent to +3 percent per annum, on average.

More utilities in Africa could emulate their peers in raising finance on the strength of improving cash flows. Consider what could be achieved if this happened in Mombasa, a city where hardly any households in the poorest 40 percent have water piped to the premise, and the 77 percent who can get water from standpipes have an average round-trip time of 22 minutes. If Mombasa's utility improved operating efficiency on key indicators to levels achieved by well performing utilities studied, it would generate enough cash to service concessionary loans of US$1.0 billion–enough to provide universal access to piped water, including water to the premise to 42 percent of poor households, while holding real increases in the average tariff to just 1.5 percent per annum.

Practical techniques to achieve widespread and affordable access

Using similar financing strategies, typical African cities may be able to expand networks and increase access by the poor. More finance and new infrastructure alone, however, will not ensure that access is widespread and affordable. Utilities in the cities that serve the poor relatively well also help poor customers to overcome financial and nonfinancial barriers to access. They implement rising block tariff structures well, to ensure they truly benefit the poor, and they cross-subsidize residential consumption by charging higher tariffs to commercial customers. They have successfully curbed water mafia and other on-sellers who charge excessive mark-ups. Where informal land tenure does not allow service provision, or the pattern of settlement or topography makes conventional network designs infeasible, they improvise new technical and institutional arrangements. This includes

GROWTH IN WATER CONNECTIONS IN CASE STUDY CITIES



SUMMARY: REFORM FEATURES

Catalyst for reform	Mid-1990s. Solve water shortage in Dakar	Early- to mid-1990s. Water shortage and low water coverage in Ouagadougou and Bobo-Dioulasso	Early- to mid-1990s. Water rationing and poor water quality problem	Late 1990s. Donor support for PPP coupled with Ugandan opposition to PPP. Conflict created space for a credible alternative, in a situation where Uganda needed the development partners	1992, Need to serve all citizens in the metro area in a way that undid the legacy of service discrimination under Apartheid
Nature of reforms	Reform plan developed with local stakeholders and development partners; then short-term improvements, followed by structural reform: a public-private partnership (PPP), making a private operator responsible for providing services and managing infrastructure	Decided against private operator to form independent national utility on a performance contract; involve consumers, government, NGOs, and development partners in Supervision Committee; Sub-contracting of small providers to reach peri-urban areas.	Independent, accountable structure; use of loan financing; transparent audited systems and strategic planning beyond the immediate; robust revenue practice, no preferential treatment; active engagement of customers, with "brand loyalty".	President and utility drove strategy to improve water supply. Early (external and internal) management contracts (1998–2004), and then internally delegated management contracts since 2004. Past 3 years fresh focus on equity. Robust corporate training facility put in place	Municipal unit not interfered with; strategic planning focus on outcomes; incentivized contracts with senior management team; training and staff performance; impressive customer call center; adjusting services to contexts; use free monthly water allowances from national government to leverage access.

working with small providers to deliver services where the utility cannot, such as ONEA does in Ouagadougou. This is proving a handy option for a wider range of utilities, for example, in Maputo. How utilities used these techniques is summarized in Table 6.1 in the main document.

eThekwini delivers water to poor households to meet basic needs for free, using technologies that can restrict the amount of water delivered to exactly the free allowance. In Kampala, the utility relies on standpipes to serve the poor, and ensures that standpipe tariffs are kept lower than the tariff for water piped to the premise. If more than two or three households are accessing water from the same yard tap, the standpipe tariff is also applied in this case. In Ouagadougou, the utility enlists small entrepreneurs to resell water at controlled prices to residents of the rapidly expanding informal settlements.

Other utilities are also adopting new technologies to better serve the poor. Some use 'water dispensers'–prepaid standpipes–that can be placed at frequent intervals in poor communities. Utilities in Kenya use a mobile phone technology in which the customers can report their own meter reading, and then pay the bill using mobile money. This system allows customers to make smaller, more frequent, payments that are in line with their own household cash flows.

Implications for the World Bank and other development partners

The research shows that effective reforms have been initiated in challenging circumstances. Would-be reformers, in politics or at the utility-level, if given an opening through an exploitable catalytic moment, use that opening to build momentum. Development partners, spotting such

champions, should back them. Finance could be phased in, with emergency needs addressed first. Technical assistance should help with governance and management reforms that address immediate needs while building for the future.

Development partners can play a supportive role in all phases of reform–starting, building, and sustaining. However, they cannot expect to create from the outside the conditions in which better service to the poor becomes a political economy priority, nor to succeed by transplanting 'best practice models' regardless of context.

In summary

The cases studied show that it is possible for rapidly growing African cities to offer the poorest 40 percent of their residents near-universal access to reliable and affordable water. The technical, financial, and managerial techniques used by utilities in these cities are widely applicable. Whether they are actually applied in any particular case depends largely on whether political economy factors enable, support, and protect the professional management and provision of services by the utility. Where these conditions can be locally created, and combined with the necessary financial and technical support, utilities in many cities will be able to extend and sustain water service to poor households.

I. Introduction

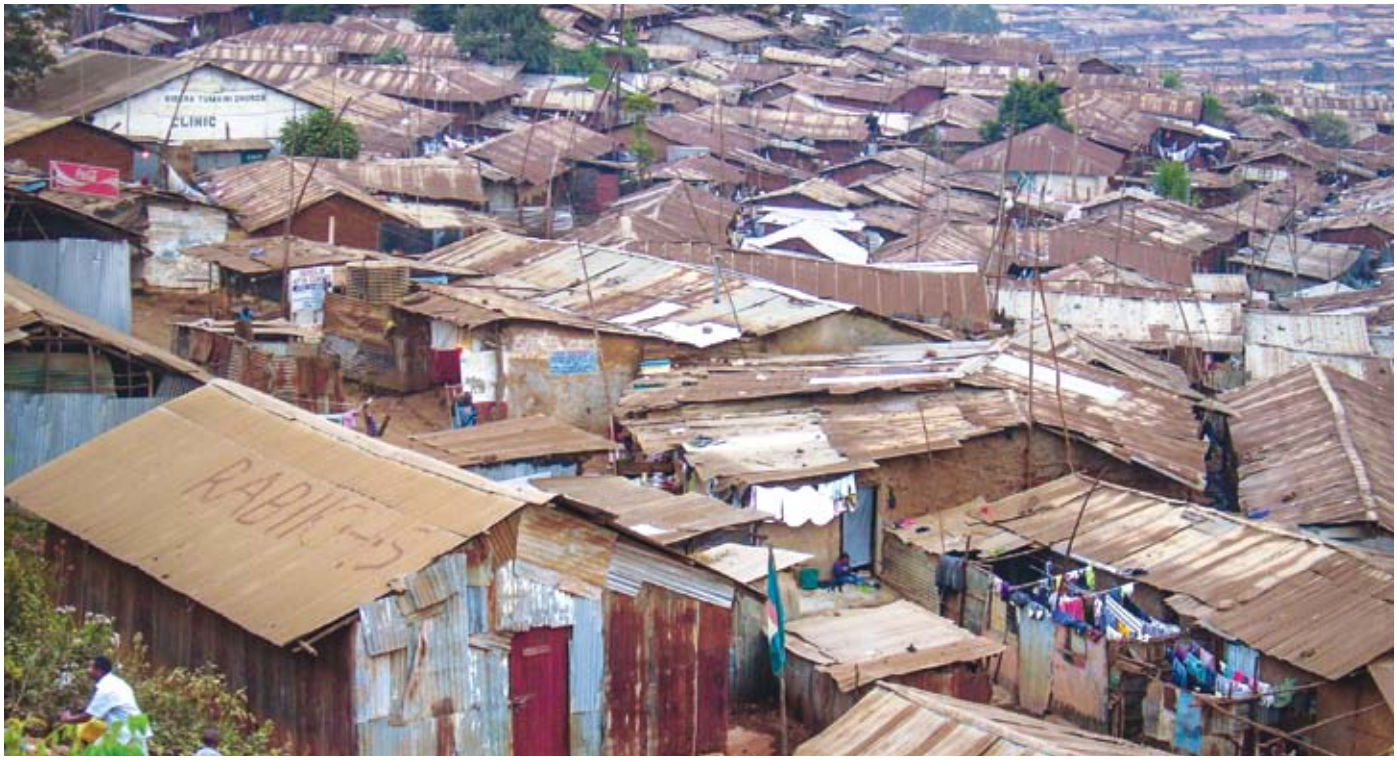
Sustainable Development Goal (SDG) 6 targets "universal and equitable access to safe and affordable drinking water for all". However, in Africa's fast-growing cities, just accessing water at all is a daily struggle for many poor families. To redress these problems, new approaches are needed in managing water supply in these cities. While it is often assumed that many cities on the continent are structurally unable to develop, implement, and sustain such new approaches, this report provides evidence that transformation and achieving services to the poor are indeed possible.

Need for new approaches to urban water supply in Africa

In urban Sub-Saharan Africa, access to "improved" water has virtually stagnated at about 85 percent, whereas access to water piped to the premises has fallen–from 43 percent in 1990 to 33 percent in 2015.[3] While data on access for the poor are not available continent-wide, the analysis and discussion in this document supports the view that poor people are almost certainly worse off than the average access statistics imply.

Rapid urbanization in Africa adds to the challenge. By 2050, the urban population will more than triple, with an average annual growth rate of 3.4 percent. Demand for water will rise at similar rates. Water resources will get progressively more difficult and costly to obtain, as cities use the closest sources of water first, and then have to tap sources that are further away. These sources require greater investment in pipes and pumping. As costs rise, reuse will become more viable and more important.

[3] World Health Organization (WHO). *Progress on Sanitation and Drinking Water: 2015 Update and MDG Assessment.* http://apps.who.int/iris/bitstream/10665/177752/1/9789241509145_eng.pdf. Improved water service did grow at a rate of one-third of a percent per annum, which may be considered virtually stagnant.



Urban Africa: Rapidly growing and densifying. *(Photo Credit: Kathy Eales).*

Exacerbating the situation is the relatively low incomes of the African countries in which rapid urbanization is taking place. Many countries in Africa are expected to have populations that are 50 percent urban while per capita incomes are at or below US$3,500.

Such rapidly growing demand and resource scarcity will strain already stretched institutional capacity. The finance needed to bring water to cities and distribute it to poor areas will increase significantly.

But more finance alone is not the answer–it would need to be accompanied by better approaches for providing water services to the poor. If not, African cities run a high risk of being marked by sprawling low income communities in which struggling families pay excessive prices for water of dubious quality, spend hours out of their day queuing for and carrying water, and cannot get enough water for daily hygiene needs. Rich households may be able to arrange adequate self-provision–for instance, through trucked delivery of water or private boreholes and in-home treatment systems (as happens from Lagos and Port Harcourt in the West to Mombasa and Dar es Salaam in the East). Poor households will not be able to rely on and afford such alternatives.

Some cities do serve the poor well–we studied them to understand how

To aid the search for better options, a case study approach is used to look for 'what works' in African cities in which the poor have access to relatively good water services, and to understand the reasons for their success. Data from a sample of 17 cities were analyzed–seven of which provide relatively good service to the poor, and 10 of which provide "typical" lower levels of service. The five case studies then analyze what some cities have been doing differently to serve the poor better.

Overview of the report

The approach to the study is set out in Section 2. Although utility data in Africa are improving, they are often confined to formal "service areas" rather than cities at large, and are still mainly self-reported with limited external verification. To develop a more complete perspective on the services that poor families receive in the 17 cities, the analysis here also used household survey data, presented in Section 3.

Case studies of five cities that turned around water service for the poor–Dakar, Senegal; eThekwini (Durban), South Africa; Kampala, Uganda; Nyeri, Kenya; and Ouagadougou, Burkina Faso–are included in Appendix A.

Drawing on these cases and other research, Section 4 examines the political economy of service reform. It explores how changes in the political economy enabled five cities to improve water services to the poor.

Improved service typically requires significant capital expenditure; Section 5 explains how these expenditures were financed, and what other cities can learn from their finance strategies.

Cities which served the poor well used a set of practical techniques for service delivery, billing, and cost recovery. Section 6 shares these techniques, explaining how they helped transcend the traditional trade-off between affordability and cost recovery, and overcame challenges such as water mafias and other barriers to service delivery in unplanned settlements which lack clear rights of way and legal tenure to land.

Conclusions concerning the wider application of the approaches and appropriate roles for development partners are drawn in Section 7.

Appendix B offers suggestions for future research. Perspectives on alternative or supplementary service providers are shared in Appendix C. Appendix D includes a description of the utility management effectiveness index. Longitudinal graphs with data from the utilities serving all 17 cities is provided in Appendix E. A list of the data sources used is provided in Appendix F. References are included in Appendix G.

II. Methodology

The primary objective of this study is to find out how some cities have been able to provide water services to poor people relatively well and to learn from these relative successes. Given the lack of a comprehensive dataset on service metrics for poor people across African cities, a case study approach was adopted. The aim is to identify the key factors that contributed to good service provision for the poor in some cities.

The case study approach

The methodology centers on in-depth case studies on five cities, focusing on political economy and governance in the water sector and its wider context, financing of access, and specific service and tariff offerings that enabled affordable access for more poor people. Comparing the five cases revealed certain commonalities–for example, in how the political economy aligned with serving poor people, or how they financed expansions in access. There also were differences–for example, in the strategies used to provide affordable access, or in what prompted the prioritization of working towards universal access. The report summarizes and analyzes the commonalities and the diversity of the experiences across the five cities.

- To put these achievements in perspective, data were collected initially for a total of 17 cities, making it possible to identify suitable case studies of improvement of services generally and to the poor especially, and to compare and contrast them with more "typical" cities. Defining 'serving the poor' in terms of access levels and service quality, seven cities were then identified as offering 'relatively good service' to the poor, taken to mean at least 90 percent access to improved water by the poorest 40 percent, and availability of water for at least 18 hours per day. The typical cities fell below this level of service to the poor–some by only a little, some very substantially.
- The team then examined how poor people in the seven cities with good service to the poor get their water. The data showed that the overwhelming majority of poor people in these cities with improved water services were getting water from pipes (figures ranged from 84 percent to 100 percent). In cities where poor people did not receive good service, the percentage of poor people getting water from pipes was more variable (from 0 percent to 100 percent). A comparison of household survey data on reported access to piped water with utility-reported access to piped water indicated that most people with piped water are served by the utility.
- This finding turned attention to utility management effectiveness as a possible driver of good service to the poor, so the team constructed an index to measure this. Analysis showed that of the seven cities with good performance, six had effectively managed utilities. None of the cities with more typical service had effectively managed utilities. The research then focused on the cities with good service to the poor and effectively managed utilities, to find out what had happened in these cities to enable poor people to get good access to water, and the role of the utility in improving service provision.

All 17 cities are listed in Table 2.1. Cities with average water supply reliability of at least 18 hours per day are listed first, in descending order of access to improved water by the poor. The seven cities identified as having relatively good service to the poor are marked with asterisks ('*').

Ten typical cities

The 10 typical cities–Addis Ababa, Kinshasa, Maputo, Mombasa, Dar es Salaam, Nairobi, Hargeisa, Tanga, Accra, and Kaduna–were selected to represent the range of service levels and contexts across cities in Africa. Data on these cities provide information on the range of access and service to the poor across African cities, and allow for a contrast between what was done in cities that have served the poor well and other more typical cities. They also provide some narratives on possible techniques that can help to bring service to the poor.

TABLE 2.1: CITIES ANALYZED IN STUDY

City	Reliability (hours/day)	Access to improved water (poorest 40%)
eThekwini (Durban)*	24	100%
Lusaka*	20	99%
Ouagadougou*	23	98%
Dakar*	24	97%
Nyeri*	24	96%
Niamey*	24	94%
Kampala*	18	93%
Nairobi	20	86%
Hargeisa	20	76%
Tanga	24	75%
Accra	18	65%
Addis Ababa	16	100%
Maputo	12	97%
Kinshasa	11	93%
Mombasa	4	92%
Dar es Salaam	8	89%
Kaduna	14	29%

* City with relatively good service for the poor.

Notes:
'Poorest 40%' refers to households in the bottom 40 percent of income distribution in the city, or households in the bottom 40 percent of an asset ownership index if income data was not available.
'Access to improved water' is as defined by the Joint Monitoring Program (see Definitions section).

Sources: Household surveys (see Table D.1 for list of sources); Utility research (see Table D.2 for full list of sources).

Case study cities

Five of the cities with relatively good service to the poor were chosen for case studies, partly on the basis of their service delivery achievements, but also considering the assignment's specific interest in whether and how utilities could secure such services. These cities are: eThekwini (Durban), Ouagadougou, Dakar, Nyeri, and Kampala.[4] Two cities with relatively good service to the poor were not selected as case studies, for different reasons.

In Niamey, the data were not available in a timely manner due to the broader security situation at the time when field visits were undertaken. In Lusaka, the level of services to the poor seemed substantially influenced by water services trusts and not the utility alone, which the team did not investigate particularly during the field visit as the focus as that stage was more on the utility. The Lusaka case is noted as an area for another study, as it may well juxtapose the utility-led approach while the approach here was more multiinstitutional. In this study, the comparative data (especially in Section 3) include these two utilities nonetheless, and the discussion draws selectively on some of their experiences.

Data sources

The access and service delivery data come from household surveys, not utilities only, which have three advantages over utility-reported data: households answer the questions directly, questions are typically standardized across cities; and results can be disaggregated by income (or a proxy for income, such as asset ownership).

By contrast, utilities estimate coverage. These estimates are often unreliable, especially estimates of the number of people getting water from standpipes.

The data on the reliability of water supply come from the utility serving the city, because these data are not included in household surveys.

In this study, longitudinal data sets (for 10 years or more), reviews of existing literature, participant interviews, and Geographic Information Systems (GIS) images where available, were used to interrogate the dynamics that led to and marked relatively good water services for poor people in some cities. The data and perspectives were shared during a video-conference with key utilities, and preliminary findings shared with individual utilities as well as at several international and regional conferences.

Limitations of the methodology

A case study approach limits the claims that can be made: it cannot establish universal relationships with statistical validity or prove that a particular technique is 'the best'.

[4] Each of the case studies is discussed cogently in Appendix A.

However, causation between a particular factor and good service for poor people *can* be inferred from participants' own narratives or expert judgment.

Another important limitation is that cause and effect are always context-dependent. There are limits to what can be concluded about which techniques are likely to work well elsewhere, since not all contexts are studied.

The research is also limited by data quality. Most household surveys do not contain questions about reliability, adequacy, affordability or provider type. While utilities can supply some of this information, data from utilities are often not available for the exact geographic area covered by a household survey. This is especially true for national utilities, which typically do not disaggregate data by city. Technical data–such as the layout of a piped network and how the network has grown over time–are often not available and thus cannot be analyzed.

Three critical aspects of the focus of the study

To avoid any misunderstanding on what the study sets out to do and what not, three points need to be made.

The focus is on water, not on sanitation. Improved sanitation is essential for public health. By 2030, the SDGs aim for "access to adequate and equitable sanitation and hygiene for all" and to "end open defecation".[5] Increasingly, the World Bank, development partners, and many governments acknowledge that this SDG requires multifaceted links between improving water, sanitation, and hygiene (WASH), and also with urban planning, management and financing. While this study focuses on improving water supply service and does not address the issues of wastewater or sanitation services at any length, it fully acknowledges the importance of these more integrated approaches. The study focuses primarily on water in the knowledge that there is a growing body of analytical work on improving urban sanitation for the poor in Africa and globally–such as *Faecal Sludge Management: Systems Approach for Implementation and Operation*[6] and 'Delivering Sanitation to the Urban Poor: A Scoping Study'[7]–and the recently completed *Fecal Sludge Management: Diagnostics and Decision Support Tools for Service Delivery in Poor Urban Areas*.[8]

Finding perspective on the relevance of the utility model was a consideration. The widely reported weak performance of so many utilities in African cities has led to a questioning of the appropriateness of the utility model. This is NOT primarily a study of utility performance but of how some cities have been able to provide a relatively good service to poor people. For a more general analysis of utility performance, the reader is referred to a related World Bank study prepared in parallel.[9] It is interesting, therefore, that in the cities studied where the poor are served relatively well, traditional utilities are the main service providers to the poor (see Section 3.2), sometimes–but not always–working with others to deliver services. Thus the question to be answered became, 'how did political economy, financing, managerial, and technical strategies allow the utilities serving these cities to provide relatively inclusive, reliable service to poor households?' A distinctive feature of this study is the elaboration of a political economy framework to help to explain how significant improvements were achieved in providing services to poor people.

A political economy framework is core to the analysis. Rather than the typical, normative instruction to countries about the way policy and governance *should* work, the tasks of political economy analysis are to "illuminate constraints on decision making" and query "why do things work the way they do, and what are the implications for policy?"[10] Thus, "…political economy analysis takes the existing situation as its starting point, and then focuses on identifying feasible solutions to improving sector performance within existing incentives structures and relations of power to achieve 'good *enough* governance'".[11]

[5] Sustainable Development Goal 6.2.

[6] Strande, Linda, Mariska Ronteltap, and Damir Brdjanovic. 2014. *Faecal Sludge Management: Systems Approach for Implementation and Operation*. London: IWA Publishing.

[7] Hawkins, Peter, Isabel Blackett, and Chris Heymans. 2013. *Delivering Sanitation to the Urban Poor: A Scoping Study.* The World Bank.

[8] World Bank. Forthcoming. *Fecal Sludge Management: Diagnostics and Decision Support Tools for Service Delivery in Poor Urban Areas*.

[9] Van den Berg, Caroline, and Alexander Danilenko. Forthcoming. *Performance of Water and Wastewater Utilities in Africa*. The World Bank.

[10] Levy, Brian. 2014. *Working with the Grain: Integrating Governance and Growth in Development Strategies*, 25. Oxford University Press.

[11] Kooy, Michelle, and Daniel Harris. 2012. Political Economy Analysis for Operations in Water and Sanitation: A Guidance Note. ODI.

For water utilities, problem-driven political economy starts from the understanding that they, like other parastatals, do not necessarily live up to their formal principal objective of the provision of services as expressed in policies and stakeholder frameworks. Decisions may be made not on the basis of collective goods provision,[12] but may be more affected by how and why competing interests engage in the utilities or their environments.[13]

As a result, the poor–who are often the least powerful constituency and the most likely to be marginalized by elite-level machinations–bear the brunt of these costs in lacking access to reliable, safe, piped water sources.[14] Elites or other internal or external interest groups often are better positioned to benefit from rent-seeking, extracting public resources from the utility through corrupt contracts or patronage, such as using the utility as a "jobs bank". These activities have more immediate pay-offs for incumbent office-bearers that may be more attractive than any long run benefits that may eventually derive from popular support generated by providing good services to more people. As a result, the political economy 'problem' that the case studies seek to understand is what was distinctive about the situation and political economy in the five case study cities that allowed them to have utilities that serve the poor relatively well.

Key points

A case study approach allows for the development of some insights into the reality of service delivery to the poor in selected African cities. The cases study cities were selected on the basis of their relative good performance in serving poor people. The proposition is that insights gained from cases of relative success can be useful in providing pointers in how services to poor people might be improved in other cities. This is particularly relevant in a context where relatively good performance is the exception rather than the norm. If it is accepted that the political-economy dynamics prevailing in many African countries and cities typically constrain good performance in serving poor people, then it is particularly important to examine how these constraints have been transcended in particular cases to enable good performance. In other words, the methodology is premised on the proposition that the answers (to service improvements for poor people) are more likely to lie in the exceptions rather than a study of the norm, and this why the study has looked at a few relatively successful case studies with a particular focus on political economy.

[12] Manghee, Seema, and Alice Poole. 2012. *Approaches to Conducting Political Economy Analysis in the Urban Water Sector*. The World Bank.

[13] Olson, Mancur. 1982. *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*.

[14] Bratton, Michael, and Carolyn Logan. 2013. "Voters but not yet Citizens." In *Voting and Democratic Citizenship in Africa*, edited by Michael Bratton. Boulder: Lynne Rienner.

III. Water Service for Poor Households in African Cities

This chapter examines access to water services provision (access and quality) in 17 cities. The selection of cities is explained in Section 2 (Methodology). Household survey data at a city level are used, together with utility-reported service reliability data and utility management effectiveness. Reliable data of this kind are not widely available and this is the reason the analysis is done for only 17 cities. The source of water for poor people (piped or not, and utility-provided or not) is examined and compared with the data on access and quality of water services for poor people, and utility management effectiveness. The analysis shows that where cities have relatively good access to water (access and quality) for poor people, this is predominantly provided by effectively managed utilities. On the basis of this analysis, five cities were chosen to undertake more detailed case studies which are the basis of the sections that follow.

3.1 Current situation

Data on service to the poor in the seven cities with relatively good service are presented together with data from the 10 typical cities. This gives a reasonable sense of the level and range of water service experienced by poor people in African cities, as well as what is possible. The data cover access for the poor, convenience, continuity of supply, and affordability.

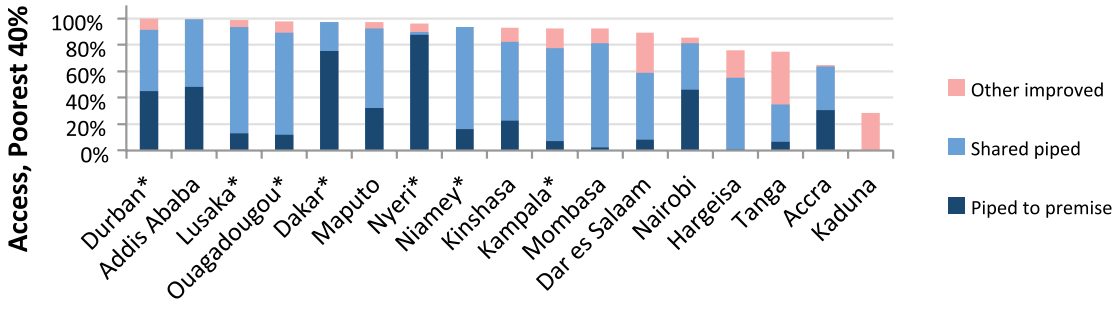
3.1.1 Access to improved water services

Using household survey data, access to improved water was calculated for each of the 17 cities, for the poorest 40 percent of households. The data are shown in Figure 3.1. Access to improved water is disaggregated into three categories: piped to premise (dark blue), shared tap (light blue), and other improved (pink). Access to improved water was analyzed because this is what household surveys measure. Note that improved water does not necessarily mean safe water (see Box 3.1). Note also that reliability of supply is not incorporated in the measure.

Cities with good access provide access to improved water to 97 percent of the poor, on average. As a group they illustrate what is possible. On the other hand, in seven of the 10 typical cities, less than 90 percent of poor households have access to improved water.

Among the typical performers, Hargeisa is doing very well for a city in a fragile state (see Box 4.3 for more on Hargeisa). However, water supply for the poor remains far from ideal. Just 76 percent have access to improved water, the others primarily accessing water from tanker trucks that charge a premium. About 55 percent have access to public taps.

FIGURE 3.1: ACCESS TO DIFFERENT LEVELS OF SERVICE, POOREST 40 PERCENT



* City with relatively good service to the poor.

Source: Household surveys (see Table D.1 for list of sources).

In Kinshasa, another conflict-affected state, access to improved water by the poor is good at 93 percent, but service is inconsistent and the utility has low indicators on management effectiveness. Kaduna–a city of almost 1 million people in Nigeria, an oil-rich country–surprisingly provides worse service than either Hargeisa or Kinshasa. There, the poor primarily get water from wells, less than a third of which are protected.

3.1.2 Access to piped water to the premises

Recent research indicates that households benefit more from water piped to the premises than they do from shared taps from which the water must be carried back. Howard and Bartram, for example, showed that the volume of water used by households depends on accessibility as determined primarily by distance and time, and that the quantities used when water must be carried may not be sufficient to reduce health risks.[15]

Evans et al. found a clear difference between the volumes of water consumed when water is available on-site rather than at a distance. The conclusion was that "at-home water supply has significant, measurable benefits when compared with shared water supply outside the home, (provided that the service provided is reliable enough to ensure access to adequate quantities of water when required). Reliable at-home water supply results in higher volumes of water consumed, greater practice of key hygiene behaviors, a reduction in musculo-skeletal impacts associated with carrying water from outside the home, and improved water quality".[16] Access by the poor to water piped to the premises is shown in Figure 3.2.

In Nyeri and Dakar, most poor people have water piped to their premises, at 88 percent and 75 percent, respectively. These cities show what is possible. However, in 12 of the 17 cities studied, less than one-third of the poor have access to water piped to the premises. In the 10 typical cities, access to water piped to the premises for the poor ranges from 0 percent to 48 percent.

BOX 3.1: SDGS 'SAFE AND AFFORDABLE' VERSUS 'IMPROVED'

The Sustainable Development Goals (SDGs) target safe and affordable water for all. Unfortunately, data consistent with this definition are not yet being widely collected and reported. In the meantime, access to improved water (the target of the MDGs) can be analyzed, but lacks the qualitative perspective that is the major additionality in the SDGs. The limitations to the improved water definition under the SDGs should, however, also be noted:

- Many of the 'improved' sources (and often, even piped sources) are not delivering safe water in urban areas (even if they may do so in rural areas).
- No measure of adequacy.
- No measure of convenience.
- No measure of affordability.

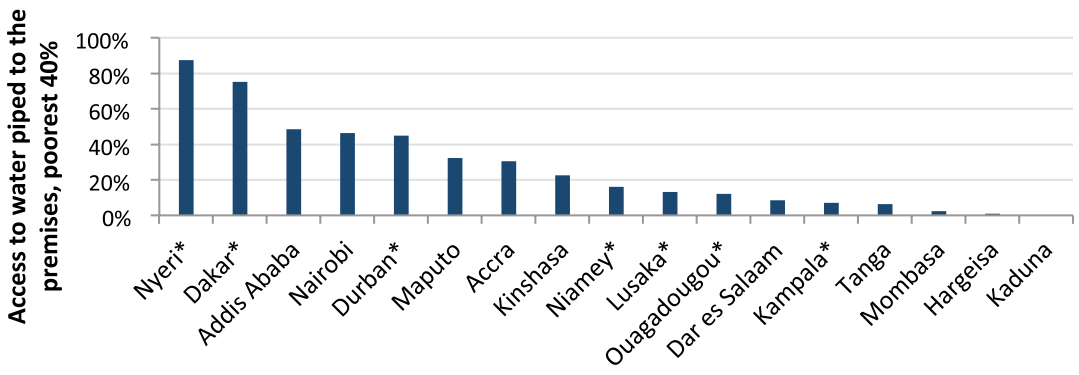
Most African utilities simply do not publish reliable data on the quality and safety of the drinking water they supply. However, water sector professionals know that wherever supply is intermittent, there is a strong chance of piped water being contaminated as polluted groundwater infiltrates the piped network during periods of depressurization. Most African water utilities report that they have intermittent supply.

Water which does not meet drinking water standards may still be safe for other purposes such as washing clothes–and can be purified for drinking purposes using in-home filters, purification tabs or boiling. These techniques are widely used in better-off African households, but may be more difficult for poor families with few facilities and little extra income.

There is thus no doubt that the proportion of poor people accessing safe water is lower than the access to 'improved' water would suggest, and in many cities also lower than the percentage able to access piped water.

[15] Howard, G., and J. Bartram. 2003. *Domestic Water Quantity, Service Level and Health*. Geneva: World Health Organization.
[16] Evans, Barbara., Jamie Bartram, Paul Hunter, Ashley Rhoderick Williams, Jo-Anne Geere, Batsi Majuru, Laura Bates, Michael Fisher, Alycia Overbo, and Wolf-Peter Schmidt. 2013. *Public Health and Social Benefits of at-house Water Supplies*.

FIGURE 3.2: ACCESS TO WATER PIPED TO THE PREMISES, POOREST 40 PERCENT



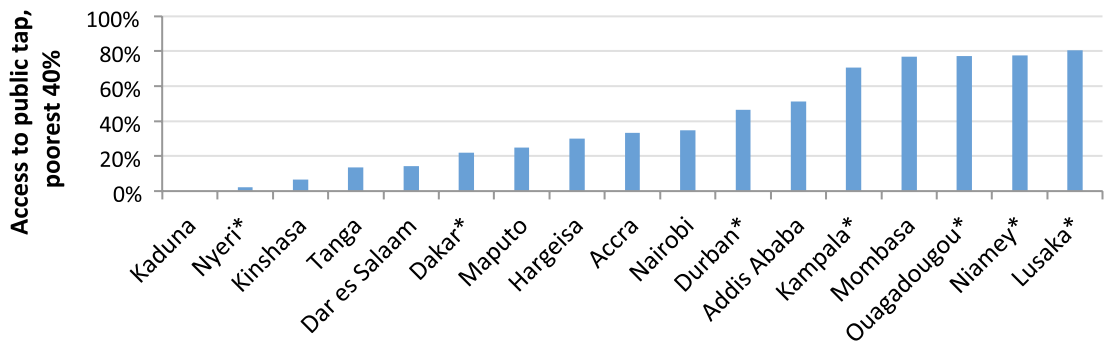
* City with relatively good service to the poor.

Source: Household surveys (see Table D.1 for list of sources).

3.1.3 Access to water from a public tap

While water piped to the premises may seem a good standard to aim for, this has not been achieved fully in most African cities, even among those that are doing relatively well in serving the poor. Often the next best thing is access to a public or shared tap. Some cities do especially well in ensuring that poor households receive water in this way, and some argue that public standpipes assist them in securing payment from users and is often close enough to the properties served that the inconvenience of walking to fetch water is largely mediated. This is an unresolved argument though, the more so because utilities that have opted for standposts as an interim option see this as realistic pragmatism that positions them for improving services affordably. Also, the definitions of both "premise" and "public tap" are not always clear. In countries with high levels of tenancy the landowner often gets a connection to the "premise" and then provides a tap for all tenants in the yard to share. In other cities one tenant in the premise (or yard) that can afford a connection may sell water to his or her "neighbors" who would otherwise have to walk to the standpipe. Nonetheless, Figure 3.3 provides a perspective on the spread among the cities studied.

FIGURE 3.3: ACCESS TO PUBLIC TAP, POOREST 40 PERCENT



* City with relatively good service to the poor.

Source: Household surveys (see Table D.1 for list of sources).

In four of the cities that provide relatively good service to the poor (Niamey, Ouagadougou, Lusaka, and Kampala), more than 70 percent access water through a public tap.

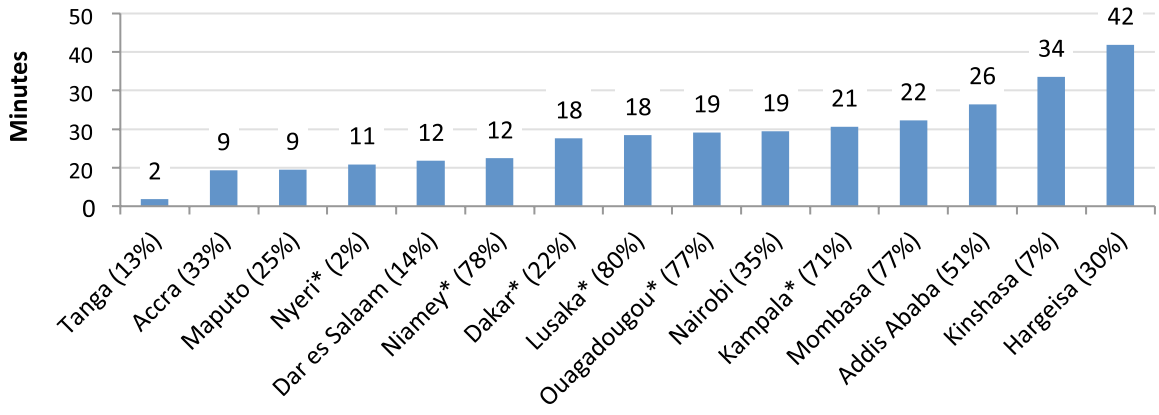
3.1.4 Time poor people must spend to get water

A public tap is only a good source if it is conveniently located. Convenience can be measured by the average roundtrip time spent collecting water from a public tap. Figure 3.4 shows the average roundtrip time for the poor to get water from a public tap. (The percentage of the poorest 40 percent accessing water from a public tap is included in parentheses next to the city name.)

In four of the cities that provide good service to the poor (Niamey, Ouagadougou, Lusaka, and Kampala), more than 70 percent access water through a public tap. This water is fairly convenient, with roundtrip times averaging from 12 minutes (Niamey) to 21 minutes (Kampala), on average. By contrast, four of the typical cities have average collection times of 22 minutes or more. In Hargeisa, this figure is 42 minutes.

All the utilities that have improved services to the poor have focused on piped water supply.
(Photo Credit: ONEA, Ouagadougou, Burkina Faso).

FIGURE 3.4: AVERAGE ROUNDTRIP TIME TO GET WATER FROM PUBLIC TAP, POOREST 40 PERCENT



* City with relatively good service to the poor.

Notes:
The value in parentheses represents the percentage of people in the poorest 40 percent with access to a public tap. Kaduna is not included in these graphs because 0 percent of the poor have access to a public tap. eThekwini is not included because data on roundtrip times were not available.

Source: Household surveys (see Table D.1 for list of sources).

3.1.5 Continuity of water service

Continuity of service is the number of hours per day that water is available, on average. Continuity matters because poor households may not consume adequate quantities of water if it is only available a few days per week. In addition, wherever supply is intermittent, there is a strong chance of piped water being contaminated as polluted groundwater infiltrates the piped network during periods of depressurization.

Unfortunately, standard household surveys do not ask people about how many hours a day or days a week they are able to access water. Still, in cities were most poor people rely on piped water, it is possible to estimate the hours of service with data from the utility.[17] These estimates are shown in Figure 3.5.

Clearly, it is possible to provide water to poor people in African cities for 24 hours a day, as Dakar, eThekwini (Durban), and Nyeri show. However, this is far from typical. In Maputo, Addis Ababa, Kaduna, Kinshasa, Dar es Salaam, and Mombasa, the utilities serving the city provide supply 17 hours a day or less. Among the most difficult places for poor people to get water reliably is Mombasa, where service is available every second day, for around six to eight hours.

[17] The utilities serving Ouagadougou, Dakar, Niamey, Kampala, and Accra are national utilities. Reliability data are for the entire utility service area. These cities typically account for more than half of all utility customers.

3.1.6 Affordability of water for poor people

The best way to measure the affordability of water in a city is to use survey data in which households report the actual amount spent on water in a given period and their income or total expenditure in that period. Such data are available for the three Kenyan cities in the sample from the Kenya Baseline "State of the City" survey, as shown in Table 3.1.

Nairobi's poor households spend the highest proportion of their monthly income on water–10 percent. This figure is lower in Mombasa and Nyeri, at 7 percent and 6 percent, respectively.

For the remainder of the sample, data on the actual amount spent on water were not available. This is an area that household surveys could usefully include questions on in the future.

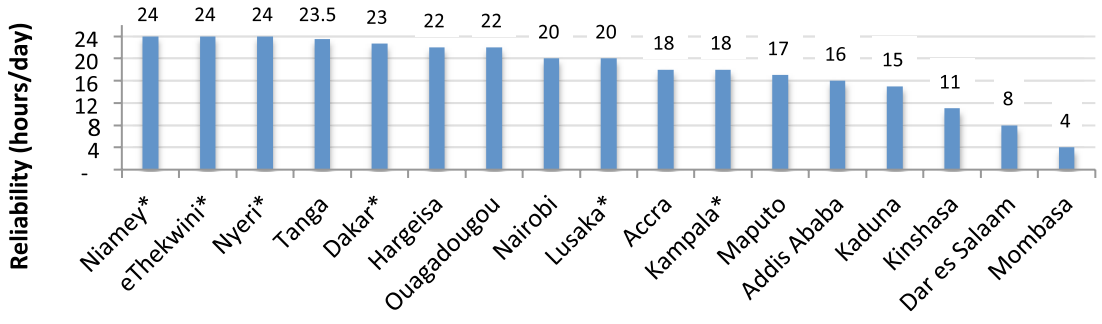
TABLE 3.1: PROPORTION OF MONTHLY INCOME SPENT ON WATER BY POOREST 40 PERCENT, KENYA

City	Income/ month (KShs)	Amount spent on water/month (KShs)	Proportion of monthly income spent on water
Mombasa	8,918	616	7%
Nairobi	6,271	596	10%
Nyeri*	8,543	509	6%

* City with relatively good service to the poor.

Source: Baseline: "State of the City" survey (Kenya), 2012–2013.

FIGURE 3.5: CONTINUITY (HOURS OF WATER SUPPLY SERVICE PER DAY)



* City with relatively good service to the poor. Continuity data are for the entire utility service area. The utilities serving Ouagadougou, Dakar, Niamey, Kampala, and Accra are national utilities.

Source: Utility research (see Table D.2 for full list of sources).

3.2 How some cities serve the poor

Understanding the current situation of water service for poor households in African cities, we need to explore *how* poor people are served in the seven cities in which they receive relatively good water services, and how this differs from other cities.

In cities with good service, water is provided to poor people through pipes

In the seven cities with relatively good water service for poor people, an average of 90 percent of the poor access water from pipes. In Dakar and Niamey, 94 percent and 97 percent, respectively, of poor people have improved water. All of those poor people are supplied by pipe. This is a valuable finding, in that it shows these cities are not relying on boreholes, or rainwater harvesting, or other less conventional technologies, for providing water services to poor people. They seem to say that while these alternative modes of supplying water may have benefits, such as conservation, some cost saving and others, they are difficult to move to scale. Cities that have reached the poor on scale have invariably developed their networks, whether to connect individual properties and households on the premises, or through public standposts.

Figure 3.6 shows the extent of Dakar's network throughout most of the city, which has greatly enhanced the city's ability to reach more people in close proximity to where they live.

Where access is good, utilities are the main service providers for poor people

Having established that piped technologies are relied on in the cities with relatively good service, the next question is about the broad institutional arrangements. Are poor people primarily supplied by small scale entrepreneurs running piped networks? Or by community organizations? Or by conventional utilities?

Household surveys do not identify the type of organization which is supplying water. There is no other good data source with this information, either. One way to gauge the type of entity providing service is to compare access estimates from household surveys with utility-estimated coverage rates. This comparison is shown in Table 3.2 (because utilities do not report service to poor people separately, it is only possible to make this comparison using access levels for the total population).

FIGURE 3.6: DAKAR PROVIDES WATER PIPED TO THE PREMISES TO (ALMOST) ALL

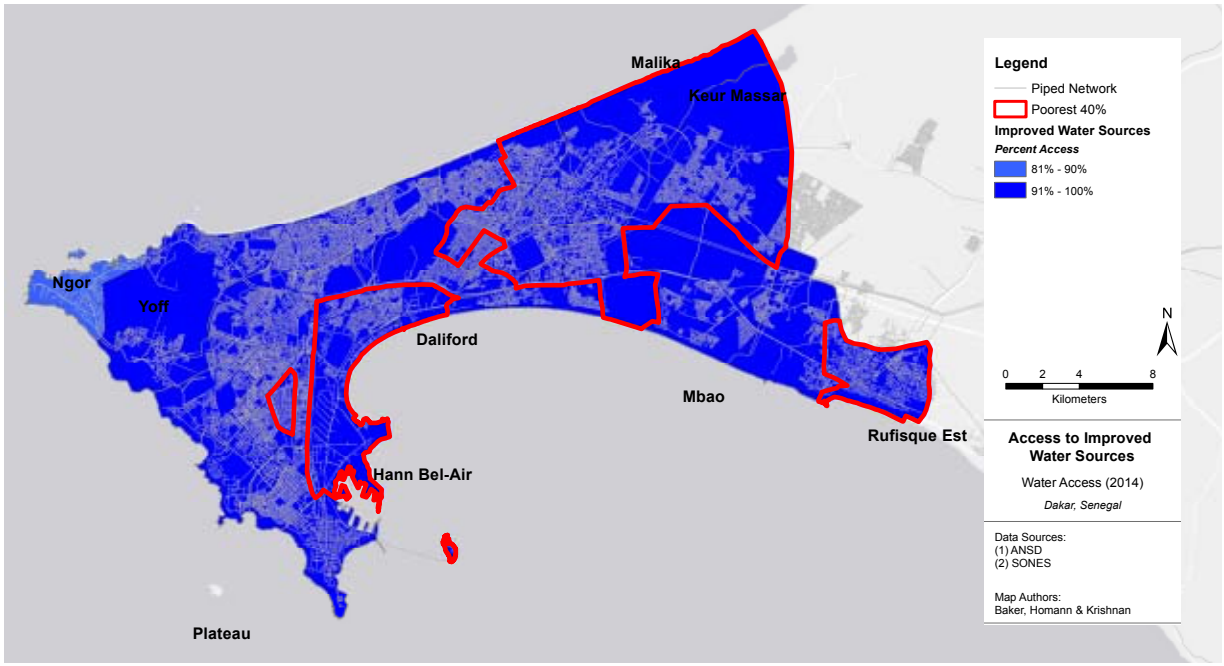


TABLE 3.2: ACCESS TO PIPED WATER, COMPARED TO ACCESS TO UTILITY-PROVIDED WATER

City	Access to piped water, household survey data	Utility estimated coverage
Durban*	97%	97%
Lusaka*	92%	87%
Ouagadougou*	94%	
Dakar*	96%	100%
Nyeri*	94%	85%
Niamey*	95%	
Kampala*	83%	78%
Nairobi	83%	75%
Hargeisa	60%	50%
Tanga	71%	98%
Addis Ababa	99%	89%
Maputo	94%	44%
Kinshasa	88%	
Mombasa	82%	57%
Dar es Salaam	62%	46%
Accra	57%	56%
Kaduna	18%	47%

* City with relatively good service to the poor.

Notes:
City-level coverage data was not available for three of the national utilities.

Source: Household surveys (see Table D.1 for list of sources); utility research (see Table D.2 for full list of sources).

A weakness in this method is that utilities' methods of estimating coverage vary, and may be unreliable, especially as regards the number of people getting water from utility standposts. The results therefore need to be cross-checked against local knowledge of the prevalence of small scale piped water providers in the city.

The data in Table 3.2 suggest that, in Durban and Dakar, everyone with piped water gets it from the utility. This matches local reports that there are few, if any, small-scale piped water operators in these cities. Lusaka, by contrast, has 5 percent more of the population reporting access to piped water than the utility reports that it serves. This is consistent with field research showing significant involvement of community trusts in supplying water in some areas.

In Kampala and Nyeri, the utilities' estimates of coverage are lower than the access to piped services reported by household surveys. The utilities may be underestimating their effective coverage because they do not include illegal connections among households served, or because they underestimate numbers served by each shared tap. In any case, the statistics suggest that all those with piped supply are served by utilities. This is consistent with interviews and field visits suggesting few, if any, alternative piped providers in these cities.

Utility coverage data were not available for the cities of Niamey and Ouagadougou. We do know, however, that in Ouagadougou a growing number of poor people in informal settlements are served by small providers. These small providers on-sell utility water under an agency arranged with the utility, as described in Section 6.

In conclusion, where the poor are relatively well served, service is provided by utilities. Service is usually provided directly to customers, though this may be supplemented with on-selling through small scale providers, as in Ouagadougou.

In the typical cities, alternative providers have a larger role

By contrast, the typical cities have a wider range of water service providers. In Maputo, for instance, 94 percent of households (all income levels) report access to piped water, whereas the utility serving Maputo (AdeM) reports just 44 percent coverage. Small scale providers account for the other 50 percent. About 500 entrepreneurs manage over 800 piped systems, providing mostly yard taps. In these cities, small scale providers are important in filling the gap left by the utility, and contribute to service to poor households being better than it otherwise would be. Additional information about this arrangement in Maputo is included in Box 6.1.
In Nairobi, by contrast, most of the poor do obtain water from the utility. However, because the utility has not extended service in a widespread manner, access to improved water remains below 90 percent for poor people.

3.2.1 Factors distinguishing utilities that serve the poor well from others

We have seen that, in cities where poor people get good water services, the service is almost always provided by a utility. At the same time, cities where the poor are less well served also have utilities. Just having a utility is clearly not enough to get good water service to the poor. We need to understand what makes some utilities serve the poor well, while most do not.

One factor which stood out as making a difference is how effectively the utility is managed. A utility management effectiveness indicator was developed. This indicator is a composite of the most important indicators for cost-effectiveness and financial sustainability for a utility: nonrevenue water (NRW), collection ratio, staff productivity, and the operating cost recovery ratio (for details, see Appendix E). Utilities that scored above 80 out of 100 on this measure were classified as good performers, the rest as typical performers. Figure 3.7 shows the relationship between service for the poor and management effectiveness of the utility.

Strikingly, of the seven cities with relatively good service to the poor, six have utilities that are good performers in terms of management effectiveness. Just one, Lusaka, has a composite management effectiveness score below 80. The 10 cities with more typical levels of service for poor people all have utilities with more typical levels of performance.

To be sure that this striking result is not an artefact of how the measures were calculated, we tested other cut-off points, and other indicators of utility performance. Among the indicators tested was one that measures general service performance in addition to management effectiveness, and one measure of utility performance developed by *Performance of Water and Wastewater Utilities in Africa*.[18] We also tested other measures of service to the poor. While one or two cities moved from one quadrant to another in these tests, the overall conclusion remained the same.

[18] Van den Berg, Caroline, and Alexander Danilenko. Forthcoming. *Performance of Water and Wastewater Utilities in Africa*. World Bank.

FIGURE 3.7: RELATIONSHIP BETWEEN SERVICE TO THE POOR AND UTILITY MANAGEMENT EFFECTIVENESS

	Aggregate utility management effectiveness score		
Service	Typical (less than 80)	Good (greater than or equal to 80)	**Total**
High (greater than or equal to 90% access to improved water for poor, and reliability 18 hours per day or more)	Lusaka	Dakar Durban Kampala Niamey Nyeri Ouagadougou	7
Low (Less than 90% access to improved water for poor, or reliability less than 18 hours per day)	Accra Addis Ababa Dar es Salaam Hargeisa Kaduna Kinshasa Maputo Mombasa Nairobi Tanga		10
Total	**11**	**6**	**17**

Source: Household surveys (see Table D.1 for list of sources); utility research (see Table D.2 for full list of sources).

A broader sample of cities would probably show some cities that serve the poor well without having effectively managed utilities, and some effectively managed utilities do not serve the poor well. The evidence does not prove that a well-performing water utility is necessary for serving the poor. The evidence here shows, however, that well-performing water utilities can and do serve poor people effectively. For six of the seven cities that serve the poor relatively well, a well-performing utility was the route to service provision. To put it another way, the overwhelming majority of poor people with good service in the cities we studied got that service from a well-managed utility.

3.3 Key points

The analysis of 17 cities shows that some cities have achieved over 90 percent access to improved water for the poor, in contrast to a range of more typical performance. In the seven cities that provided both good access to the poor (more than 90 percent) and reliable access (more than 18 hours per day), the water was provided predominantly by well-managed utilities in six of these seven cities. Five of these six cities (and their utilities) were studied in more detail as case studies, namely Dakar, Durban, Kampala, Nyeri, and Ouagadougou. (Timely data for the sixth city, Niamey, and its utility was not obtained.) See Appendix A. The sections that follow are based on the findings of these five case studies.

IV. The Political Economy of Improving Water Service for the Urban Poor

Many critics say that African parastatals, including water utilities, are run to benefit vested political and economic interest groups, with little regard for the poor. The political economy question of interest, therefore, is 'why and how do some utilities provide good service to the poor', despite this inauspicious environment? Five cases–Dakar, eThekwini, Kampala, Nyeri, and Ouagadougou–were analyzed to understand why and how such "islands of excellence" exist (see Appendix A for the full case studies).

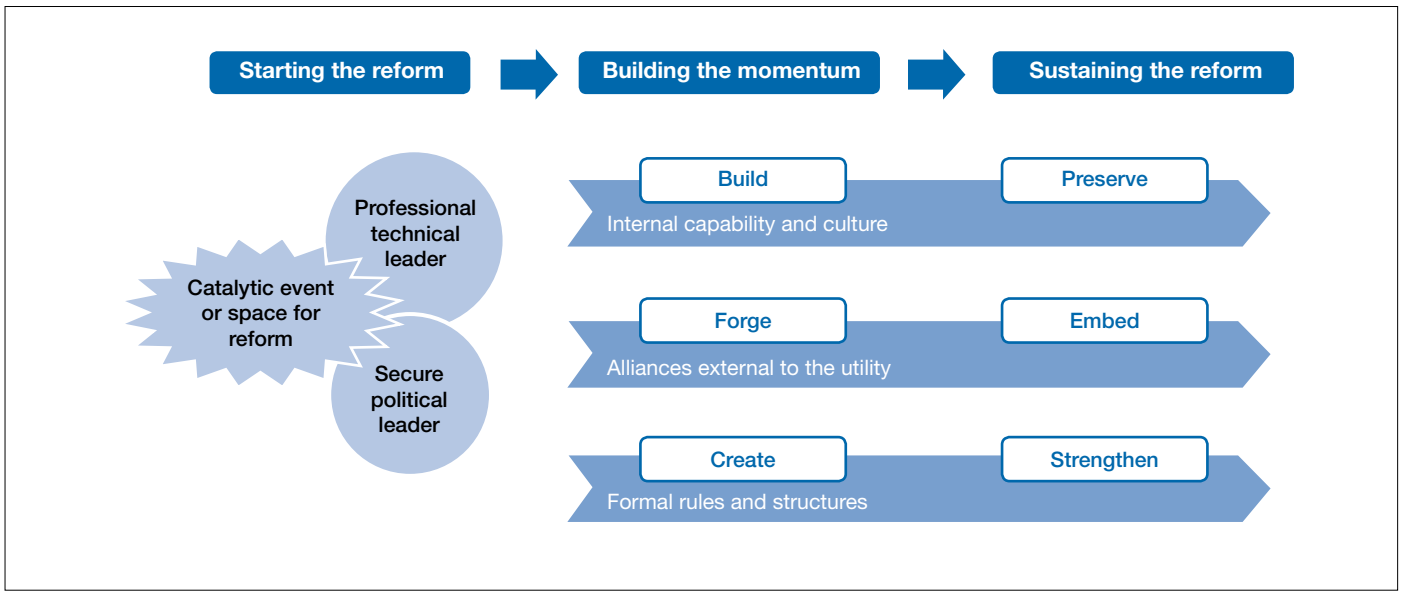
In each case, a distinct turnaround was identified–the utility serving the city once provided inferior or no service at all to the poor, and now provides relatively good service. The findings from the cases flow from three distinct but interrelated avenues of inquiry: how reforms are started, how reform momentum is built, and how successful outcomes are sustained. Figure 4.1 shows these phases.

Starting reform. A catalytic event–such as a cholera outbreak, a water shortage or an upheaval in the broader political environment–can create a space for reform. Exploiting this space for reform requires leadership, but whatever the leaders do needs to build up to developing networks and alliances for change and start to embed the reform legacy, even if not immediately comprehensively. In the cases looked at here, a political leader involved in starting the reform was typically secure, and wished to improve service sustainably. A technical leader, often from the utility, had a vision and entrepreneurial spirit to seize opportunities and influence the environment, forging a mutually beneficial partnership with the political leader.

Building momentum. Public entrepreneurs often build reform momentum by carving out sufficient bureaucratic space to operate, even against the odds. Daniel Carpenter's (2001) classic study of how the United States of America built agency capability in the late 19th and early 20th centuries highlights the role of such "public entrepreneurs" that are able to build the internal capacity of the agency and forge external alliances, thereby constructing a new coalition that will insulate the ongoing reforms from self-interested "predatory" rivals.[19]

[19] Carpenter, Daniel. 2001. *The Forging of Bureaucratic Autonomy: Reputations, Networks, and Policy Innovation in Executive Agencies, 1862-1928.* Princeton: Princeton University Press; Levy. *Working with the Grain: Integrating Governance and Growth in Development Strategies,* 138–58.

FIGURE 4.1: STARTING THE REFORM, BUILDING MOMENTUM, AND SUSTAINING THE REFORM



Sustaining reform. Success begets success, but also brings risks and countervailing factors, for three key reasons. First, as the leaders who created the success depart, their replacements may not share or understand the original vision, or may lack the skills and charisma to carry the organization forward. Second, success may actually reduce the perceived political value of high quality water services. When memories of a water crisis have receded, widespread reliable water supply may come to be taken for granted by both the public and politicians, and no longer seen as something to fight for. Third, the benefits of predation on the utility will increase once it becomes successful. As utilities expand service to the poor and others, they generate operating cash surplus, making controlling the utility more attractive to elites and other interest groups. When utilities gain access to finance to implement capital expenditure projects worth tens or hundreds of millions of dollars, the stakes are even higher.

In these cases, sustaining reform was made possible by continuing to do the two things initiated in the 'building momentum' phase–namely, by strengthening this internal capacity, and embedding external alliances. Formal rules or structures (institutions) also need to be strengthened over time. A brief description of the six key elements that helped start the reform, build momentum, and sustain reform in each of the five cases are listed in Table 4.1, with additional detail in Sections 4.1 (starting reform) and 4.2

BOX 4.1: INSTITUTIONS AND INDIVIDUALS IN WATER SECTOR IMPROVEMENTS

In many developing countries, the prevailing lack of checks and balances (as would be provided by strong formal institutions), means that governments do not always make credible commitments in those polities (Keefer, 2004).[20] However, the basis for credibility may emerge from personalized deals, often coupled with third party enforcement mechanisms. Such personalization alone may have limited impact on reform if the leaders disregard the institutional constraints and incentives, as well as alliances that make change happen. But it also highlights the importance of attention to informal institutions in political economy research on developing countries (see Levy, 2014: 153).[21]

Seminal analyses in political economy demonstrate the importance of institutions in structuring politics and relations between actors (North, 1990; Steinmo et al., 1992). Development practitioners have incorporated institutionalist perspectives into their policies and engagement inasmuch as they typically emphasize the development of formal rules, norms and practices, and these structural dimensions can be shaped, to some extent, by specific donor interventions. Indeed, there is a reluctance on the part of development partners to focus on individuals and personalities, not least because these factors lack generalizability and, more importantly, replicability.

In the case of successful reforms in the urban water sector, the role of individual utility leaders, although not discounted altogether, is seen as unique. The common responses to NWSC's William Muhairwe and eThekwini's Neil MacLeod exemplify this tendency: Those averse to focusing on personalities note that 'of course if we had 5 Williams and 5 Neils we could reform 10 water utilities–but we don't–we can't simply create these people and insert them. That's why we need to focus on institutional and structural factors.'

The successful reform cases of utilities in Ouagadougou, Nyeri, Dakar, Kampala, and Durban suggest that both institutions and personalities are important. It has been the personalities that have actually driven institutional reform to improve service delivery and prioritize the poor–but to become sustainable, institutional systems had to be transformed so that they would work differently even after the reformer has set in motion and consolidated change.

Those policy makers, development agencies or others who want to promote turnaround, need to be skilled at identifying and backing the right type of people, but also need to understand that they need support in their respective political economy environments–none of which would ever be exactly the same and replicable elsewhere.

[20] Keefer, Philip. 2004. *What does Political Economy Tell Us About Economic Development– and Vice Versa?* The World Bank.

[21] In general, our analysis is consistent with this view that institutions that are stronger, more inclusive, and more effective in terms of governance, produce better outcomes. This relationship does not appear in all contexts, however; Uganda is a notable outlier. There, good governance institutions are lacking, but the government can make credible commitments.

TABLE 4.1: KEY ELEMENTS IN STARTING REFORM, BUILDING MOMENTUM, AND SUSTAINING REFORM

	Starting reform			Building momentum and sustaining reform			
City utility, country	Catalytic event or space for reform	Political leader	Technical leader	Internal capacity and culture	External alliances	Formal rules and structures	Current utility leadership
Ouagadougou ONEA, Burkina Faso	Early- to mid-1990s. Water shortage and low water coverage in Ouagadougou and Bobo-Dioulasso	Salif Diallo, Minister Environment and Water (1995–1999)	Mamadou Lamine Kouate, Managing Director (1995–2005) Dieudonne Sawadogo, Manager and Secretary General	ISO certified (2009) Strategic planning Service contract for commercial functions (2001–2006)	Supervision Committee (representatives of consumers, government, NGOs, and development partners)	Performance Contract Supervision Committee (representatives of consumers, government, NGOs, and development partners)	Hamado Ouedraogo and Moumouni Sawadogo
Nyeri NYEWASCO Kenya	Early- to mid-1990s. Water rationing and poor water quality problem	Mayor Jackson Wanjage	Eng. Joshua Nguiguti (1995–2014)	Transparent and audited systems Strategic planning	Customers: barazas, annual open days, and good service fosters "brand loyalty"	WASREB (regulator)	Peter Gichaaga
Kampala NWSC, Uganda	Late 1990s. Donor support for PPP coupled with Ugandan opposition to PPP. Conflict created space for a credible alternative, in a situation where Uganda needed the development partners	President Museveni (1986–present)	William Muhairwe (1998–2011)	Early (external and internal) management contracts (1998–2004), and internally delegated management contracts (2004–present) Corporate training facility	Political: continued support of President Museveni Customers: Pro-Poor Unit	Parliamentary approval of the tariff indexation (2004) and political support for "Water for All" program more recently	Silver Mugisha
eThekwini (Durban) eThekwini, South Africa	1992, Need to serve all citizens in the metro area in a way that undid the legacy of service discrimination under Apartheid	Obed Mlaba Executive Mayor (1996–2011)	Neil Macleod, Managing Director (1994–2014)	Incentivized contracts with senior management team Strategic planning Training	Customers: agreed to raise free monthly water allowances from 6 m^3 to 9 m^3	Incentivized contracts with senior management teams	Ednick Msweli
Dakar SDE/ SONES, Senegal	Mid-1990s. Solve water shortage in Dakar	Minister of Water, Mamadou Faye (1992–2000)	Madio Fall, Water Director at Ministry of Water (1992–2003)	Combination of continued leadership in the public sector (the MD of SONES was the previous MD of SONEES) and international, private sector expertise	Development partners: World Bank, AFD	Affermage contract for SDE Concession contract for SONES	Abdoul Bal and Cheikh Sall

Source: Interviews with participants, Professor Scott Taylor.

(building momentum and sustaining reform). Box 4.3 explores the applicability of these findings in fragile and conflict-affected states.

4.1 Starting reform

In each turnaround case, three factors were important in starting reforms: a catalytic event, a political leader, and a utility leader. Box 4.1 elaborates the reasoning that shows the importance of individual actors, but also underscores that their roles need to be viewed, developed, and supported within their institutional settings.

For each city, how political and technical leaders supported water sector reform, in the context of a catalytic event, is described below.

Dakar

In 1994, Dakar suffered a water shortage. The utility serving the city was only able to supply 60 percent of demand. Water was rationed to 16 hours a day, with low pressure and contamination of the piped supply in some areas. Rapid population growth (more than 5 percent per annum) and rapidly depleting water resources spelled imminent crisis.

A small group of leading figures–from the Water Directorate, the private operator, and the World Bank–was "behind the reforms in Senegal and can collectively be credited for their success".[22] Their personal desire to improve the quality of public services for all residents, making these services more inclusive, was one reason they were so successful. Among these leaders, Madio Fall (Water Director at the Ministry of Water from 1992 to 2003) was the key bureaucratic entrepreneur involved in Dakar's reform. Described as 'a towering and respected figure within the sector, Madio Fall had the full support of the Minister of Water, Mr. Mamadou Faye, who himself remained in place from 1992 until the presidential elections in 2000'.[23] Fall himself says he was motivated 'by the urge to improve the public side of water administration and delivery', and "to 'stop seeing women on the streets of Dakar spending hours fetching water'."[24]

With the support of development partners, a reform plan was developed.[25] In the short-term, additional boreholes were constructed and an existing treatment plant was expanded. A public-private partnership (PPP) contract was signed, giving a private operator (*Sénégalaise des Eaux*, SDE) the responsibility for providing service to customers and for operating and maintaining the infrastructure.

Importantly, political elites in the ruling *Parti Socialiste* (PS) as well as the opposition were able to reach consensus about both the importance and direction of reforms. To secure World Bank support for reforming the sector, the government had to commit to making the water sector financially sustainable–which it did. The President of Senegal at that time, Abdou Diouf, was in a relatively secure position, and the PS had been in power since 1960. Potential opponents were included in government to build ownership of the reforms across the political spectrum. Development partners supported this approach because, once the PS agreed to water sector reform, the ready-made consensus made proposed reforms easier to enact.[26] This also enabled opposition leaders to maintain momentum around water sector reforms once they were elected to government in 2000.

Ouagadougou

In the 1990s, Ouagadougou also faced a severe water shortage. The city population had doubled from 1985 to 2000, but the development of water service infrastructure had not kept pace with increasing demand. By 2000, just half the population had access to piped water (through individual taps or communal standpipes).[27] *l'Office national de l'eau et de l'assainissement* (ONEA), the utility responsible for providing water to Ouagadougou, was performing poorly and thus lacked the cash needed for service improvement. Salif Diallo (Burkina Faso's Minister of Environment and Water from 1995 to 1999) and Mamadou Lamine Kouate (Managing Director (MD) of ONEA from 1995 to 2005) were the political and technical leaders, respectively, that were critical to starting the water sector reform. It

[22] Trémolet. 2006. *Case Study on Senegal's Water and Sanitation Sector Economic Regulation: Final Report*. A Report to the World Bank on behalf of Castalia Advisors. May. By Trémolet's account, the list includes Fall and his two director generals in the Water Directorate; Water Minister Mamadou Faye; World Bank officials Jan Janssens, Matar Fall and Fadel Ndaw; Mamadou Dia at SDE; and independent conciliator Jan Dirickx.

[23] Trémolet, 55.

[24] Trémolet, 81.

[25] The World Bank's contribution was considerable, but the success hinged largely on the dedicated and creative responses by Senegalese role-players.

[26] Beck, Linda. 1999. "Senegal's Enlarged Presidential Majority: Deepening Democracy or Detour?" In *State, Conflict & Democracy in Africa*, edited by Richard Joseph, 214. Boulder: Lynne Rienner.

[27] World Bank. 2001. "Project Appraisal Document, Ouagadougou Water Supply Project."

can be inferred that Burkina Faso's then-president, the strongman Blaise Compaoré, gave his political blessing. Diallo and Kouate resisted suggestions from the World Bank to introduce a private operator to manage the service. Instead, ONEA remained a government-owned, limited liability company. From 2001 to 2006, technical assistance from a private operator (Veolia) was provided through a performance-based service contract.[28] In addition, a Supervision Committee–comprising representatives of consumers, government, NGOs, and development partners–was established. The Supervision Committee monitors both ONEA and the government's performance against the *Contract Plan* (three-year performance contract), but it also is an example of a formal structure that developed an important informal role in connecting the key actors in a common forum, from where they have been able to guide and support reform and progress in alliance mode.

Nyeri

In the early 1990s, municipal water was rationed, unreliable, and unsafe to drink. Although reliable data on the situation before 1995 are not available, those who lived through the period recall that infrastructure investment had not kept up with population growth. Water was rationed by limiting supply to a few hours per day. The poor families living in the growing informal settlements lacked access to the piped water network.

The reforms at Nyeri Water and Sewerage Company (NYEWASCO) were initiated through the combined efforts of a political and a technical leader. The political impetus for reform came from the mayor, Jackson Wanjage, who had support from the municipal council. Technical and managerial input came from the Municipal Engineer, Joseph Nguiguti, who at the time was responsible for water supply because of his role in running all of the municipality's engineering services. Together, they persuaded GTZ to let Nyeri join an existing program supporting the creation of municipal-owned public companies with autonomous management.

At the time of reform, predation and neo-patrimonial leadership were reportedly widespread in Kenya, and one would expect that the utility would have been subject to penetration by national and local political elites. However, this was not the case in Nyeri in 1995. Mayor Wanjage was a civic-minded reformer, with an uncommon level of autonomy. The utility's small size and weak financial standing minimized vested interests in continuation of the status quo (low coverage and intermittent service) for patronage, corruption or other forms of predation. In other words, it seems the political benefits of improved service outweighed the political costs from loss of rent-seeking opportunities. It may also have helped that Nyeri is a relatively ethnically and culturally homogenous town, minimizing inter-group rivalries that could otherwise have interfered with a drive for universal service and the use of cross-subsidization to achieve it.

eThekwini (Durban)

In Durban, South Africa, in the 1990s, the entire sociopolitical context in which utility services were provided shifted dramatically. Under 46 years of apartheid rule, black people mostly lived in separate areas where water services were poor or nonexistent. The catalytic event, therefore, was democratic transition in South Africa in 1994, from an exclusive race-based franchise to universal franchise. Reform of local government amalgamated previously racially separate local governments. Shortly thereafter, the 1996 Constitution included a bill of rights that required the state to progressively realize the right to water. The Durban water department, previously providing a high level of service to the city center and affluent white suburbs, now had the responsibility to manage and extend services over a much wider and poorer area. The service boundary was extended by 68 percent to include more rural areas that added a further 9 percent to the population of 3.6 million people.

eThekwini provides a quintessential example of "public entrepreneurship" under the leadership of Managing Director Neil Macleod, an engineer with a Master's in Business Administration. In the early 1990s, Macleod acted early to reorient the water service towards a pro-poor focus, even before the first democratic elections in 1994. The turnaround began with institutional reforms to incorporate multiple municipal water departments into a single metropolitan water department within the metropolitan government. The utility moved rapidly to incorporate the

[28] The contract with Veolia is described in more detail in Section 4.2. A description of the loan secured for ONEA is provided in Section 5.1.

To get the water flowing reliably, safely and for all people in the city, creating conducive political conditions and developing technical, managarial and financial strategies and options mostly take time and tactical acumen. (*Photo Credit: The World Bank).*

various township utilities into its management structure. Macleod focused on expanding and improving service, and constantly innovated institutionally. He reminisces that he felt like he was "just trying to run faster than everyone else" in putting together institutional, financial, and management models. Macleod's success at starting reforms illustrates how speed can help set the agenda.

Ultimately, whatever significant changes Macleod proposed or implemented as MD needed the consent of the City Council. Creating proposals quickly let him set the agenda. Implementing change rapidly let him demonstrate success, overcoming theoretical objections and turning "new" into "status quo" before opposition developed. New politicians were eager to be seen to be doing something quickly and it was thus convenient to back a manager who had already demonstrated he was being effective in line with the new political agenda.

The Executive Mayor, Obed Mlaba (1996 to 2011), and later City Manager, Mike Sutcliffe (2002 to 2012), helped foster a stable and enabling political context. They were sufficiently secure politically to establish and maintain the Water and Sanitation unit as a 'semi-autonomous' entity within the municipal administration. The roots of this arrangement have been so firm that it has been in existence and successful for over 20 years.

Kampala

In 1996, access to piped water (from private connections and public taps) was a mere 48 percent. Poor families predominantly lived in the low-lying and swampy valleys between Kampala's hills, relying on wells, springs, and water bodies as alternative sources of water for reasons of convenience and cost.[29] Much of this water was contaminated, often as a result of infiltration from latrines,[30] which contributed to cholera outbreaks in December 1997 to March 1998.[31]

[29] The World Bank. 2014. *Do Pro-Poor Policies Increase Water Coverage: An analysis of service delivery in Kampala's Informal Settlements*. The World Bank, 14.

[30] Kayaga, S., J. Fisher, and R. Franceys. 2009. "Improved access to urban water services in Uganda." *Proceedings of the ICE: Municipal Engineer* 162:3, 165–170.

[31] Legros, D., M. McCormick, C. Mugero, M. Skinnider, D.D. Bek'Obita, and S.I. Okware. 2000. "Epidemiology of cholera outbreak in Kampala, Uganda." *East Africa Medical Journal* 77 (7): 347–349.

This poor service had been present for decades, however, and previous reform attempts had failed. The true catalytic event that sparked the National Water and Sewerage Corporation's (NWSC) successful reform in the late 1990s was a call for privatization of parastatals nationwide, and creative tension between development partners and Ugandan stakeholders over how this might apply in the water sector. President Yoweri Museveni supported privatizing 85 percent of Uganda's public enterprise sector by the end of 1997 (Tangri, 1999: 56) as part of an internationally accepted debt forgiveness deal worth US$2 billion.[32] Inside Uganda, however, tensions remained between embracing market-oriented economic governance on the one hand and the desire for national and social control of key entities on the other. In the water sector, development partners championed private sector participation. A management contract with a private firm (Gauff) was signed in 1998.
In 1998, William Muhairwe was appointed as MD of the NWSC. He quickly gained a reputation as an ardent reformer. In the initial phase of reforms, the Muhairwe-led NWSC implemented a series of "Change Management Programmes" geared toward the rapid improvement of operations.[33] Meanwhile, President Museveni, operating from a position of political strength under the prevailing 'no party' system of politics, backed this reform, giving Muhairwe the autonomy to run the NWSC, first alongside private management contractors, then on his own.

Box 4.2 discusses the role of national and local political leaders in the reforms.

[32] International Monetary Fund. 2000. "HIPC Debt Relief for Uganda Increased to a Total of US$2 Billion: Additional Relief vital for Uganda's Poverty Reduction Programs." *International Monetary Fund*. Accessed September 18, 2015. https://www.imf.org/external/np/sec/pr/2000/pr0006.htm

[33] These included the 100 Days program, Service and Revenue enhancement project (SEREP), Area Performance Contracts (APC), Stretch out programme, Internally Delegated Area Management Contracts (IDAMCS), One Minute Management Concept (OMM), and a Checkers system that deploys staff, often undercover, to expose bribery and other malpractices at branch offices (Muhairwe, 2010; see also WIN, 2009: 48).

BOX 4.2: ROLE OF NATIONAL AND LOCAL POLITICAL SUPPORT IN REFORMS

Given the high degree of centralization that characterized African polities in the 1990s and the persistence of *patron-clientelism,* the scope for proactive, reform-oriented leaders, whether in politics or at the utilities, ordinarily would be circumscribed.

Uganda's utility circumvented this constraint because, in the case of water, at least, the president himself was the reformist leader. Among our cases, Uganda offers the clearest case of water sector reform fitting within the president's political objectives at the time: he imbued the Managing Director, William Muhairwe, with a level of authority that may have even exceeded that of the water minister. The signs are that his successor, Silver Mugisha, has similarly paid considerable attention to working with the president and senior political leadership in developing new directions and focus points for the NWSC. Though comparative evidence is more limited, we can infer that Burkina Faso's then-president, the strongman Blaise Compaore, similarly gave his political blessing to ONEA, and that the utility leadership has worked hard at making sure that this has been developed and grown.

Kenya followed a different course in the 1990s, as opposition to the tactics of President Daniel Arap Moi caused growing alienation of the ruling Kenya African National Union (KANU) from the Kikuyu people, many of whom were embracing the nascent opposition in Central Province and Nyeri, its heartland. Thus, Nyeri's water sector politics were largely divorced from national level politics. Senegal and South Africa, for their part, had more democratic, decentralized processes, thus utility reform in those countries would bear less of a presidential imprimatur than Uganda.

The eThekwini case mirrors Nyeri in that the role of national political leaders was less visible and less germane to understanding the case. The national and local political transformation in 1994 undoing the apartheid system established a broad mandate for reform, with a focus on extending services to the poor.

4.2 Building momentum and sustaining reform

Political and technical leaders, working together in the context of a catalytic event, can spark reform. However, success is only possible if the balance of political economy pay-offs remains in favor of reform and–once achieved–in favor of sustained good service, even as the attractions of predation on the utility increase. The cases suggest that building reform momentum and sustaining service required action on three interrelated fronts:

- **Build and strengthen internal capacity and culture.** The technocratic and managerial skills that helped launch the reforms were then used to build strong staff and managers. Other managerial techniques–such as performance-based pay, inclusive corporate strategic planning, and general transparency–also helped build and strengthen performance-based cultures.
- **Forge and embed external alliances.** Alliances with customers, the government, development partners, and other stakeholders were used to build momentum for reform, and help sustain it. Utility leaders demonstrated a high degree of political savvy, understanding of the political and wider sociocultural context, and the ability to navigate competing interests in an unsettled governance and institutional environment. Alliances constructed in the momentum phase were instrumental in maintaining reforms later.
- **Adopt formal rules and structures.** Contracts, regulatory arrangements, and other formal frameworks and institutions were used to support service delivery improvements. Credible commitments through multistakeholder frameworks, as well as legally-binding contracts between public and private parties, worked to reduce the risk of predation, and sustain successful governance models.

Importantly, these factors can be self-reinforcing and promote virtuous circles. Effective leaders build alliances and create meritorious business cultures, which in turn strengthen institutions, and so on. How the case study utilities built momentum and sustained reform is described in the following subsections.

4.2.1 Building and preserving strong internal capabilities and culture

Where conditions are favorable for reform, what should be done first? Successful reforms are mostly problem-focused (that is, responsive to the crises that drove the need for reforms), well-timed, and adaptive. The utility may need a new water supply scheme, repairs to the distribution network, or help implementing systems to collect cash from customers, or to send bills automatically. The case studies are replete with evidence of utility leaders contributing to virtuous circles by building internal capabilities and cultures that make the utility successful.

Later on, this same culture helps to sustain reforms.[34] A professional culture provides a barrier against predation on the utility since, being anathema to professional culture, the organization itself will fight against it. Grooming future leaders and promoting training and development were particularly important in the cases studied. This is an indication that leadership is a critical variable, not solely at the outset of reforms, but throughout the life of a successful utility, particularly in a precarious macro political economy context. By creating a deep management bench, a utility reduces the risk that losing a leader will undo its success.

A performance-based corporate culture, with an emphasis on transparency, also promoted reform momentum and reform resilience. A performance-based pay system–based on annual reviews against performance indicators derived from the utility's overall mission, and well-defined job descriptions for staff–is important in many of the case utilities. Many utilities also involve all staff in strategic planning. This sets the scene for establishing ownership of the institution, with staff at all levels understanding, operationalizing, and able to articulate the approach taken by the management.

Kampala

William Muhairwe (MD of the NWSC, 1998 to 2011) first addressed the culture of slackness pervading the NWSC when he took over. Garbage was left lying around offices. To shock the organization out of its lethargy, he instituted a 100-day turnaround program, in which managers and their

[34] Carpenter. *The Forging of Bureaucratic Autonomy*, 14.

teams committed to extraordinary goals which they would achieve within the first 100 days. This signaled that things were changing, and made subsequent changes easier.

He then created a management system based on autonomy, accountability, and incentives. He built on a foundation established by international operators under management contracts with clear targets, including with Gauff (1998 to 2001), and subsequently with ONDEO (2002 to 2004). In parallel with these external management contracts, Muhairwe developed a series of internal management contracts. The first of these were 'area performance contracts' which applied to the areas outside Kampala not managed by the external management contractors. The NWSC managers for these areas were given performance targets and bonuses for meeting the targets. In 2004, a similar concept called 'Internally Delegated Management Contracts' was applied to the management of the NWSC's Kampala service area also.

The NWSC developed its staff. Leaders were hard-working, committed, and dynamic. Staff were granted autonomy and were motivated by clear vision, mission, and objectives. The utility invested in a corporate training facility and emphasized monitoring and evaluation, increased customer focus, outsourcing noncore activities, and information sharing through benchmarking.[35]

The appointment of quality technocratic leadership in the senior management of Uganda's NWSC was instrumental in enabling reforms to stick, in securing political autonomy, and in instituting rigorous performance metrics. When Muhairwe retired, there was an intermission amid some controversy over succession, but in the end his place was taken by Dr. Eng. Silver Mugisha, a member of the management team that Muhairwe had developed. Good leadership, in turn, promoted and sustained virtuous circles within the organization, including the cultivation of a professional staff and an institutional culture of efficiency and accountability. This has not meant sticking exactly to his predecessor's agenda–in fact, in the three years or so since his appointment, Mugisha has been quite assertive in driving a firmer agenda on the NWSC's role in smaller towns than was the case under the previous MD. He has also intensified efforts to reduce NRW, improve revenue, and modernize the customer feedback systems.

Nyeri

Under Joshua Nguiguti (MD from 1995 to 2014), NYEWASCO adopted modern management techniques, serving to build internal capacity and culture. All staff are involved in strategic planning. Computerized systems are used. The systems are transparent and audited, reducing risk of malfeasance. Staff are provided with technical and managerial training. All of this has built a strong corporate culture which now resists predation.

This internal capacity has been preserved after Nguiguti's departure. The Board brought in a new MD from outside the organization, who immediately confirmed his commitment to working with the established senior leadership. The current MD of NYEWASCO also recounted that if senior management were to try to cook the books to their personal benefit, their actions would be quickly visible to the accounting staff, who would report it. He explained that this is the reinforcing power of a strong professional culture and transparent information systems.

Dakar

In Dakar, much of the PPP's success was due to management capability in both the private and public institutions. From 1996, then new state-run asset holder, *Société Nationale des Eaux du Sénégal* (SONES), maintained a degree of continuity by retaining the MD of the forerunner institution, *Société Nationale d'Exploitation des Eaux du Sénégal* (SONEES), while the *affermage* contract brought in private sector expertise from a reputable international company, SAUR. Senegal's long experience with private sector management–an *affermage* contract prior to the 1972 nationalization and a consulting contract with SAUR between 1972 and 1995–facilitated trust, familiarity ,and cooperation between public and private actors.

eThekwini (Durban)

eThekwini's Neil Macleod built momentum through technical innovation, changes in the institutional culture, and customer engagement, all of which led to improved service for the poor. This in turn increased political backing

[35] Muhairwe, William. 2010. *Making Public Enterprises Work*. IWA Publishing.

Building alliances is not only about high-level politics – in fact, continously improving services and maintaining infrastructure is a concrete way to win and build customer support. *(Photo Credit: ONEA, Ouagadougou, Burkina Faso).*

for the management approach adopted. Under Macleod, eThekwini established a customer management unit with equal status to other major management units such as finance and the engineering functions. Macleod was willing to innovate, using technological solutions–such as flow limiters on customer connections and HDPE (high-density polyethylene) pipes–which allowed the utility to provide free basic water in poor communities.[36] At the same time, management efficiency allowed eThekwini to cover all of its operating and maintenance costs from the tariff.

eThekwini developed a people-focused and trust-based organizational culture in which staff contributions were recognized and valued. The eThekwini management has consistently emphasized people as the most important asset. The MD adopted a personal and engaging management style, being quick to give visible recognition to good staff performance through awards. He built trust in the management team and communicated effectively with staff, frequently visiting staff in the field. He fostered a positive attitude by encouraging people to propose solutions to the problems they brought to management.

[36] Additional information on this technological innovation is provided in Section 6.2.3.

The MD negotiated a performance contract with the City Manager linked to the water unit's overall performance. This contract made 25 percent of his remuneration dependent on meeting performance targets. These performance agreements were cascaded to the senior management team. Critically, although not operating a classic corporatized utility, Macleod was able to establish and sustain the Water and Sanitation unit as managerially 'semi-autonomous' within the municipal administration, which protected management and staff from outside interference in operations, and enabled accountability.

Ouagadougou

In Burkina Faso, ONEA's MD Mamadou Lamine Kouate was in place throughout a key phase of the reform period (1995 to 2005), providing stability in the 'building momentum' phase. He developed the first strategic plan for the period 2004 to 2008. From 2001 to 2006, ONEA also benefited from technical assistance from a private operator (Veolia), which ran commercial operations. Veolia provided two deputy managers, plus other short-term advisors, for ONEA's commercial and finance departments. They set up new accounting and customer management systems, and helped ONEA identify illegal connections, improve meter reading and meter repairs, and improve customer

service. These factors combined to improve management effectiveness. From 2001 (start of reform) to 2006, collection efficiency rose from 85 percent to 95 percent; staff productivity improved from eight staff per 1,000 connections to five staff per 1,000 connections; and NRW remained low at about 17 percent.

In building a well-trained, motivated management team, Kouate helped ensure that succession was smooth and the reform sustained. In 2009, ONEA became ISO 9000 certified. The company reports that this promotes internal discipline. Management effectiveness indicators have continued to improve even in the course of a transition on leadership–by 2013, collection efficiency was 97 percent, staff productivity was three staff per 1,000 connections, and NRW was maintained at about 17 percent.

4.2.2 Forging and embedding alliances with external stakeholders

Internal strength needs to be supplemented with external alliances. Alliances with customers, development partners, government, and other stakeholders protect utility performance, since stakeholders allied or networked with the utility resist predation and other influences that may undermine its ability to serve successfully.

Alliances with customers

NYEWASCO's customers exhibit "brand loyalty". It is said that, when travelling, many carry jerrycans of water from the utility's taps because they consider Nyeri to provide the best water in Kenya. Such loyalty helps preserve the utility's success. Management recounted that, whenever there was a news report or rumor suggesting that political interference in the utility might be in the offing, customers would call the utility office to ask what they, as customers, needed to do to head off such interference. In other words, citizens of this town in Kenya seemed well aware of the risks of "predatory behavior", and the damage it could do. They have shown readiness to protect an entity that had demonstrated success.

Other factors embedding NYEWASCO in a network of alliances includes being locally owned, and strong communication between the utility and the stakeholders it serves. NYEWASCO fosters a relationship with citizens through *barazas* (a deliberative gathering) and its annual open day, operates an effective customer service line, makes a point of fixing burst pipes quickly, and reaches out to serve poor communities as well as the middle class.

At the NWSC as well, managers have also made water customers into advocates and allies. The NWSC has a well-developed customer service apparatus, which includes a dedicated Pro-Poor Unit focusing on informal settlements in Kampala, and a range of feedback mechanisms, such as annual surveys that reach 3 to 5 percent of the now 214,000 customers in Kampala. The management team reported that providing service to the poor is a key factor in ensuring continued *political* support of the utility since "in Kampala, the poor vote". The NWSC has now also galvanized support in communities and government for the "Water for All" program. Again, service is embedded in a relationship with communication. Like NYEWASCO, the NWSC holds *barazas* in communities. There, the utility listens to the community's needs, acknowledges its own problems, and talks about how it plans to improve. Community leaders and politicians are also involved. In this way, the politicians see what the utility is doing for the community and the fact that the community supports the utility. This encourages the politicians and community leaders to cooperate with the utility and support it, rather than try to score political points that undermine sustainable service.

eThekwini in South Africa established alliances by doing its work effectively, serving its primary (new) constituents in the black majority and, in the process, aligning to the transformative objectives of the post-apartheid government. The importance of listening to poor communities and taking what they say seriously is recognized. After establishing community consultation committees, the initial engagement was tepid. Community members were not sure if the dialogue was meaningful and were wary of the utility. The first major issue the consultation brought up was that the free water allowance was not enough to allow families to meet their basic needs. In 2008, eThekwini Water got Council approval to increase the nationally set allowance from 6 m^3/month to a locally-set volume of 9 m^3/month. After that, the communities knew the consultation was meaningful and engaged more enthusiastically. The then MD says his contract was renewed largely because the utility successfully served poor communities.

Alliances with development partners

In Dakar, the World Bank and *Agence Française de Développement* (AfD) were the leading development partners in Senegal's water reforms. As in the Burkina Faso case, both were advocates of more extensive private sector participation. Yet the development partners worked with the government as it opted to preserve some elements of SONEES, its former (owner-operator) water parastatal, in the new institutional structure of SONES, which retained the water assets.

The World Bank also helped to develop the *affermage* contract for the private operator. The experience in Burkina Faso, where the government resisted World Bank proposals for a more private sector-driven model, also highlights the value of a development partner being open to learn. This flexibility and openness on the part of the Bank eventually was conducive to the emergency of a strong, professional ONEA, owned by the public sector, but engaged tactically with civil society, organized business, and–at the operational level –contracting of small providers to help extend services in low income settlements where the utility has been prevented by mandate from operating.

In Kampala, international engagement and support aligned positively with the objectives of the Museveni government at the time of reforms. Subsequently, the substantial support of international development partners and lending agencies was instrumental to the NWSC's success from 1998.[37] German Corporation for International Cooperation (GIZ)–then Germany Agency for Technical Cooperation (GTZ)–was a longstanding partner, providing technical assistance prior to reforms, and the Austrian government supported network infrastructure development. Among the largest and most consistent supporters of the sector have been the World Bank and the German Development Bank (KfW), which have provided funding, especially for the extension of access to the poor.

In Nyeri, development partners were quite marginal when reform started. At the momentum phase, however, the GTZ's help in developing commercial, business-like management and institutional models was valued. Moreover, the KfW provided a loan and helped NYEWASCO develop a financial strategy that included lower operating costs and a grace period in which free operating cash flows could be directed toward network improvements before debt service obligations kicked-in.[38] The payment discipline that the KfW instilled helped NYEWASCO maintain its own commercial and financial discipline.

Alliances with political leaders

In Kampala, the NWSC has formed a powerful alliance with President Museveni. He was instrumental in bestowing autonomy on the reformed utility (he allowed MD Muhairwe to have a substantially free hand), and he insisted that government offices pay any arrears to the water company. Essentially, President Museveni has been the "constant" among NWSC allies since the utility embarked upon reforms in 1996. With his support, the NWSC has been largely insulated from predation by other elites or other internal or external interest groups.

In eThekwini, the Executive Mayor and City Manager supported the retention of Macleod as the head of water (a position he held for over 20 years).[39] Macleod's early success and effectiveness were likely key factors in convincing them of the merits of retaining Macleod, and thereby avoiding the turbulence that afflicted other local governments and urban water systems.

4.2.3 Creating and strengthening formal rules and structures (institutions)

In isolation, formal rules and structures are an inadequate guarantee of sustained success. 'Independent' boards, for example, are routinely replaced by politicians, sometimes in breach of company law, or sometimes bending the rules to fill boards with their own people. 'Independent' regulators may be reluctant to approve tariff increases.

When coupled with the professionally capable organizations embedded in a web of stakeholder alliances, however, formal regulatory and governance structures can contribute

[37] Schwartz, Klaas. 2008. "The New Public Management: The future for reforms in the African water supply and sanitation sector?" *Utilities Policy* Volume 16, Issue 1, 49–58.

[38] How this loan was secured for NYEWASCO, and how the utility managed to service its debt, is covered in Section 5.1.

[39] In other cities, senior managers have held their positions for much shorter periods. The City of Tshwane, for example, has had five city managers in 12 years.

to the sustainability of reforms. Adherence to formal rules and practices strengthens the utility, the regulator, and government. Lessons from the World Bank's work in fragile environments like Hargeisa in Somaliland has reiterated the critical value of developing such core capacity formally, even though there may be periods in the immediate aftermath of conflict or other causes of fragility where the only way to get water to people would be informally.

Contracts

Contracts with private parties can embed successful models. In Senegal the *affermage* contract defined the service standards and remuneration for the operator, and provided mechanisms to monitor and enforce performance. While a contract between a public utility and its government owner is generally easily amended or ignored if the government so wishes, a contract with a private party cannot be changed without the consent of both parties. Thus, an *affermage* contract helped increase the durability of the service delivery improvements in Senegal. This system also evolved over time. While the contracts and institutional structures were generally well specified from the beginning, the contract was later amended and extended.

Incentivized contracts with senior management teams may also help to embed good governance. If managers' pay depends on the results they deliver–as it did in Kampala and eThekwini–those managers will have incentives to preserve autonomy, ensure financial ring-fencing of the utility, and to avoid predation.

Regulation

In Kenya, WASREB, the national regulator is credited by NYEWASCO with allowing adequate tariffs while promoting cost effectiveness.[40] National tariff regulation mitigates the impact of local politics on tariff setting. WASREB also sets and enforces corporate governance rules that utilities such as NYEWASCO must comply with. These strengthen the utility against attempted political predation. WASREB's own ability to remain independent may in part be due to the fact that it regulates numerous utilities, making it harder for political opportunists to bend the rules for any individual utility.

In Kampala, parliamentary approval of the tariff indexation took the politics out of tariff increases needed to keep pace with rising input prices.

In Ouagadougou, a *Contract Plan* with the government serves to regulate ONEA. Its effectiveness is increased through a multistakeholder Supervision Committee and independent auditors, as explained below.

The takeaway from the case studies is that various regulatory systems can help utilities sustain success by protecting against predation. This report does not make a judgment call about which form of regulation is best.

Formal supervision involving multiple stakeholders

An innovative model used in Ouagadougou for formalizing external relationships is ONEA's multistakeholder Supervision Committee in Ouagadougou. The Supervision Committee comprises representatives of consumers, government, NGOs, and the development partners who finance ONEA. Its role is to monitor both ONEA's and the government's performance against the Contract Plan. The Committee does this through an annual meeting. Prior to the meeting, Committee members receive not just a report from each party on its performance against the contract, but also the report of a financial auditor and a technical auditor whose job it is to assure the quality of the information. The auditors' reports indicate the degree of confidence they have in the information presented. The auditors appear in person before the Committee and explain their reports. ONEA's management credits this committee with an important role in making sure that both the utility and the government play their agreed roles under the Contract Plan.

This arrangement has institutionalized a web of relationships with external stakeholders. Those stakeholders have a venue, an official role, and reliable information with which to demand performance from the utility. They also have the opportunity to protect the utility against predation from government. Bringing customers, development partners, and other stakeholders together–and giving them reliable information–raises the costs of predation, reducing the risk of back-sliding.

[40] Even with independent regulators, utilities feel that rules ensuring tariff adequacy need to be used with political savvy. This includes, for example, avoiding applying for a tariff increase during an election season. Afterwards, politicians will be less likely to oppose it–indeed, they will be more interested in seeing how the utility can improve service during their term in office.

BOX 4.3: APPLICABILITY OF THE FINDINGS IN FRAGILE ENVIRONMENTS

One may question if these findings are applicable in in fragile and conflict-affected states. The experience of the Hargeisa Water Agency (HWA) illustrate there relevance in such cities. The HWA provides water for over 500,000 people in or around Hargeisa, the capital of Somaliland. Currently, 76 percent of poor households have access to an improved water supply, and about 55 percent have access to piped water for 22 hours per day. Another 13 percent of the poor obtains water from private vendors. On management effectiveness measures, the HWA is covering operating costs from revenues, maintaining collections efficiency at 92 percent, and with nonrevenue water at 33 percent.

How has Hargeisa put itself in a position to improve water services, while many others utilities in fragile states are financially unsustainable without government support? The answers may be in the political economy dynamics of the respective systems. In conflict-afflicted, poor governance environments, failure of government institutions is the norm, such as in Kinshasa, Democratize Republic of the Congo (DRC) where the utility, REGIDESO, focused on new investments and awarding construction contracts, rather than instilling management autonomy and sustained building of institutional systems.[41]

In contrast, Hargeisa's surprising improvement (albeit from a low base) demands explanation. It seems possible that, with Somaliland having asserted a form of independence from the rest of Somalia (albeit contested) and external assistance being limited, there was no source of surplus in the water sector on which to prey. Equally, the local initiative that drove the creation of Somaliland and the HWA may evidence a polity that is relatively cohesive and focused on improving things for the community.

In this environment, the politics appear to have been relatively favorable to the creation of a service-oriented utility with autonomous management. The things that Hargeisa credits for its success–good customer relations, transparency, accountability to stakeholders, and a focus on fair resolution of conflicts–are exactly in line with the governance and political economy approaches in the case studies.

The HWA faces challenges of limited water resources and damaged infrastructure. Somaliland is a semi-arid country with low surface water potential, and the country suffers from persistent drought. The civil war that broke out in 1988 destroyed water infrastructure, as state institutions collapsed. When, after the war, some development partners provided investments in infrastructure, an emphasis and institutional strengthening helped put in place the organizational structure, policies, and procedures required for the HWA to better manage its finances, procurement, and human resources.

With some external support, HWA's management has improved its performance in key areas: water connections almost doubled from 11,900 (2006) to 21,000 (2014); Collection efficiency was 92 percent or higher in 2012 to 2014. Access to piped water by the poor is still only 55 percent, but reliably available 22 hours per day, on average.

The HWA still has a long way to go to achieve its vision for clean, affordable, and safe water for every resident of Hargeisa city, but illustrates that, despite a challenging starting point–with the right external support aimed at building core systems and capable management–services can be improved and new approaches introduced.

[41] Doyen, Jean H. 2015. "REGIDESO 2006-2014: Restoring & Expanding Capacity in a Post-Conflict Context." WSP, November; SDE-ERANOVE. 20015. "Rapport Annuel 2014; Contrat de Service." March.

4.3 Key points

Though reform is often sparked by a catalytic event such as a water supply crisis, and driven by utility and political leadership, the key reforms ultimately cannot be driven by outsiders. Development partners could, however, provide initial finance for the turnaround, but their longer term impact is highest when they carefully direct financial and technical support towards bolstering reform and enhancing core systems. Especially in fragile environments, the latter is often an essential aspect of sustainable impact.

A combination of internal competence and motivation, external alliances, and institution-building can shape the institutional changes required to put service providers on track. There are no golden rules or magic bullets–context is the key determinant, demanding that external support and local reform is problem-focused and adaptive. The very notion of 'best practices' seems out of place in such processes–what is needed from local role-players and development partners is creative, adaptive engagements to allow reform progress at a pace that locals are comfortable with, and that ultimately transcends the individual leaders, but getting embedded in locally grown institutions.

While the search for context-independent best practices seems out of place, the good news is that alignment of political economy in support of good water services can occur in a wide range of circumstances, including in:

- Countries with low incomes. Burkina Faso's gross domestic product (GDP) per capita is US$720, and Uganda's is US$677.
- Countries with uncompromising governance environments. When Uganda's reforms started in 1998 the country was still recovering from decades of brutal dictatorship and civil war. Niger ranks 20th in Africa on the World Bank government effectiveness indicator.
- Cities of all sizes, ranging from 150,000 (Nyeri) to more than 3.5 million (Dakar).
- Countries stressed for water resources. Burkina Faso has renewable internal freshwater resources per capita of just 711 m^3, well below the Democratic Republic of the Congo's 12,020 m^3 per capita, for example.
- Cities with rapid population growth. Ouagadougou grew at an average of 7.5 percent per year from 2000 to 2015.

Building stakeholder confidence has been integral to the improvement strategies of all case study utilities – from call centers to deal with complaints and follow ups, to forging alliances with political leaderships, city stakeholders and customer groups. *(Photo Credit: eThekwini Water).*

These cases show that alignment of the political economy of the water sector with service to the poor is possible in a range of contexts. Ouagadougou is perhaps the most impressive case, being a poor, arid city with one of the fastest growth rates in the region. This case provides hope that good service to the poor is possible in cities of all sizes and income levels, and a wide range of endowments in terms of water, financial, and institutional resources.

V. Financing the Extension of Good Service to the Poor

To improve service to the urban poor, utilities in the cases studied had to invest in network expansion and bulk water supply schemes that often cost hundreds of millions of dollars. This section explores two questions: how did these utilities successfully finance improved service, and how could typical utilities in Africa do the same?

5.1 How successful utilities financed improved service to the poor

In the 1990s, water service in four African cities–Nyeri, Kampala, Ouagadougou, and Dakar–looked very different from today.[42] Water was rationed and typically unsafe to drink. In Kampala and Ouagadougou, less than half the city population had access to piped water. Access rates for the poor are unknown, but likely even lower.

Today, these cities are exemplars of good water service to the poor. In Dakar and Nyeri, most poor have access to water piped to the premises (75 percent and 88 percent, respectively). Nearly all the poor not served by direct connections are served by public taps. Water in these cities is available 24 hours a day and is safe to drink. In Kampala and Ouagadougou, most of the poor are able to obtain safe water from public taps. Overall piped water access rates for the poor in these cities are 78 percent and 90 percent, respectively. These service improvements are summarized in Table 5.1.

Delivering quality water service depends on making connections throughout the city. The utilities serving these four cities, plus the utility in eThekwini (Durban), have increased the number of water connections in the city by an average of 93 percent since 2006.[43] Growth in connections–represented as an index with a base year (2006) equal to 100–is shown in Figure 5.1. The number to the right of each line is the value of the index in the most recent year for which data are available.[44]

[42] eThekwini is not analyzed in this section due to unavailability of capital expenditure and financing data.

[43] 2006 was chosen as a base year because it is the earliest year for which data on connections are available for all cities. In all cases, the reform began before 2006.

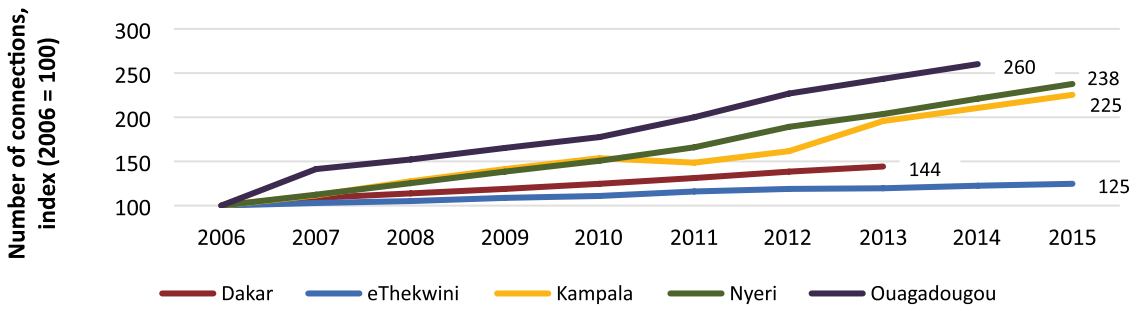
[44] Subtracting 100 from this number gives the percentage growth in connections since 2006.

TABLE 5.1: IMPROVED WATER SUPPLY SERVICE TO THE POOR

City	Situation in the 1990s	Situation today
Nyeri	• Water rationed and unreliable • Unsafe to drink • Utility did not serve informal settlements on steep slopes surrounding urban periphery	• 88% of the poor have access to piped water to the premise, and 2% use public taps • Water is available 24 hours a day and is safe to drink
Kampala	• Less than half the city population had access to piped water (1998)	• 78% of the poor have piped water
Dakar	• Water shortage • 20% had no access to piped water at all, while others relied on standpipes	• 75% of poor have water piped to their premises, with a further 22% accessing standpipes
Ouagadougou	• Water shortage • Half the population had access to piped water (2000)	• 90% of the poor have piped water

Source: Household surveys (see Table D.1 for list of sources).

FIGURE 5.1: GROWTH IN WATER CONNECTIONS IN CASE STUDY CITIES

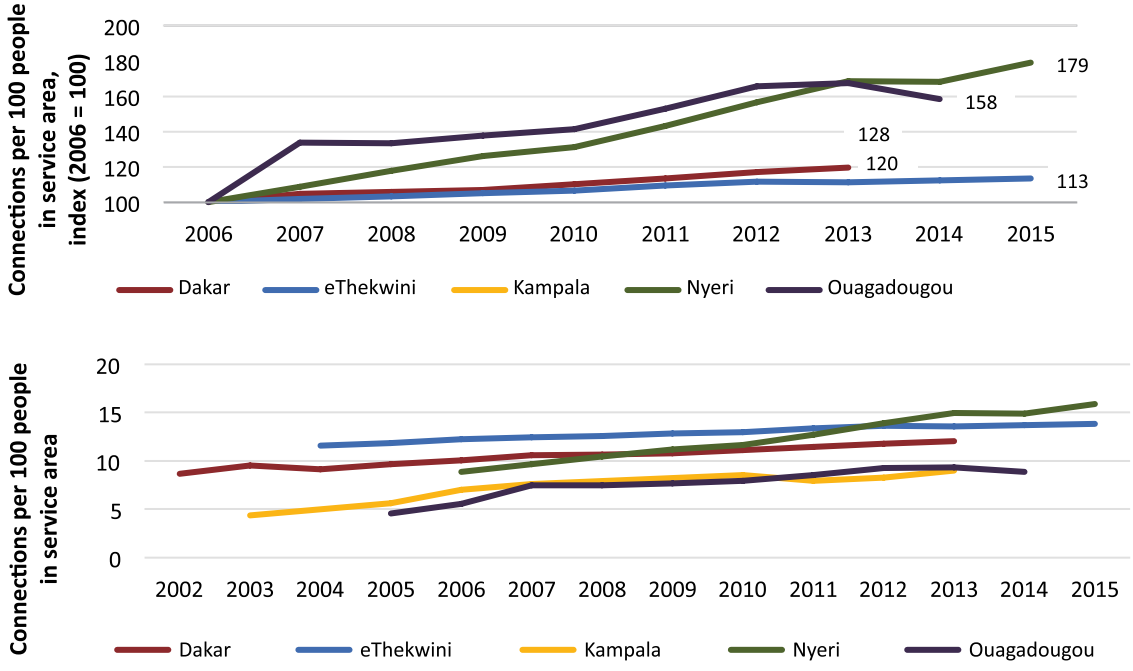


Source: Utility research (see Table D.2 for full list of sources).

These utilities expanded connections in their cities at rates faster than population growth. This can be measured by connection density, the number of connections per 100 people in the city. These five utilities have increased the number of water connections per 100 people in the city by an average of 40 percent since 2006, as shown in Figure 5.2. For context, the change in the absolute number of connections per 100 people in the city is shown as well.

In addition to expanding access, most of the cities invested heavily in increasing bulk water supply and treatment.

FIGURE 5.2: GROWTH IN CONNECTION DENSITY (CONNECTIONS PER 100 PEOPLE IN CITY)



Source: Utility research (see Table D.2 for full list of sources).

Financing solutions implemented

How did these utilities finance such service improvements? In every case, the utilities were on-lent donor finance on concessional terms, with low interest rate and long grace periods. The loans were primarily repaid with operating cash, generated by improving operating efficiency (thus minimizing costs) and expanding access (thus increasing revenue). Some of the finance was given as an equity contribution or another form of grant. Table 5.2 shows the sources and amounts of capital expenditure financing for four utilities: NWSC (Kampala), NYEWASCO (Nyeri), ONEA (Ouagadougou), and SDE/SONES (Dakar).[45]

NYEWASCO

For NYEWASCO to increase access and improve service, KShs 1.2 billion (US$19 million) in capital expenditure was required from 2005 to 2014. Capital expenditure for network expansions and other major projects was primarily financed by loans, grants, and net cash from operating activities, as shown in Figure 5.3.

[45] The NWSC, ONEA, and SDE/SONES are national utilities. The figures presented in the table are for the entire service area, not just the city of interest.

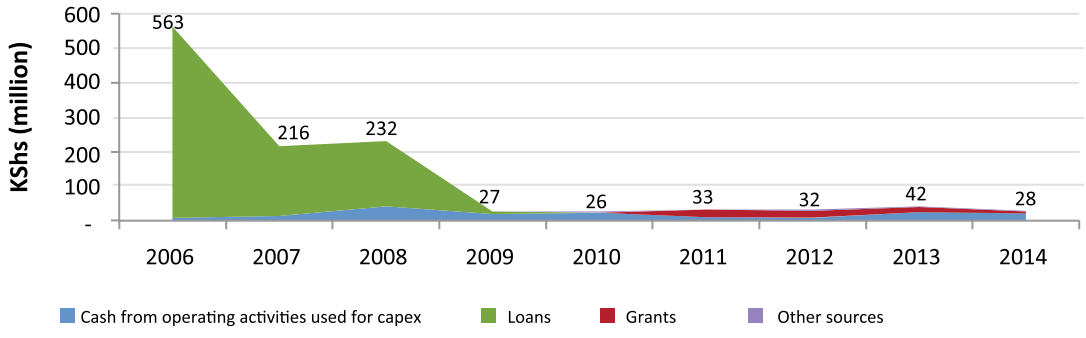
TABLE 5.2: SOURCES AND AMOUNTS OF CAPITAL INVESTMENT FINANCING

Utility (years)	Estimated total capital investment (US$ million)	Capital investment per person served per year (US$/ person/year)	Percent grant-financed	Percent financed by internal cash flow	Percent financed by loans
NYEWASCO (2005–2014)	19	22	5%	14%	80%
NWSC (2002–2011)	97	4	28%	52%	16%
ONEA (2002–2013)	600	23	52%	10%	29%
SDE/SONES (1996–2013)	770	10	29%	23%	47%

Notes:
For the NWSC, total capital expenditure was estimated using cash flow statements. Cash outflow was summed from the following financing activities: Capital Work-in-Progress; Purchase of Property, Plant and Equipment; and Purchase of Computer Software. For ONEA and SDE/SONES, investment data were provided by the World Bank.
Totals for the NWSC, ONEA, and SDE/SONES are for the entire service area, not solely the city of focus.

Source: Utility research (see Table D.2 for full list of sources).

FIGURE 5.3: SOURCES AND AMOUNTS OF CAPITAL EXPENDITURE FINANCING (KSHS BILLION)



Notes:
All amounts in nominal Kenyan Shillings (KSh).

The 2008 financial year was 18 months long, running from January 2007 to Jun 2008. For this reason, 2007 does not appear in the graph above. (Prior to 2007, NYEWASCO's financial year ran from January to December.)

Source: NYEWASCO Financial Statements.

From 2005 to 2008, NYEWASCO financed 94 percent of total capital expenditure through a KShs1.1 billion (US$18.2 million) loan from the KfW for network rehabilitation and extension. The loan was facilitated by the Government of Kenya, which borrowed in Euros, and on-lent to NYEWASCO in Kenyan Shillings. The other loan terms were an interest rate of 2.5 percent, a tenor of 30 years, and a grace period of eight years. The loan financed a new production facility and network expansion, as well as rehabilitation and equipment for leak detection and repair. Following that, from 2009 to 2014, 57 percent of capital expenditure was financed through cash from operating activities (US$2.4 million). Another 33 percent was financed through grants from the Water Services Trust Fund (US$0.7 million).

At the same time, NYEWASCO paid more than US$3.6 million (in 2014 real terms) in debt service payments from 2010 to 2014. Cash from operations (at US$6.0 million in 2014 real terms) was sufficient to service the debt and contribute to other capital projects. Figure 5.4 shows the net cash from operations compared to debt service payments.

To service the debt, and to finance additional capital expenditure, NYEWASCO improved operating cash flow through greater efficiency. To improve efficiency, NRW was reduced from 42 percent in 2006 to 19 percent in 2014. During the same period, staff costs as a percentage of revenue fell from 44 percent to 31 percent, in part due to increased labor productivity–there were just three staff per 1,000 connections by 2014. Meanwhile, the collection ratio stayed high at around 100 percent.

TABLE 5.3: SUMMARY OF EFFICIENCY INDICATORS, NYEWASCO

Indicator	2006	2014
Collection efficiency	98%	100%
Staff productivity*	9	3
Nonrevenue water	42%	19%

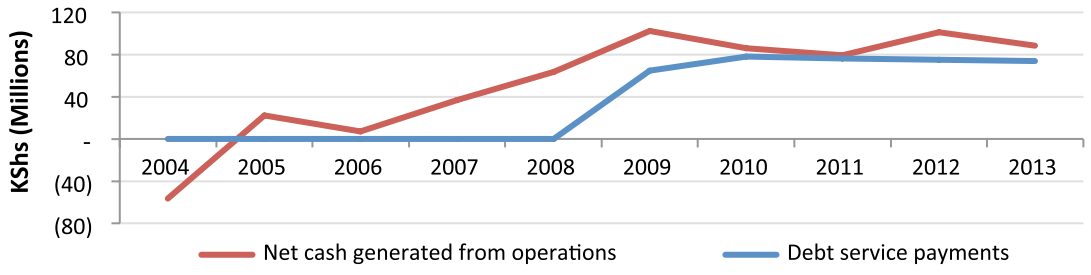
* Staff per 1,000 connections.

Source: Utility research (see Table D.2 for full list of sources).

NYEWASCO maintained a high collection rate through continued collection of long over-due arrears, as well as rigorous collection of current bills. To collect from government customers, NYEWASCO makes a point of knowing when government customers will receive cash from the budget, and follows up on payment at that time. To ensure collections from the police compound, NYEWASCO strategically re-laid pipes so that the compound could be cut off for nonpayment from within the utility headquarters. This innovative approach stopped the harassment of utility staff that had previously prevented it from enforcing payment.

In addition, increased sales, due to expansion and a major bulk water supply project, also helped increase operating cash. From 2006 to 2009, water production increased from an average of 10.2 MLD (3.7 million m^3/year) to an average of 14.3 MLD (5.2 million m^3/year)–an average increase of 12 percent per year. During the same period, active water connections increased from 9,863 to 13,661–an average

FIGURE 5.4: CAPITAL EXPENDITURE FINANCING AND DEBT SERVICE PAYMENTS



Source: NYEWASCO Financial Statements.

increase of 11 percent per year. This led to a 50 percent increase in the volume of water sold during the period.

NWSC

For the NWSC to increase access and improve service in Kampala and in other cities, more than UShs171 billion (US$97 million) of capital expenditure was required from 2002 to 2011. While approximately 28 percent was grant-financed, 52 percent was financed by internal cash flow and 16 percent from loans. A small portion was financed by other sources–this includes cash from nonoperating activities, such as proceeds from disposal of property, plant, and equipment. The NWSC's sources of finance are depicted in Figure 5.5.

Early in this period, the NWSC had debts to the government that it could not service. The government agreed to a moratorium on debt service for a period–then, in 2007, the government converted all outstanding loans from development partners (UShs 85 billion, or US$47 million) into equity.

Since then, the NWSC has borrowed from commercial banks and is repaying loans from operating cash flow. For instance, in 2010, a commercial loan of US$2 million was obtained for financing the extension of the Ggaba intake plant, which supplies water to Kampala city and the surrounding areas. This loan is being serviced from operating cash flow.

Increasing operating cash flow was key to achieving expansion in service. The NWSC increased collection efficiency (from 85 percent in 2001 to 95 percent in 2011), reduced NRW (from 43 percent in 2001 to 33 percent in 2011), and increased labor productivity by limiting staff growth as connections increased (see Table 5.4). Real tariffs increased at a modest 3 percent per year. Together, these factors provided the operating cash surplus used to finance investment and repay debt.

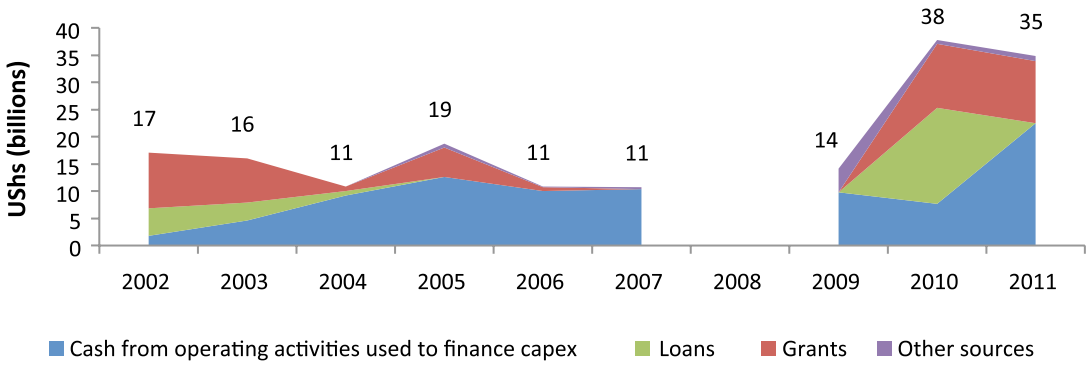
TABLE 5.4: SUMMARY OF EFFICIENCY INDICATORS, NWSC

Indicator	2001	2011
Collection efficiency	85%	95%
Staff productivity*	16	6
Nonrevenue water	43%	35%

* Staff per 1,000 connections.

Source: Utility research (see Table D.2 for full list of sources).

FIGURE 5.5: SOURCES AND AMOUNTS OF CAPITAL EXPENDITURE FINANCING (USHS BILLION)



Notes:
All values are in nominal Ugandan shillings (UShs). The exchange rate in 2011 was UShs2,340 to US$1. Data were unavailable for 2008 so capital expenditure for that year is not included in the total.

Source: NWSC Financial Statements.

ONEA

For ONEA to increase access and improve service in Ouagadougou and other cities, investment totaling about US$600 million was required from 2002 to 2013.[46] While approximately 52 percent was grant-financed, 19 percent was financed by own cash and 29 percent from loans. ONEA can service its debt from its operating cash flows. Figure 5.6 shows the sources and amounts of investment financing during this period.

Among the most important initiatives was the Ouagadougou Water Supply Project (US$269 million, 2001–2007). The World Bank lent US$70 million to the Government of Burkina Faso. US$28 million was on-lent to ONEA, and the remaining US$42 million was given as an equity contribution. The interest rate was 5.4 percent and the tenor was 20 years (including a 10-year grace period).[47] Other development partners provided the remaining finance, also via loans to the government.

The program included construction of the Ziga dam, Boudtenga reservoir (5,400 m^3), a water treatment plant and pumping station, and extension of the distribution network. Increased water production led to near perfect water supply reliability (23 hours per day).

Operating cash flow was key to the expansion, allowing ONEA to service the debt, and to invest directly. Forty-eight percent of capital expenditure was funded directly or indirectly, from free cash from operations. Drivers of increased cash flow included: increasing collection efficiency (78 percent in 2002 to 97 percent in 2013), maintaining low levels of NRW (around 18 percent), and increasing labor productivity (from eight staff per 1,000 connections to three staff per 1,000 connections) by limiting staff growth as connections increased. A contract with Veolia (a specialized water operator) to help manage the utility's commercial function was useful in achieving some of these improvements.

SDE/SONES

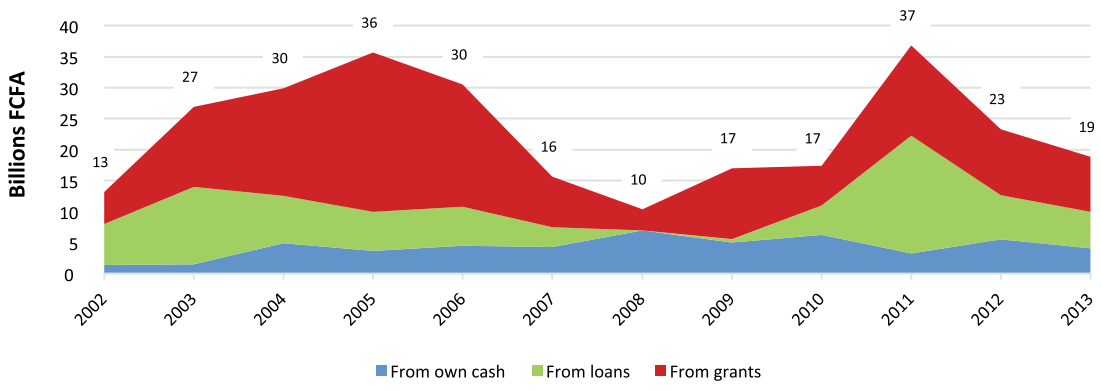
For the SDE and SONES to increase access and improve service in Dakar and other cities, investment totaling about US$770 million was required from 1996 to 2013.[48] This amounts to about US$10 per person served per year. Figure 5.7 shows the sources and amounts of investment financing during this period. While approximately 29 percent was grant-financed, 23 percent was financed by own cash and 47 percent from loans from development partners. The loans from development partners are repaid from tariff revenue, which is allocated to SONES for this purpose.

[46] Figure quoted in 2013 dollars.

[47] World Bank. 2001. "Project Appraisal Document, Ouagadougou Water Supply Project," (2001): 12.

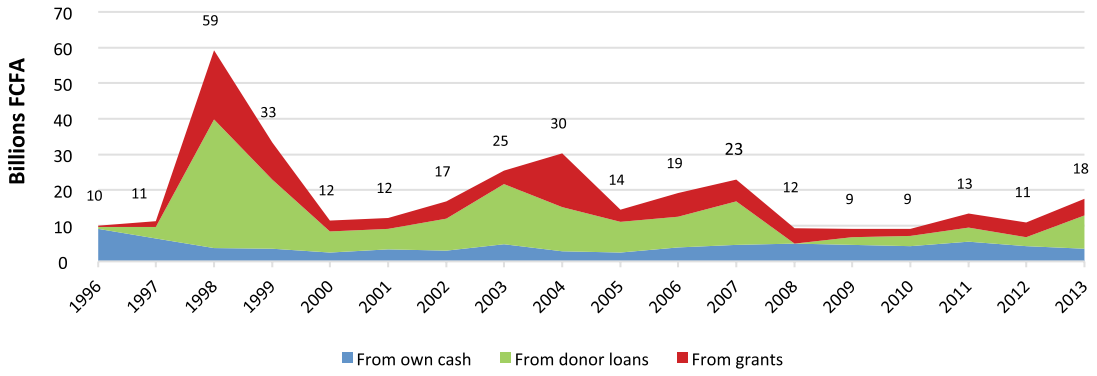
[48] Figure quoted in 2013 dollars.

FIGURE 5.6: SOURCES AND AMOUNTS OF INVESTMENT, ONEA



Source: Utility research (see Table D.2 for full list of sources)

FIGURE 5.7: SOURCES AND AMOUNTS OF CAPITAL EXPENDITURE FINANCING, SDE/SONES



Source: Utility research (see Table D.2 for full list of sources).

Two major programs implemented during this period were the Senegal Water Project (US$223 million, 1996–2004) and the Long-Term Water Project (US$255 million, 2002–2009).[49] The World Bank was a financier for both projects, providing US$85 million and US$146 million respectively, with interest rates around 6 percent and tenors of 20 years (including five-year grace periods).[50]

The Senegal Water Project financed urgent work to increase water supply in Dakar, including boreholes, expansion of a treatment plant, and leakage reduction. A private operator was brought in through this project as well. Signing a PPP contract satisfactory to the World Bank was a condition of the World Bank loan. The Long-Term Water Project financed the Keur Momar Sarr water treatment plant (in 2005, 65,000 m^3/d; upgraded in 2008 to 130,000 m^3/d) along with a continued expansion in the distribution network.

US$231 MILLION

Financing from the World Bank towards the implementation of the Senegal Water Project (US$223 million, 1996–2004) and the Long-Term Water Project (US$255 million, 2002–2009), providing US$85 million and US$146 million respectively.

[49] World Bank, Implementation Completion Report, Senegal Water Project; World Bank, Implementation Completion Report, Long Term Water Project. Note: These projects included sanitation components which is overseen by ONAS, not SDE or SONES.

[50] World Bank, Staff Appraisal Report, Senegal Water Project, p. iv; World Bank, Project Appraisal Document: Long Term Water Project, 20.

Strategies for improving operating cash flow

Generating operating cash allowed utilities to repay the loans that financed network expansion and service improvement. A small portion of operating cash also directly financed investment. **Operating cash flow** is defined as the net cash generated from normal business operations. There are three main ways to increase operating cash flow:

- Improving operating efficiency, in particular by increasing the collection ratio and reducing NRW (particularly commercial losses).
- Expanding access, thus increasing sales and therefore revenue.
- Raising real tariffs, thus increasing revenue.

It is important to note that expanding access and raising tariffs alone may not lead to positive operating cash flow. Operating efficiency is also important. For instance, if a utility has a collection ratio of just 80 percent, 20 percent of earned revenue is not collected as cash. If this utility could improve its collection ratio to 95 percent, even without any increase in total revenue, cash collected would increase by 18.75 percent.[51]

How the utilities increased operating cash in practice is shown in Table 5.5. For the NWSC and ONEA, increasing collection ratios were particularly important.

[51] 15 percent divided by 80 percent equals 18.75 percent.

TABLE 5.5: STRATEGIES FOR IMPROVING OPERATING CASH FLOW

Utility	Increase in collection ratio	Decrease in NRW	Annual increase in connections	Annual change in real average tariffs
NYEWASCO	98% to 100% (2006 to 2014)	42% to 19% (2006 to 2014)	10% (2006 to 2014)	-8% (2010 to 2014)
NWSC	85% to 95% (2001 to 2011)	43% to 35% (2001 to 2011)	15% (2001 to 2011)	+3% (2002 to 2009) -1% (2009 to 2011)
ONEA	78% to 97% (2002 to 2013)	Averaged 17% (2002 to 2013)	15% (2002 to 2013)	-2% (2005 to 2013)
SDE/SONES	Averaged 97% (1996 to 2013)	30% to 20% (1996 to 2013)	6% (1996 to 2013)	+2% (1997 to 2009) -1% (2009 to 2013)

Source: Utility research (see Table D.2 for full list of sources)

At NYEWASCO and SDE/SONES, collection ratios were always quite high–these utilities maintained their high collection ratios and focused on significantly reducing NRW. All four utilities increased total connections at impressive rates–notably, for more than a decade, both the NWSC and ONEA achieved annual average increases of 15 percent.

Real tariff increases, if any, were moderate. The NWSC had the highest average annual real tariff increase (3 percent per year during the 2002 to 2009 period). From 1997 to 2009, the SDE's real average tariffs increased by about 2 percent per year. In recent years, real average tariffs have actually fallen at all four utilities. This comparison shows that, while strategies differed slightly from utility to utility, improving operating efficiency and expanding access (by using loan money) helped improve operating cash flow. Real average tariff increases were not always necessary.[52]

5.2 How typical utilities could finance improved service to the poor

Four cities with good service to the poor–Nyeri, Ouagadougou, Kampala, and Dakar–broadly used similar financing strategies. Concessional loans, along with some grants, financed most capital expenditure early on. By improving operating efficiency and increasing sales, utilities generated the cash needed to service the debt. Over time, free operating cash also directly financed new capital expenditure and allowed additional borrowing.

[52] Adequate tariffs are critical for good service provision, as discussion in Section 6.

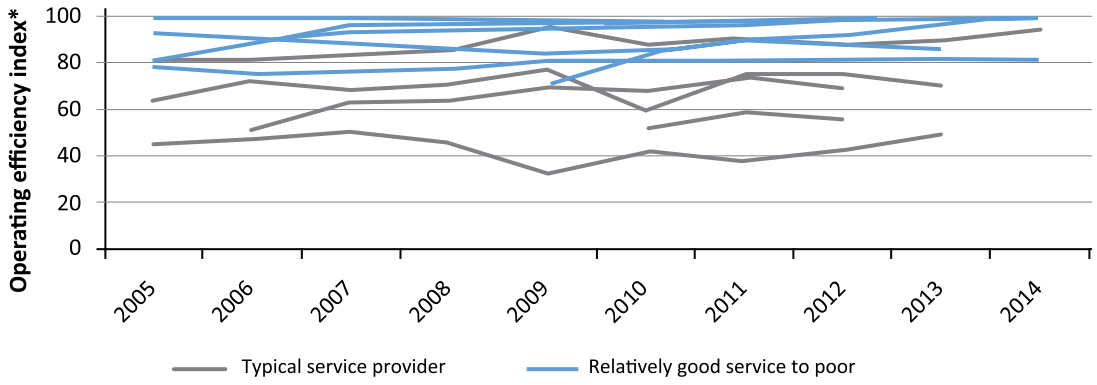
Figure 5.8 compares the operating efficiency of 11 utilities (six with relatively good service and five with typical service, selected based on data availability). The figure shows that the utilities in cities with relatively good service to the poor (represented by blue trend lines) are more efficient than the utilities in cities with typical service to the poor (represented by gray trend lines).

Comparing longitudinal trends in connectedness (connections per 100 people in city) among utilities results in a similar finding (see Figure 5.9). Utilities in cities with relatively good service to the poor have higher connectedness than utilities in cities with typical service to the poor. As shown in the previous section, expansion of access in the relatively good cities has certainly contributed to improved operating cash flow.

This comparison raises the question of whether the typical African cities could finance improved service to the poor by adopting similar strategies. To test this proposition, the research team analyzed whether Mombasa would be able to improve service to the poor using a financing strategy based largely on loans serviced from operating cash flow.

For Mombasa Water Supply and Sanitation Company (MOWASCO) to increase access to 100 percent by 2030, while ensuring adequacy of supply, more than US$1.0 billion in capital expenditures would be required. MOWASCO is currently not financially viable. Reasons for this poor financial performance include low collection rates (80 percent in 2014), high NRW (52 percent from 2013 to

FIGURE 5.8: COMPARISON OF UTILITY OPERATING EFFICIENCY



* Weighted average of NRW, staff productivity, and collection ratio indices.

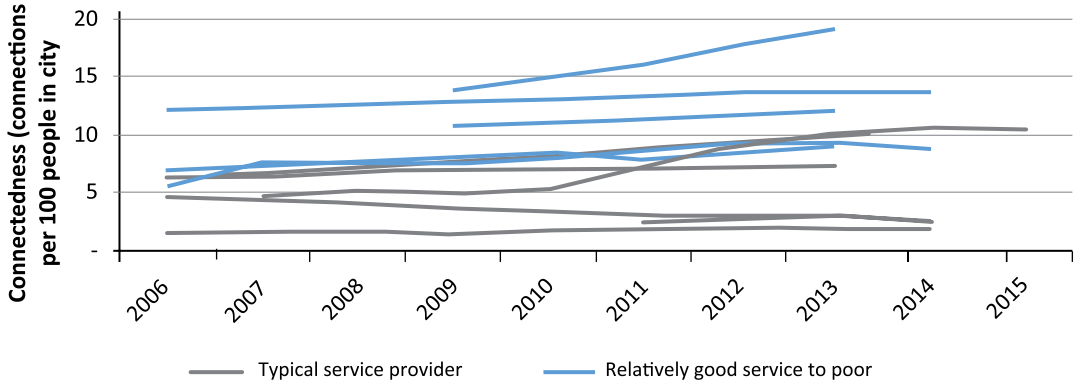
Source: Utility research (see Table D.2 for full list of sources).

2015), and not supplying enough water to meet demand. Despite this, MOWASCO *could* finance the US$1.0 billion needed to reach full coverage by:

- Progressively increasing collection efficiency to 96 percent by 2025.
- Progressively reducing NRW to 25 percent by 2030.
- Cutting operating expenses per m3 supplied by 10 percent by 2025.
- Increasing tariffs by just 1.5 percent per annum in real terms.
- Borrowing a total of US$1 billion at an interest rate of 0.75 percent, with a 10-year grace period, and a loan tenor of 30 years.

As Table 5.6 shows, these improvements are all within the range achieved by other Sub-Saharan African water utilities.

FIGURE 5.9: COMPARISON OF UTILITY CONNECTEDNESS (CONNECTIONS PER 100 PEOPLE IN CITY)



Source: Utility research (see Table D.2 for full list of sources).

TABLE 5.6: PERFORMANCE OF SUCCESSFUL UTILITIES

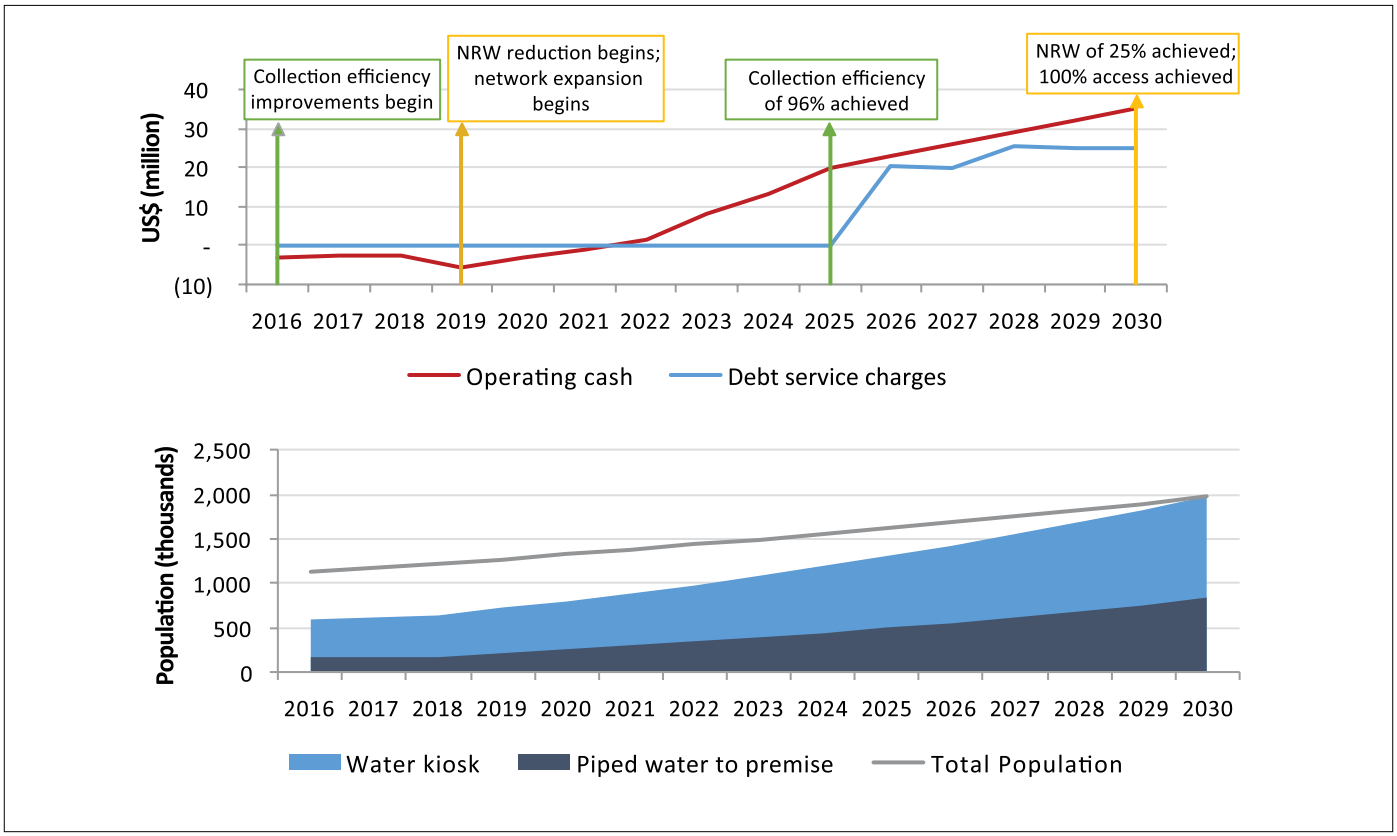
Utility	Country	Collection ratio	NRW	Decrease in real opex/m³ supplied
SEEN	Niger	100%	16%	17% (2005–2014)
Nyeri	Kenya	100%	18%	11% (2005–2014)
ONEA	Burkina Faso	96% (avg)	17%	2% (2005–2013)
SDE	Senegal	97% (avg)	20%	-
MOWASCO assumptions for financing		**96%**	**25%**	**10% (2015–2025)**

Source: Full list of sources for utility data included in Appendix B.2.

Figure 5.10 shows the free cash from operations that MOWASCO could generate if these performance levels were reached. This would be sufficient to service the debt taken on to make the investment. The projected improvement in service is also depicted in Figure 5.10.

What does this analysis of MOWASCO tell us? It does not say that Mombasa will soon solve its water supply problems. That depends on political economy in Mombasa County, and management effectiveness in MOWASCO. It certainly does not prove that all cities in Africa can self-finance the provision of universal access to quality water services. What it does do is provide the hope that, if the financial techniques that worked in the five case study cities are deployed in other cities in Africa, there is a reasonable prospect of extending service to the poor. Mombasa was not selected for analysis because it is a particularly easy case. On the contrary, providing water service in Mombasa

FIGURE 5.10: A FINANCING STRATEGY FOR UNIVERSAL ACCESS



is challenging. Given the city's massive service problems and investment needs, the analysis might have shown that massive public subsidies are needed if universal, affordable water supply is to be provided. That the financial analysis did not show this is some evidence that what worked financially in five African cities can be extended to other cities in Africa.

5.3 Key points

The water supply networks and production facilities in African cities need substantial investments, both for new infrastructure and for the upgrading of existing facilities. A combination of grants and concessional loans have assisted utilities that have reached the poor, but the utilities have also worked hard at improving operating efficiency, especially reducing NRW, improving productivity, and increasing collection rates. This made them able to raise new revenue, thereby more operating cash, and enabling them to pay back loans and finance more capital investment.

There is a perceived trade-off between cost recovery and affordability, but the case studies show that this is not inevitable. Utilities in the case studies have helped lower the cost of connections through lower tariffs for the poor, or by enabling customers to pay back connection costs over time. New technologies like cellphone meter readings and payments, and the introduction of prepaid meters have also opened ways for poor households to spread out water payments into affordable portions. The net result has been that investment needs and operational costs have been proven not to be inevitably prohibitive to extending and improving services to poor people.

This does not mean that serving the poor is profitable for utilities. As the next section describes, many utilities charge people less than the average cost of service. At the extreme, eThekwini provides enough water to meet basic needs for free for poor people. Nevertheless, all five of the case study utilities have found ways to be profitable at the utility level, even if they supply services to poor people at below cost.

In summary, in the five cities studied, extension of access to the poor was made possible, and affordable, through the following strategies:

- Generating positive free cash from operations, through a combination of ensuring cost-effectiveness and adequate tariffs. Cost-effectiveness was achieved in large part by limiting NRW, collecting bills effectively, and boosting labor productivity. Adequate tariffs are those which generate enough revenue–across all customer classes–to fully cover operating and maintenance costs and generate a surplus for investment. The operating surplus was typically in the 20 percent to 40 percent range.
- Ensuring affordability for poor people through service and tariff offerings specifically designed to meet their needs (these are discussed in detail in the following section).
- Using the free cash generated from operations to fund infrastructure investment. This was done by taking out loans which could be serviced with the cash from operations, and direct investment of the cash left after debt service into additional infrastructure. Across the cases, the share of infrastructure investment financed from operating cash-flows ranged from 10 percent to about 50 percent of the total, and from US$2.4 million in Nyeri to US$180 million in Dakar.
- Taking advantage of grants from the national government for capital investment, to cover infrastructure investment that could not be financed from operating cash flow. These grants were typically higher at the start of the reform, and tapered off as the utility generated free cash. Grants as a share of total capital expenditure ranged from 5 percent in Nyeri to about 50 percent in Ouagadougou

The big question is whether similar strategies can work in other African cities. An analysis of Mombasa shows that at least one African city with severe water access problems could achieve universal access if it adopted the techniques described above. For other cities, the answer will vary. Some cities may able to achieve universal access entirely from their own resources. These will typically be cities endowed with higher income levels, and utility networks that are already relatively extensive. The poorest cities with the greatest needs may need grants if they are to achieve widespread affordable access quickly–just as Ouagadougou did. It is safe to say, though, that the financial techniques used in the five case studies will always help to extend access faster, and sustain it longer, for any given level of grant provision.

VI. Practical Techniques to Achieve Widespread and Affordable Access

The previous sections highlighted that financing network expansion is within the grasp of many African cities, political economy acumen or enabling environments can open opportunities to serve the poor, and there is a suit of technical possibilities to extend services. They also show that serving the poor is unlikely if it merely an addition to a utility–instead it becomes more likely that utilities will be able to serve poor people better if they are well-managed utilities more generally. Not only does being a good utility bring financial and technical capacity, but it also may open the scope for taking risks and innovating. The discussion here continues to focus on the case study utilities, but it also shows with a few references encouraging examples of other utilities grappling with, and innovating to improve, services.

However, even when these bigger issues seem resolved, service providers often need to overcome many other barriers the poor face in accessing water. This section examines the practical techniques that the case study cities and utilities used to achieve widespread, affordable access.

6.1 Techniques to overcome financial barriers to access

It is often assumed that there is a trade-off between cost recovery and affordable service. If utilities can generate the operating cash needed to finance investment, it is expected that tariffs must be high–perhaps prohibitively so. There is a logic to this. Utilities need to recover their operating costs and some of their capital costs if they are to finance expansion and improvement of service to the poor. However, the poor often cannot afford to pay a typical cost recovery tariff or a standard utility connection fee. These become financial barriers to access.

Nevertheless, in the cities where access for the poor is relatively good, utilities have managed to combine cost-recovery with affordability. Indeed, their strategy has been to use cost recovery to finance the infrastructure that provides access, while using other strategies to ensure affordability for the poor. This section reviews some of the strategies that allowed these cities to transcend the trade-off between affordability and financing access.

To provide convenient access for poor customers, some utilities focus on water piped to the premises, while others at least endeavor locating public taps near where people live, and ensuring that the unit price of water is affordable.
(Photo Credit: ONEA, Ouagadougou, Burkina Faso).

6.1.1 Affordability of access connections

The first financial barrier to address is the connection charge. NYEWASCO has kept connection costs down for low income consumers. Currently, a low income family needs to pay KShs 3,100 (about US$35) to get a connection. Of this payment, KShs 2,000 is a deposit. Recognizing that even this level of upfront payment is a barrier, NYEWASCO has decided to reduce the deposit to KShs 1,500. Other utilities in Kenya, such as Nairobi, have followed similar approaches, and although it is too early to measure the results, this shows an openness to learn as service providers across Kenya struggle to deal with the demands of urbanization and informal settlements.

In Kampala, the NWSC has operated an Affordable Connections Policy since 2004. Connection fees were reduced from US$75 to US$35. Moreover, the NWSC took on responsibility for making a service connection of up to 50 meters from the NWSC supply point. The NWSC also maintains the service line, up to the meter on the customer's premises.

With the help of development partners, SONES provided more than 200,000 social connections since 1996–most of these were located in Dakar.[53] The connection costs for poor households are subsidized by the water rates, and amounts to just over 20 percent (US$31) of the actual cost of a connection. Subsidizing connections enables beneficiaries to benefit from a higher quality and quantity of water services, which the authorities see as pivotal to improving public health in peri-urban neighborhoods where many poor people reside.

ONEA has also implemented social connection policies, and furthermore pays for the construction materials in informal settlements (see Section 6.2.2).

This said, most poor people in Africa access water from public taps (see Figure 3.1). There is no "connection charge" to access a public tap, but time spent collecting water (which could be used for other purposes) is often a prohibiting factor.

[53] World Bank. 2011. 'Water Supply and Sanitation in Senegal: Turning Finance into Services for 2015 and Beyond.' World Bank (2011): 22. Accessed April 28, 2016, https://www.wsp.org/sites/wsp.org/files/publications/CSO-senegal.pdf.

Utilities need to build these taps near where people live, and ensure the unit price charged is affordable. Niamey, where 78 percent of the poor access water through a public tap, is doing well to ensure that standpipes are built near the poor. The average roundtrip time to collect water for the poor is just 12 minutes (see Figure 3.4). Kampala, where 71 percent of the poor access water through a public tap, is still working on enabling convenient access. The average roundtrip time is 21 minutes. The NWSC is addressing this by providing more water kiosks in more areas, providing more connections to the premise in poor areas, and charging the 'kiosk' water rate to individual customers whose connections serve multiple households.

6.1.2 Ensuring affordability of on-going service

Once connected to the network, or conveniently able to access a public tap, the poor worry about paying for on-going service. In many African cities, incomes of poor families are not sufficient to pay for a basic needs quantity of water at average cost. In addition, from a cash management perspective, paying a full month's water bill at once is challenging, especially if consumption is higher than expected. Moreover, customers know the consequences of nonpayment are high–disconnection itself comes with additional costs. Even once the debt is paid, a reconnection fee is often charged before service can resume.

To ensure affordability of on-going service for the poor, utilities have adopted many strategies. Some sell a basic needs quantity of water at a below average tariff, and sell water above the 'basic needs' quantity at an above average tariff (known as a progressive or rising block tariff structure). They also cross-subsidize nonresidential consumption, by charging nonresidential customers more than residential customers. Some have implemented innovative billing and payment systems to help customers manage their cash flow. Others offer volume restricted connections, to allow households to monitor consumption during the month.

Progressive tariffs for residential, piped to premise connections

Under a progressive–or 'rising block'–tariff structure, a monthly 'basic needs' quantity of water is sold at a low tariff. The equity objective is to provide affordable water to low-volume customers, who are typically poor.

However, it has been questioned whether rising block tariffs actually achieve this objective in practice. Often, consumption at the lowest block is cross-subsidized for *all* customers, not solely the poor.[54] In cities where the poor do not have water piped to the premises at all–due to limited network expansion or high connection charges–solely the well-off benefit.[55] These issues highlight how rising block tariffs are often misused, failing to benefit the poor.

In the cities where service for the poor is good, however, the utilities have used rising block relatively tariffs well. eThekwini, for instance, offers the initial block of free water only to poor households. In Dakar, 75 percent of the poor have access to piped water to premise, and consume low quantities–likely to ensure their consumption falls within the lowest block. The same logic applies for Nyeri, where 88 percent of the poor have access to piped water to premise. Residential tariff structures for eThekwini and SDE/SONES (Dakar) are depicted in Figure 6.1. Additional information about the strategies they use follows.

[54] Banerjee, Sudeshna, Vivien Foster, Yvonne Ying, Heather Skilling, and Quentin Wodon. 2010. "Cost Recovery, Equity, and Efficiency in Water Tariffs: Evidence from African Utilities," World Bank.

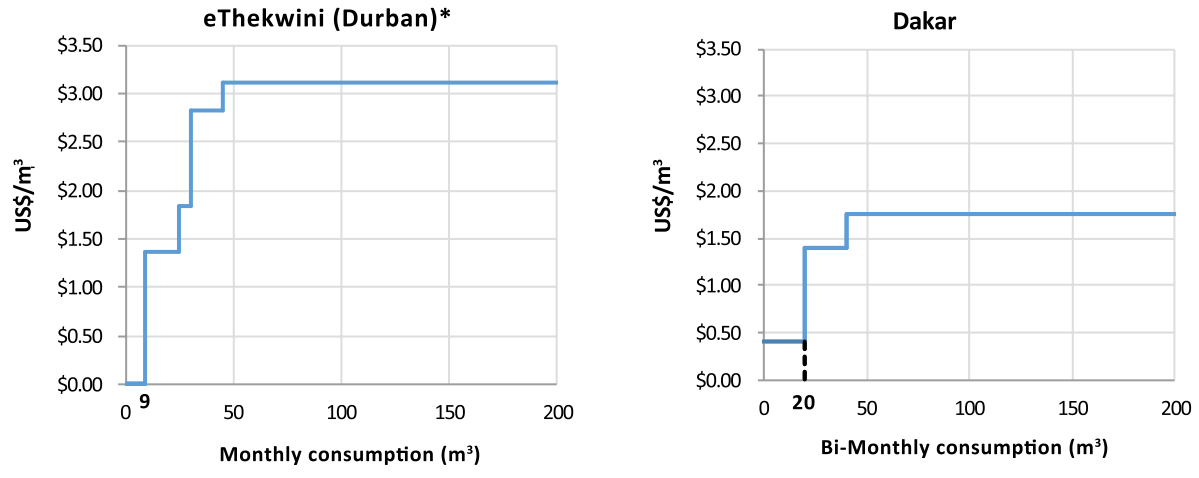
[55] Komives, Kristin, Vivien Foster, Jonathan Halpern, and Quentin Wodon, 2005. *Water, electricity, and the poor: who benefits from utility subsidies?* World Bank.

Figure 6.1 shows the SDE subsidizes consumption at low amounts by charging much higher tariffs for what it deems to be excessive consumption. Senegal's increasing block tariff structure has a subsidized social tariff for consumption below 20 m^3 (FCFA202, or US$0.40) per bimester.[56] There is also a regular tariff for consumption from 21 m^3 to 40 m^3 (FCFA697.97, or US$1.39), and a "dissuasive" tariff for consumption above 40 m^3 (FCFA878.35, or US$1.75). The dissuasive tariff is designed to deter excessive water use. It can be seen that the social tariff is less than a third of the regular tariff, and less than a quarter of the dissuasive tariff. Only the social tariff–and the standpipe tariff (FCFA366, or US$0.73)–are below the average tariff (FCFA494, or US$1.08).

eThekwini also employs a rising block tariff, with a number of distinctive features. Most notably, the first block of water is free, in accordance with South Africa's 'free basic water' policy. When eThekwini introduced the policy, the free amount was set at 6 m^3 per month per household. After residents of poor communities made it known that this was not enough to meet basic needs, the amount was increased to 9 m^3 per month per household.

[56] Every two months

FIGURE 6.1: COMPARISON OF PROGRESSIVE TARIFF STRUCTURES (ETHEKWINI, SDE/SONES)



* First block applies to households whose dwelling has a capital value of less than 250,000 Rand (US$20,500).

Sources: eThekwini Water and Sanitation, 'Water Tariffs 2015/2016'; SONES.

In South Africa, the cost of providing this free water allowance is partially supported by a national government unconditional grant indexed to local poverty levels. However, the grant does not cover the full cost. To limit the financial burden on the municipality, the municipality provides free water only to households whose dwelling has a capital value of less than ZAR250,000 (about US$20,500), or whose houses are built of materials that indicate poverty. This innovative combination of an initial low cost or free block, with targeting, improves the utility's ability to finance investment, since it avoids subsidizing middle class and wealthy households. Households with property values greater than ZAR250,000 pay US$1.16/$m^3$ for the first 9 m^3/month.

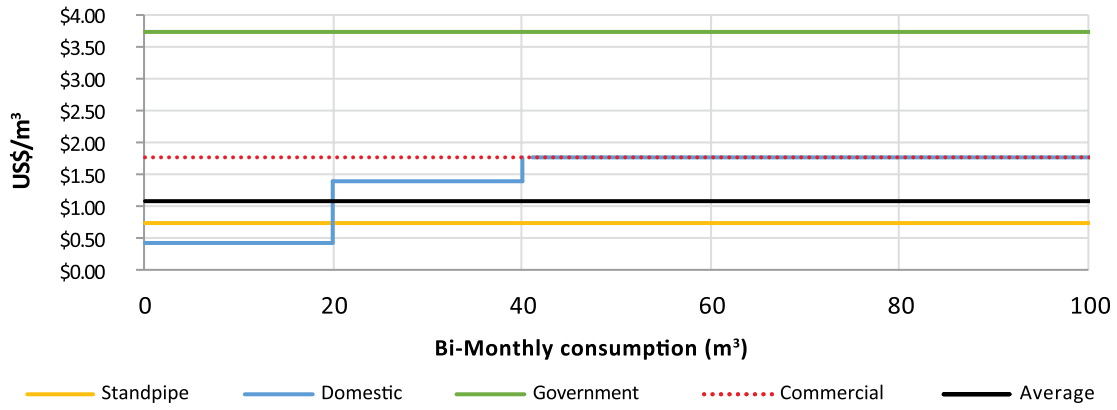
Cross-subsidized tariffs for residential customers

Another way to achieve sustainable cost recovery, while ensuring affordability, is to charge more for water to those customer categories that are better able to pay. Such cross-subsidies between customer classes have been important to Dakar and Kampala's ability to finance service expansion while maintaining affordability. The SDE/SONES charges commercial customers a high tariff of FCFA878.35 (US$1.75). This is higher than the first two blocks of residential tariff, and equal to the highest block of the residential tariff.

Government customers pay even more–their tariff is FCFA1,868.88/m^3 (US$3.72/$m^3$). The high tariff for government was introduced in 2007 as a way to keep residential tariffs stable while ensuring cost recovery for the utility. The relatively high tariffs charged to commercial and government customers allow the lower blocks of the residential tariff to be maintained at affordable levels. This also enables the standpipe tariff, which is kept low to promote affordability.

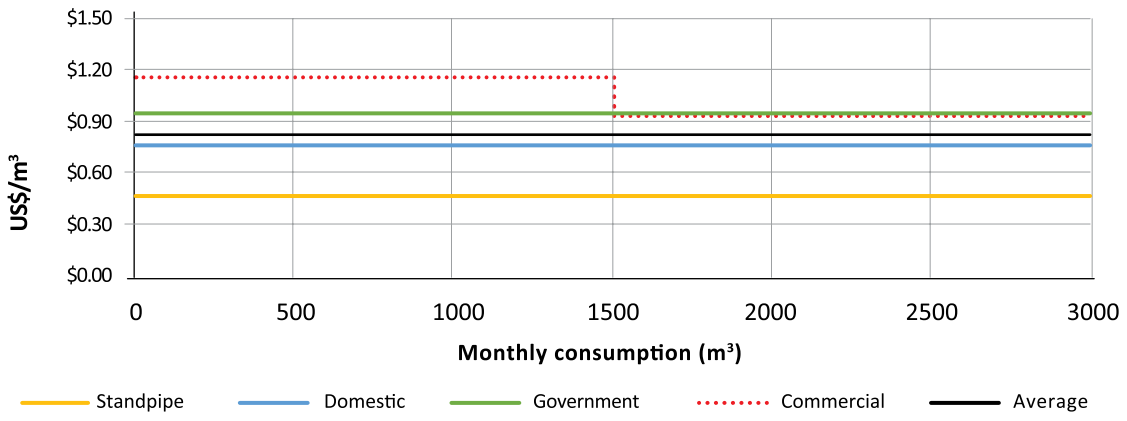
The NWSC's tariff structure (see Figure 6.3) is another example of cross-subsidization. Domestic customers are charged less than nondomestic customers, no matter how much they consume. The NWSC charges households US$0.77/$m^3$, a rate slightly below the weighted average tariff (US$0.82/$m^3$). The standpipe tariff is even lower at US$0.47/$m^3$. This is vital to the NWSC's strategy of affordable access, since most poor people in Uganda get water from standpipes and kiosks. To compensate for the low rates charged to households, the tariff for institutional and commercial customers is above the average, at US$0.94/$m^3$ and US1.16m^3$, respectively. However, to encourage large users to stay on the system, the tariff for commercial consumption above 1,500 m^3 per month (at US$0.93) is lower than the tariff for consumption below that amount (US$1.16).

FIGURE 6.2: SDE/SONES TARIFF STRUCTURE, 2014



Source: 'Grille tarifaire, 5éme Bimestre 2014'.

FIGURE 6.3: NWSC TARIFF STRUCTURE, 2015



Source: NWSC Tariffs, November 1, 2015.

Share of nonresidential customers in consumption by volume

The NWSC's ability to finance access and maintain affordability has been aided by a growth in the share of commercial consumption from 21 percent to 33 percent (by volume), as commercial consumption by volume has risen by an average of 11.1 percent per year.[57] These trends indicate that charging commercial customers at rates above the average tariff has not resulted in reduced consumption. The decreasing block tariff for commercial customers could be a reason the cross-subsidization mechanism continues to work well. In contrast, for the SDE/SONES nonresidential consumption (as a share of total) has decreased over time, from 33 percent of all water billed by volume (2004) to 7 percent (2013).[58]

The takeaway from these cases is that cross-subsidization works as long as certain principles are followed. The average tariff should be sufficient for cost recovery. To ensure affordability for households, residential tariffs can be set lower than the average tariff, but rates should be no lower than needed for affordability, and should apply only to amounts required to meet basic needs. If possible, targeting can be used to limit access to subsidized water to those who really need it, as is done in eThekwini. Commercial tariffs or tariffs for high levels of consumption can be set higher than the average tariff, but not too high. To keep large users on the system, nonresidential tariffs must be set lower than the cost of alternate water sources for large users.

Helping customers manage cash flow

Many poor households are able to pay for service, but do not always have cash available when the bill is due. They value payment options that allow them to pay when cash is available. Moreover, the money available for water may fluctuate from month to month. Poor customers value options that allow them to know how much the water they are using is costing them, so they can keep consumption in line with ability to pay on a day-by-day basis. Traditional utility meters and monthly billing cycles do not allow this. One of the most prominent and biggest innovations in water utility payment systems in recent years has been prepaid meters. Prepaid meters are perceived to be an attractive option for water utilities because they eliminate credit risk. The World Bank studied the use of prepaid meters in several Sub-Saharan African countries to better understand the benefits and costs in practical terms across their three main applications–for water dispensers (public standpipes), individual connections (yard taps or house connections), and institutional/commercial customers.[59]

[57] International Benchmarking Network for Water and Sanitation Utilities (IBNET).

[58] IBNET.

[59] Heymans, C., K. Eales, and R. Franceys. 2014. The Limits and Possibilities of Prepaid Water in Urban Africa: Lessons from the Field, WSP, World Bank, Washington. The discussion on prepaid meters draws on this report, not the case studies.

Prepaid Metering: Although a more expensive technology, and not always reliable, research shows many poor customers see prepaid systems as allowing them to consume in line with their ability to pay on a day-to-day basis.
(Photo Credit: Kathy Eales).

The study found that prepaid water dispensers in Kampala, Nairobi, and Nakuru have resulted in a sharp fall in what people without their own connections pay for water. Customers now get more water for less money, because they receive the benefit of a lifeline tariff directly. In Kampala, a 20-liter jerrycan costs just fewer than UGX25 (Ugandan shillings) (US$0.01) from a prepaid standpipe. This works out at 55 percent of the cost from a house connection, and substantially less than the UGX200 to UGX500 and more that water vendors and resellers charge.

However, prepaid water dispensers are no less prone to 'capture' than any other valuable resource. In Kampala, some landlords deny prepaid customers access to 'their' meter unless they pay a premium, despite the agreement they sign with the utility that commits them to allow any customer access to the meter installed on or adjacent to their property. Some landlords insist on selling the water themselves with a substantial mark-up.

The study found, however, that the economics of prepaid meters are marginal for both water dispensers and individual domestic connections. The financial analysis showed that a 'typical' utility in Africa would, in fact, make a loss on prepaid meters in these two contexts. However, the economics of prepaid meters are much stronger for commercial and institutional applications with high consumption volumes, and prepaid meters have been used successfully in Lusaka to get government departments to pay for water, a significant benefit.

Prepaid water systems are not a 'turnkey' technical solution. All service providers studied found that they had underestimated the requirements to manage prepaid systems effectively. Managing prepaid systems is more demanding than conventional meters and billing, with greater complexity and system fragility as a result of the interdependent electronic, mechanical, software, and information system components. The additional demands add to the costs of prepaid systems for the service provider beyond the initial purchase price.

Water utilities should carefully consider the benefits relative to the full management implications and costs of prepaid systems for their specific contexts. For both financial and practical reasons, it makes sense to implement prepaid meters for commercial and institutional customers first before extending their application to other areas.

Other than prepaid meters, cities with good service to the poor have also developed a number of other interesting options to assist poor families with cash flow management and staying connected. Some have adopted technical innovations to help low income customers keep their consumption in line with their ability to pay, and to pay small amounts when money is available, rather than larger

amounts dictated by the utilities' billing cycle. eThekwini's water bailiffs are one such example.

NYEWASCO, like other Kenyan water utilities, has adopted a technology to allow customers to read their own meters as frequently as they like, and then pay using mobile money (on Kenya's MPESA platform). This allows customers to monitor their own consumption and its costs, and to pay when cash is available. Regular meter-readings by the utility cross-check readings done by customers. This costs less to implement than prepaid meters.

Another innovation is eThekwini's electronic flow limiter, which monitors consumption. When the daily free water allowance is reached, the flow-limiter slows the flow of water to a trickle. Originally it was developed as a way to ensure that customers with poor payment records received free basic water without running up further charges. Now low income customers with piped connections request flow limiters to be installed, so they can avoid going over their daily allowance and incurring charges they may not be able to pay. This device could also be useful in systems that do not have free water allowances. It would allow families to limit their bills to a known amount, or to remain within the first block of a rising block tariff.

6.2 Techniques to overcome nonfinancial barriers to good service

The obvious barriers to serving the poor are financial. Less obvious barriers to serving the poor are legal, social, and technical in nature. This section examines how African cities have overcome three nonfinancial barriers to access for poor people: water mafia and other on-sellers charge excessive mark-ups, informal land tenure does not allow service provision, and pattern of settlement or topography makes conventional network designs infeasible.

These issues are clearly multisectoral. From the perspective of the city as a whole, long-term solutions may lie in the reform of land and housing markets. Release of adequate land for housing, provision of title to the land and services to the plots, adequate transport for travel to jobs, fairer tenancy laws–all these things should be considered.

While water sector professionals in cities need to contribute to plans for holistic solutions to poverty, they also know that these plans may take decades to bear fruit. In the meantime, they have to find ways to serve the poor as best they can. Approaches used by utilities to overcome each of these barriers in the short-term are summarized below.

6.2.1 Prepay water dispensers that cut the monopoly power of water vendors in Nairobi and Kampala

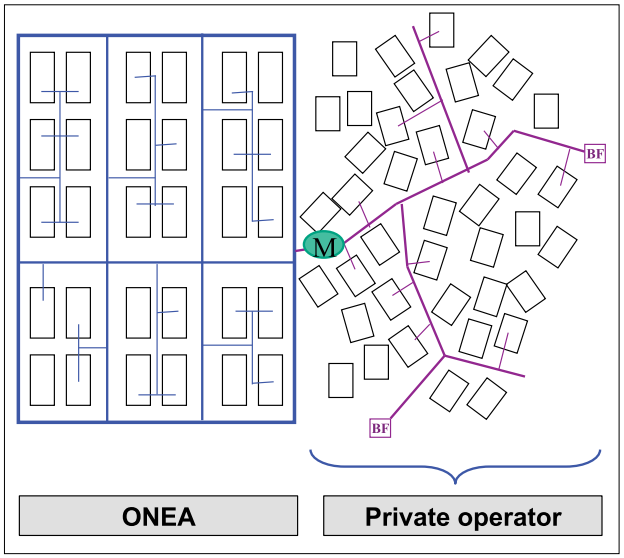
In some Nairobi and Kampala slums, piped water service was lacking and households relied on informal water vendors. Due to lack of competition (enforced by violence to deter competitors) these vendors were able to charge high prices. In addition, slum landlords that had connections would charge tenants excessive amounts for water. (Nairobi is not a case study city, but is included because of its success in improving services to low income communities by using water dispensers.)

For various reasons, the Nairobi City Water and Sewerage Company (NCWSC) was not able to install piped networks throughout the slum. In Kampala, the NWSC also concluded that it can bring water to more people more rapidly through standposts, and that prepaid systems then facilitate better cost recovery while helping poor customers to control their expenses better. As an interim solution to mitigate these issues, these two utilities placed prepayment water dispensers at regular intervals in and near informal areas where they already had a network. Those who live near the dispensers can access water more readily, at a fixed and reasonable price. In areas still primarily served by water vendors, prices have fallen due to competition from the dispensers.

6.2.2 Small providers as utility agents serve informal areas in Ouagadougou

ONEA, in Ouagadougou, does not have a formal mandate to serve informal areas, as inhabitants of these areas lack legal title to the land they occupy. Determined to nevertheless ensure access to water for the poor families living in informal settlements, the utility has delegated service provision to small entrepreneurial providers. This relationship is shown in Figure 6.4.

FIGURE 6.4: DELEGATION OF WATER SERVICE IN INFORMAL SETTLEMENTS IN OUAGADOUGOU



Source: Sawadogo, Dieudonné, 'Delivering city-wide WASH services: reaching informal settlements in Ouagadougou, Burkina Faso', August 2015, PowerPoint presentation.

As shown in Figure 6.4, ONEA provides water to a meter (shown as 'M' in the figure) at the edge of the settlement. The private operator manages the network within the settlement itself. These providers typically start in business operating a water kiosk. However, they can then expand their delivery options, supplying multiple water kiosks (BF in the figure) and making connections to individual premises. Connection materials are provided by ONEA and the operators' installation costs are reimbursed to encourage them to make connections. The operators are able to apply a small margin on the price of water paid to ONEA. However, ONEA controls the prices that the small providers charge, reducing the risk of small providers using local monopoly power to on-sell water at excessive prices.

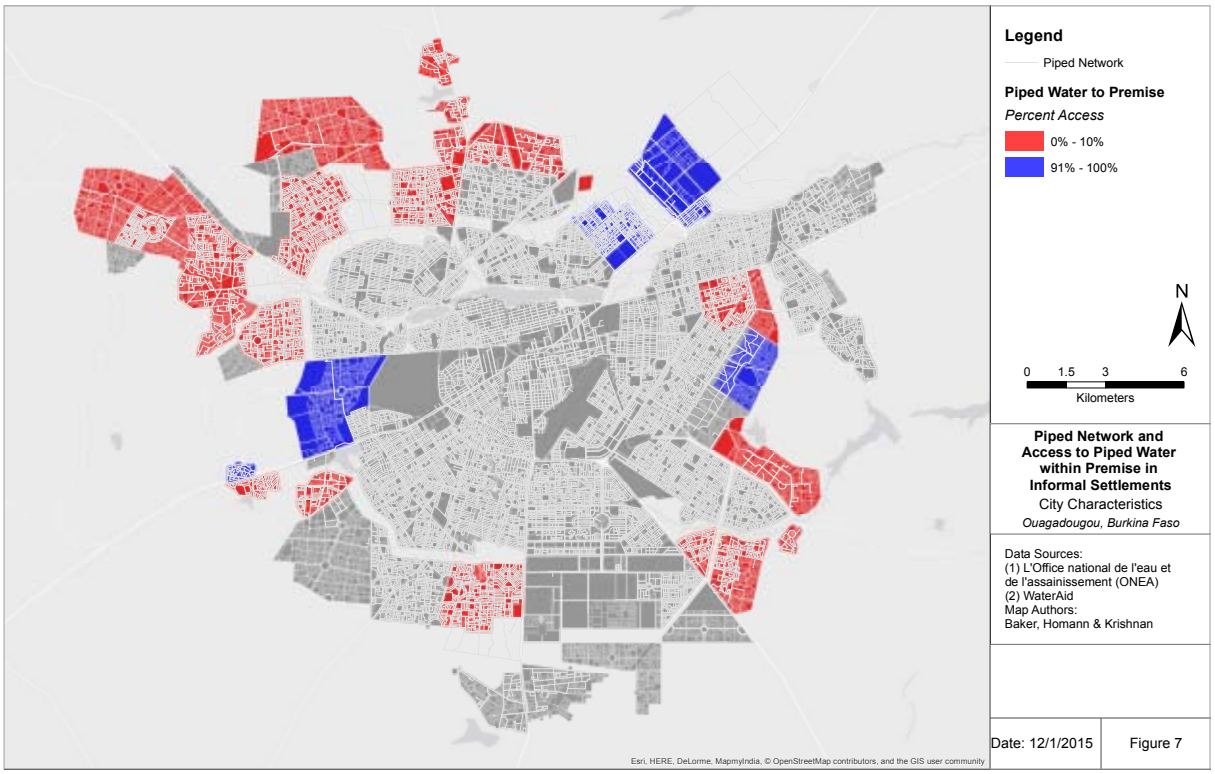
By the end of 2014, there were 7,578 connections in five informal settlements of Ouagadougou. Figure 6.5 shows access to piped water to premise in informal settlements in Ouagadougou. Those settlements shaded blue, indicating at least 90 percent access, are the pilot areas for this initiative. The areas shaded in red, indicating low access to piped water to premise, will follow. By 2030, ONEA plans to serve 80 percent of its service area population with piped water to premises.

The same approach has been applied in several other cities. In Maputo, Mozambique, for example, data show that more people in the metropolitan area are being served through small providers than by the formal utility. Box 6.1 captures the essence of this interesting case. It shows that even though utilities may be–or even need to be–at the core of an urban service delivery system, they could benefit from working with others to serve more people. It also indicates that obtaining water in this way may cost poor people more, as the prices charged by the small providers have been considerably higher than the tariffs of the public provider.

6.2.3 Ensuring access in hard-to-reach areas in Nyeri and eThekwini (Durban)

In Nyeri, informal settlements are typically located on steep slopes, making construction of conventional networks technically infeasible. To serve the poor in these areas, NYEWASCO first opened water kiosks from which small

FIGURE 6.5 : ACCESS TO PIPED WATER TO PREMISE IN OUAGADOUGOU'S INFORMAL SETTLEMENTS



private operators could sell water to people living in the communities. However, the utility was not content with this solution. It wanted as many households as possible to have water piped to their premises. To achieve this, NYEWASCO provided a connection at a 'meter bank' at the boundary of the community. The utility then provided flexible pipes to households that wished to connect from the meter bank to their home. This approach has been successful–88 percent of the poor have access to piped water to premises.

eThekwini also experimented with offering a version of meter banks in its peri-urban areas, characterized by lower density in a more rural setting within the municipal boundary. Tanks located at household premises are filled once a day with water needed to meet the basic needs of the household. The flow in the low pressure HDPE supply pipe to the tank is controlled electronically at the meter bank. This prevents the theft of water that would occur if there were continuously pressurized pipes in the community, while ensuring that very poor households have a water supply adequate for their basic needs. However, the newly urbanizing communities on the periphery of the more formal urban areas are very dynamic–many families only stay in a community for a few months before moving on, and new dwellings are constantly being built. This resulted in the private connection pipes getting built over, people forgetting where the pipes are, and new neighbors tapping into existing pipes, taking water that other households were being charged for. eThekwini's response has been to move away from meter banks in informal and transient communities and it is now aiming to provide individual volume-restricted connections to each household.

6.2.4 Do Pro-Poor Units help in serving the poor?

Traditional utilities are well adapted to serving customers in formal areas of the city–customers with addresses and regular monthly incomes. For the traditional utility, serving poor customers with low and erratic incomes, living

BOX 6.1: THE ROLE OF PRIVATE PROVIDERS IN GREATER MAPUTO

Maputo is not one of the case study cities. However, it illustrates how small scale providers can serve the poor in a situation where the utility is struggling. It complements the description of how ONEA worked with small scale providers in Ouagadougou.

The metropolitan area of Maputo has between 1.7 million to 2 million inhabitants. The vast majority of households get their water from a yard tap or house connection. Maputo's 500 or so water operators provide piped water services to about 191,000 households. This is more than the 185,000 households served by *Águas da Região de Maputo* (the main utility). The private providers range in size, with at least one serving 12,000 connections. The tariffs charged by private providers are higher than those charged by the main utility, averaging 35 Metical per m3, compared to the main utility's charge of 14 Metical for the first social tariff block, 19 Metical for the next, and 25 Metical thereafter.

Private water providers developed because of the lack of service and poor reliability of the public provider. Private households drilled boreholes for themselves, some then helped their neighbors and translated this into a larger business serving more people. Private operators now provide competing networks even in areas where a public network already exists. In some areas the survey found that private providers were more reliable, provided a service for longer hours compared with the public provider. More recently, the public provider has experienced difficulties with the adequacy of its water supply and has reduced its hours of supply due to maintenance problems. The survey also found that private providers offer more flexible terms for payment. For these reasons, many customers prefer using a private provider rather than a public provider even when there is a choice and notwithstanding the higher tariff. Private providers are 100 percent self-financed. Private water providers are practical in Maputo due to the readily available groundwater found in wide-ranging and shallow aquifers. This is a safe source of water in many, but not all, areas. Risks involve saline intrusion as the water table is lowered through over-extraction and contamination of the source with nitrates and pathogens from human waste as a result of inadequate or poorly maintained sanitation and wastewater infrastructure.

The government has taken the initiative to both recognize and regulate private operators. In areas where groundwater quality is a problem, special regulations will apply, and the public provider will sell bulk piped water from the public network to the private water providers in these areas. All private providers will need to be licensed in terms of a Decree made by the Minister's Council in October 2015, yet to be published, and licenses will address issues of mandate (area of service), water quality, and price. It is anticipated that this system, in the process of being established, will reduce conflicts between the public and private providers. Licenses will be issued by the local municipalities or district government and the system will be overseen by the national water regulator, CRA. A key challenge will be to establish capacity at the local and district government to issue licenses, and for this reason CRA will provide training and guidance.

Sources: Personal communication, 2016; SUWASA, 2015: Sustainable Water and Sanitation for Africa: Final Report, USAID.

in informal areas, with no address to send a bill to, is a problem. Utilities in our sample have had mixed experiences of creating a special unit to help them adapt to serving poor customers and informal areas. Box 6.2 discusses this polemic, with reference to a few experiences in the broader utility fraternity, not only the detailed case studies.

BOX 6.2: PRO-POOR UNITS: DRIVERS FOR SERVING THE POOR?

African water utilities with limited piped works, and with a mandate or requirement to recover their costs, are often perceived to predominantly serve businesses and the wealthier residents. In an effort to reorient water and sanitation utilities to meet the needs of poor people in large urban settlements, development agencies have encouraged utilities to set up dedicated Pro-Poor Units within their utility structures.[60]

Dedicated Pro-Poor Units are motivated on the grounds that service delivery to the poor in Africa's large cities requires a special approach due to the challenges presented by unclear land tenure, unplanned layout, overcrowding, and a lack of accurate data. It is also argued that Pro-Poor Units are necessary to counter a perceived lack of political will on the part of utility owners and/or managers to serve the poor. In Nairobi, the utility also intends using the informal settlements unit to house "one-stop" facilities that would make it easier for the residents of these settlements to interface with the utility on all service related issues.

Examples of Pro-Poor Units have been in Kampala (National Water and Sewerage Corporation), the Nairobi City Water and Sewerage Company (Kenya), Dar es Salaam Water and Sewerage Authority (Tanzania), and Lusaka Water and Sewerage Corporation (Zambia), among others.

The National Water and Sewerage Corporation Pro-Poor Unit supports branches in the city of Kampala with informal settlements and works with headquarters and development partners to implement capital works programs targeting the urban poor. The Nairobi City Water and Sewerage Company's Pro-Poor Unit was created mainly as a liaison unit based at headquarters. However, the utility found that branch office staff were reluctant to serve the poor and the unit has now been established as a seventh 'region' to give it greater status with respect to investment and operations. The Lusaka Water and Sewerage Company coordinates the implementation and operations of services in peri-urban and informal settlements. Dar es Salaam Water and Sewerage Authority implements and supervises the community-managed water and sanitation schemes; and is also responsible for DAWASA public relations and implementing the resettlement action plan.

This study has shown that some utilities have achieved very extensive access by poor households to piped water and that this is achieved through building an extensive network within reach of most households. This requires the pro-poor strategy to be embedded within the overall strategy of the utility. The risk with Pro-Poor Units is that their activities may become isolated and marginalized from the rest of the utility.

Nevertheless, these units can play an important role in catalyzing change, especially as a transitional mechanism in a utility reform process. In the National Water and Sewerage Corporation, for example, the setting up of a Pro-Poor Unit was one of a number of strategies used to kick-start a new initiative to improve access to water by poor people.[61] In eThekwini, a dedicated unit was set up to initiate the expansion of piped water services into rural areas. After five years the activities of the unit were fully incorporated ("mainstreamed") into the normal business of the utility.

[60] Setting up Pro-Poor Units to improve service delivery. Lessons from water utilities in Kenya, Tanzania, Uganda, and Zambia. Water and Sanitation Program Field Note. September 2009.

[61] World Bank and the International Bank for Reconstruction and Development. 2014. "Do pro-poor policies increase water coverage? An analysis of service delivery in Kampala's informal settlements."

Pro-poor units may improve data on poor customers, and thereby enable utilities to plan for and respond more effectively to service needs and problems. *(Photo Credit: Kathy Eales).*

6.3 Key points

Utilities in the cities that serve the poor relatively well have taken special initiatives to help poor customers to overcome financial and nonfinancial barriers to safe, reliable, and affordable access. The basis for this has been that the utility has been well-managed generally, so that it is customer-oriented, held accountable, and willing to innovate and take risks. The specific techniques are summarized in Table 6.1.

The five utilities studied have, for example, implemented rising block tariff structures targeted on poor households, and cross-subsidized residential consumption by charging higher tariffs to commercial customers. The average tariff was thus kept sufficient for cost recovery, while targeting subsidized water to those who really need it.

Service provided to the poor might be loss-making if analyzed on a stand-alone basis. The utilities in the five cases do not analyze it that way. They see their mission as providing service to all. Thus they try to provide all poor households with a good quality service that they can afford, while earning from the totality of their customers enough revenue to cover their operating and maintenance costs and generate a surplus for investment.

These cities and utilities have also tackled nonfinancial issues. They have not backed down when informal land tenure disallowed service provision, or physical conditions made network extension difficult. Instead, they improvised with new technology and institutional arrangements. They have taken counter-measures against water mafia and other on-sellers that inflated the cost of water.

TABLE 6.1: SUMMARY OF TECHNIQUES USED TO ACHIEVE AFFORDABLE ACCESS

Barrier	Description of technique	Where used (examples)
Financial barriers		
Connection costs are unaffordable	Keep connection charges low	NYEWASCO (Nyeri) has reduced its up-front payment for a new connection to US$26. Of this, about half is a refundable deposit against future bills. Only low income customers benefit from this low charge. NWSC (Kampala) cut its up-front charge to US$35. The NWSC also covers the cost of making a service connection of up to 50 meters. This low charge is only available to low income consumers.
	Provide convenient standposts and shared taps (so customers can access water without paying connection fees)	The NWSC uses standpipes to serve 71 percent of poor people in Kampala. Roundtrip times average just 21 minutes. The NWSC has also made it easier for households to serve their neighbors by charging a lower tariff to any connection that serves more than two or three households. Niamey serves 78 percent of poor people through standpipes. By building standpipes in convenient locations, roundtrip time has been reduced to 12 minutes. (Niamey is not a case study city, but is one of the seven cities with relatively good service for the poor.)
Monthly bills are unaffordable	Charge poor households lower tariffs for a basic needs level of consumption	eThekwini (Durban) does not charge poor households for up to 9 m^3 per month. SDE (Dakar) charges $0.40 per m^3 for consumption below 10 m^3 per month.
	Keep standpipe charges low	Kampala (NWSC) charges $0.47 per m^3 for standpipe consumption.
	Provide information and flexible payment options to help customers manage consumption and cash flow	NYEWASCO (Nyeri) offers customers a mobile app that lets them read their own meter at any time, and get an updated bill. Customers can also pay some or all of their bill at any time, using mobile money. (Other Kenyan utilities, including Nairobi, have similar systems.) eThekwini (Durban) uses electronic flow-limiters that cut off supply when the free water quantity for the day has been reached. This helps customers avoid incurring bills entirely.
Nonfinancial barriers		
Monopoly power of water vendors and landlords	Water dispensers (standpipes that operate automatically to dispense water in exchange for electronic payment)	NWSC (Kampala) placed prepaid water dispensers (automatic water vendors) in poor communities. NCWSC (Nairobi) placed prepaid water dispensers at frequent intervals along the edge of slums. (Nairobi is not a case study city, but its experience is shared because it has been successful in driving down prices charged by informal vendors in slums through use of water dispensers.)
Legal restrictions on the utility serving properties in informal settlements	Use of small scale providers as agents of the utility	ONEA (Ouagadougou) uses small scale providers as its agents to serve informal settlements. These agents buy water from ONEA, build small networks into the informal communities, and on-sell the water through standpipes and individual connections in these communities. ONEA gives the small providers the material to build out these connections, and also regulates the price at which the small providers may sell.

Barrier	Description of technique	Where used (examples)
Terrain, settlement pattern, and lack of streets makes installing utility connections in low income areas difficult	Provision of meter banks on the edge of the settlement, from which households can make their own connections	NYEWASCO (Nyeri) serves poor settlements on steep slopes where it cannot build by offering connections at the edge of the settlement. Several meters are placed at one location, and households run a pipe from the meter to their premises. NYEWASCO also provides the piping materials to the low income households.
Utility processes and mindset are not suitable for serving poor communities	Pro-Poor Units	NWSC (Kampala) has a Pro-Poor Unit. This unit helps the operating branches of the utility to serve poor communities appropriately, including helping with the installation of networks poor communities. eThekwini (Durban) developed a Pro-Poor Unit, then mainstreamed the pro-poor thinking into the entire utility.

VII. Conclusion

Africa needs new approaches to urban water supply

Access rates for water piped to the premises in urban Africa are falling, while access rates to improved water are rising only marginally. Meanwhile, the urban population is expected to triple by 2050, increasing from 340 million people today to over 1 billion people. Demand for water will rise, water resources will become more expensive, and financing needs will increase significantly. How can the SDGs–which target "universal and equitable access to safe and affordable drinking water for all"–be met in this context?

Provision of good water service to the poor in African cities is possible

The analysis here offers many lessons from those cities that have already made significant progress towards the challenging goal of good services to the poor. Household survey data show that more than 90 percent of the poor have access to improved water across a range of African cities, and that in seven such cities included in this study, water is also available for at least 18 hours per day. The report classified the combination of such coverage and frequency of supply as providing relatively good service to the poor. The experience of these cities show that the provision of water supply is possible in rather difficult urban environments: densely populated, rapidly urbanizing, and located in countries with limited freshwater resources, relatively low household income levels, and not necessarily conducive governance environments.

In the cities where the poor are served well, traditional utilities are the main service providers to the poor, and some of them have ventured into partnerships with others–such as small providers–to address areas of service delivery where they lacked capacity, experience or legal mandates to operate. These utilities have in common that they are effectively managed, having high operating cost coverage ratios and scoring well on other measures of efficiency and cost effectiveness. The research shows that making the utility work well is a core part of achieving improved services in cities. This is not to say that complementary strategies cannot also provide good service to the poor, but rather that utilities ***can*** serve the poor well, and indeed are far and away the most important providers of water to the poor in the cities studied. Even though they may in some situations have to partner with other institutions, there is no obvious alterative to dedicated, professional water utilities as the instruments to develop and manage networks on scale, as is required in Africa's rapidly growing cities.

Financing good water service

To turn around service to the poor, utilities need substantial investment to build distribution networks and production facilities. At the start of their turnaround, most of the utilities studied have needed concessional loans and some grants. They then quickly worked to improve operating efficiency–by reducing NRW, improving staff productivity, and increasing collection rates–and then to expand access (thus also increasing revenue). Increased operating cash then allowed them to service the concessional loans, and to finance additional capital investment. Using similar financing strategies, typical African cities may be able to serve the poor well, as the evidence for Mombasa in Section 6 shows.

Ensuring good service is affordable

To service the debt used to expand access, utilities need to recover their costs. To serve the poor well, utilities need to also ensure access is affordable. This is often portrayed as a trade-off, yet good utilities transcend the traditional trade-off between cost recovery and affordability. They minimize up-front connection charges, and provide a basic needs quantity of water at a low tariff. They also use innovative technologies–such as prepaid and limited flow meters or cellphone-based payment platforms–to help poor households to manage their water payments in line with their cash flows, and manage consumption to an affordable level.

Utilities also innovate to overcome nonfinancial barriers. Prepayment water dispensers also have this effect–often used in convenient locations in informal settlements, to compete with water vendors and drive down their prices. Some utilities delegate service provision to small entrepreneurs in

informal areas where they lack a formal mandate because inhabitants lack legal titles to the land they occupy.

To turn around poor service, cities must work with the grain of the political economy

While good service for poor households is possible, it is not the norm. The dysfunctional political economy in many African countries, related to poor governance arrangements, often leads to a 'low equilibrium trap' at the utility level. Those in power choose *predation*, using the water utility as a vehicle from which to extract public resources for personal or political ends.

Why then, in the context of the general political environment and poor governance arrangements, do some African utilities serve the poor well? While difficult, reform within a dysfunctional political environment is possible. In the five cities analyzed in detail, there were three factors typically involved in the starting of reform–a catalytic event such as a water supply crisis, an exemplary utility leader, and a secure political leader (see diagram below). The confluence of these factors is determined by the local political economy, and cannot easily be influenced by outsiders. However, where the political economy conditions are favorable for reform, financial and technical support are helpful. Development partners, noticing these conditions are in place, can play a role by providing initial finance for the turnaround.

To build momentum for reform, three factors–internal competence, external alliances, and institution-building–are key. Which to tackle first depends on context. Successful reforms are problem-focused, well-timed, and adaptive. They are not necessarily direct applications of 'best practices', but rather are creative next steps that allow the reform process to continue accelerating, with sensitivity to the specific context.

At the managerial level, sustainability requires building a deep management bench, and a culture of joint planning, accountability, and transparency. Management reforms and institutional culture and capacity-building, an essential component of both the 'building momentum' and 'sustaining reform' phases, are important dimensions of the process. They are also outgrowths of effective management and leadership–delivered by bureaucratic entrepreneurs–which are needed in all phases of reform.

Over time, these three factors help foster virtuous circles, strengthening utility capacity and service to the poor even in inauspicious contexts. Reforms can persist and deepen. For instance, political and bureaucratic opponents buy in to reforms. Tariffs can become less politicized when utilities operate from a position of strength and a record of success on which to justify increased charges. In this stage too, development partners can play a role through disseminating comparative knowledge, but also by continuing to finance the utility whose performance is improving, to sustain and protect good service.

As good service is achieved, however, the risk of predation does not disappear. In fact, as utilities become more financially successful, predation could well increase. Formal governance rules and managerial competence may be useful instruments to keep this at bay, but the more enduring way to counter predatory behavior is to develop networks of internal and external alliances. However, if those predators come from erstwhile government allies–whether seeking rents or political opportunism–restraining them can prove challenging. Changes in political or professional leadership can also increase the risks of predation. Again, this issue can be addressed by implementing systems involving multiple stakeholders, which will protect the utility from predation while promoting accountability. Equally critical, embedded alliances with domestic stakeholders, 'not among the voters of one party or one section, not in a single class or interest group, but in multiple and diverse political affiliations' may best afford utilities, and their leaders, sufficient leverage and autonomy to sustain the process of reform.[62]

Furthermore, formal governance arrangements should aim to embed relations of accountability with external stakeholders who benefit from success, and to support professionalism in the utility's culture. However, institutional form in itself is no guarantee of success–and neither is being public, nor being private, a fundamental precondition for success. The successful cases analyzed here have ranged from corporatized public to private water service providers, and to water or engineering departments that remained part of

[62] Carpenter (2001: 5).

municipalities. They have also included national and more localized institutions.

Role of development partners

So where should development partners focus scarce concessional loans and grant finance? The political economy analysis does not suggest a fully replicable model–the local context must always be considered. Rather, the research shows that good reforms have developed from the right combination of political economy dynamics. It is advised that would-be reformers, in politics or at the utility-level, if given an opening through an exploitable catalytic moment, use that opening to build momentum. Development partners, spotting political or technical champions, should back them.

Under these conditions, finance could be phased in, with emergency needs addressed first. Additional funding to improve management effectiveness and operations, perhaps coupled with technical assistance from private operators, could come next. A large financing deal may wait until the commitment to reform appears credible. Yet, development partners may also need to take some risks before improvements are seen. There is no universal strategy.

One thing is clear though, given the limited concessional loan and grant finance and the high investment needs–as operating cost recovery improves, utilities would gain from transitioning to blended or commercial financing, rather than remaining reliant on grant financing.

On the other hand, where promising conditions are not in place, funding the utility may not lead to sustainable services for poor. Capacity building and reforms that can improve governance–for instance, improving transparency and promoting information sharing–would be more practical in these cases, in the hope that the country will develop towards conditions where transition to a commitment and capacity to serve the urban poor is more likely.

Development partners can support reforms through the three phases–starting, building, and sustaining. They cannot initiate nor control the reform, however. Successful utilities must master the complex interdependence between the technical, the financial, and the institutional to work with challenging political environments to better serve the poor in their cities. Political leaders can win by partnering with strong technical leaders to build effective institutions that earn the support–and the votes–of the poor.

Providing Water to Poor People in African Cities Effectively:
Lessons from Utility Reforms

Appendixes

Contents

Appendices

Tables

Figures

Appendix A: Case studies: How Cities Turned Around Water Service for the Poor

A.1 Dakar, Senegal

In 1994, Dakar, the capital of Senegal, was running out of water to serve its 2 million inhabitants. Poor people in the city mostly relied on standpipes. Twenty percent of the population had no access to piped water at all, relying on water vendors and shallow wells. Water was rationed to 16 hours a day. A growing population and depleting water resources spelled imminent crisis.

Twenty years later, 75 percent of poor people have water piped to their premises. Standpipes serve almost all the remainder. Overall, 98 percent of poor people access piped water supply, which is available nearly 24 hours per day. The investment and operating costs of these improvements have been covered largely from tariffs charged for sales of water.

This turnaround was made possible by an innovative scheme to bring in a private firm to operate water supplies. The private firm increased cost effectiveness, generating free cash flows. These cash flows serviced the multilateral development bank loans that financed expansion of water production and extension of service to poor areas.

The reform was planned with the assistance of the World Bank, which also provided much of the financing. Government buy-in was made easier by the relatively secure position of the President, a reform plan that preserved jobs, and public sector control of the investment program, and a belief that the plan could end a water crisis and benefit poor constituents.

Service before the reforms	In 1994, the utility was only able to supply 60 percent of demand. Public standpipes were the main provision made for poor people. Fourteen percent of total population of the city relied on standpipes, drawing just 20 lpcd–barely enough to meet basic needs. A further 20 percent of the population had no access to piped water at all, relying on water vendors and wells. Supply from the utility was limited to 16 hours per day, with low pressures and contamination of the piped supply in some areas.
Catalyst for reform	Impending crisis catalyzed reform. Inadequate water supplies threatened a city with population growth running at over 5 percent per annum. Ground resources near the city were depleted. The water table was falling as much as 1.5 meters per year in some areas. Saline intrusion threatened to ruin the aquifer. Shallow wells, relied on by poor people and others, were being contaminated with seepage from latrines.[1] The only sustainable solution was construction of a new system to bring water from the Senegal River, about 250 km away. This system was expected to take eight to 10 years to complete. In the meantime, additional boreholes, expansion of a treatment plant, and leakage reduction works were urgently needed to prevent further deterioration. This was expected to cost US$162.5 million (in 1995).[2]
Actors driving the reforms	The government turned to the World Bank for assistance. World Bank staff believed that private operation of the system was needed to make the utility efficient and made finance conditional on this.[3] The President of Senegal at that time, Abdou Diouf, was in a relatively secure position. His party had been in power since 1960. Potential opponents were being included in government to build ownership of the reform across the political spectrum. It has been argued that this approach was supported by donors because the resulting political consensus made it easier to enact economic reforms in a number of important areas.[4]

[1] World Bank. 1995. Staff Appraisal Report. Water Sector Project, 2–4.

[2] World Bank. 1995. Staff Appraisal Report, 24.

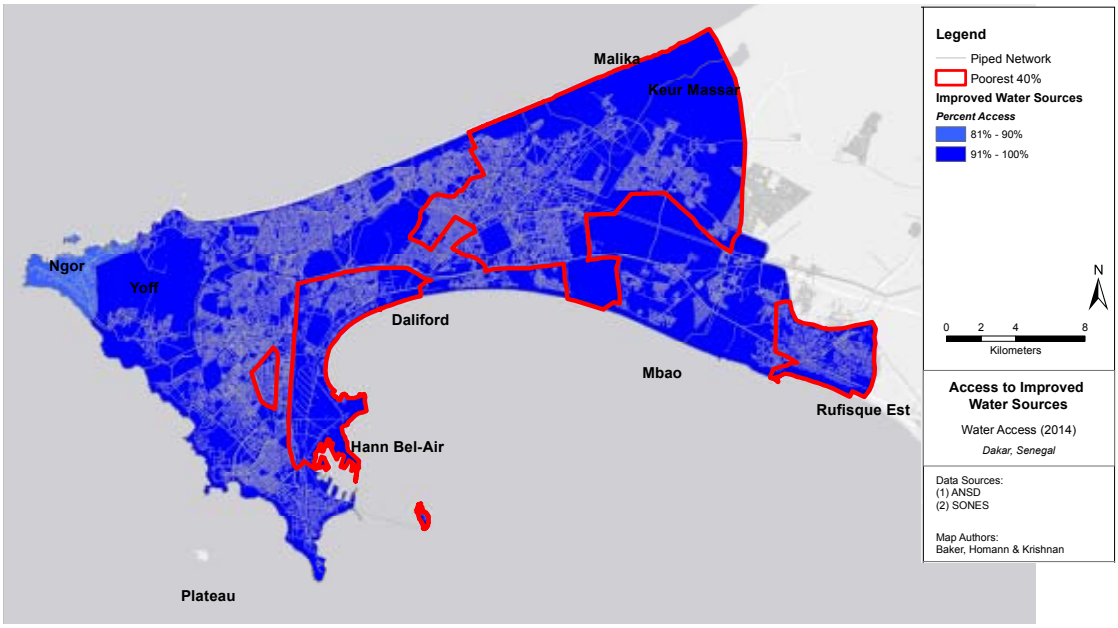
[3] World Bank. 1995. Staff Appraisal Report, paragraph 8.2

[4] Beck, Linda. 1999. "Senegal's Enlarged Presidential Majority: Deepening Democracy or Detour?" In *State, Conflict & Democracy in Africa,* edited by Richard Joseph, 214. Boulder: Lynne Rienner.

Course of action decided on	A comprehensive long-term plan was developed. The first stage of the plan focused on quick increases in production and extension of service into some poor areas. The second stage involved the much larger Keur Momar Sarr water treatment plant (in 2005, 65,000 m^3/d; upgraded in 2008 to 130,000 m^3/d) along with a continued expansion in the distribution network into poor areas. The infrastructure expansion plan was anchored on institutional reforms. The water supply service of the state-owned utility was divided into two companies: the SDE became the company responsible for operating and maintaining the infrastructure, providing service to customers, and collecting revenue. The infrastructure assets were transferred to SONES, a new publicly-owned company responsible for planning and financing new investments. A controlling stake in the SDE was to be transferred to an international water operator through a competitive tender. Sanitation services were spun out from the water utility into a new public entity (ONAS), since sanitation needed continued subsidies.
Technical solutions implemented	Production capacity was increased by about 30 percent (up 60 MLD) in the first phase through expansion of an existing treatment works and an emergency program of drilling new boreholes. In the second phase, the 130 MLD Keur Momar Sarr water treatment plant (near the Senegal River) and associated transmission and treatment works were completed. With more water available the system was able to meet the city's demand for water. Another important technical solution was network rehabilitation and active leakage control. In the first phase (in which production capacity was still not adequate to meet demand) 100 km of pipe were rehabilitated, along with 25,000 connections.[5] Between 1995 and 2013, the distribution network in the SDE/SONES service area was more than doubled by adding 4,800 km of pipe. The number of connections in Dakar was almost doubled, from around 189,000 (2002) to around 368,000. In densely populated areas, most poor families have water piped to their premises, while in less densely populated areas standpipes are more common. Figure A.1 shows how the network extends into poor areas (outlined in red). In the majority of these poor areas, at least 80 percent of households have water piped to their premises.

[5] World Bank. 2004. Implementation Completion Report. Senegal Water Project, 10.

FIGURE A.1: DAKAR PROVIDES WATER PIPED TO THE PREMISES TO (ALMOST) ALL



Commercial solutions implemented

In 1995, most poor people served by the utility got water from standpipes. Earlier in the 1990s, the standpipes had been given to small entrepreneurs to operate. This was done to reduce waste of water. The standpipe operators sold water by filling containers, and paid the utility for the water used as recorded by a meter.

Standpipes are still an important method for delivering service to poor people, with 22 percent of poor people in Dakar getting water this way.

Senegal's increasing block tariff structure has a subsidized social tariff (tranche sociale) for levels of consumption below 20 m^3 (US$0.40) per bimester.[6] There is also a regular tariff for consumption from 21 m^3 to 40 m^3 (US$1.39), and a "dissuasive" tariff for consumption above 40 m^3 (US$1.75). The dissuasive tariff is designed to be a disincentive for excessive water use. It can be seen that the tariff for household consumption of less than 20 m^3 per 60 days is less than a third of the regular tariff, and less than a quarter of the tariff for consumption in the top block. A family of six consuming 50 liters each per day would pay US$3.62 on average each month. Bills are sent every two months based on meter readings, and the SDE can cut off water supply for nonpayment. The standpipe tariff is US$0.73 per m^3–this is between the social and regular tariff for domestic piped connections.

A disadvantage of rising block tariffs is that they can discourage utilities from serving poor neighborhoods. This is because the utility will expect most customers to pay only the lowest tariff. If this is lower than the cost of service, the utility will lose money–or have to put up tariffs to other customers. The *affermage* contract for Dakar gets around this problem by paying the private operator the same tariff for every unit of water sold.

A more unusual kind of subsidy was introduced in 2007. The cost recovery model indicated that the average tariff should be increased, so that the operator's tariff and SONES debt service requirements could be covered. Rather than increase all tariffs equally, the government agreed that the tariffs for government customers should be increased by 70 percent, while the tariffs for other customers remained constant. In 2009, the government tariff was raised again, to allow other tariffs to remain constant. In 2015 this arrangement was reversed, necessitating a 4 percent increase in the *tranche sociale* and a 9 percent increase in the rates to other users.

Financing solutions implemented

Total urban water sector investments from 1996 to 2013 totaled US$770 million.[7] About half was financed by loans from donors. Two major programs implemented were the Senegal Water Project (US$223 million, 1996-2004) and the Long-Term Water Project (US$255 million, 2002– 2009).[8] The World Bank was a major financier for both projects, providing US$85 million and US$146 million, respectively. The interest rates on these loans were around 6 percent. Tenors were 20 years (including five-year grace periods).[9] The cost of finance was kept down because the investments were the responsibility of the publicly-owned SONES. This meant standard donor rates were applied. (If investment had been the responsibility of the private operator, the cost of the finance would have been higher.) These loans had to be repaid. The private operating company (SDE) was limited by its contract to charging a fixed operator tariff. For the sector to be financially self-sufficient, the average retail tariff paid by customers had to cover the operator tariff, plus an amount to service the debt taken on by SONES.

Keeping the tariff at affordable levels was a challenge. Thus it was important to keep the operating cost component of the tariff to the lowest possible level. The decision to bring in a private operator was made in part because analysis suggested that this would result in lower tariffs. The winning bid (from SAUR) was for an operator tariff that was 60 percent of the tariff the public utility had been charging customers.

[6] Every two months.

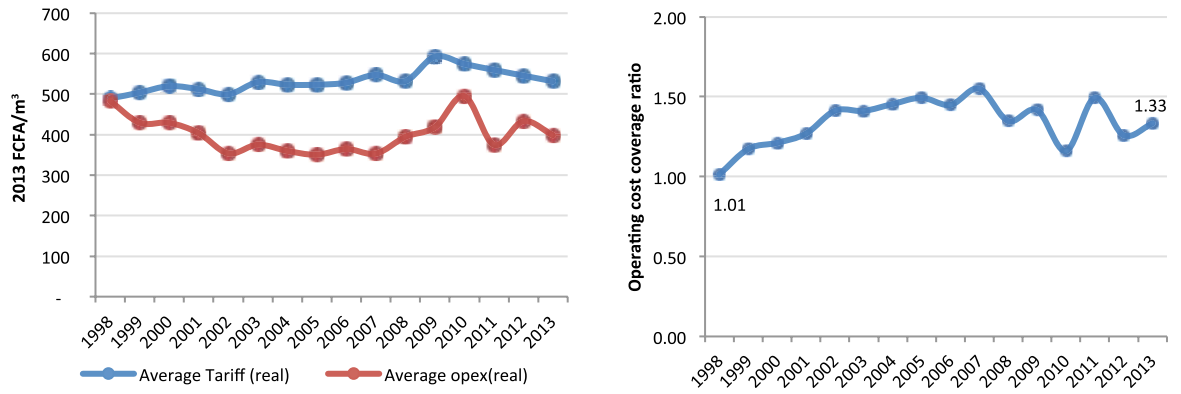
[7] World Bank. 1995. Staff Appraisal Report.

[8] Implementation Completion Report, Senegal Water Project; Implementation Completion Report, Long Term Water Project. Note: These projects included sanitation components which is overseen by ONAS, not SDE or SONES.

[9] World Bank, Staff Appraisal Report, Senegal Water Project, iv; World Bank, Project Appraisal Document: Long Term Water Project, 20.

To make money within the agreed operator tariff, the SDE had to maximize cost effectiveness. It maintained a collection rate of 98 percent, reduced NRW from 29 percent to 20 percent, and tripled staff productivity, moving from seven staff per 1,000 connections to just two staff per 1,000 connections. Because of these gains, average operating expenditures in real terms declined slightly over the period. Fairly modest real tariff increases (see Figure A.2) then allowed the sector to generate a substantial operating surplus which could be used to service debt, or to pay for capital expenditure directly.

FIGURE A.2: OPERATING EXPENSES AND TARIFFS, OPERATING COST RECOVERY RATIO



Source: Utility research (see Table F.2 for full list of sources).

Management solutions implemented	The most important management solution was to bring in an international private operator. That operator, in turn, brought in modern management systems and techniques, and skilled managers. The operator trained local staff, so the company is now run almost entirely with national staff, at high levels of efficiency. Profit incentives for owners, in turn, led to performance-oriented management for the staff.
Institutional and governance solutions	The management model involved a significant realignment of roles and responsibilities in the sector. Operational autonomy was conferred on the privatized operating company, which was controlled through a long-term *affermage* contract that specified what the operator had to achieve, and controlled what it could charge.

Reflections and conclusions

Results of the turnaround	By 2014, 75 percent of poor people in Dakar had water piped to their premises, with a further 22 percent accessing standpipes. Compare this with 20 years previously, when most poor people with piped water got it from public taps and 20 percent of the entire population–most of them poor–had no access to piped water at all. Across the city as a whole, 86 percent of people have water piped to their premises. Water supply is reliable and has been available 24 hours per day at constant pressure across most of the system for most of the period since 2007. That said, water demand is once again running ahead of supply. Some residents complain that water does not reach the higher stories, or is not available in certain areas at certain times. The significant increase in access and service seen in Dakar was achieved without burdening Senegal's stretched public finances. Finance for investment was available on concessional terms because of the credible institutional model adopted. Debt service on the loans was covered out of the utility's cash flow because the private operator managed to run the system cost-effectively.

How a mandate for the reform was secured	A comprehensive reform plan was prepared with the assistance of the World Bank. The plan was acceptable to stakeholders because workers were guaranteed employment under the new arrangements, tariff increases were limited, and public sector managers retained control of the investment program. The lack of other financing options, and World Bank insistence on the reforms as a condition of financing, contributed to the Government's acceptance of the approach. Acceptance was made easier by the cooption of potential political opponents into the Government at the time. Another factor which may have influenced the reform direction was experience with private management of the utility prior to 1971 by the private operator *Generale des Eaux* (later renamed Veolia Environment). In addition, SAUR, the private operator that won the tender, had been providing technical assistance to the public utility for some years prior to the reforms.
Phasing the reforms	The reform in Dakar followed a blueprint laid out at the start. Quick measures to increase water availability and extend service to poor areas were prioritized. Institutional changes were implemented in parallel. While these measures were taking effect, planning for the big increase in water supply the city needed was already under way. The Dakar turnaround is remarkable for its institutional continuity. It has continued in the same basic form for almost 20 years, surviving a change in administration when opposition leader Wade was elected President in 2000. It also continued through the next change in administration in 2012.
Sustaining performance	Supply is once again exceeding demand in Dakar. Major new production sources are being developed, but there are concerns they will not come on-stream in time. In 2013, a transmission main that carries water from a source 250 km out of Dakar ruptured. This main, which supplies 40 percent of the city's water, took three weeks to restore to service. The resulting shortages led to outbreaks of social unrest. Some stakeholders suggest that SONES has not been sufficiently proactive in infrastructure development and major rehabilitation works. Indeed, the government recently gave the SDE responsibility to implement some urgent expansions in supply. The *affermage* model depends for its sustained success on the continued strong performance from the public sector entity in charge of infrastructure development. If this is lacking, the model will need to evolve toward greater private sector responsibility or risk failing to deliver. Another risk to sustainability in Dakar is the periodic expiration of the *affermage* contract. While the limited term provides the government with flexibility, it also builds in a discontinuity. Every 10 years–more or less–the system has to figure out whether to rebid the contract, bring operations back into the public sector, or negotiate an extension. Despite these risks, stakeholders in Dakar say that the system is generally working well. Accountability is institutionalized through contracts. Reliance on donor finance for investment promotes good governance and limits predation in SONES. As a private company, the SDE is able to insulate its operations from political predation to a great extent. The fact that the SDE and SONES can each perform the other's functions to some extent provides tension, but also resilience. The SDE has stepped up where SONES has appeared to lag, but this in turn is likely to encourage the latter to improve its performance so it can earn back the territory.

A.2 eThekwini (Durban), South Africa

When apartheid ended in South Africa, local governments strove to undo the racial inequalities which had forced the black majority to live in townships spread around the periphery of the more affluent suburbs reserved for white people. These townships had poor urban services compared to the traditionally white areas.

In the Durban area, over 46 separate municipal councils were amalgamated over a period of six years (ending in 2000), to form a single metropolitan municipality, eThekwini. The Durban water department now had the responsibility to manage and extend services over a much wider and poorer area. The service area was extended by 68 percent, adding a further 9 percent to the population of 3.6 million people. The far-reaching and complex political and institutional changes brought about by the transition to a universal democratic franchise created the space for 'public entrepreneurship' whereby public managers were able to build external alliances (within a broad and progressive political mandate), establish managerial autonomy, and develop institutional capability to provide effective public services.

Over an 11-year period (2004 to 2015) the number of connections increased by over 129,000 (from 369,000 to 498,000), an increase of 35 percent at an annual rate of 2.8 percent. The network length nearly doubled from 6,998 km in 2000 to 13,900 km in 2015. The 2011 Census showed that 80 percent of the population had access to water on their premises and a further 17 percent had access to an improved piped water source, giving a total access of 97 percent. About 55 percent of the poorest 40 percent of the population have access to water piped to the premises, and a further 38 percent to a public tap–that is, 93 percent of poor people have access to a safe piped water source.

For the 97 percent of households using piped water, water is available 24 hours a day and is safe to drink. The city received the highest award ('blue drop') by the national water ministry for its management of drinking water quality.

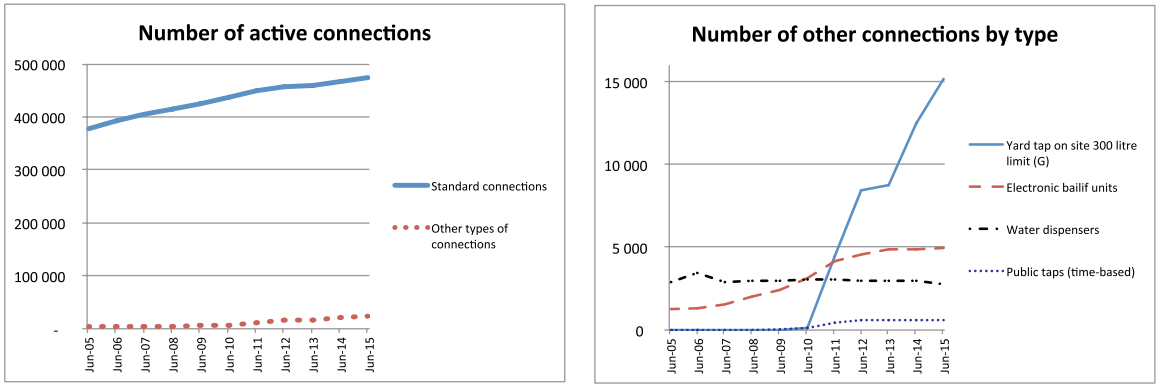
Service before the reforms	Reliable data on the situation before 1995 are not available. White people living in and near the city center (the original Durban municipality) received on-premise, good quality, 24x7 water. However, black people living in townships received an unreliable service and rural households received no service at all.
Catalyst for reform	The democratic transition in South Africa in 1994, from an exclusive race-based franchise to universal franchise, and the subsequent reform of local government to amalgamate previously racially separate local governments, created the catalyst for the reform of Durban water.
Actors driving the reforms	Neil Macleod, head of the Durban water department, an engineer with a Master's in Business Administration, took up the challenge of extending a good service equitably across a wider and poorer area at the commencement of the political changes in the early 1990s. He was able to work within a stable and enabling political context created by the Executive Mayor, Obed Mlaba (1996–2011), and later with an effective City Manager, Mike Sutcliffe (2002–2012), to establish and sustain the Water and Sanitation unit as a 'semi-autonomous' (from a management perspective) entity within the municipal administration over 20 years.
Course of action decided on	The extension of the service boundary involved taking on additional preexisting service areas (as well as previously unserved areas), and the incorporation of operations and staff from other municipalities. This required normalization of staff conditions across the operations and the creation of a single corporate culture and identity. At the same time, new investments were required and existing services needed to be rehabilitated.
Technical solutions implemented	A key challenge was to provide universal but affordable services to all people in the service area. A conventional full-pressure system with individual connections and meters for each household was considered too expensive, given the high needs, and the relatively low densities and low income levels on the urban periphery (where most of the population without a piped water supply lived). eThekwini solved this problem by providing a full-pressure metered connection to a local off-take for a group of houses (typically 15 households) and then reticulating through separate inexpensive and flexible

small diameter HDPE pipes at low pressures to a 200 liter ground tank at each house. An electronic bailiff unit was developed that automatically filled each tank overnight. This fulfilled the City's commitment to provide a free basic service in an affordable way. (Households could opt for a higher level of service but would have to pay for this.). About 5,000 units were installed (see Figure A.3).

In time, difficulties were experienced with the management of this system. The population in the peri-urban areas grew more rapidly than anticipated and new houses were constructed over existing pipes. New residents made illegal connections to their neighbors' pipes.

In response, the Water Department innovated again, developing an electronic flow-limiter. Poor households are now offered a full pressure connection. The electronic flow-limiter assists households to keep their consumption within the free basic amount of 300 liters per day by limiting flow to a trickle when this amount is exceeded.

FIGURE A.3: THE NUMBER OF CONNECTIONS IN ETHEKWINI INCREASED BY 35 PERCENT OVER 11 YEARS WITH SOME EXPERIMENTATION IN ALTERNATIVES



Source: Utility research (see Table F.2 for full list of sources).

Commercial solutions implemented

eThekwini adopted a policy of free basic water in 2000. At first, the free basic amount was calculated on the basis of 25 liters per person per day, a minimum requirement for health specified by the World Health Organization. A monthly amount was calculated assuming eight persons per household to give 200 liters per day, or 6 m^3 per month. This was provided to all consumers, due to the difficulty in identifying only the poor households.

Following feedback from consumer forums, the free basic water allowance was increased to 300 liters per household per day in July 2008. Households with restricted water services (ground tanks or flow limiters as described above) had the daily amount delivered to them increased by the utility. For customers on regular metered service, consumption in excess of the free water limit was charged at the standard tariff.

Tariffs escalate with increased usage, with the top marginal tariff (for consumption above of 45 m^3 per month) set at the long run marginal cost of supply. This is above the average historic cost and is both efficient and surplus generating.

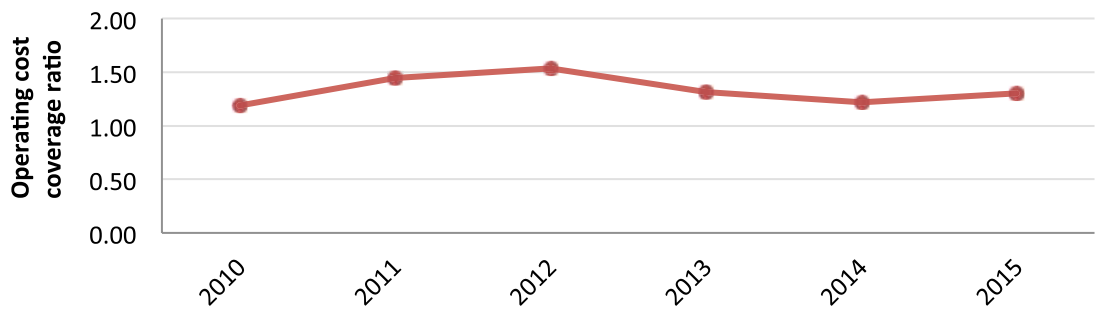
In July 2012, eligibility for free basic water was restricted to customers whose property value was less than ZAR250,000 (about US$20,000). Customers with higher value houses (an indicator of wealth) are now required to pay the regular tariff for all water consumption.

Financing solutions implemented

Immediately after the democratic elections, the municipality focused its investments on expanding access to poor households. These initiatives were supported across South African municipalities by the national government through capital and operating grants. Initial grants were project specific and were part of the national Reconstruction and Development Program. These grants were transformed into sector-based programmatic grants. The multiple grants were then aggregated into a single capital grant called the Municipal Infrastructure Grant and a single operating grant, the Equitable Share Grant. In addition to the grant money from national government, the municipality has raised commercial finance. For example, it established a EUR50 million facility with the European Investment Bank for infrastructure investment in 2010.

The utility has maintained a positive operating cost recovery ratio (see Figure A.4) by implementing cost-recovery tariffs, and has consistently achieved a high cash collection rate (averaging over 100 percent over the last few years as a result of successful arrears debt collection).[10] This means that the utility is able to cover all its operating and maintenance costs from the tariff, and generate free cash flow which is available to the municipality to service the debt raised to finance new investment.

FIGURE A.4: OPERATING COST COVERAGE, ETHEKWINI WATER AND SANITATION UNIT



Source: Utility research (see Table F.2 for full list of sources).

Management solutions implemented

eThekwini developed a people-focused and trust-based organizational culture in which staff contributions were recognized and valued. The eThekwini management has consistently emphasized that it regards people as the most important asset in the organization. The Managing Director (MD) adopted a personal and engaging management style, being quick to give visible recognition to good staff performance through awards.

eThekwini established a customer management unit with equal status to other major management units such as finance and the engineering functions. The MD built trust in the management team and communicated effectively with staff, frequently visiting staff in the field. He fostered a positive attitude by encouraging people to propose solutions to the problems they brought to management. Perhaps unusually for a department within a municipality, he encouraged talking rather than writing, with minimum use of memoranda, minutes, and lengthy reports. The MD negotiated a performance contract with the City Manager linked to the water unit's overall performance. This contract made 25 percent of his remuneration dependent on meeting performance targets. These performance agreements were applied to the senior management team.

[10] The water unit produces a set of income statements for water that are then amalgamated with the City's finances (all services). Separate cash flow and balance sheets are not available for water and the separate income statement for water is not published. The income statement contains an accounting entry with an estimate of the opportunity cost of revenue forgone by providing free basic water (included as negative revenue). This item has been removed from the income statement, so that the revenue used here is the actual amount billed.

Institutional and governance solutions	The MD protected management and staff from outside interference in operations while demanding accountability, thereby building staff loyalty and promoting staff retention. The MD's response to inappropriate requests was to insist these were put in writing. The MD was thus able to establish and sustain the Water and Sanitation unit as a 'semi-autonomous' (from a management perspective) entity within the municipal administration. The unit had a distinctive corporate culture (it had its own separate head-office), ring-fenced finances (it had a separate income statement), was responsible for meter reading, and had its own financial and human resources staff involved in the day-to-day management of the business. The MD was able to 'showcase' the effectiveness of the unit, winning political support for the unit's investment proposals, annual budgets and on-going management autonomy, creating a virtuous cycle–management effectiveness wins trust, trust enables autonomy, autonomy enables effective management. It is this virtuous circle that resulted in eThekwini Water and Sanitation being named the 2014 winner of the Stockholm Industry Water Award, for its transformative and inclusive approach to providing water and sanitation services.

Reflections and conclusions

Results of the turnaround	The results of the reforms are clear: 55 percent of the poorest 40 percent of households have water piped to the premises. Those poor households that do not have water piped to the premises get safe, reliable water from standpipes. Overall, 97 percent of the population have access to piped water, with 80 percent having water piped to the premises. This water is safe to drink and available 24 hours a day. Affordability was enabled by providing 300 liters per day of free water for poor households.
How a mandate for the reform was secured	The national and local political reforms in 1994 established a broad mandate for reform, with a focus on extending services to the poor. The 1996 Constitution included a right to water. The constitutional and policy mandate was given practical effect through the key reform actors at the local level–the executive mayor, the municipal mayor, and the head of the water and sanitation department. Somewhat unusually, Neil Macleod, a white male, was retained as the head of water (a position he held for over 20 years).[11] Early success and effectiveness was likely to have been a key factor in convincing the city manager (a new appointee) and the executive mayor (a politician) of the merits are retaining the existing water manager. Macleod himself said that he 'ran faster than the others'. Macleod anticipated the forthcoming political changes and acted early to reorient the water service towards a pro-poor focus even before the first democratic elections in 1994. New politicians were eager to be seen to be doing something quickly and it was thus convenient to back a manager who had already demonstrated he was being effective in line with the new political agenda.
Phasing the reforms	The MD was able to 'showcase' the effectiveness of the unit in providing services to poor people early on (even before the formal political changes in 1994), and was thus able to win political support for the unit's investment proposals, annual budgets, and on-going management autonomy. The turnaround began with institutional reforms to incorporate multiple municipal water departments into a single metropolitan water department within the metropolitan government. The utility moved rapidly to incorporate the various township utilities into its management structure. It focused on expanding and improving service, and constantly innovated institutionally. Some elements of the design were agreed early in the process–such as ring-fencing the utility's finances and performance pay for the MD. Others, such as the free water allowance and how it would be paid for, were developed "on the hoof", and adapted in response to customer feedback. In many ways, the institutional structure remained very light–a department within the metropolitan municipality. There is no independent regulator, no long-term performance contract, and no separate legal corporate entity with a Board of Directors.

[11] In other cities, senior managers have held their positions for much shorter periods. The City of Tshwane, for example, has had five city managers in 12 years.

Sustaining performance	The water department remains within the overall municipal structure and is accountable to the municipal manager, the executive mayor, and the elected councilors. The council passes budgets annually and the department must report on its performance and achievements each year. This is an indirect accountability model operating at the local municipal level. Durban Water must also meet national minimum standards regulated by the national finance, local government, and water ministries–indirect accountability operating at the national level. The water unit holds customer focus groups, undertakes surveys of customer satisfaction and manages an effective call center that responds to queries and complaints. These more direct feedback mechanisms complement the indirect accountability processes. eThekwini developed a strong second tier of managers and the transition to a new manager has been apparently seamless. The strong performance culture within the organization could play an important role in sustaining the organization going forward. However, time will tell to what extent the formal structures and organizational culture are sufficient to sustain performance over time and resist predatory pressures being experienced in other state institutions in South Africa.[12]

[12] See, for example, Levy, Brian, Alan Hirsch, and Ingrid Woolard. 2015. "Governance and Inequality: Benchmarking and Interpreting South Africa's Evolving Political Settlements." ESID Working Paper No. 51.

A.3 Kampala, Uganda

Uganda's capital Kampala has a population of over 1.6 million. In 1998, when the city population was closer to 1 million, less than half the population had access to safe water sources. Access for poor families was not tracked but was certainly lower than this, with most poor families living in slums and relying on contaminated springs, wells, and water bodies. Now, 83 percent of the population has access to relatively convenient and safe piped water.[13] More importantly, this access is almost evenly distributed, with 78 percent of poor families having access to piped water. Five years after the retirement of the utility leader that drove those initial reforms and service improvements, the commitment to constantly improving performance has also been sustained under the new leadership of the current MD, Silver Mugisha. This includes a new "Water for All" program aimed at reaching the poor, both in Kampala and in a larger number of small towns that have previously been served by small providers.

The turnaround was backed by the President of the country as part of a donor-driven program of parastatal reform. A charismatic new MD of the national utility (National Water and Sewerage Corporation, hereafter NWSC) helped drive this reform. He created a management system based on autonomy, accountability, and incentives, which built on the successes achieved in the first six years of the turnaround (1998–2004) through management contracts with international firms. His strategy involved investment, cost-effectiveness, and financial viability as essential elements of extending access to everybody, including the poor. A Pro-Poor Unit, massive expansion in the number of public water points, and introduction of prepaid public water points, have all helped in bringing better quality water to poor people in Kampala.

Service before the reforms

A precise picture of service for poor people in Kampala in 1998 is not possible from the available data. For the population as a whole, access to piped water (from private connections and public taps) was 48 percent. Most of those without piped water drew water from boreholes and protected springs. More than half of those with access to piped water got it from a standpipe or kiosk. Data from 2004 (by which time improvements had already started) show that only around 22 percent of households had water piped to the premises.

Among the poor, less than 48 percent would have had access to piped water. Around 44 percent of families in Kampala lived in slums, where piped water services were very limited.[14] Many of these slums were built on private land, on which the utility was generally not able to offer either individual connections or standpipe service.[15] Moreover, the poor families predominantly lived in the low-lying and swampy valleys between Kampala's hills. In these areas, wells, springs, and water bodies provided alternative sources of water which many poor people relied on for reasons of convenience and cost.[16] In fact, when households in Uganda that were not using safe sources were asked why not, 55 percent cited cost as the main reason, while most of the rest cited inadequate sources or the long distance to safe sources.[17] Unfortunately, much of this water was contaminated, often as a result of infiltration from latrines.[18] Contaminated water sources contributed to cholera outbreaks from late December 1997 to March 1998.[19]

[13] DHS, 2011.

[14] This estimate is for 2002, but the number would have been similar four years earlier. The World Bank. 2014. *Do Pro-Poor Policies Increase Water Coverage: An analysis of service delivery in Kampala's Informal Settlements,* 12–13. The World Bank.

[15] World Bank. 2014. *Do Pro-Poor Policies Increase Water Coverage,* 13. Fifty-two percent of land in Kampala is owned by the Kingdom of Buganda. Many slums have grown up on these lands.

[16] World Bank. 2014. *Do Pro-Poor Policies Increase Water Coverage,* 14.

[17] Uganda Bureau of Statistics, "National Survey of Service Delivery 2004", Table 5.9.

[18] Kayaga, S., J. Fisher, and R. Franceys. 2009. "Improved access to urban water services in Uganda. Proceedings of the ICE: Municipal Engineer" Volume 162, Issue 3 (2009): 165–170.

[19] Legros, D., M. McCormick, C. Mugero, M. Skinnider, D.D. Bek'Obita, and S.I. Okware. 2000. "Epidemiology of Cholera Outbreak in Kampala, Uganda." *East Africa Medical Journal* Volume 77, Issue 7 (2000): 347–349.

Catalyst for reform	The catalyst for reform in Kampala was the relationship between the Museveni administration, international financial institutions (IFIs), and political elites in country. In the 1990s President Museveni and his National Resistance Movement (NRM) were supported by donors.[20] This combination of local leadership and international support enabled consolidation of service and governance reform after a long spell of dictatorship and civil war. In early 1995, President Museveni committed his government to privatizing 85 percent of Uganda's public enterprise sector by the end of 1997.[21] This commitment helped paved the way for a debt forgiveness deal worth US$2 billion to Uganda, being developed by the International Monetary Fund (IMF) and World Bank.[22] Yet at the same time, many in the NRM resisted foreign private ownership of important Ugandan companies. The tension between a desire to please donors by embracing market-oriented economic governance on the one hand–and the desire for national, social control of key entities on the other–shaped the reform path in the urban water sector. Donors recommended private participation in water services to deliver sustainable improvements, noting that *"'Over the last 10 years, the GOU [Government of Uganda] in partnership with the World Bank and other donors has made significant investments (over US$100 million) in the urban water and sewerage sector. These investments have contributed immensely to rehabilitating the existing infrastructure under the NWSC management. Unfortunately, these investments have not been matched with the necessary efficient commercial and financial management capacity that can ensure the delivery of sustainable services in the medium to long-term.'"*[23] The Government of Uganda agreed to bring in an international company to operate the NWSC under a management contract. At the same time, utility and political leaders in Uganda began a search for a Ugandan, public sector solution to the performance problems in the NWSC.
Course of action decided on	In 1997 the principles were set: commercialized management of the utility, continued donor investment, and the aim of improving service to everyone. In Kampala a management contract with Gauff, a German company, was signed in 1998. Yet there was no overall blueprint. The management contract was for just three years–an interim step. The next stage of institutional development was left open. Regulatory matters such as setting of tariffs and service standards were left largely to the utility. There was no engineering masterplan that guided service in the city. Much was left open to be solved as new information and challenges emerged.
Actors driving the reforms	At a political and policy level the actors driving the reforms were President Museveni and several donors. In 1998, a powerful new player entered with the appointment of William Muhairwe as MD of the NWSC. From then on, the strategy in Kampala's water sector was a product of Muhairwe's drive and enthusiasm, backed up by President Museveni's all-powerful support. While donors initially advanced management reform, the model that developed after 2004 was a new approach that combined autonomy incentives and accountability with public sector ownership and a Ugandan management team.

[20] Ottaway, Marina, 2000. *Africa's New Leaders: Democracy or State Reconstruction?* Washington, DC: Carnegie Endowment for International Peace.

[21] Tangri, Robert K. 1999. *The Politics of Patronage in Africa: parastatals, privatization and private enterprise,* 53. Oxford.

[22] International Monetary Fund. "HIPC Debt Relief for Uganda Increased to a Total of US$2 Billion: Additional Relief Vital for Uganda's Poverty Reduction Programs" *International Monetary Fund* February 8, 2000. Accessed September 18, 2015. https://www.imf.org/external/np/sec/pr/2000/pr0006.htm

[23] World Bank. "Aid Memoiré Document, 1998, Project Evaluation Report to NWSC Management," cited. Mugisha and Berg. 2008.

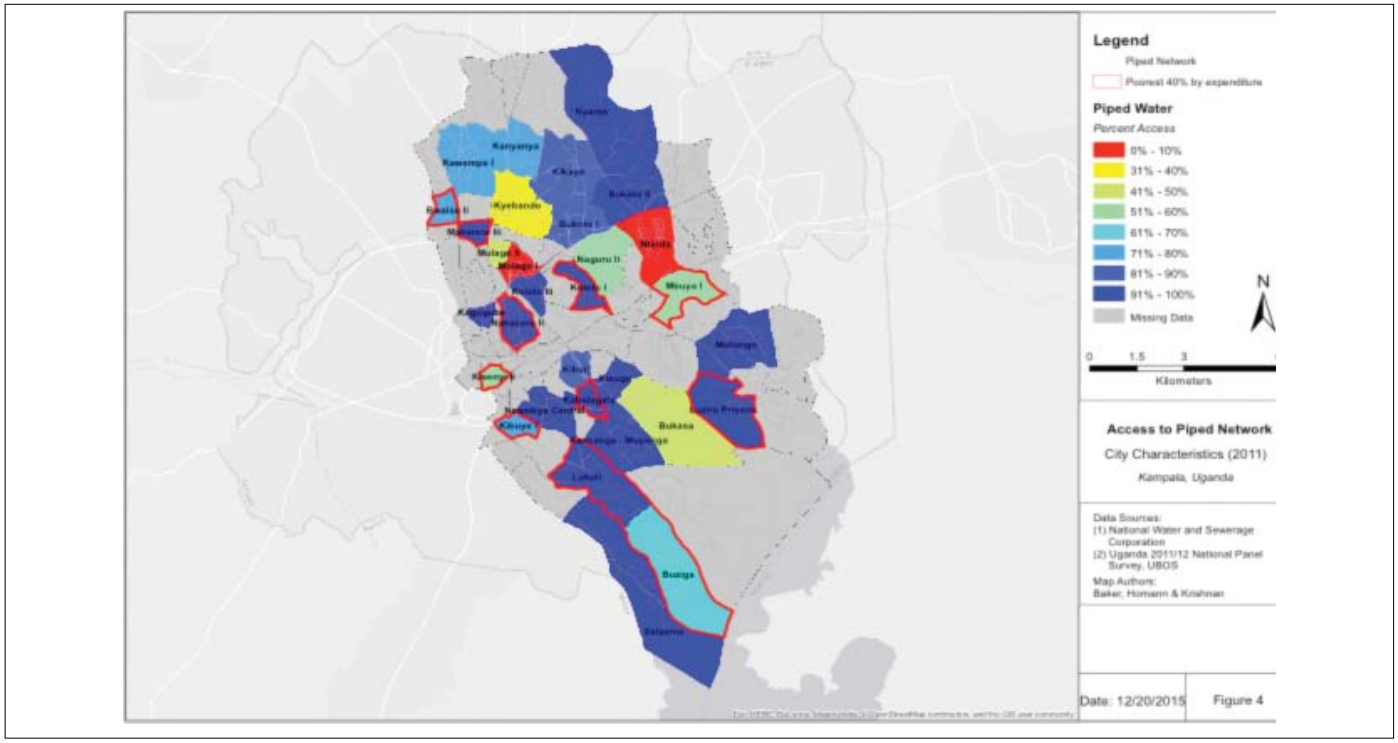
Technical solutions implemented

Water production for Kampala nearly doubled from 2002 to 2015, increasing from 34 million m^3/year to 63 million m^3/year. In 2006, the Gaba III water treatment plant project was completed–this raised water production for Kampala and nearby areas by 80,000 m^3/day.

To extend service throughout the city, the NWSC more than doubled the total length of the network, adding around 1,300 km of pipe in Kampala between 2004 and 2013. Network extensions allowed the total number of connections to be more than quadrupled, from around 45,000 in 2002 to over 200,000 in 2015.[24] In planning its network extension, the NWSC used geographic information systems (GIS) to identify poor communities and ensure service reached them.[25]

Figure A.5 shows rates of access to piped water in neighborhoods of Kampala for which sufficient data were available. Those areas surrounded by a red line are where the poorest 40 percent are estimated to live. The map shows that in many poor areas, access to piped water is greater than 90 percent. However, in some areas in the Northeast, access to piped water by the poor appears very low.

FIGURE A.5: ACCESS TO PIPED WATER BY POOR, KAMPALA



[24] Connections include public standpipes and all connection types (domestic, industrial, and institutional).

[25] World Bank. 2014. Do Pro-Poor Policies Increase Water Coverage, 13.

Standpipes serving water kiosks were chosen as the main way of providing water services to low income communities. This kept costs low, compared to making individual connections, and also enabled service to poor people in informal settlements on private land where the NWSC could not offer individual service. The NWSC has more than tripled the number of standpipes in its service area since 2003, bringing the total number to around 7,700 in 2013.

Water is available for 18 hours per day on average across the network. Results of water quality tests have been provided in the publicly available Annual Reports since 2010. As of 2013, in the 23 towns the NWSC served at the time, at least 97 percent of samples passed E-coli tests. In the same year, 22 of 23 towns produced water that met the National Standard for turbidity (less than 5 NTU).

Commercial solutions implemented

In 2004 the NWSC changed its commercial and services delivery strategies to better align them with the government's objective that 100 percent of the urban population should have safe, sustainable, water services within easy reach.[26]

Around 7 percent of poor households in Kampala have water piped to their premises.[27] To promote such access, the NWSC has operated an Affordable Connections Policy since 2004. Connection fees were reduced from US$75 to US$35. Moreover, the NWSC took on responsibility for making a service connection of up to 50 meters from the utility's supply point. The NWSC also maintains the service line, up to the meter on the customer's premises. By taking responsibility for constructing and maintaining the line, the NWSC has not only helped customers but also increased the quality of the service lines, reducing nonrevenue water. The connection subsidy is covered from a 10.7 percent surcharge on most consumption. The tariff for domestic consumption is around US$0.77/$m^3$.

Standpipes and shared taps are the main source of water for poor people in Kampala, with 71 percent of poor families relying on them in 2011.[28] These shared taps have provided a huge increase in access to safe water, compared with what prevailed in 1998. Most of these taps serve kiosks operated by someone who has paid for the connection and then on-sells the water. Some kiosks are municipal, some are run by community groups, others are private. The NWSC charges $0.47/$m^3$ for water dispensed at standpipes. This is below the domestic tariff. The subsidy is justified on the basis that standpipes are mostly used by poor people. However, some of the kiosks charge a significant mark-up for the water. Once the water is dispensed in 20 liter jerrycans at the kiosk, the effective tariff can be US$1/$m^3$or more.

To make access to shared taps more widespread and more affordable, the NWSC innovated by:

- **Removing the monthly fixed charge for some standpipes in poor areas.** This reduced the cost of water from these taps by about 10 percent. This change was made after the President pledged it during the 2006 election campaign.
- **Recognizing that some individual yard taps are, in fact, shared water points.** The NWSC monitors consumption of water per connection in low income areas. When consumption is unusually high, staff from the NWSC's Pro-Poor Branch visit. If it is clear that the yard tap is serving more than two or three households, then the tariff for public water points is applied.
- **Using prepaid public water points.** These are standpipes which automatically dispense water when a customer inserts an electronic token. By cutting out the middleman (the kiosk operator) these prepaid water points ensure that poor customers can access water at the tariff set by the NWSC, avoiding mark-ups.

[26] The World Bank. 2014. *Do Pro-Poor Policies Increase Water Coverage,* 21. Material in this subsection is derived from that publication unless otherwise noted.

[27] DHS, 2011.

[28] DHS, 2011.

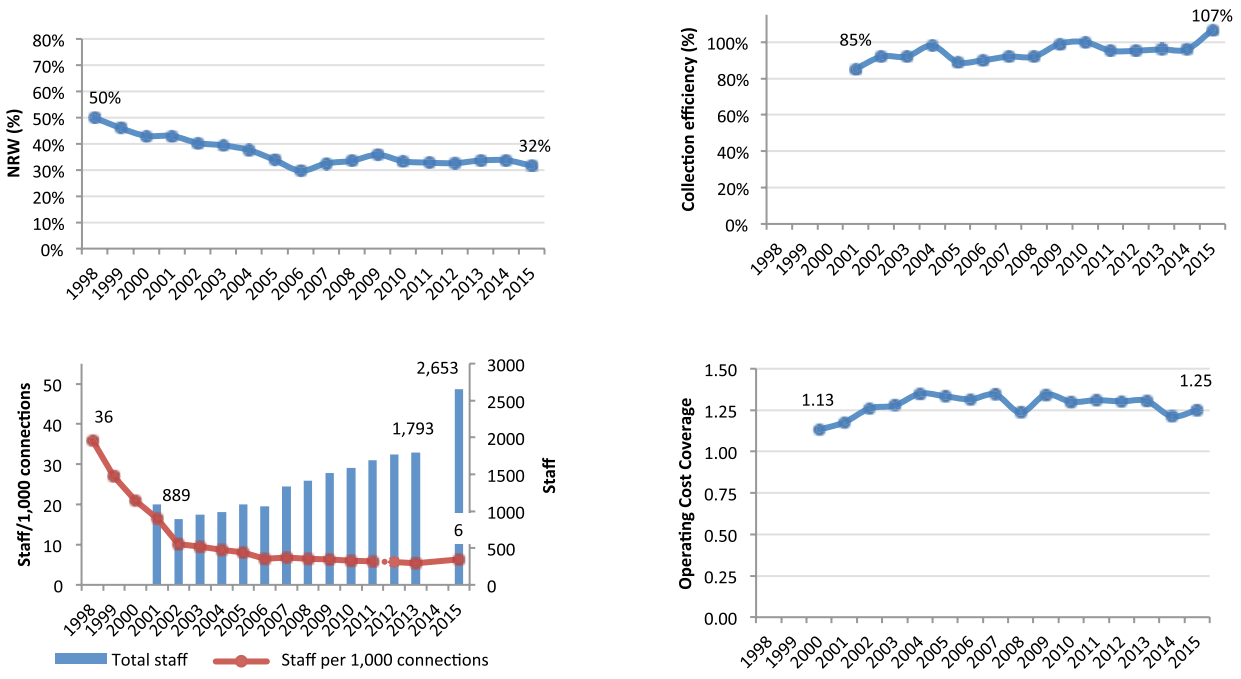
Financing solutions implemented

The infrastructure and service improvements described above required about US$100 million in capital expenditure between 2002 and 2011.[29] Only 28 percent of this was grant-financed. About half was financed from operating cash flows. In 2010, a commercial loan of US$2 million was obtained for financing the extension of the Gaba intake plant, which supplies water to Kampala city and the surrounding areas. This loan is being serviced from operating cash flow.

When the reforms started, the NWSC had debts to the government that it could not service. Most of the indebtedness resulted from loans from IFIs to the Government of Uganda that had been on-lent to the utility. The government agreed to a moratorium on debt service for a period, which gave the NWSC financial breathing space. Then, in 2007, the government converted the outstanding balance of US$47 million into equity–effectively forgiving the debt.

Achieving financial self-sufficiency was core to the service improvement strategy from the start. The NWSC's ability to earn a surplus over operating costs has enabled expansion of service to poor neighborhoods to proceed independently of availability of funding from the government budget. As Figure A.6 illustrates, the NWSC has had an operating surplus of at least 18 percent of operating costs since 2002 (bottom right panel). Figure A.6 shows a positive continuation of these trends in these developments, and a new drive is in progress to address NRW with fresh dedication.

FIGURE A.6: ACHIEVING FINANCIAL SELF-SUFFICIENCY AT NWSC



Note:
Figures are for the NWSC as a whole, not just its Kampala service territory.
Source: Utility research (see Table D.2 for full list of sources).

[29] Figure quoted in 2011 US dollars. Data are from NWSC financial statements and annual reports.

To achieve this surplus, the NWSC has driven NRW down from 50 percent in 1998, with its continued efforts helping getting it to around 32 percent in 2015. Collection efficiency has also improved considerably, from 85 percent in 2001 to over 95 percent since 2010. Labor productivity has skyrocketed from 36 staff per 1,000 connections to just six staff per 1,000 connections now. Until 2002 this improvement was achieved by reducing staff numbers, which brought the ratio down to 10. Since then, productivity gains have been achieved by adding connections quickly, while holding increases in staff numbers to a lower rate.

Adequate tariffs have been equally important to the NWSC's ability to finance expansion of service to the poor. To protect real revenue from the effects of inflation, the NWSC's tariff has automatically increased with inflation since 2004.[30]

Cross-subsidies are important in the NWSC's strategy to combine financial stability with affordability. The average water and sewer tariff of US$1.06 – adequate for cost recovery – is higher than the domestic tariff of US$0.77, which is in turn is higher than and the standpipe tariff of US$0.47. Overall cost recovery is achieved by charging large users more than domestic customers. However, to keep large users on the system–and so contributing to revenue–the tariff rate for commercial consumption above 1,500 m^3 per month is lower than for consumption below that rate (US$0.93/$m^3$ compared with US$1.16/$m^3$).

In 2015, eligibility for subsidized connections was restricted to only poor customers. By charging better off customers the full cost of a connection, the NWSC hopes to increase the cash available to expand service to poor customers.[31]

Institutional and governance solutions

A new law in 1995 corporatized the NWSC, giving it a fairly standard set of corporate powers and responsibilities. The corporation is governed by a Board of Directors appointed by the Minister responsible for water. In 1998 a new Board and a reforming MD, Muhairwe, were appointed. Muhairwe replaced Hillary Onek (who later became Minister of Internal Affairs) as MD "at a time when the company was almost collapsing due to poor management, poor services and debt".[32]

Shortly before Muhairwe and the Board were appointed, Gauff, an international engineering firm, had been brought in on a three-year contract to run the NWSC's Kampala operations (more than 70 percent of the company). After a gap of a couple of years, another management contract was awarded, this time to ONDEO.

In parallel with these 'external' management contracts, Muhairwe developed a series of internal management contracts. The first of these were 'area performance contracts' which applied to the areas outside Kampala not managed by the external management contractors. The NWSC managers for these areas were given performance targets, and bonuses for meeting the targets. Later, a similar concept called 'Internally Delegated Management Contracts' was applied to the management of the NWSC's Kampala service area also.

In 2003 a Performance Contract was agreed between the government and NWSC. The Performance Contract set out targets for the utility, including a requirement to develop plans, and funding for network expansion. The contract was essentially a corporate strategic plan with quantifiable targets and milestones, setting out the agreed way forward.[33]

By 2004 then, the NWSC had forged for itself a distinctive governance structure. Contracts agreed with the national government set out service and efficiency indicators. The utility was financially and managerially autonomous. Performance targets and managerial autonomy were transmitted down the organization from the MD to unit managers using internal management contracts. Incentives for good performance were provided through worthwhile bonuses.

[30] The Water Act (General Rates) Instrument, 2006.

[31] Mugisha, Silver. 2015. "Water for all: Delivering the promise." National Water and Sewerage Corporation.

[32] Matsiko, Haggai. 2011. "Behind the Scenes at Muhairwe's Exit." The Independent (Uganda). http://independent.co.ug/business/business-news/4897-behind-the-scenes-at-muhairwes-exit

[33] Performance Contract between the Government of the Republic of Uganda and the National Water and Sewerage Corporation, October 17, 2003.

The appointment of quality technocratic leadership in the senior management of the NWSC was instrumental in enabling reforms to be sustained and further reforms introduced. It has also helped securing political autonomy and instituting rigorous performance metrics. After Muhairwe retired, his place was taken by Dr. Eng. Silver Mugisha, a member of the management team developed during these earlier transformative reforms. There has also been willingness to try new approaches and renew priorities. In the three years or so since his appointment, Mugisha has been quite assertive in driving a firmer agenda on the NWSC's role in smaller towns than was the case under the previous MD. He has also placed a renewed emphasis on revenue collection, which–according the utility's data–has doubled. There has been a renewed emphasis on NRW reduction activities, and notably a new drive for increased community and other key stakeholder involvement, customer outreach, and responsiveness. This has included upgrading the call center and digital (social media) systems.

Management solutions implemented

During the period of the external management contracts, substantial progress was made in reviving the NWSC as an effective service provider. NRW fell from 50 percent in 1998 to 43 percent by 2001 while connections rose from 51,000 to 66,000. GIS and other IT systems were improved.

In parallel, Muhairwe focused on building a performance culture within the organization. An initial 100-Days program crash program (February 1999 to May 1999) set demanding short-term targets which the management team stormed toward, shocking the system out of its lethargy. Other initiatives followed, including consultative strategic planning to build a shared sense of purpose among all staff.[34]

In 2006 a Pro-Poor Unit was created to bring a focus on extending service to poor areas. This unit, with seven multidisciplinary staff, takes up issues in effectively serving the poor with the commercial and operational branches of the Corporation.[35]

Under the current MD, Mugisha, the cultivation of a professional staff and an institutional culture of efficiency and accountability remains firmly on the organization's agenda. With government support for the NWSC's new "Water for All" program, this has meant an improvement in getting government institutions to meet their own debt obligations to the utility.

Reflections and conclusions

Results of the turnaround

Thanks to the NWSC's turnaround, 78 percent of poor households in Kampala now have access to piped water services. The cost of water has come down for many poor people. Across the network, water is available on average for 18 hours per day. All operating costs, and much of the capital costs of expansion to poor customers, are covered by resources generated by the utility itself. This resource generation is made possible by the NWSC's cost effective operations, coupled with a tariff that allows for cost recovery overall.

How a mandate for the reform was secured

Institutional reforms to create an effective utility were recommended by donors, and supported by a President with a secure political position. However, the path the reforms took was not that envisaged by the donors. Rather, it was a homegrown model crafted by a savvy utility MD. This model transcended the dilemma of 'efficiency or local control' by adapting models designed to bring efficiency through foreign management control to work with local, public sector control. In this way it appealed to local political elites while also being acceptable to international donors. The model has delivered sustained success in expanding access for poor people for over more than 15 years.

[34] Mugisha, Silver, Sanford V. Berg, and William T. Muhairwe. 2006. "Using Internal Incentive Contracts to Improve Water Utility Performance: The Case of Uganda's NWSC," 3.

[35] World Bank. 2014. *Do Pro-Poor Policies Increase Water Coverage,* 21. Material in this sub-section is derived from that publication unless otherwise noted, 26.

Phasing the reforms	The reforms were fluid and adaptive. The initial concern was to deliver water to existing customers while staunching financial losses. Competing models of local and international management were tried in parallel. Pragmatic solutions including tariff indexation, financial restructuring, and a performance contract rather than a regulator, were developed. Much attention was given to the management aspects of creating a successful utility, from the original 100-day program to eventual construction of a training center to boost skills systematically. After the utility's finances and management were stabilized in 2004, attention shifted to improving service to the poor, with creation of a Pro-Poor Unit, and development of commercial and technical solutions to improve access for poor households.
Sustaining performance	As the NWSC has become successful, generating increased revenue, positive cash flows, and deploying a large capital expenditure program, the temptation for predation must increase. The utility management team told us success in serving the poor breeds its own protection, since "In Kampala, the poor vote." The utility also cites the barazas (community meetings) as ensuring it remains accountable while building community constituencies of support. A strong culture, coupled with training and management succession planning, support continued professionalism. The formal mechanism of automatic tariff indexation helps to protect against populist short-termism, preserving the utility's ability to continue to fund expansion of service to the poor.

A.4 Nyeri, Kenya

In Nyeri–a city of almost 150,000 people in Central Kenya–88 percent of poor households have water piped to their premises by the municipal utility (NYEWASCO). Two percent use public taps, while 7 percent rely on other improved sources, giving a total of 96 percent access to improved water services.[36]

For the 90 percent of poor households using piped water, water is available 24 hours a day, and is safe to drink. In fact, Nyerians travelling to Nairobi and other towns in Kenya may carry containers of NYEWASCO water for their journey, so great is the trust in the utility.

It was not always like this. In the early 1990s, water was provided by the then municipality. It was rationed, unreliable, and unsafe to drink. The network did not serve the growing informal settlements built on steep slopes around the urban periphery.

[36] Baseline: "State of the City" survey (Kenya), 2012–2013.

In 1995 the Nyeri Council, led by Mayor Jackson Wanjage, decided the town deserved better. The Municipal Engineer (Joseph Nguiguti) provided the technical expertise. Together, they persuaded a donor to let them join an existing program in Kenya supporting the creation of municipal-owned public companies with autonomous management and a commercial orientation. The new company faced two immediate problems–inadequate supply and high losses. While in the process of negotiating a loan for new investments to fix the supply problem, the new company focused on improving cash flows and reducing losses.

Things really started to turn around in the early 2000s when NYEWASCO secured a loan from the KfW to finance new production capacity. Thanks to sound technical and commercial management, NYEWASCO has been able to extend the network and service the loan through improved cash flows, made possible by providing a better service. Social tariffs ensure water is affordable. Kiosks and meter banks serve people in informal settlements where laying conventional distribution networks is not feasible.

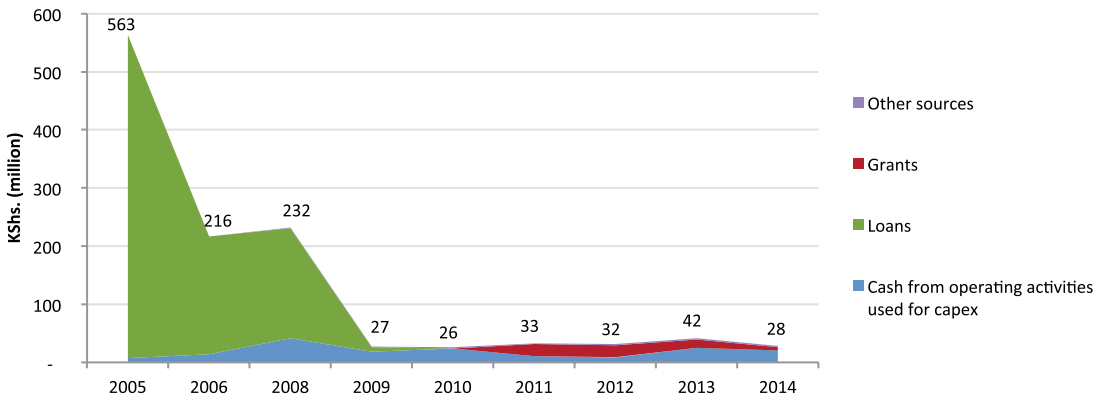
Service before the reforms	Reliable data on the situation before 1995 are not available. Those who lived through the period recall that infrastructure investment had not kept up with population growth. Water was rationed by limiting supply to a few hours per day–and this water was not safe to drink. Informal settlements were not served at all.
Catalyst for reform	There was no donor conditionality, technical assistance or national government intervention to catalyze reform. Rather, the then local government became convinced that the poor service was not in keeping with the town's needs, and that it must be possible to do better.
Actors driving the reforms	The political impetus for reform came from the visionary and charismatic Mayor, Jackson Wanjage, who had political support from the municipal council. Technical and managerial input came from a capable and motivated Municipal Engineer, Nguiguti, who at the time was responsible for water supply because of his role in running all of the engineering services in the municipality.
Course of action decided on	In 1995 the town administration united around the objective of providing safe reliable water to all citizens. Lacking money and utility management expertise, the decision was made to seek external support. The mayor and municipal engineer successfully lobbied to be included in a German Technical Cooperation (GTZ) program assisting with water utility commercialization. This helped develop the next stage of the reform vision–to build an efficient utility, and raise finance to expand production and distribution.
Technical solutions implemented	The number one problem was that water production was not adequate to supply the needs of the growing population. A loan from the KfW was negotiated to finance a new bulk water supply scheme. However, donor sanctions during the Moi administration meant it could not be disbursed. NYEWASCO's own engineering team improvised ways to boost production from the existing infrastructure above design capacity, increasing supply from 6 MLD to 8 MLD. The team also started to get leakage under control. More production and less leakage meant that hours of supply could be increased.

	In 2003 the KfW loan was finally disbursed, allowing NYEWASCO to construct a new 21 MLD capacity plant. The new water source brought an end to water rationing. It also reduced pumping and treatment costs because the new facility was located above the town, near the water source. With the new facility on line, NYEWASCO was able to expand its distribution network, taking advantage of a grace period in loan repayment and increased cash flows arising form a better service. Between 2006 and 2015, 752 km of pipe were added to the network, more than quadrupling total network length. This allowed more than 13,000 additional households to be connected. During the same period, the number of public water kiosks was increased from 3 to 16. Networks were extended to all parts of the town, both rich and poor. In informal communities, after the installation of public kiosks, households were offered private connections. Where conventional service pipes could not be laid for technical reasons, meter banks were installed. NYEWASCO then assisted households in making flexible pipe connections from the meter bank to their home.
Commercial solutions implemented	To assist poor households in connecting, Nyeri has kept the upfront costs of connection low. Until recently, households had to pay KShs 3,100 (about US$35), of which KShs 2,000 is a deposit. Recognizing that even this amount is a barrier, NYEWASCO recently reduced the deposit by 500 KShs. The tariff is rising block. Consumption up to 10 m^3/month is KShs 32/m^3 (US$0.36/$m^3$). A poor household of six people consuming 50 liters each per day would have to pay KShs 284 per month (US$3.23). Industrial and commercial customers, and residential customers consuming in the higher blocks, pay cost-reflective tariffs. Businesses such as tourist lodges pay tariffs six times higher than people in slums. These cross-subsidies allow the utility to finance universal service. The average water tariff across all customer classes is KShs 58/m^3 (US$0.65/$m^3$). All customers are metered. NYEWASCO uses mobile technology to help poor customers manage their cash flow by paying in small and irregular increments, as water is consumed or as cash is available. Customers can read their meter at any time and use a mobile phone to communicate the reading to the utility billing system. The customer can then pay using MPESA, Kenya's widely used mobile money system.
Financing solutions implemented	When Nyeri embarked on its turnaround strategy, it had no funds to invest in infrastructure. After embarking on the GTZ-supported commercialization strategy, NYEWASCO was able to secure a loan from the KfW. The loan was facilitated by the Government of Kenya, which borrowed in Euros, and on-lent to NYEWASCO as a KShs 1.1 billion (US$18 million) loan. The other loan terms were an interest rate of 2.5 percent, a tenor of 30 years, and a grace period of eight years. This loan financed the new production facility and some initial network expansion, as well as work on rehabilitation and equipment for leak detection and repair. Apart from the KfW loan, other sources of finance were cash generated from operating activities (all of which went on debt service or was plowed back into the business), and a total of US$0.7 million in grants from Kenya's Water Services Trust fund which assisted with expanding distribution. Financing sources over time are shown in Figure A.7.

NYEWASCO could not have secured this loan if it had not convinced the KfW of its ability to operate cost-effectively and to service the debt. To actually service the debt, the utility needed to generate enough cash from operations to cover its debt service obligations once the grace period ended in 2009. As Figure A.8 shows, this was achieved.

To ensure that it could service the debt, NYEWASCO focused on improving operating efficiency. By 2006 it had already got its collection rate up to 98 percent. From then on the collection rate averaged more than 100 percent–made possible by continued collection of long over-due arrears, as well as rigorous collection of current bills. To collect from government customers, NYEWASCO makes a point of knowing when government customers will receive cash from the budget, and follows up on payment at that time. To ensure collections from the police compound, the utility strategically re-laid pipes so that the compound could be cut off for nonpayment from within the utility headquarters. This innovative approach stopped the harassment of utility staff that had previously prevented it from enforcing payment.

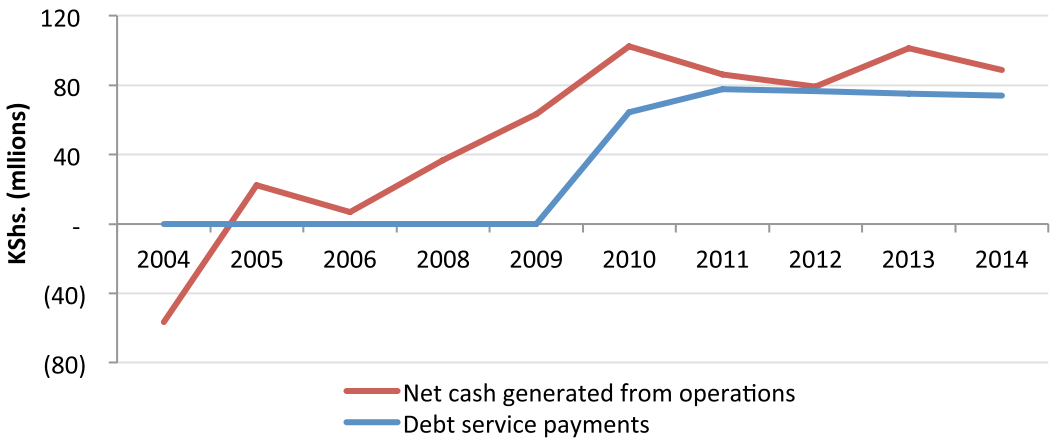
FIGURE A.7: SOURCES AND AMOUNTS OF CAPITAL EXPENDITURE FINANCING



Note:
The 2008 financial year ran from January 2007 to June 2008. Prior to 2007, NYEWASCO's financial year ran from January to December. For this reason, 2007 does not appear in the graph above.

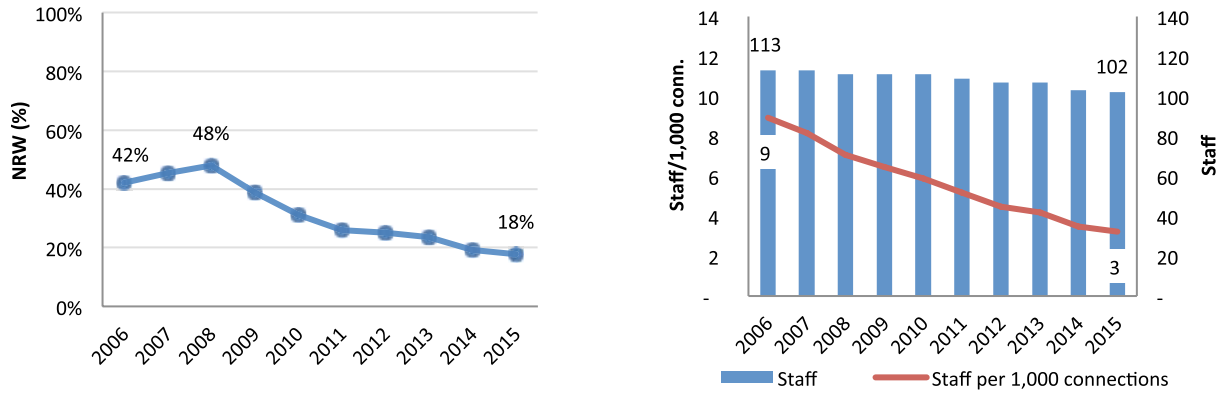
Source: NYEWASCO Financial Statements.

FIGURE A.8: CASH FROM OPERATIONS COMPARED TO DEBT SERVICE PAYMENTS



Source: NYEWASCO Financial Statements.

FIGURE A.9: NONREVENUE WATER, STAFF PRODUCTIVITY (NYEWASCO)

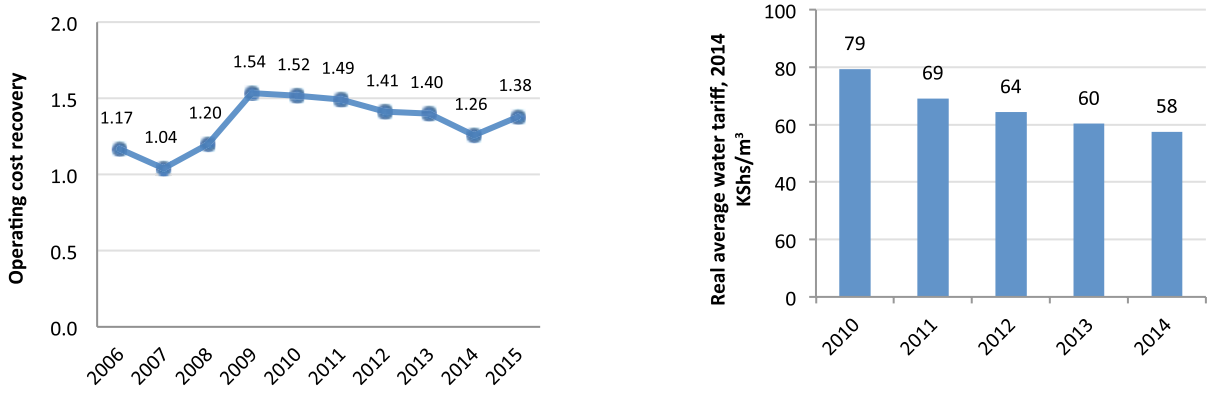


Source: NYEWASCO.

As Figure A.9 shows, NRW was 42 percent in 2006, and then went up as new supply came on line. NRW reached a high of 48 percent before NYEWASCO was able to get it under control and drive it down to its current levels of 18 percent. During the same period, staff productivity tripled, because the utility was able to hold staff numbers roughly constant while tripling customer numbers.

These increases in operating efficiency have allowed NYEWASCO to consistently achieve an operating cost coverage ratio of between 1.26 and 1.54 every year since 2009, even as average tariffs declined in real terms (see Figure A.10). It should be noted that NYEWASCO is concerned that the declining real tariff could threaten its ability to finance asset replacement in the future.

FIGURE A.10: COST RECOVERY AND REAL AVERAGE WATER TARIFF OVER TIME



Source: NYEWASCO.

Management solutions implemented	To drive the efficiency gains that allowed universal service to be financed, NYEWASCO adopted modern management techniques. All staff are involved in strategic planning. Computerized systems are used. The systems are transparent and audited, reducing risk of malfeasance. Staff are provided with technical and managerial training. All of this has built a strong corporate culture which now resists predation or malfeasance.
Institutional and governance solutions	At the start of the commercialization program, the utility–which had been a department in the municipal government–was corporatized, becoming NYEWASCO (a wholly municipal-owned company established in terms of private company law in Kenya). Utility staffing, accounts, and finances are ring-fenced. Kenya promulgated a new Constitution in 2010, and since 2013, water services have been a devolved function. This means that Nyeri Water and Sewerage Company is currently owned by the County Government of Nyeri. However, since the national Water Act of 2002 has not yet been repealed, NYEWASCO still has a Service Provision Agreement (SPA) with the nationally owned asset holding Tana Water Services Board. NYEWASCO reports and accounts together with the County Government of Nyeri to the national regulator, WASREB, on an annual basis. The utility is therefore accountable to the county government, but also to WASREB, Kenya's national water regulator. WASREB sets tariffs and minimum services standards through a process divorced from local politics. WASREB also monitors and publishes key performance indicators for NYEWASCO and all other Kenyan utilities, and it oversees and enforces minimum good governance processes related to the selection of board members, their security of tenure, and related matters. The continuity of the management team is a notable feature, with the capable MD retaining his position from the commencement of the company until 2014. After a prolonged interim arrangement, a new MD took office in 2015.

Reflections and conclusions

Results of the turnaround	The results of the reform are clear: near-universal access to piped water (94 percent), 96 percent of poor households with access to improved water services, 88 percent of poor households with water piped to their home, water that is safe to drink, and availability of 24 hours a day. All this was achieved with almost no financial support from the local or national government. The utility's operating efficiency is among the best in Africa, which enabled it to finance near universal service while preserving affordable tariffs and minimizing subsidies.
How a mandate for the reform was secured	Civic pride, a strong political leader (the mayor), and a dedicated and capable utility engineer were the key ingredients that came together to put Nyeri on the path toward universal high-quality water service. From a political economy perspective, it probably helped that the utility at the time was small and starved of funds. Its small size and weak financial standing likely minimized vested interests in continuation of the status quo–low coverage and intermittent service–for patronage, corruption, and other forms of predation. In other words, it seems the political benefits of improved service outweighed the political costs from loss of rent-seeking opportunities. It may also have helped that Nyeri is a relatively ethnically and culturally homogenous town, minimizing inter-group rivalries that could otherwise have interfered with a drive for universal service and the use of cross-subsidization to achieve it.
Phasing the reforms	The turnaround began with managerial reforms to increase efficiency. Governance reforms to create a ring-fenced utility followed. Throughout, the utility's goal was to raise the finance needed to improve and extend service. However, securing the finance took several years, and disbursement was delayed because of a period of poor relations between Kenya and IFIs. In the interim, the utility improvised low-budget solutions to improve service. These service improvements, together with a policy of avoiding layoffs and building corporate culture, secured continuing stakeholder support for the turnaround plan. Once finance was available, the first priority was to bring a big new production plant on line. This immediately improved service to existing customers. Leakage went up initially, but that did not matter in the short term: ample water was available, and pumping and treatment costs had been reduced. The next priorities were to get leakage under control, and to extend the network. In parallel, NYEWASCO knew it was urgent to increase operating cash flows. The grace period on the loan created just enough time in which to do this.

Sustaining performance	NYEWASCO's success in growing, securing finance, and generating positive cash flow now make it a tempting target for predation by politicians and corruption from within. The utility protects itself from predation by building strong community support. It not only provides good service, but also has highly visible commitments which create credibility with the community, such as fixing pipe bursts in less than 24 hours. NYEWASCO is transparent, holding regular *barazas* (similar to town hall meetings) and an annual open day in which customers are invited to tour its offices and facilities. As a result, customers–who are also voters–are fiercely protective of NYEWASCO and its autonomy. For instance, when the local radio station reported that a political attempt to interfere in NYEWASCO's management could be afoot, many citizens called the utility asking what they needed to do to stop such interference. At NYEWASCO, an internal culture of performance, transparency, and accountability creates an *esprit de corps* that also militates against corruption and predation.

A.5 Ouagadougou, Burkina Faso

A severe water shortage and financial difficulties in the 1990s led to an initiative to reform the utility responsible for providing water to Ouagadougou in Burkina Faso. In the context of a structural adjustment program for the country, the financiers proposed that the government lease ONEA's operations to a private operator as part of a broader set of financial conditions. An alternative was negotiated, namely, to establish a corporatized government-owned company operating under public management. A private consortium was contracted to provide commercial and financial management support services to the public utility in the period 2001 to 2006. Improvements in service coverage and performance have been both dramatic and sustained over a period of 15 years. Starting initially with an investment in water production capacity, the utility subsequently focused on expanding the distribution network, resulting in an increase in the number of connections from 42,000 in 1996 to 330,000 in 2014, a growth of 11 percent per year. As a result, 90 percent of the poorest 40 percent of households living in Ouagadougou (and 94 percent of the total population) now have access to a piped water service. Only half of the total population had access to individual or communal piped water service before 2000. These achievements are particularly noteworthy in a country with a per capita GDP of US$713 (2014) and available freshwater resources of only 711 m^3 per person per annum (2014).

After an initial injection of equity, grants, and loans, the expansion of services was achieved through net positive cash flows. These were in turn enabled by a combination of improved management and efficiency and increased tariffs. These improvements were reflected in increased revenue collection (from 85 percent to 97 percent), greater staff productivity (from over eight to below three), and maintaining NRW at 18 percent.

ONEA has maintained financial viability with net cash flows (cash revenues less cash expenditure for operations) comfortably exceeding the debt servicing requirements. A well-calibrated financial model, agreed with a stakeholder body that is formally engaged in the process, and used to inform both planning and tariffs, has been an important contributing factor.

ONEA has a mandate to serve formal areas only; however, 25 percent of the 2.5 million people in Ouagadougou live in informal settlements (Figure A.11). The expansion of Ouagadougou's water supply system enabled ONEA to expand services to informal areas even though it did not have a formal mandate to do so. The management of the network going into the informal settlements is delegated to private operators who construct the network and connections and sell water to customers. This is resulting in much improved services in these areas with many households receiving a connection at their premises.

(Photo Credit: ONEA, Ouagadougou, Burkina Faso).

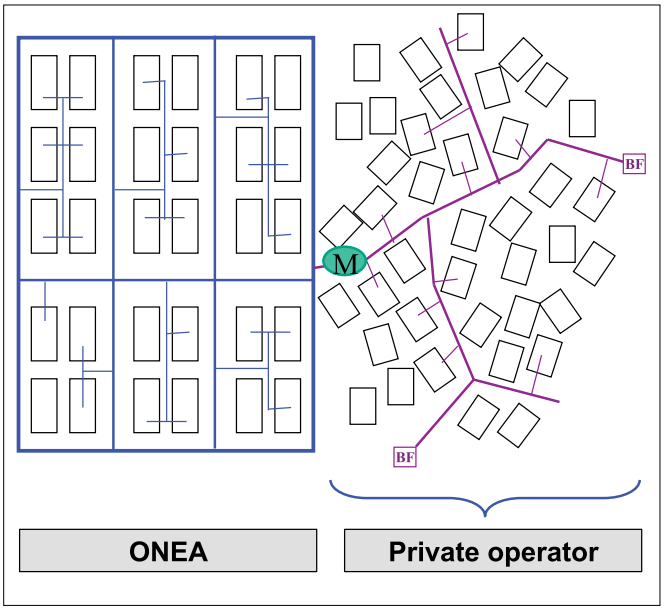
Service before the reforms	The population of Ouagadougou had doubled in the period 1985 to 2000 (to about 1 million people), but the development of water services infrastructure had not kept pace with increasing demand. In 2000, only half of the population had access to piped water (through individual taps or communal standpipes) and 60 percent of the service areas experienced severe water shortages during the three hottest months of the year. ONEA had 29,000 customers in Ouagadougou. Staff productivity was low at 10 staff per 1,000 connections. Cash collections were also below par at 85 percent from private customers and 65 percent from government customers. Up until 1996, ONEA was mired in serious management and administrative problems–it had stopped producing financial statements and, until 1998, its auditors were unable to verify its accounts. Water was sold below the cost of production and distribution, and the service provider was in serious financial difficulty. Finances for the expansion of services were not available.[37]
Catalyst for reform	The reforms arose as a result of a deepening crisis. There was not enough water to provide to residents in Ouagadougou and severe shortages were a regular feature, especially in the hot summer months. The government did not have the financial resources to remedy this situation and turned to donors for assistance. Burkina Faso entered into a structural adjustment program in 1990 to address its dire economic and financial situation. Engagement between the government and donors throughout the 1990s ultimately led to an investment project, conditional on associated reforms of the utility commencing in 2001.
Actors driving the reforms	Salif Diallo, Minister of Environment and Water (1995 to 1999), negotiated the water sector reforms with the World Bank and other donors. Mamadou Lamine Kouate was the Director-General (MD) of ONEA over the period 1995 to 2005 and led the reforms of the utility. Both resisted the World Bank's recommendation to introduce a private operator to manage the service, along the lines of the successful reform which had been implemented in Senegal. This tension produced a different solution–ONEA remained a government-owned, limited liability company. Through a performance-based service contract, deputy managers for the commercial and finance functions were brought on from Veolia. A Supervision Committee–comprising representatives of consumers, government, nongovernmental organizations (NGOs), and donors–was established to oversee ONEA's and the government's performance against the *Contract Plan.* Kouate proved to be a capable leader and manager of the utility reforms (as evidence in the impressive results). The undertakings made by Diallo on behalf of the government–including, for example, a government commitment to pay for water–proved to be credible.
Course of action decided on	Investments in increasing the supply of water to Ouagadougou were urgently needed. Funds were committed in 1996 by 11 donors, including the World Bank who contributed US$70 million of the more than US$200 million water infrastructure and reform project. Conditions related to the funding were negotiated with the Government of Burkina Faso. Technical assistance from a private operator, Veolia, was provided through a service contract in the period 2001 to 2006 coinciding with investments in infrastructure, to run ONEA's commercial, accounting, and financial operations.
Technical solutions implemented	Investments were made in additional supply capacity for Ouagadougou with the Ziga water supply project (including a new 200 million m^3 dam) and in extending the network–171 km of secondary network and 1,437 km of tertiary network were constructed. A key challenge was to provide piped water services to people living in informal settlements (where some 25 percent of the city population lived). Stakeholders agreed on a new vision of water supply to informal areas in 2004. Pilot projects were conducted in five suburbs of Ouagadougou from 2009. This involved the construction of the network and supply of water to a meter at the edge of the pilot informal settlements. The management of the network going into the informal settlements was delegated to private operators, as was the construction of the network and connections (using flexible HDPE piping and meters) and the retail to customers. Private household connections are an important part of the service mix as this enables the private operator to sell more water and hence increase its own revenue. Water is sold on the same terms as are provided by ONEA. Connection materials are provided by ONEA and the operators' installation costs are reimbursed to encourage them to make connections. By the end of 2014, there were 7,578 connections

[37] World Bank. 2001. Project Appraisal Document, Ouagadougou Water Supply Project.

in the five informal settlements of Ouagadougou and the program is being extended to other informal areas. ONEA is the lead agency in the operation and an inclusive stakeholder consultation framework has been established.

ONEA monitors water quality using a central laboratory with modern facilities and regional laboratories. The National Public Health Laboratory under the Ministry of Health carries out daily checks and its results are included in the calculation of the indicators and in the water quality reports.

FIGURE A.12: DELEGATION OF WATER SUPPLY TO PRIVATE OPERATORS IN INFORMAL AREAS



Source: ONEA.

Commercial solutions implemented	Connection fees were reduced and are subsidized for both ONEA's direct customers as well as customers getting water from private operators in informal areas. ONEA sells water to the private operators at a wholesale price which allows operators to apply a margin while keeping the retail price at the same level as ONEA's retail price in other service areas. The financial model ensures that ONEA maintains a financial equilibrium with free cash flow to repay capital loans and invest in the network. ONEA's own direct customers benefit from a social tariff for the first 8 m^3 per month. Apart from these social tariff arrangements, the tariff is set to recover costs on average. ONEA's tariff for the first consumption block is just 18 percent of the tariff for consumption in excess of 30 m^3.
Financing solutions implemented	An investment of more than US$200 million was made by 11 development banks and donors (primarily for a new dam, transmission and distribution pipelines, and related infrastructure). The World Bank contributed US$70 million through an IDA loan to the government, of which US$42 million was transferred to ONEA in the form of an equity contribution, and the remaining US$28 million on-lent to ONEA with a maturity of 20 years, including 10 years of grace period for the principal, and at an annual interest rate of 5.4 percent. The introduction of the financial equilibrium model has been a key factor in the achievement of a financially sustainable provider and sector. The model is used to set the annual tariff through a transparent process agreed with stakeholders. Ongoing network expansion has been financed through free cash flow.

Management solutions implemented	The Director-General had a tenure of 11 years, and along with other senior staff of long standing, provided stability in the management of the utility. ONEA's accounts were certified by an international audit firm for the very first time in 1998. The first strategic plan was developed for the period 2004 to 2008. ISO certification was achieved in 2009. NRW is well managed and has been in the range 17 percent to 19 percent over the last 10 years. ONEA has consistently achieved high cash collections of more than 95 percent since 2006, including from government. (Government is obliged by the performance contract to settle its water bills.)
Institutional and governance solutions	The Minister of Water issued a mandate to the Director General of ONEA to establish the Ziga Project Unit. In 1997, the Director General of ONEA delegated powers to the Ziga Project Unit, granting it administrative and financial autonomy. In view of the close ties between the project (with a large infrastructure focus) and the implementation of sector reform, the head of the unit played an increasingly important role and enjoyed excellent relations with the Director General of ONEA. The utility reform component of the project was designed with a focus on the finances, with three key elements: instituting a performance contract between government and the utility, with audits; the development and institutionalization of a multiyear financial equilibrium model (ensuring the sector was adequately funded); and the creation of a path of financial recovery with improved cost controls and efficiency and tariffs that recovered costs. A private operator was contracted to assist with the financial and commercial aspects of the report and played a key part in all three. Financial equilibrium was achieved a few years into the reforms. The audited performance contract between the government and the utility was a key innovation. An international technical auditor was used to audit ONEA's performance and the service contract for the first time in 1999. The audited performance is published and is used in the stakeholder processes, together with the financial equilibrium model, to agree on targets and to set tariffs. A Supervision Committee was also established to supervise ONEA's activities. This Committee includes representatives from the government, technical and financial partners, municipalities, and consumers. At its annual meetings, it examines the implementation of the investment program for the attainment of the agreed service targets and ONEA's management and performance report. The Committee makes recommendations on the sector's financial stability, particularly whether price adjustments are needed, based on the analysis of the technical auditor who audits all the reports submitted to the Committee in advance.

Reflections and conclusions

Results of the turnaround	The results of the reforms are clear: 90 percent of the poorest 40 percent of households living in Ouagadougou (and 94 percent of the total population) now have access to a piped water service whereas only half of the total population had access to a piped service before 2000. The network length increased by a factor of 2.5 times over the period 2005 to 2014. The number of connections per 100 people in the service were more than doubled. The water is safe to drink. Service reliability has improved and a 24x7 supply has been achieved in the period 2004 to 2008 and 2011 to 2012.[38] Connections were made affordable through a social connection fee policy, and more poor people living in informal settlements are also being served with affordable piped water at or near their houses each year. A social tariff keeps the first 8 m^3 of water provided affordable for on-premises connections. Tariffs are cost reflective and the utility is efficiently managed to support and sustain the above.
How a mandate for the reform was secured	The reform mandate arose from a crisis in the water supply coinciding with a financial crisis, both for the country and the utility. The country needed financial assistance and negotiated access to finance and a related set of conditions with international development partners (the World Bank and others), which included the reform of the utility. The mandate was given effect by two key actors, the Minister responsible for water and the Manager in charge of the utility, with the support for the financiers and a private consortium (for financial management support). This was not a straightforward process and took several years. There were disagreements between the World Bank and the government on what constituted necessary reforms. The World Bank wanted to implement a lease contract with a private operator. The government wanted to retain public ownership and management. A compromise was reached with the use of a private operator to run the financial and commercial functions of the utility for a period of time. The decision to sponsor the subsidized connection program together with an effective communications strategy facilitated buy-in by customers and other stakeholders to the reforms.
Phasing the reforms	Initial attention was given to the financing of an expanded water supply and then expanding the water network. Financial management support was provided by a private consortium that was competitively procured. Improved efficiencies softened the necessary tariff increases. An audited contract between the government and the utility clarified accountability and was used to set appropriate performance targets. The achievement of financial equilibrium was phased in. A capable manager was in place throughout a key phase of the reform period–1995 to 2005–and a strong management team built so that the succession was smooth. Later in the reform process (2009), the utility innovated to expand water supply to the rapidly growing informal settlements using the expanded supply and the extended network as the necessary backbone to achieve this. It developed alternative institutional arrangements, making use of small private operators, to overcome the problem of its limited formal and legal mandate.
Sustaining performance	The reforms are remarkable in the extent to which they have been sustained, with continued expansion of service to serve the poor, supported by ongoing excellent utility performance and financed by the utility's own cash flows in a country with limited economic means, all over a period of close to 20 years since the onset of the reforms. ONEA has managed to develop and sustain a culture of performance within the organization that is supported by management autonomy and a formal performance contract with government, that is, in turn, overseen by a formalized stakeholder body. These three ingredients–strong performance culture, formal rules of accountability, and a formalized alliance of stakeholders–all appear to reinforce each other to sustain and extend the achievements of the reforms.

[38] Since then reliability has declined to 21 hours in 2015 due to supply limitations. Supply constraints are being addressed through new investments and the situation is anticipated to be alleviated in 2017.

Appendix B: Suggestions for Further Research

The important deficiencies in data available, and the limitations of the methodology used, mean that additional work on this topic would be valuable. This work should add detail to the messages established in this report, test their limits, and add new ideas beyond those which can be gleaned from the cases studied for this report.

Better data are needed

To better understand access and service levels for the poor, much more household survey data are needed. Household survey data need to be available across many more cities, and need to cover more variables–such as reliability, adequacy, and affordability. This robust dataset would allow for the use of econometric analysis–like that applied by the forthcoming *Performance of Water and Wastewater Utilities in Africa* study–to examine the extent to which utility management effectiveness and cost recovery drive service to the *poor* across the region as a whole.

Utilities will need to produce and publish better data as well. Audited, unqualified accounts will give more accurate cost recovery figures. Universal metering will result in more accurate NRW levels. On the service side, more accurate estimates of coverage rates are needed, as is a disaggregation of coverage rates by customer type (residential, commercial or government), location (major city versus smaller town), and income (so that utility service to the poor can be understood).

Better yet, if spatially disaggregated household survey data were widely available–and utilities employed better GIS mapping capabilities–the extent to which network extent drives service to the poor could be better understood. This knowledge could help utilities with citywide investment planning.

Additional cases should be studied

Five case studies have illuminated many aspects about how cities serve the poor relatively well in their particular contexts. Additional cases would add to this rich body of knowledge. In particular, political economy analysis for cities that do not serve the poor well could uncover what drives bad service to the poor, and how that contrasts with the political economy dynamics in cities with relatively good service.

Simply studying more cities that are relatively successful in serving the poor would uncover more useful techniques that could be considered for use elsewhere. It is quite possible that in a wider range of cities, there would be some that provide good service to the poor largely through small scale providers, or through utilities that were not managed well. Knowledge of why these alternative methods have worked, and in what contexts, could inform the reform plans of typical cities looking to serve the poor better.

Appendix C: Perspectives on Alternative or Supplementary Service Providers

TABLE C.1: PERSPECTIVES ON ALTERNATIVE OR SUPPLEMENTARY SERVICE PROVIDERS

Features, by technology	Dependent	Independent
i) Piped Networks		
System	Operator buys water in bulk from utility and develops distribution sub-networks connected directly to households, institutions and public kiosks stand posts	Operator develops own water sources (wells or boreholes) and connect network to households and other users
Organization	Private company or individual, community organization or neighborhood association	Sole proprieter, cooperative, private land and housing developer, water user association, community-based organization.
Regulatory Issues	Contract with utility, business license, customer agreements, bulk rates, customer tariffs	Groundwater abstraction permits, title deeds, resale permits licenses, water quality testing, business licenses, rights to own infrastructure and/or to lay networks in public rights of way
ii) Point Sources		
System	Kiosk or standpost connected to the utility network (could be household supply); buying water in bulk - at a special tariff - or at household tariff	Water point linked to own source (well or borehole, underground or above-ground storage tank) installed privately and operated on a for-profit basis. Water may be purchased from a tanker
Organization	Individual, enterprise, self-help group	Neighborhood association, micro-enterprise, community based organizations
Regulatory Issues	Contract with utility, license/permit, customer tariff, bulk purchase price, performance incentives	Groundwater abstraction permits, license, tariff structure, water quality testing
iii) Mobile Distributors		
System	Tankers or truckers obtain water in bulk from the utility (or municipal supply) and deliver it directly to the customer, including public utility water storage tanks, communal cisterns, or individual households and institutions	Tankers, truckers and carters develop source or obtain water from a private well for distribution to households; public utility water storage tanks, communal cisterns, or institutions
Organization	Sole proprietor, tanker association, lessee, informal sector	Sole proprietor, tanker association, lessee, informal sector
Regulatory Issues	Transport license, business license, tanker cleanliness, bulk rate, utility contract, customer tariff	Transport license, business license, water quality, abstraction permit

Source: Kariuki, Mukami, and Jordan Schwartz. 2005. "Small-Scale Private Service Providers of Water Supply and Electricity: A Review of Incidence, Structure, Pricing and Operating Characteristics." World Bank Policy Research Working Paper 3727.

Appendix D: Utility Management Effectiveness Index

To measure utility management effectiveness quantitatively, an index was developed (shown in Table D.1). The indicators included in the index are those that are widely available for a large set of utilities.[39] While ultimately a judgment call, indicator choice and weighting are based on a synthesis of what is used by the water regulators in Kenya, Zambia, and Tanzania.

Using this index, management effectiveness of the utilities serving the 17 cities in our sample was calculated, as shown in Table D.2. Years were selected to match the year for which household survey data were available.

[39] For instance, NRW as a percentage of water supplied is the most widely used and understood measure of NRW; however, NRW is best represented as cubic meters per connection per hour.

TABLE D.1: UTILITY MANAGEMENT EFFECTIVENESS INDEX

Indicator	Scoring (max 100 in each subcategory)	Weight
Operating cost coverage	▪ If < 1.00, score = 0; =1.00, score = 50; ≥ 1.20, score = 100	30
Collection ratio	Collection ratio (%) * 100 *If collection ratio > 100%, score = 100*	23.$\overline{3}$
NRW	▪ If NRW < 20%, score = 100; If NRW > 60%, score = 0 ▪ Otherwise, score = [(NRW – 20%) / 40%] * 100	23.$\overline{3}$
Staff/1,000 conn.	▪ If staff/1,000 conn. ≤ 4, score = 100; ≥ 12, score = 0 ▪ Otherwise, score = [(staff/1,000 conn.) – 4] / 8 * 100	23.$\overline{3}$
TOTAL		**100**

Source: An adaptation of the indices and weights used by WASREB, NWASCO, and EWURA.

TABLE D.2: INPUTS FOR UTILITY MANAGEMENT EFFECTIVENESS INDEX

City	Year	OCCR	Coll. ratio	Staff prod.	NRW	ME index
Accra	2008	1.15	93%	7.7	50%	66
Addis Ababa	2014	1.09	102%	5.1	37%	78
Dakar	2014	1.33	98%	2.6	20%	100
Dar es Salaam	2012	0.83	78%	6.2	50%	41
Durban	2015	1.30	98%	3.5	39%	88
Hargeisa	2011	0.90	95%	19.0	24%	43
Kaduna	2011	0.23	54%	16.7	30%	30
Kampala	2011	1.31	95%	5.9	35%	85
Kinshasa	2014	0.63	63%	12.1	43%	25
Lusaka	2014	1.26	96%	9.8	42%	69
Maputo	2011	1.03	123%	4.6	52%	67
Mombasa	2013	1.04	80%	9.3	49%	50
Nairobi	2013	1.05	78%	5.0	42%	68
Niamey	2012	1.13	119%	4.8	15%	92
Nyeri	2013	1.40	102%	4.2	24%	97
Ouagadougou	2010	1.24	96%	3.6	19%	99
Tanga	2012	0.98	100%	5.2	28%	62

OCCR = Operating cost coverage ratio.

Coll. ratio = Collection ratio.

Staff prod. = Staff per 1,000 water and sewer connections.

NRW = Nonrevenue water.

ME index = Management effectiveness index.

Source: Utility research (see Table F.2 for full list of sources).

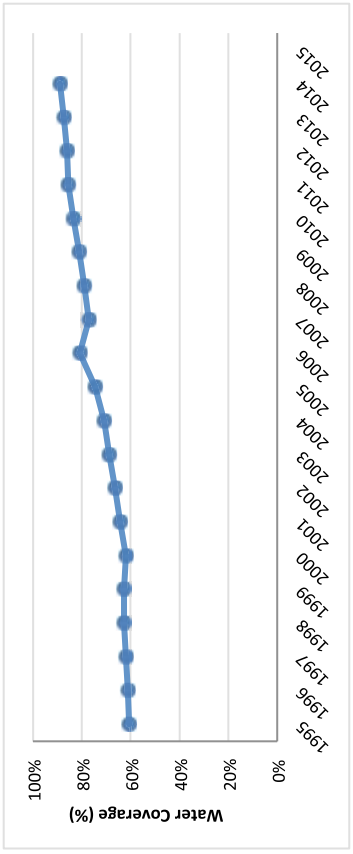
Appendix E: Longitudinal Utility Data

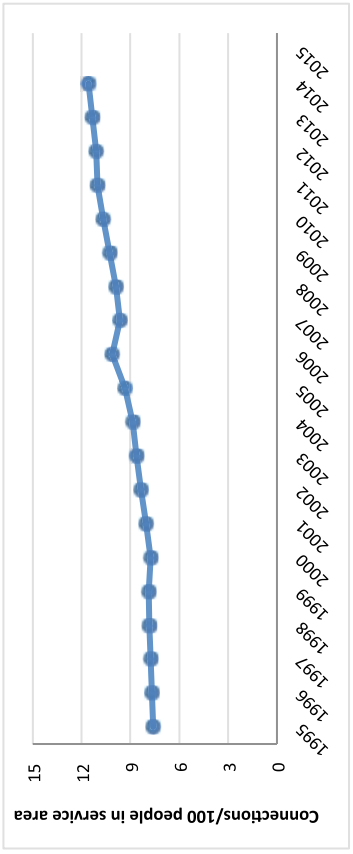
This appendix contains longitudinal performance graphs for the utilities serving the 17 cities. Graphs were created for 12 key indicators:

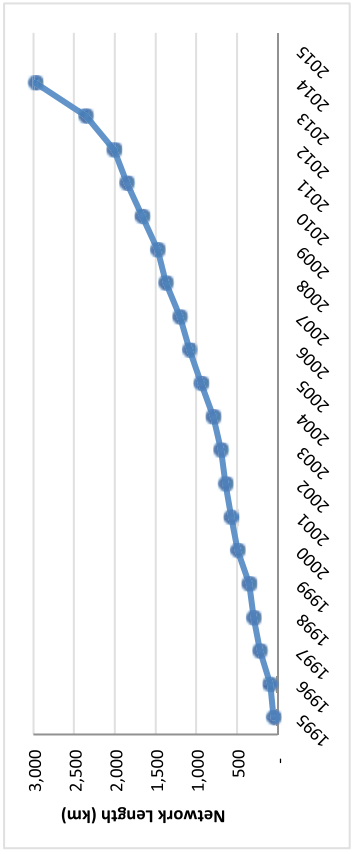
- Water coverage;
- Population served versus service area population;
- Water connections;
- Connection density (connections per 100 people in city);
- Hours of service per day;
- Network length;
- Total amount supplied into network and total amount sold;
- NRW;
- Total staff numbers;
- Staff productivity;
- Collection ratio; and
- Operating cost coverage.

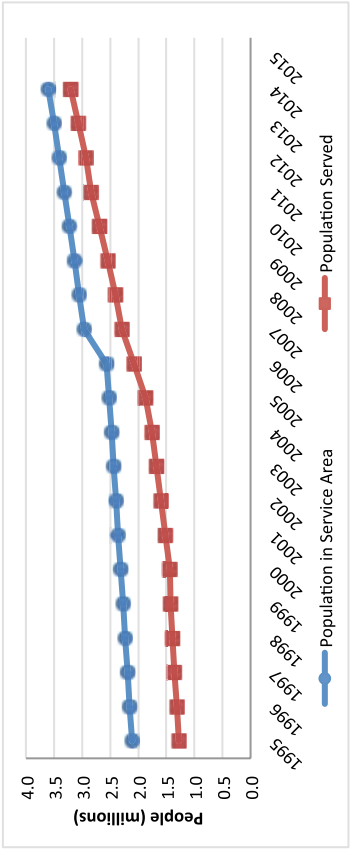
Blank graphs indicate that data were unavailable for that indicator, for that utility. Data sources are listed in Appendix F.2.

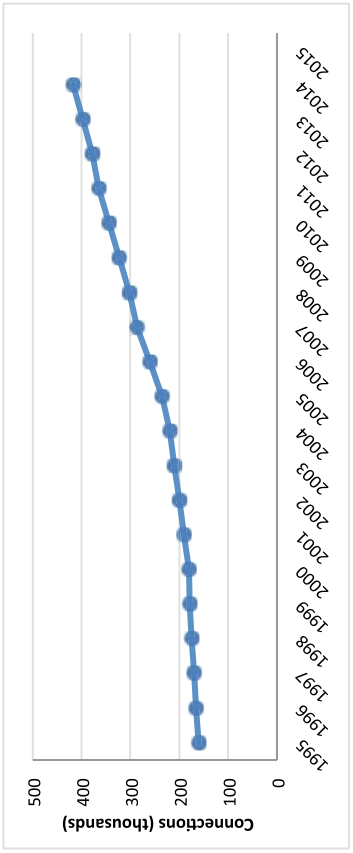
E.1 Addis Ababa Water and Sewerage Authority (AAWSA)

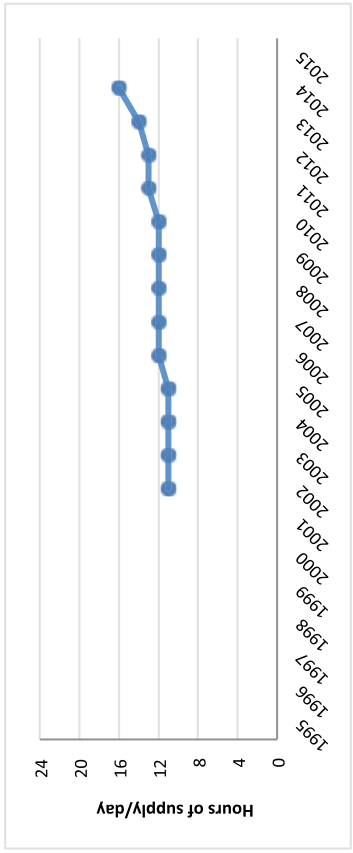


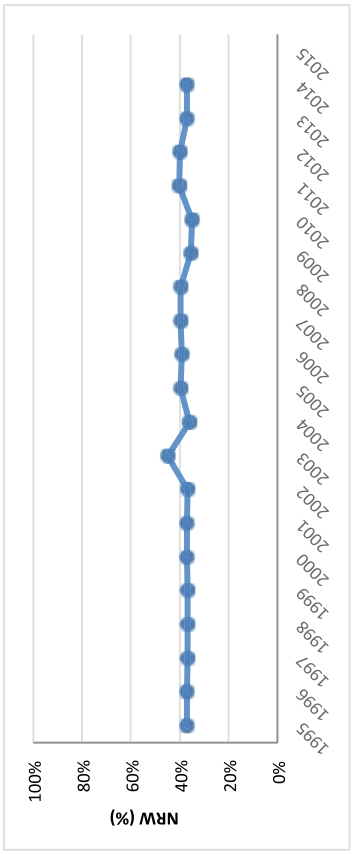


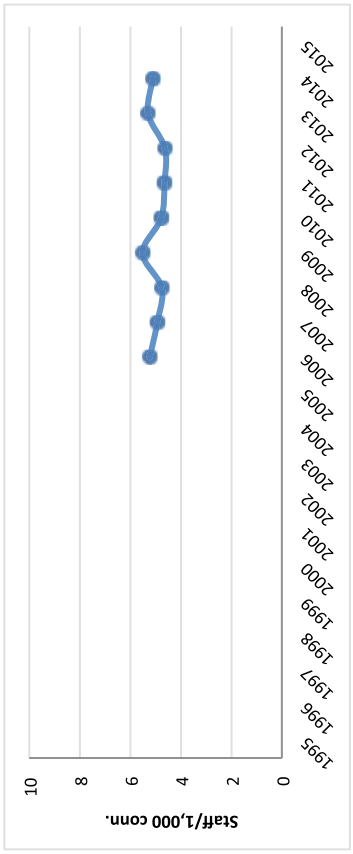


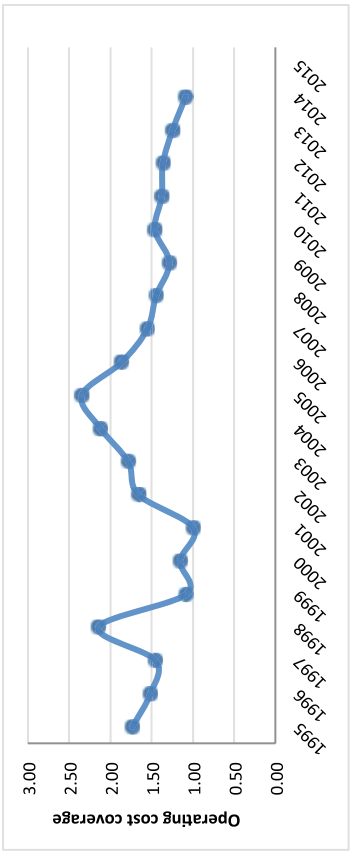


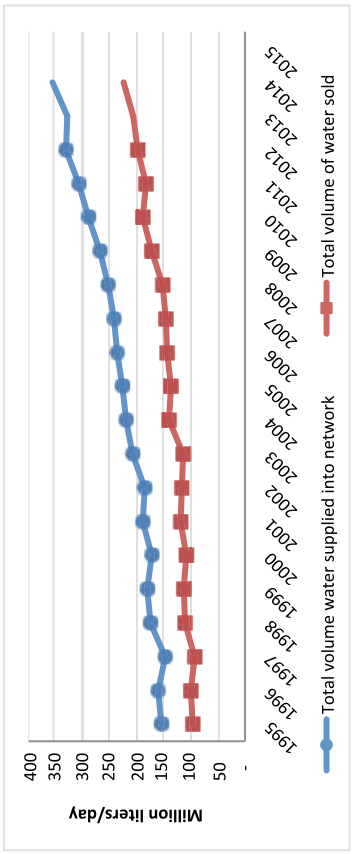


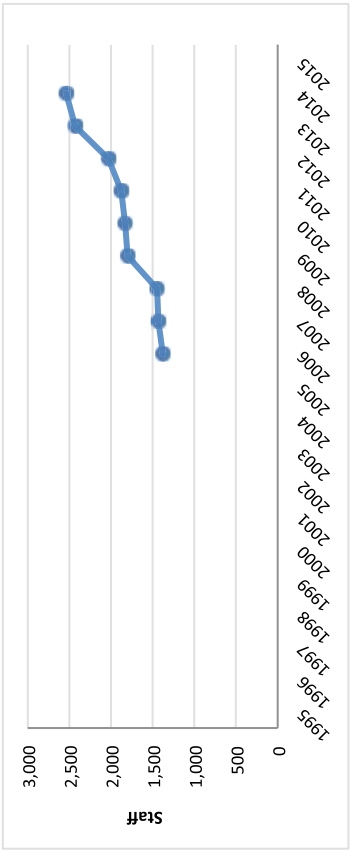


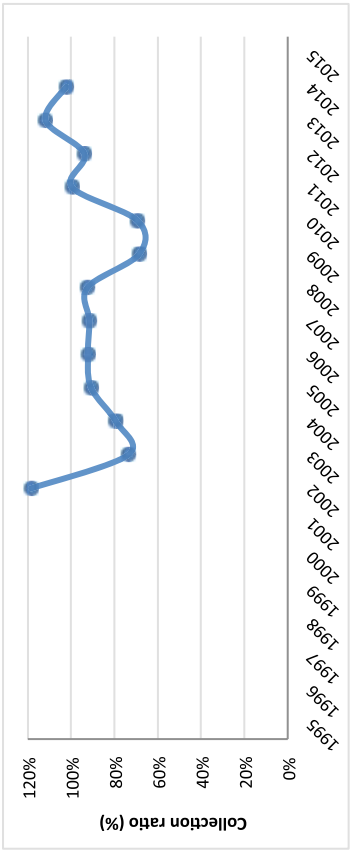

NRW (%)
100%
80%
60%
40%
20%
0%
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
10
8
6
4
2
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

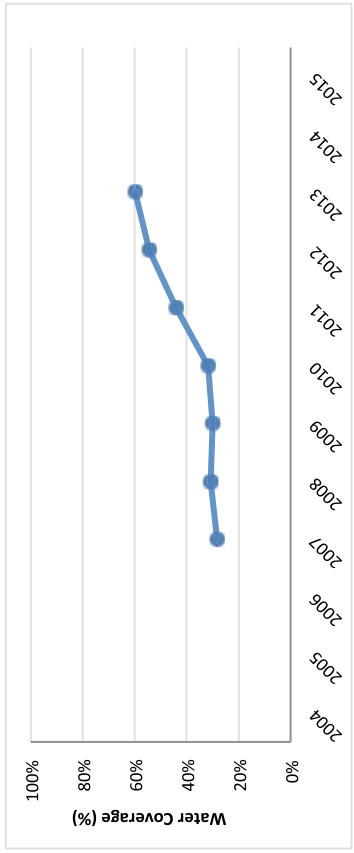

Operating cost coverage
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

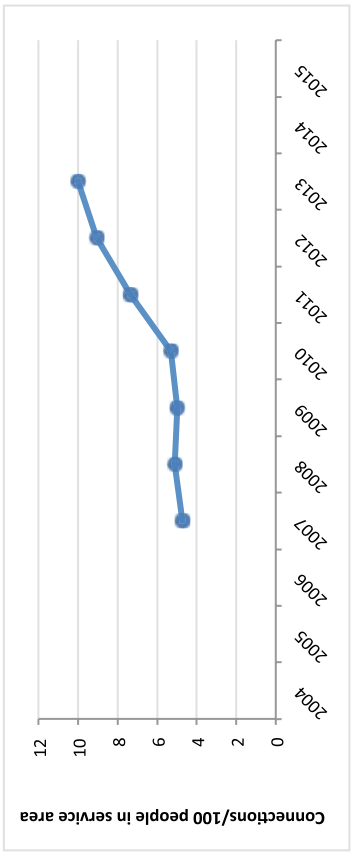

Million liters/day
400
350
300
250
200
150
100
50
-
Total volume water supplied into network
Total volume of water sold
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

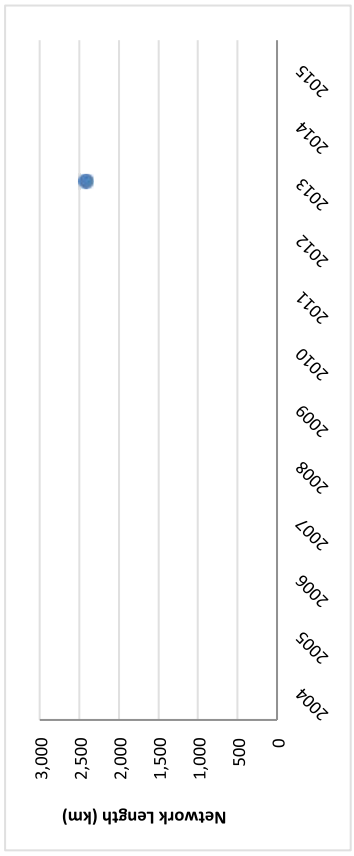

Staff
3,000
2,500
2,000
1,500
1,000
500
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

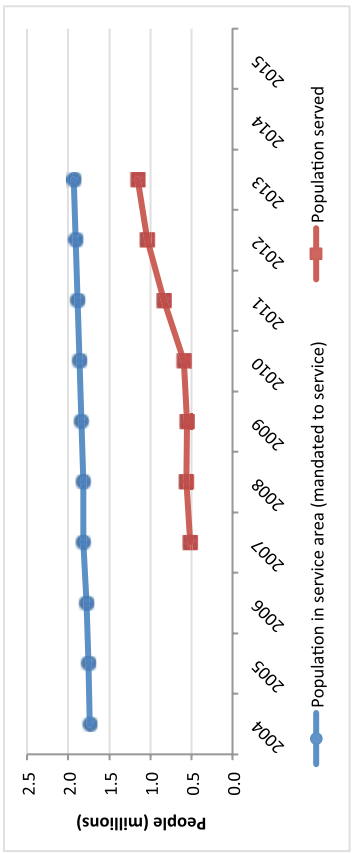

Collection ratio (%)
120%
100%
80%
60%
40%
20%
0%
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

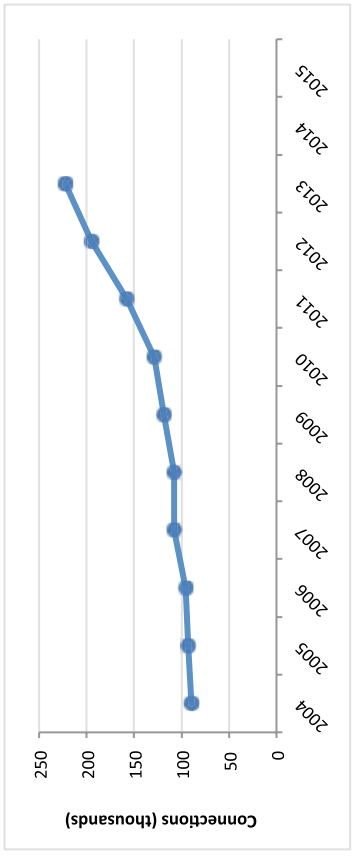
E.2 Aguas da Regiao de Maputo, Mozambique

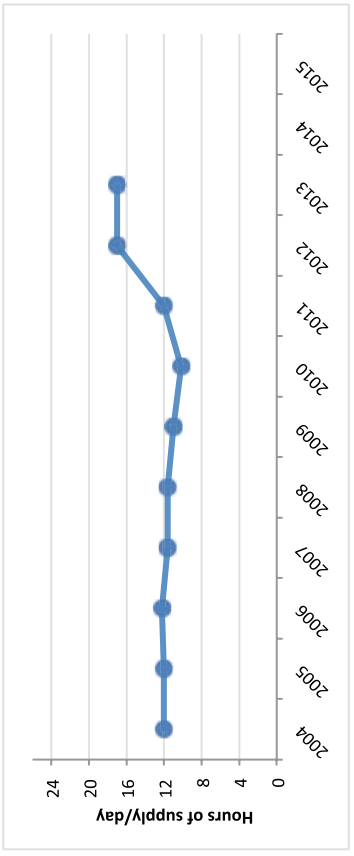


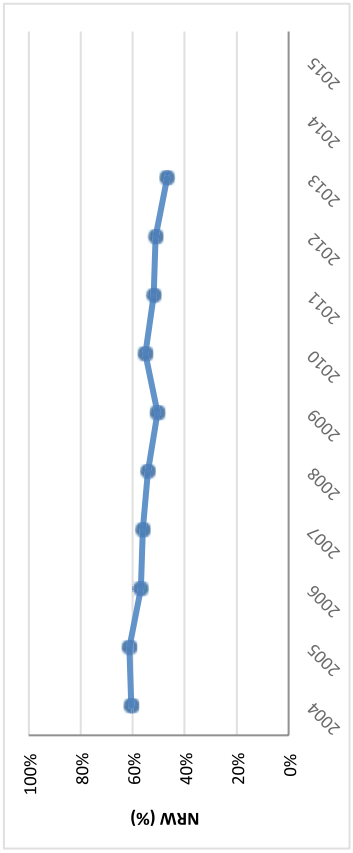


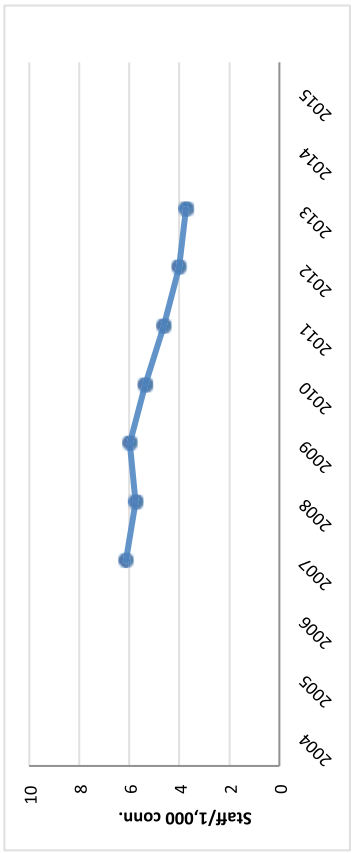


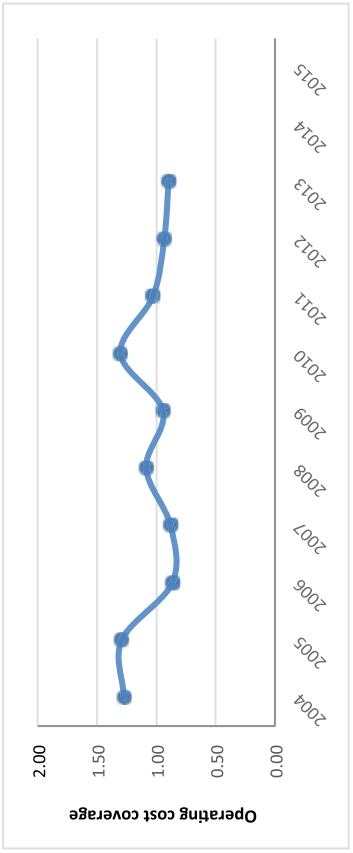


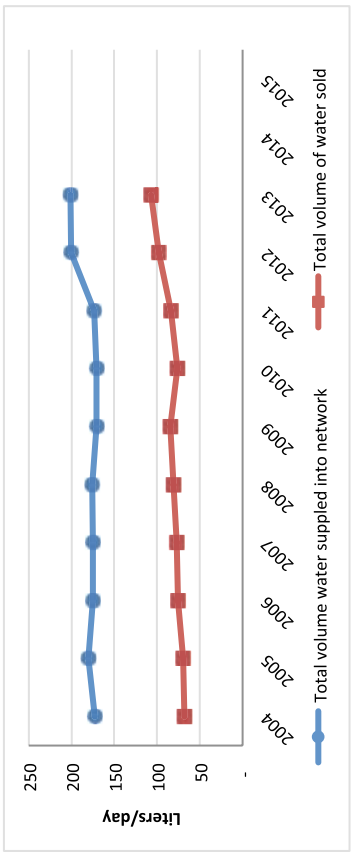


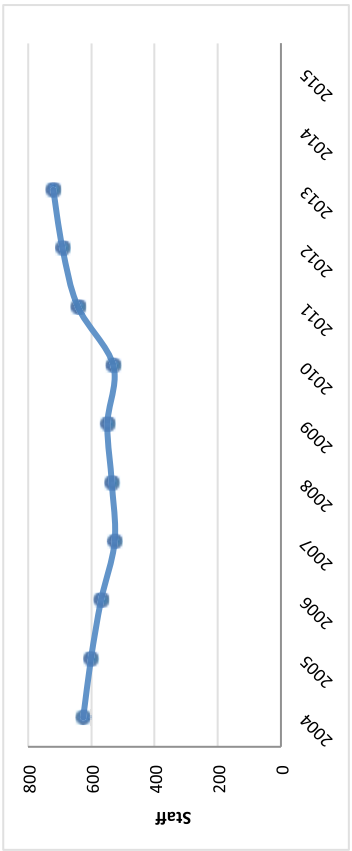


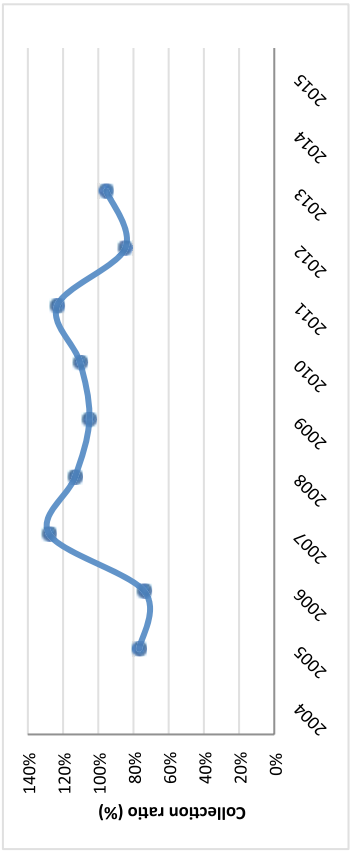

NRW (%)
100%
80%
60%
40%
20%
0%
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
10
8
6
4
2
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

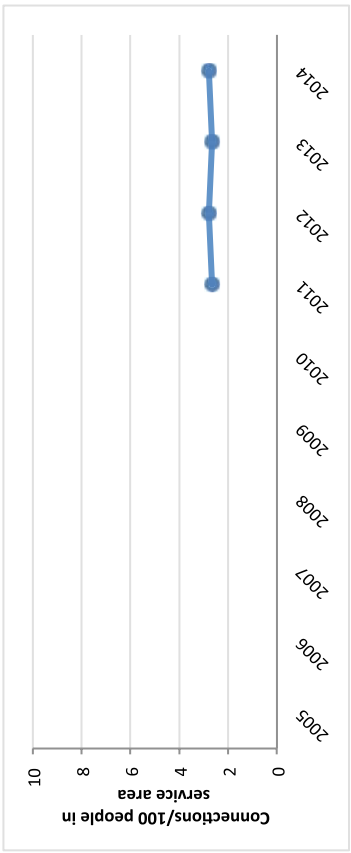

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

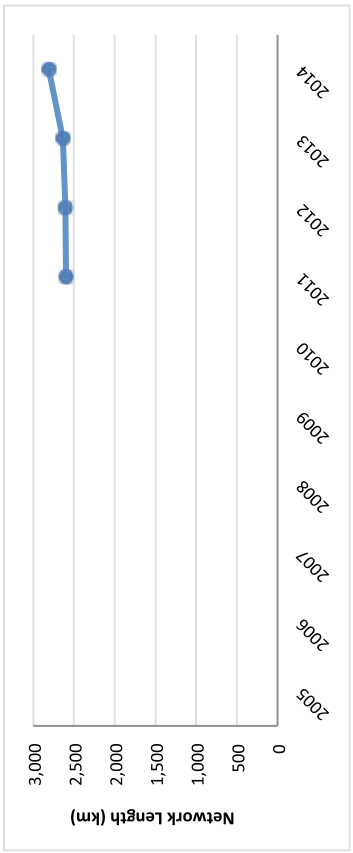

Liters/day
250
200
150
100
50
-
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Total volume water suppled into network
Total volume of water sold

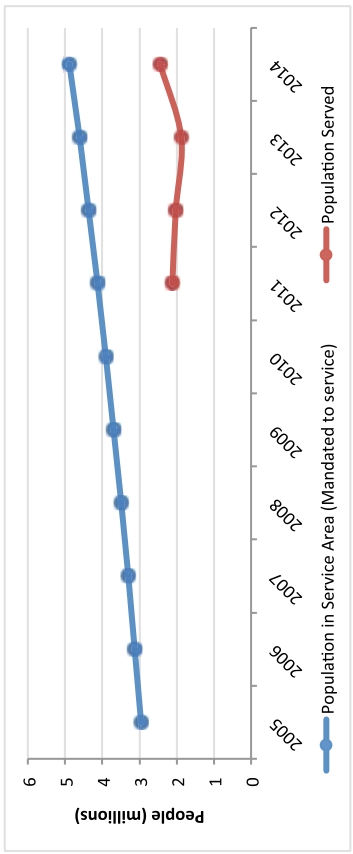

Staff
800
600
400
200
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

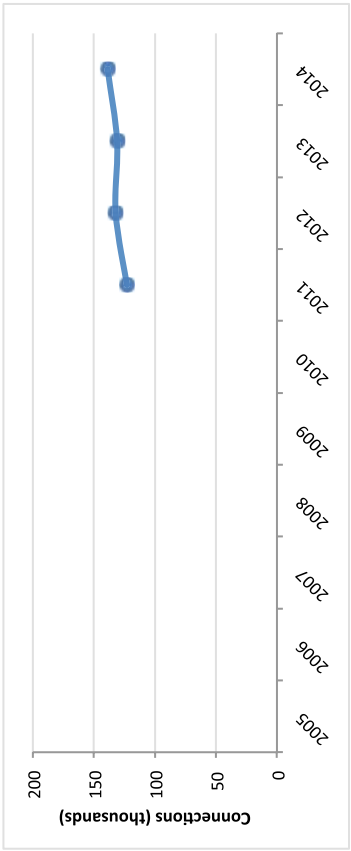

Collection ratio (%)
140%
120%
100%
80%
60%
40%
20%
0%
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

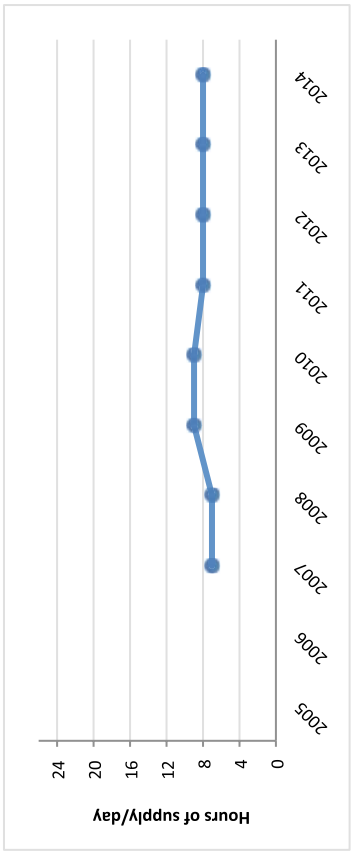
E.3 Dar es Salaam Water and Sewerage Corporation (DAWASCO), Tanzania

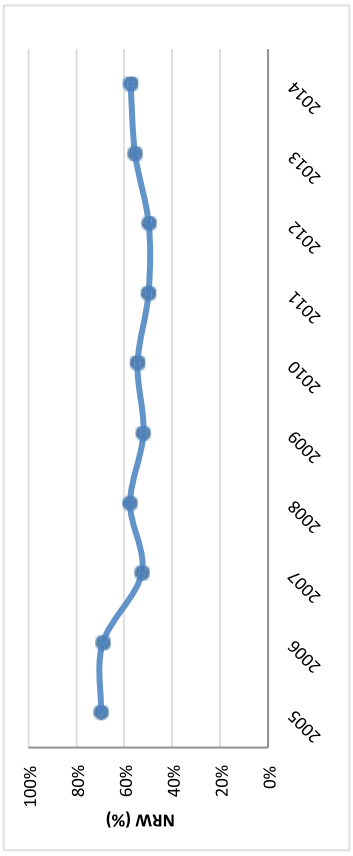


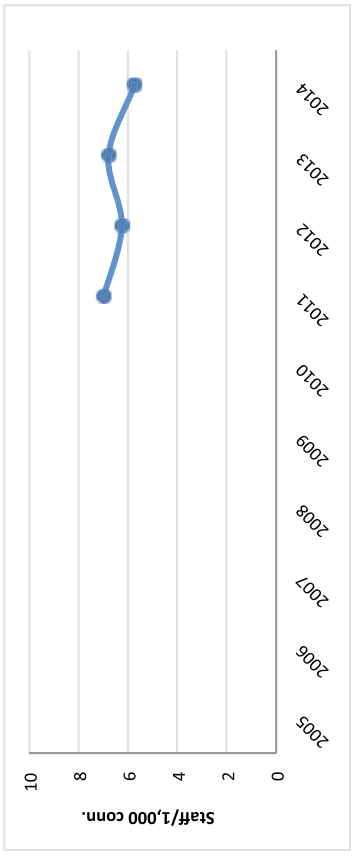


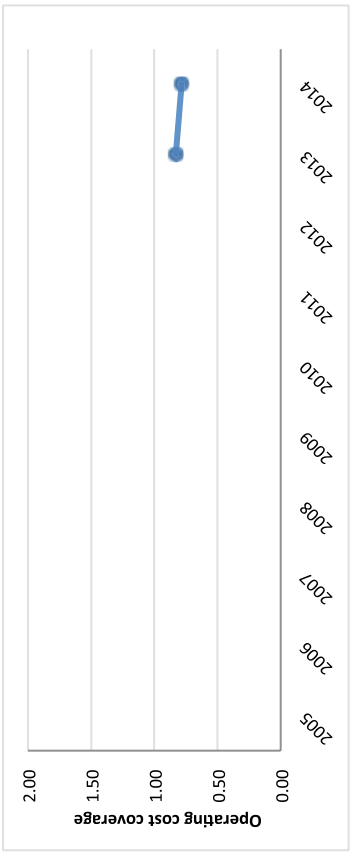


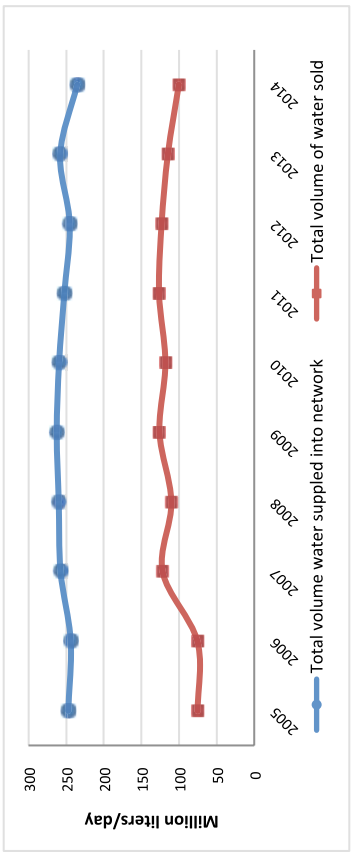


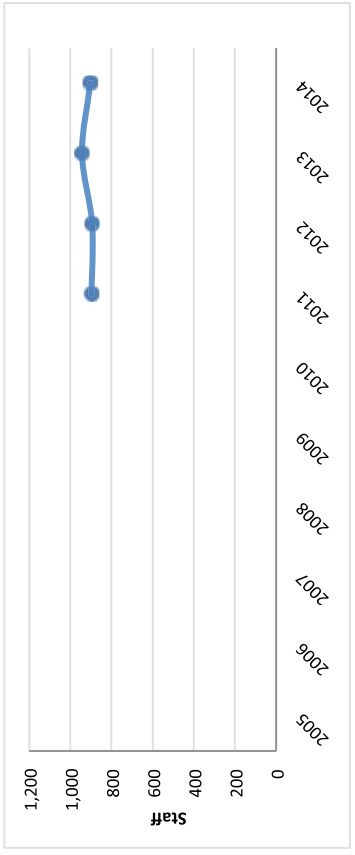


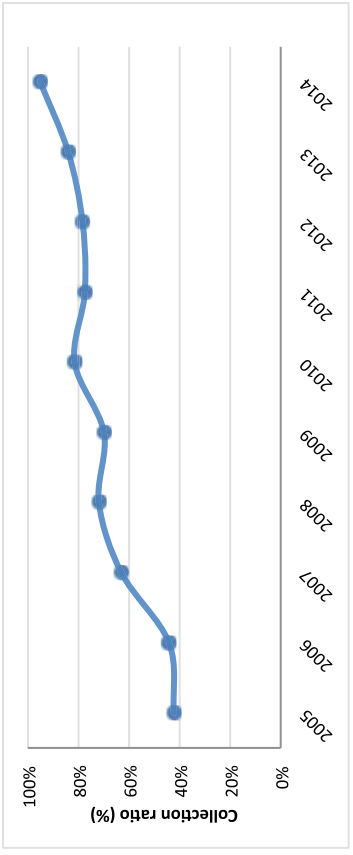

NRW (%)
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


Staff/1,000 conn.
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

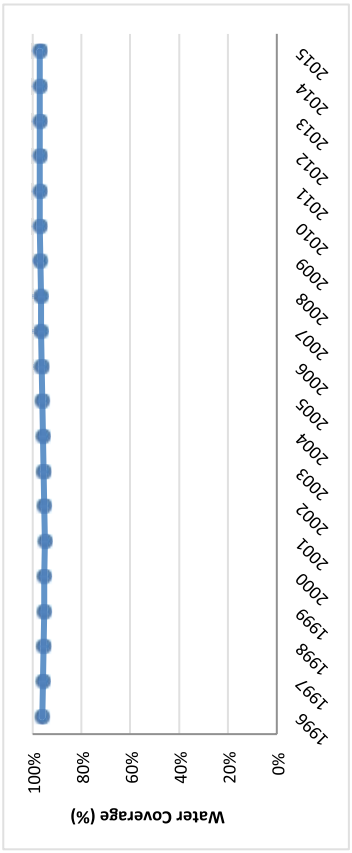

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

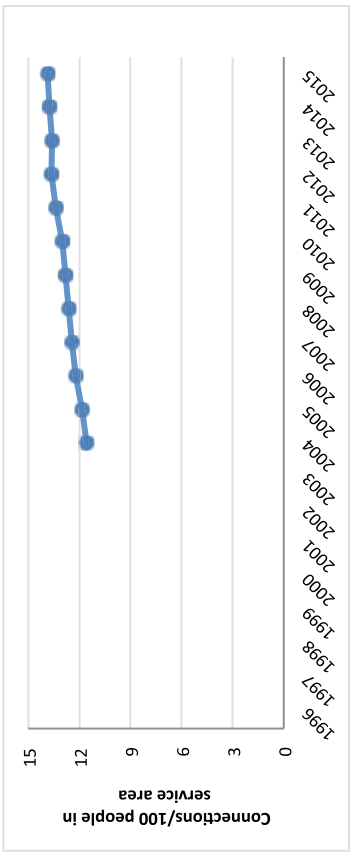

Million liters/day
300
250
200
150
100
50
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Total volume water suppled into network
Total volume of water sold

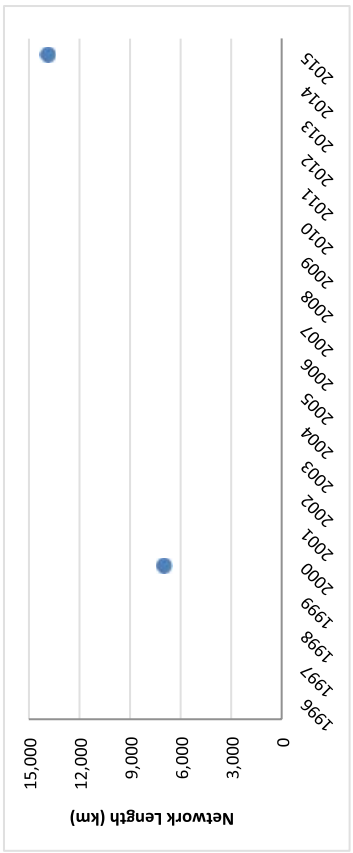

Staff
1,200
1,000
800
600
400
200
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

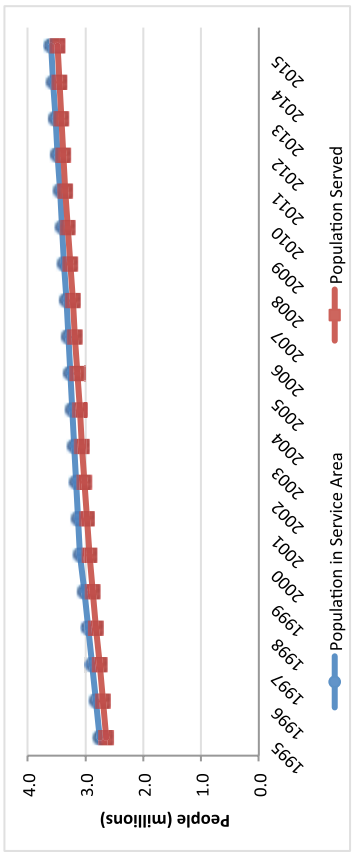

Collection ratio (%)
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

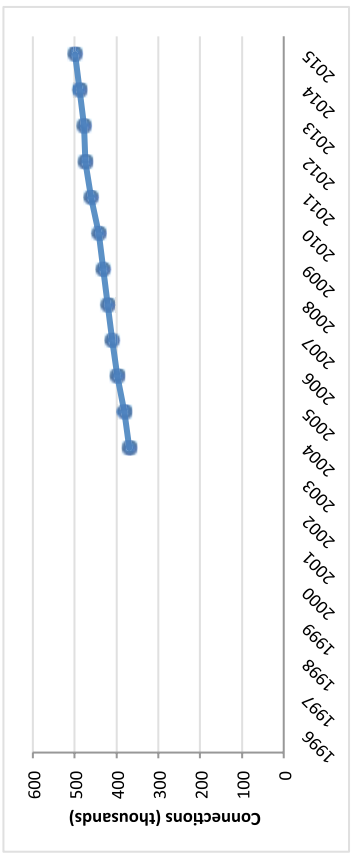
E.4 eThekwini Water and Sanitation Unit, South Africa

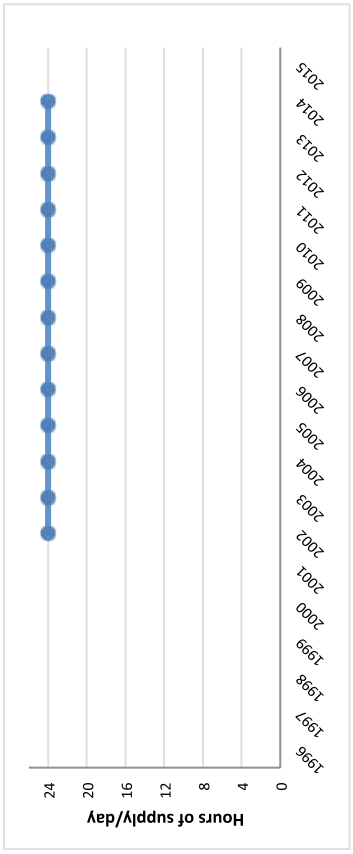


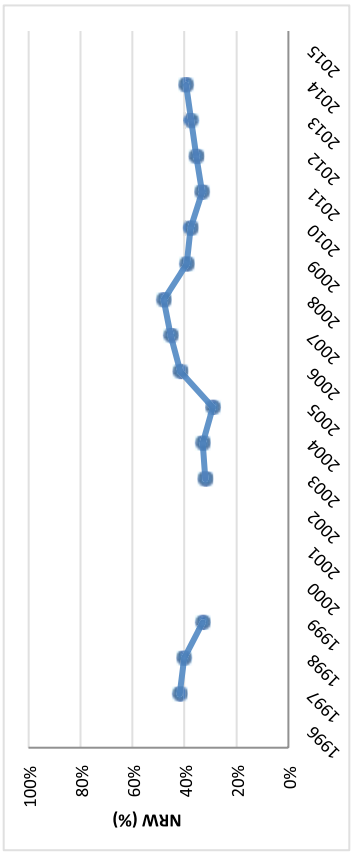


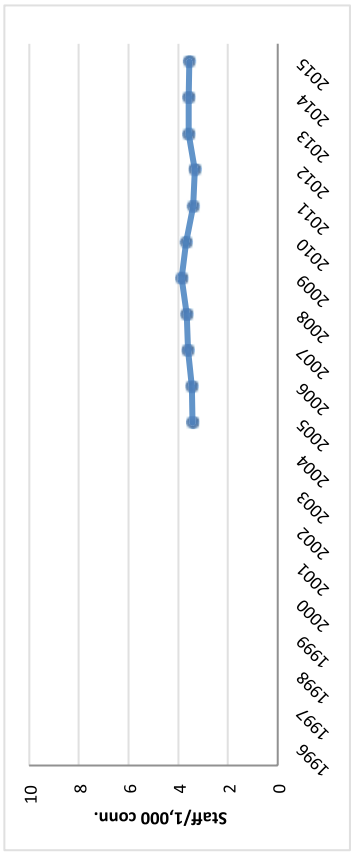


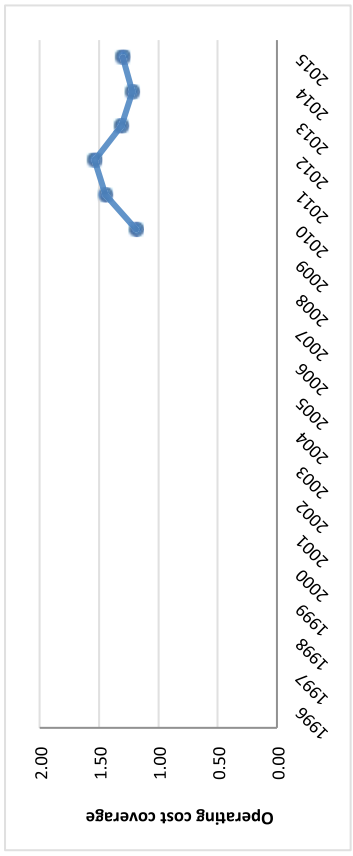


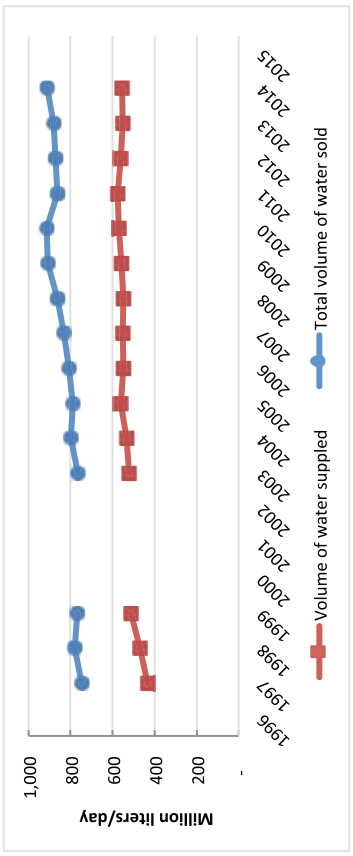


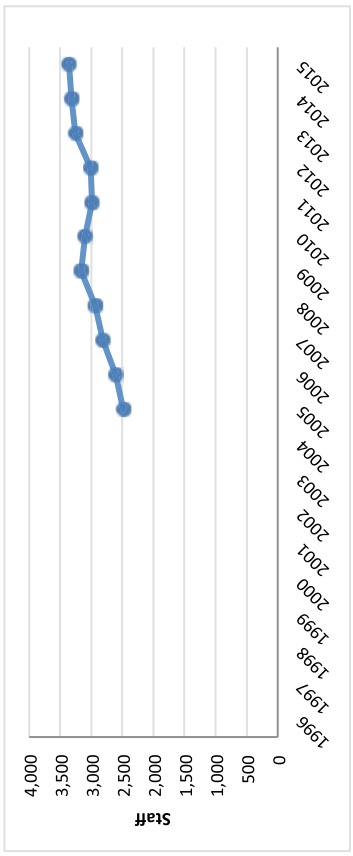


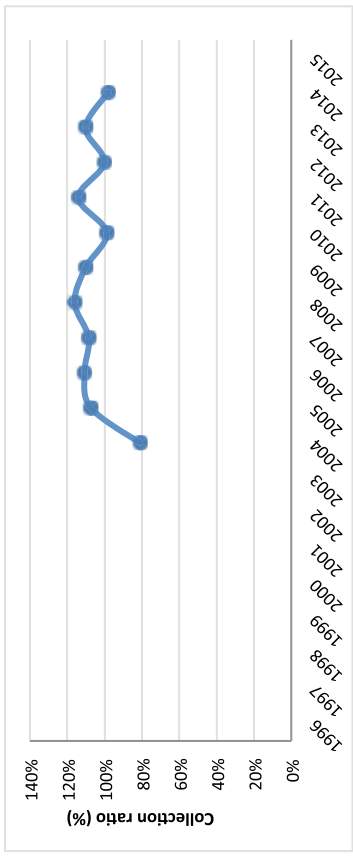

NRW (%)
100%
80%
60%
40%
20%
0%
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
10
8
6
4
2
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

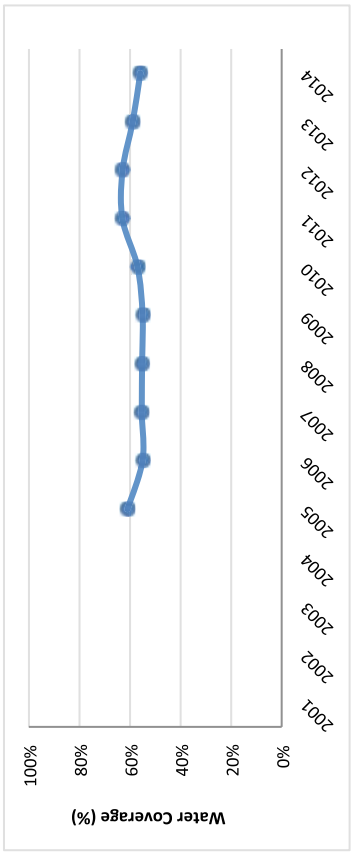

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

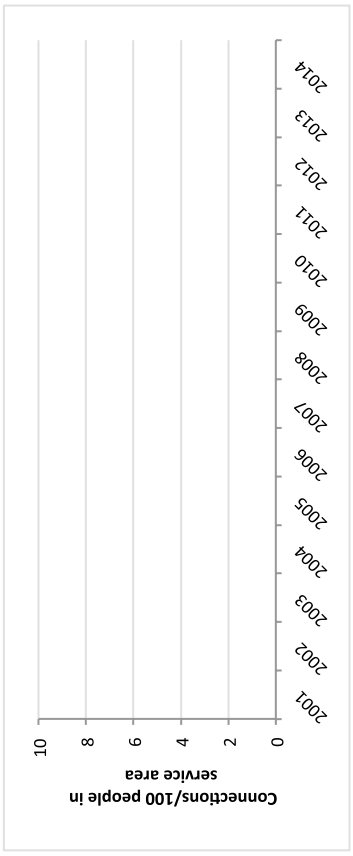

Million liters/day
1,000
800
600
400
200
-
Total volume of water sold
Volume of water supplied
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

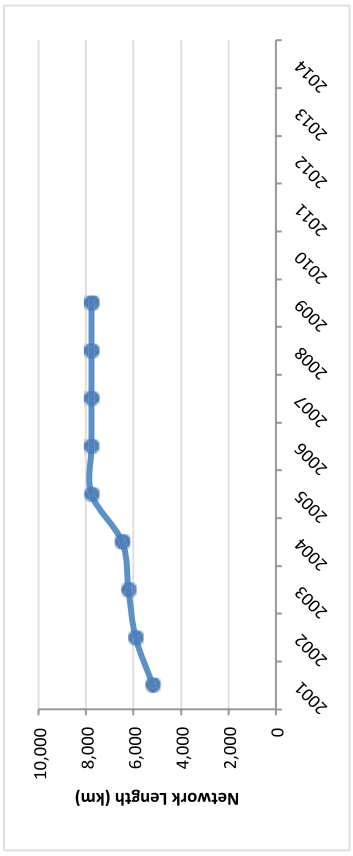

Staff
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

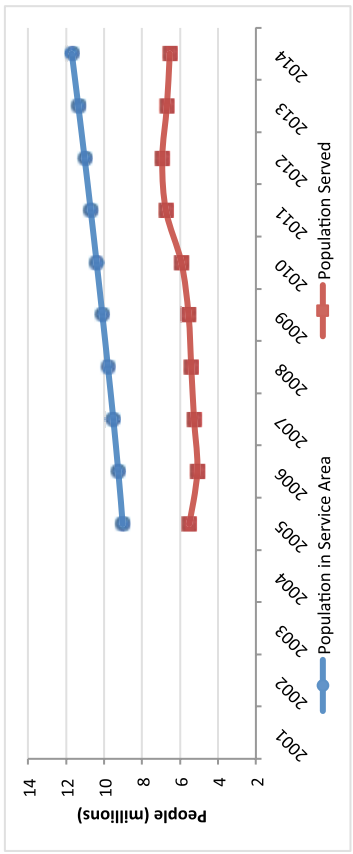

Collection ratio (%)
140%
120%
100%
80%
60%
40%
20%
0%
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

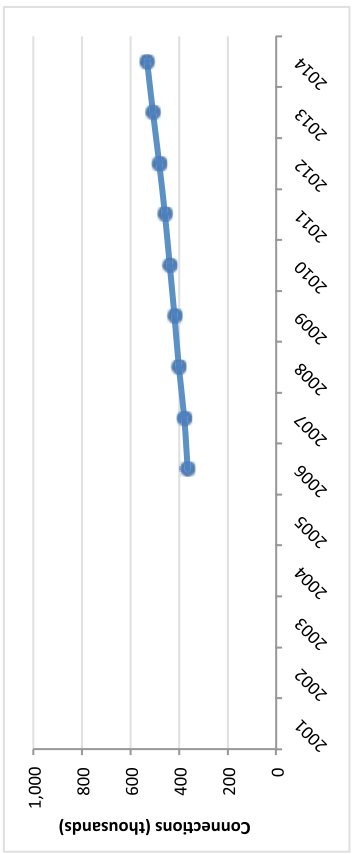
E.5 Ghana Water Company, Ltd. (GWCL), Ghana

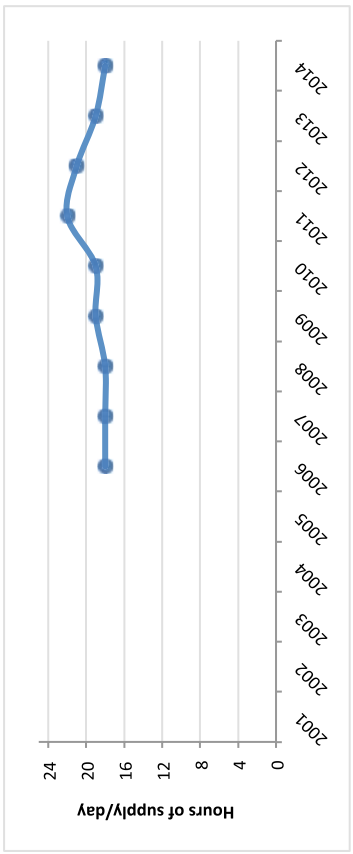


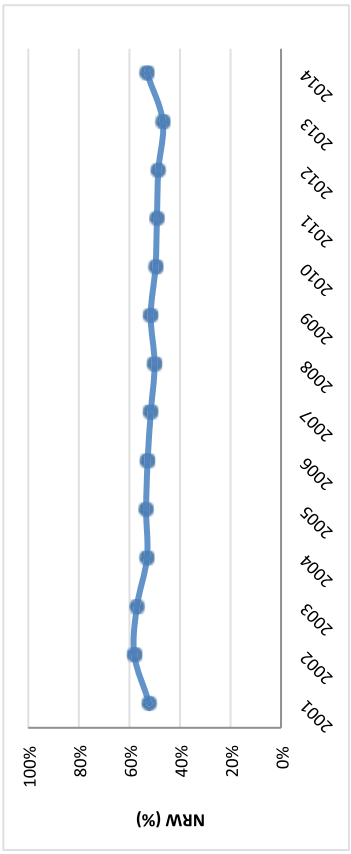


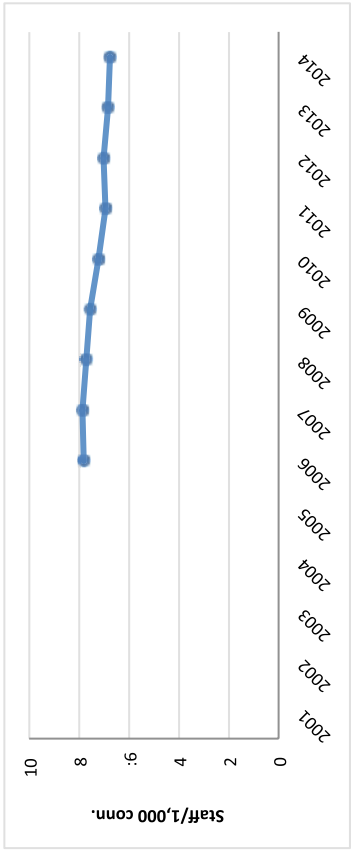


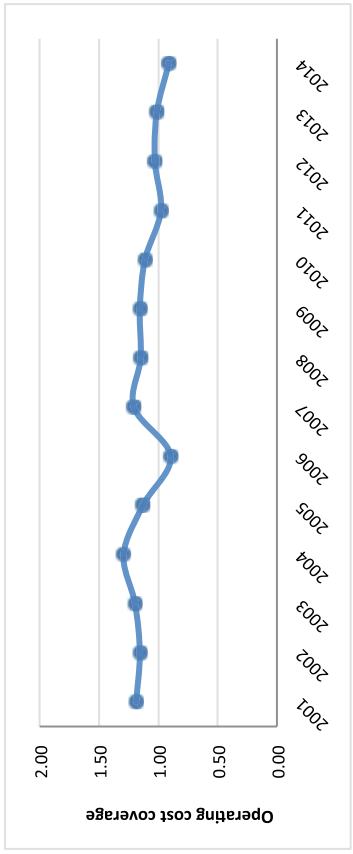


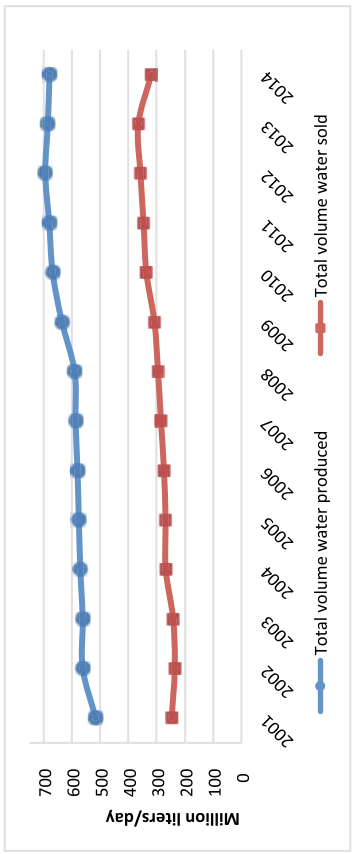


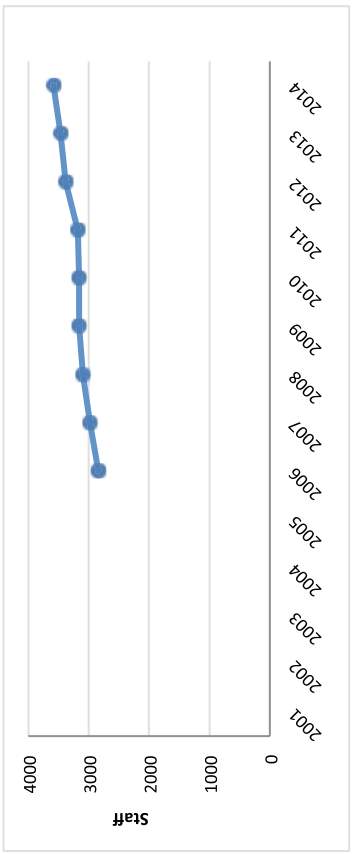


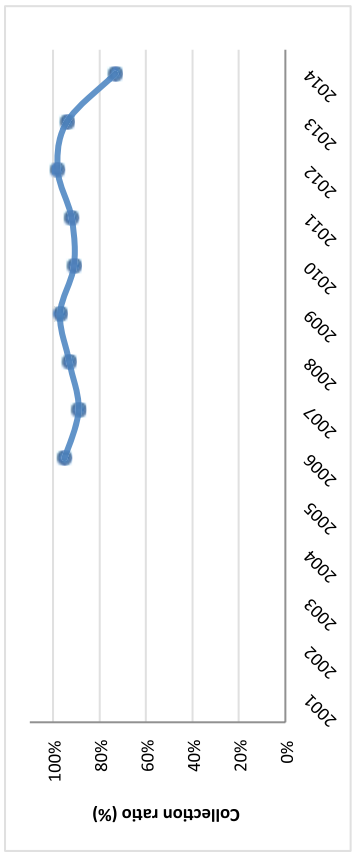

NRW (%)
100%
80%
60%
40%
20%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


Staff/1,000 conn.
10
8
6
4
2
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

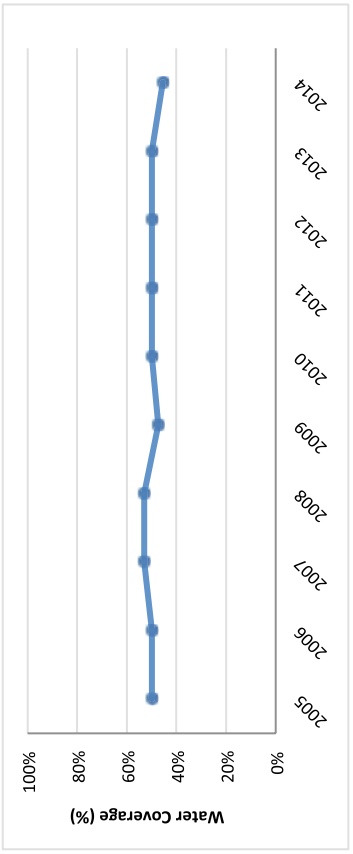

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

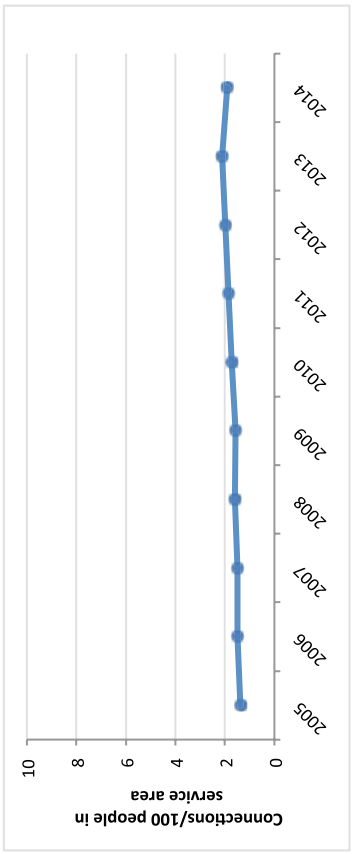

Million liters/day
700
600
500
400
300
200
100
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Total volume water produced
Total volume water sold

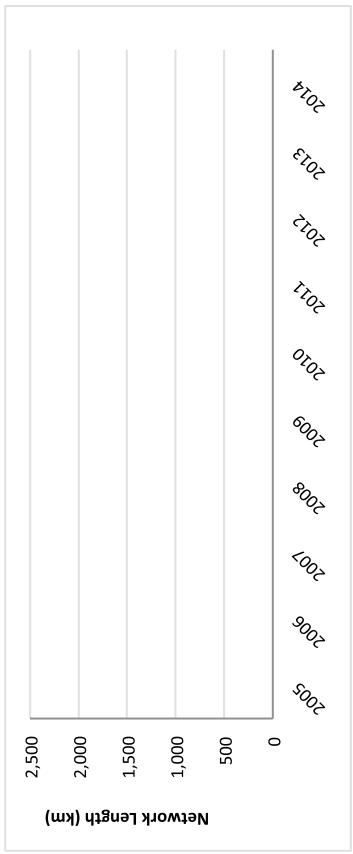

Staff
4000
3000
2000
1000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

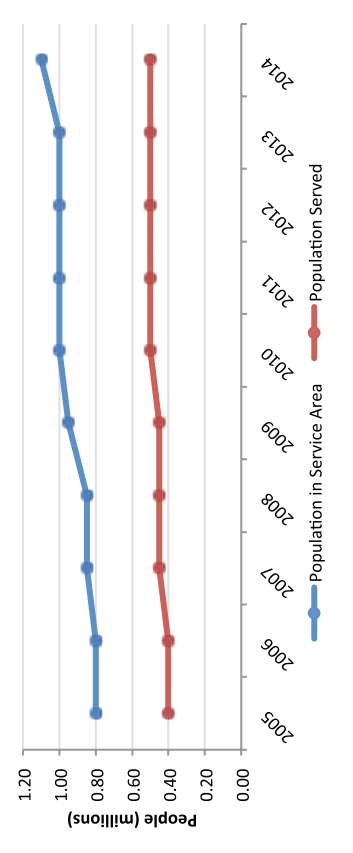

Collection ratio (%)
100%
80%
60%
40%
20%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

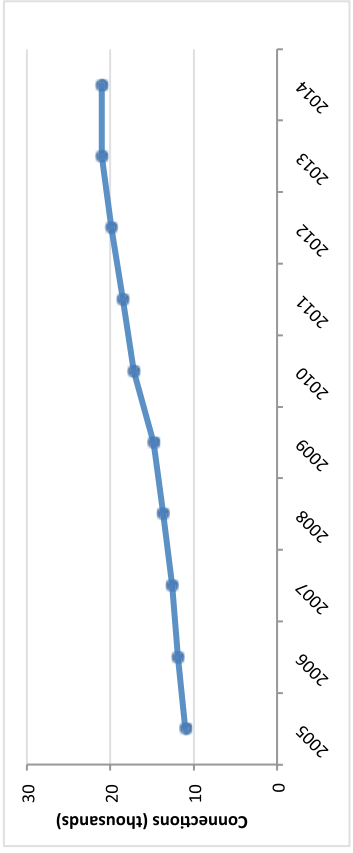
E.6 Hargeisa Water Agency (HWA), Somaliland

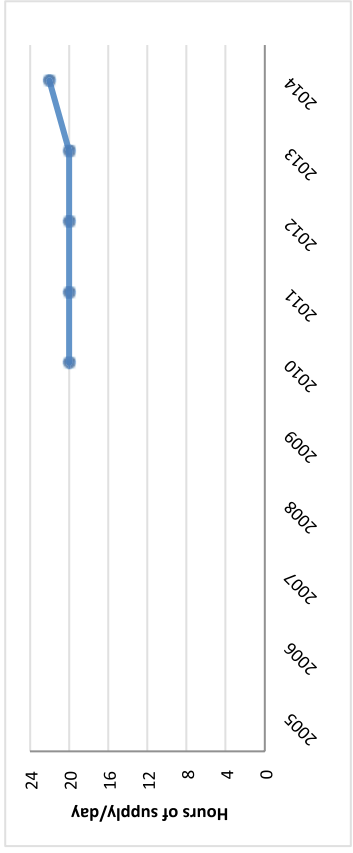


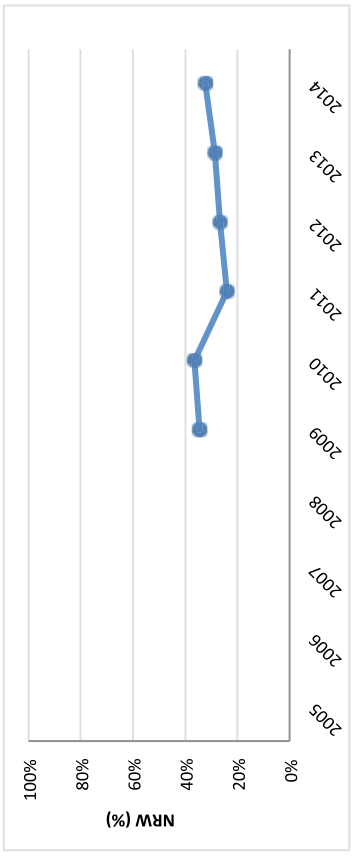


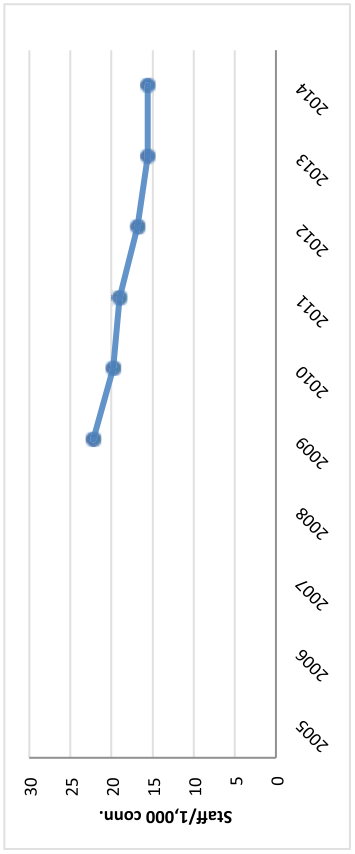


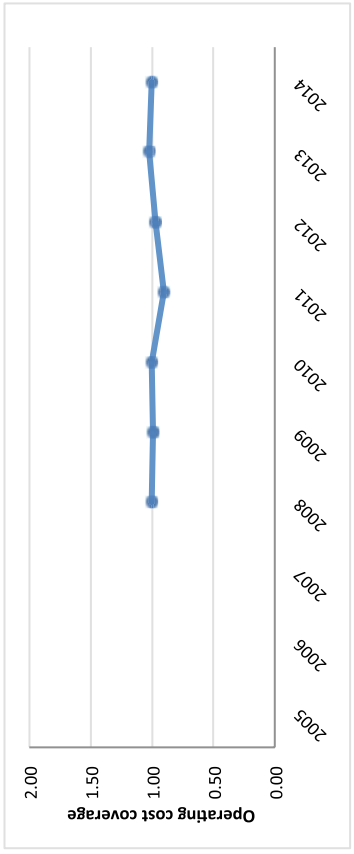


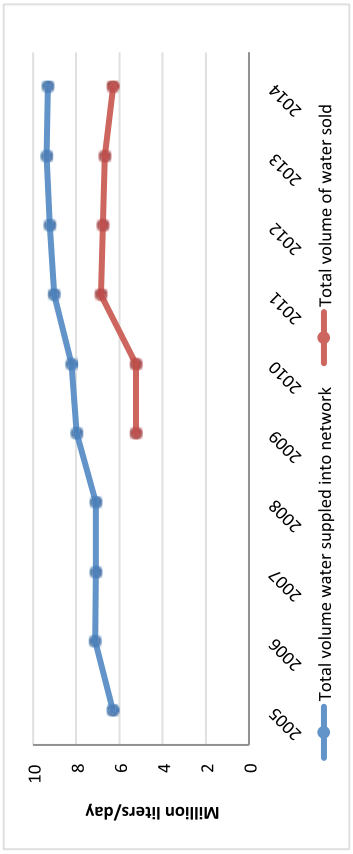


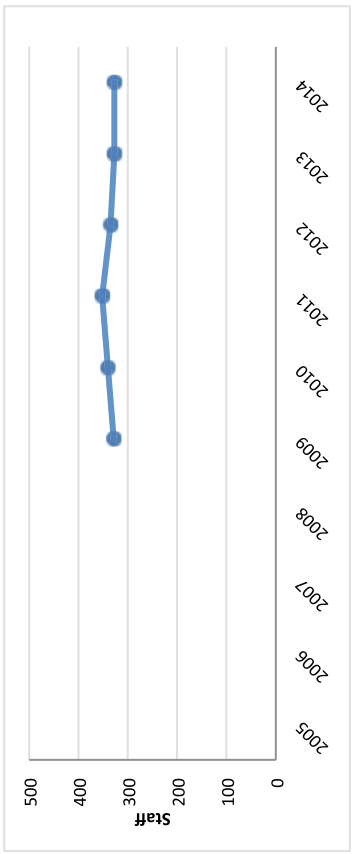


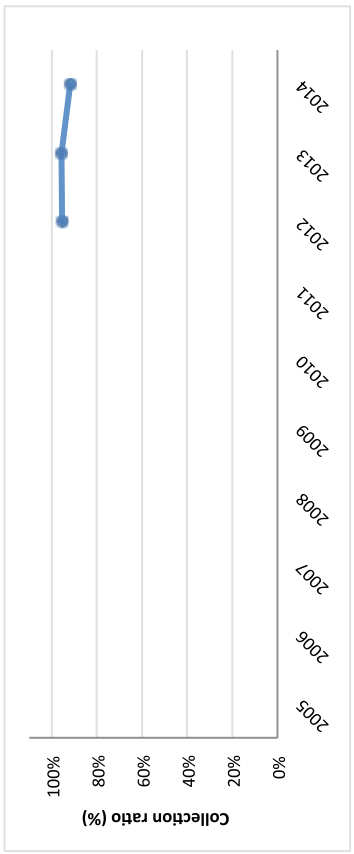

NRW (%)
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


Staff/1,000 conn.
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

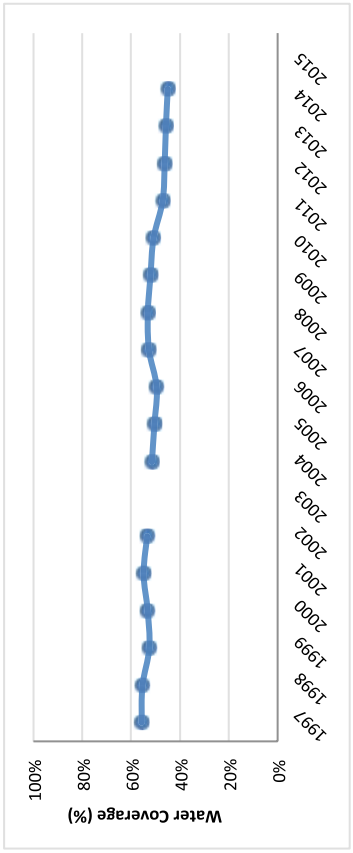

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

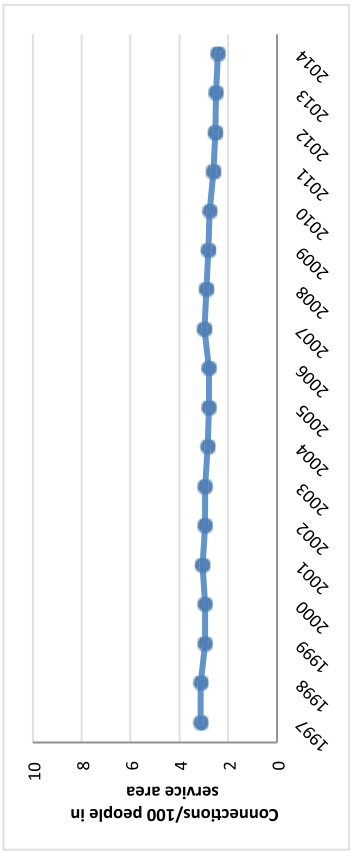

Million liters/day
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Total volume water suppled into network
Total volume of water sold

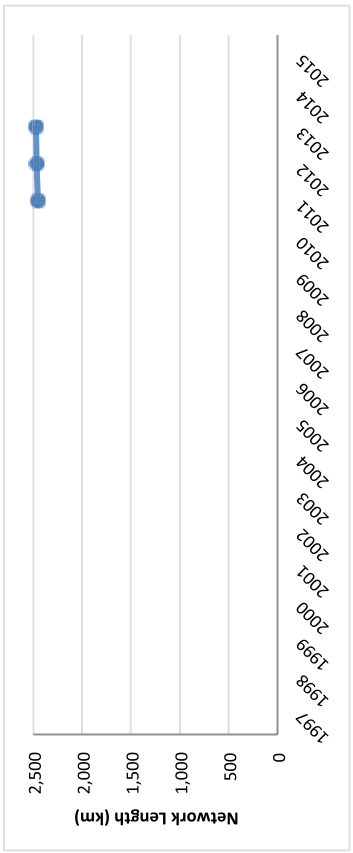

Staff
500
400
300
200
100
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

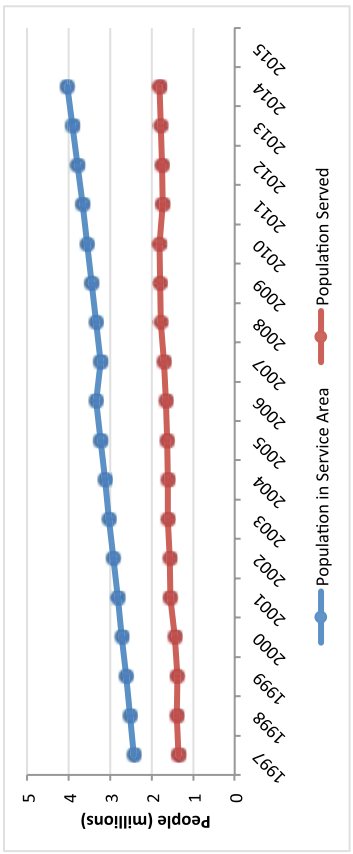

Collection ratio (%)
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

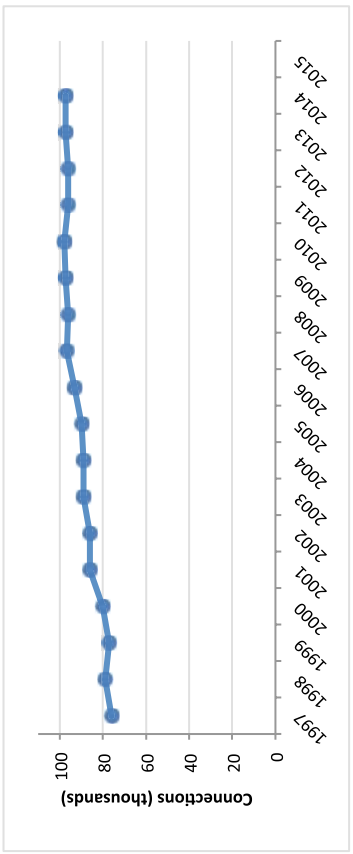
E.7 Kaduna State Water Board (KSWB), Nigeria

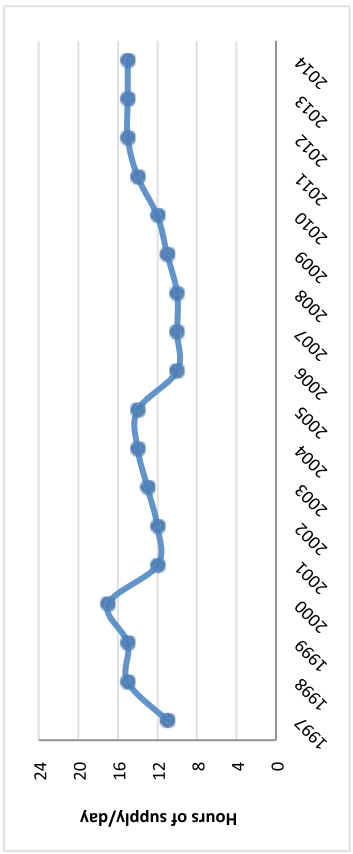


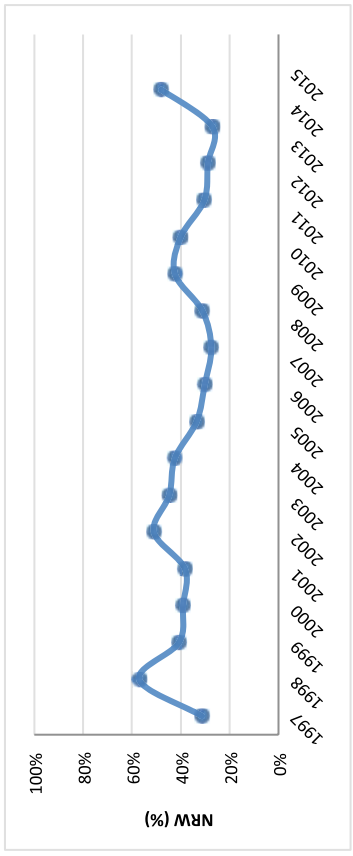


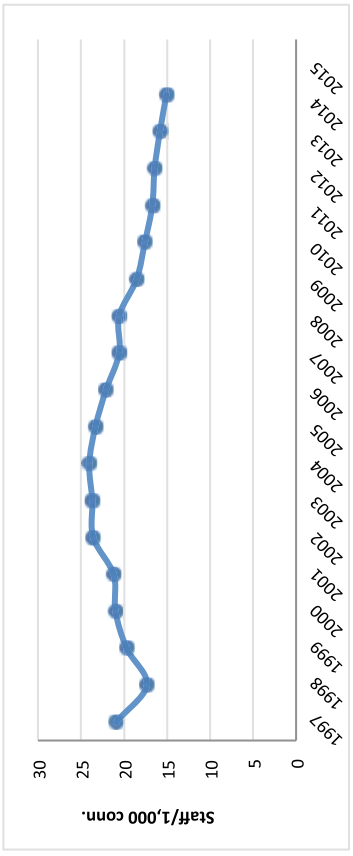


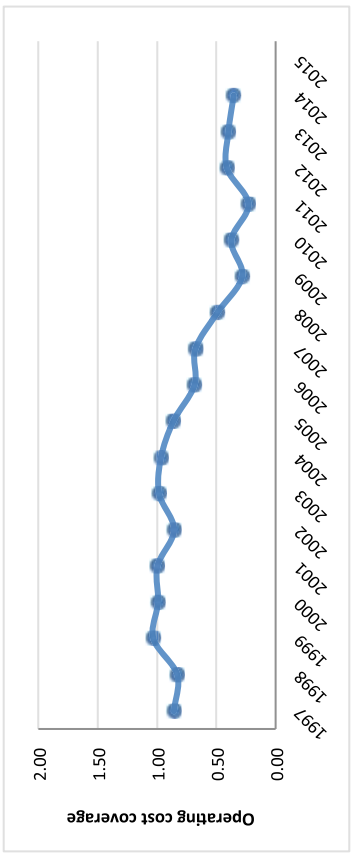


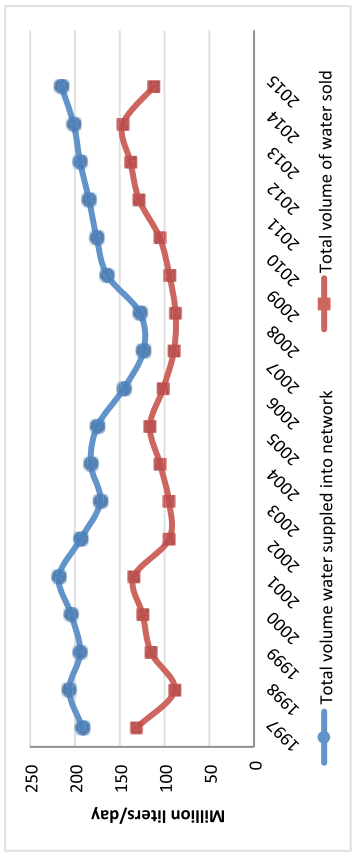


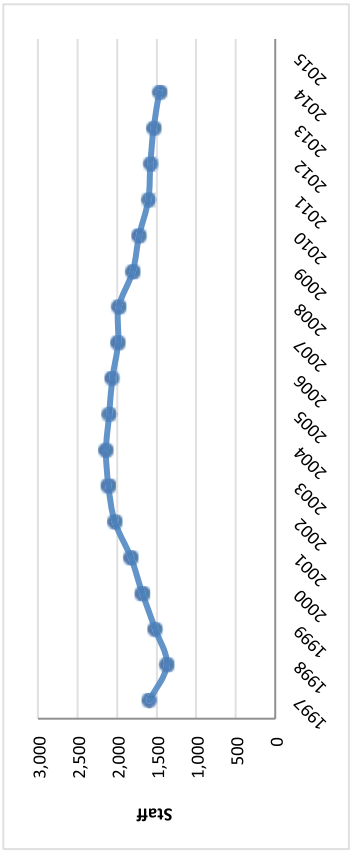


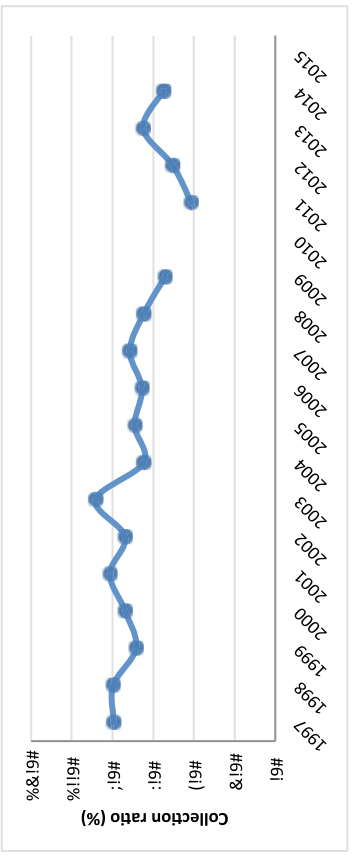

NRW (%)
100%
80%
60%
40%
20%
0%
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
30
25
20
15
10
5
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

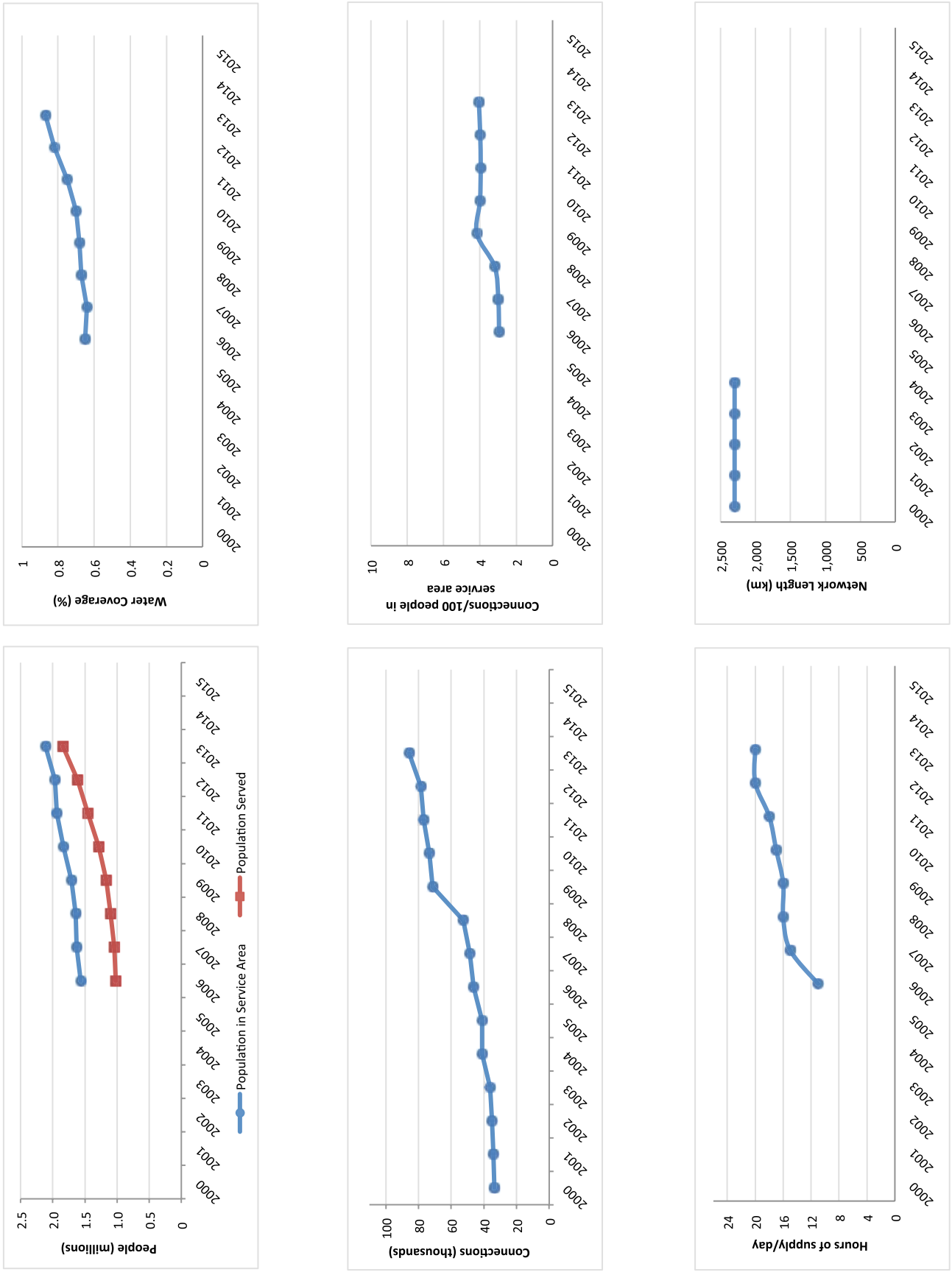

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

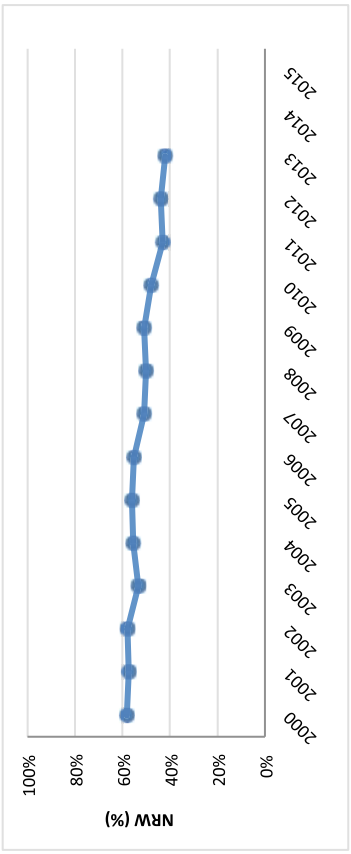

Million liters/day
250
200
150
100
50
0
Total volume water suppled into network
Total volume of water sold
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

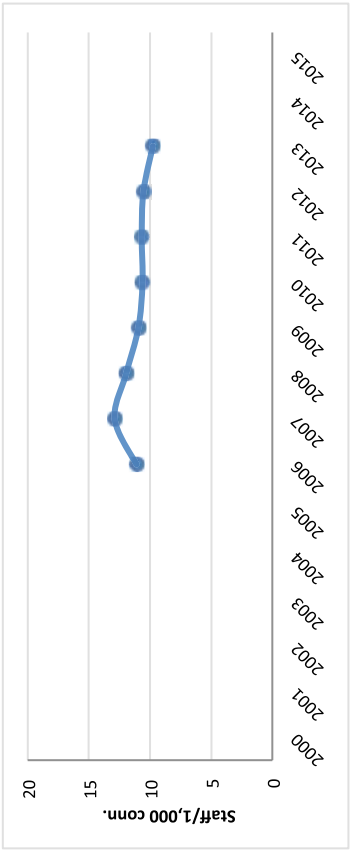

Staff
3,000
2,500
2,000
1,500
1,000
500
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

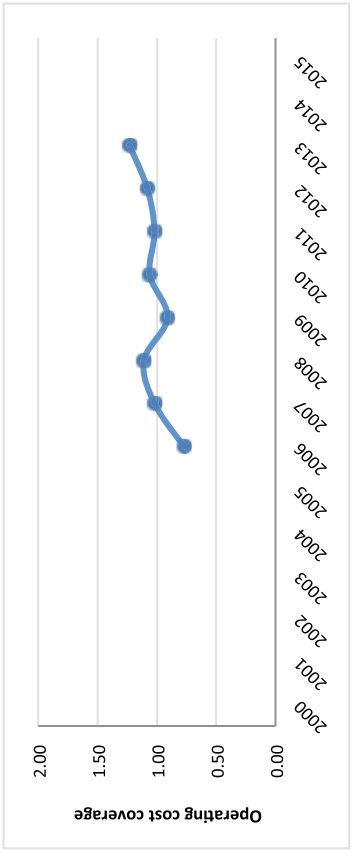

Collection ratio (%)
#61&
#61(
#61:
#61;
#61!%
#61&%
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

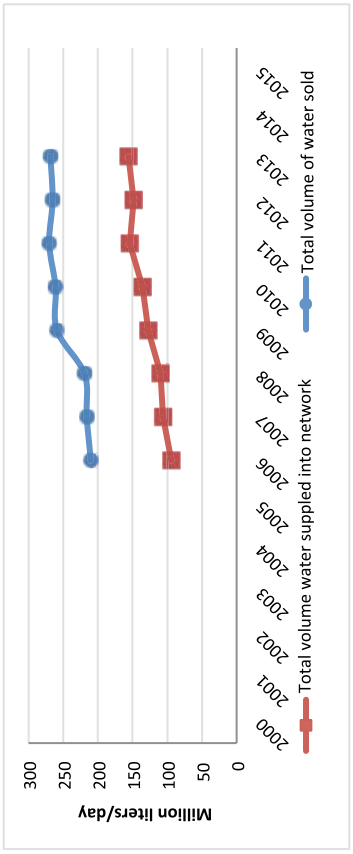
E.8 Lusaka Water and Sewerage Company (LWSC), Zambia

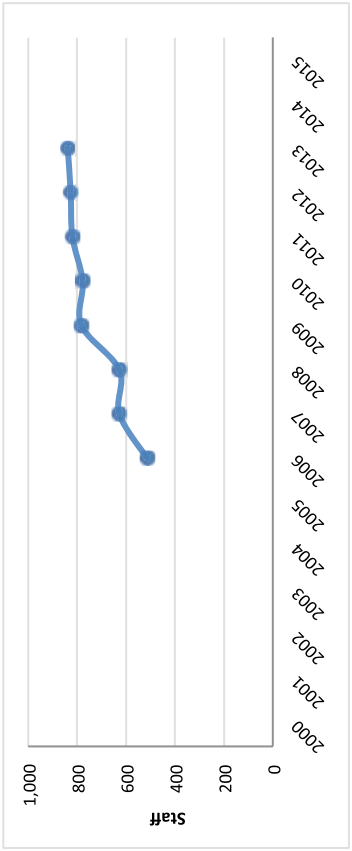


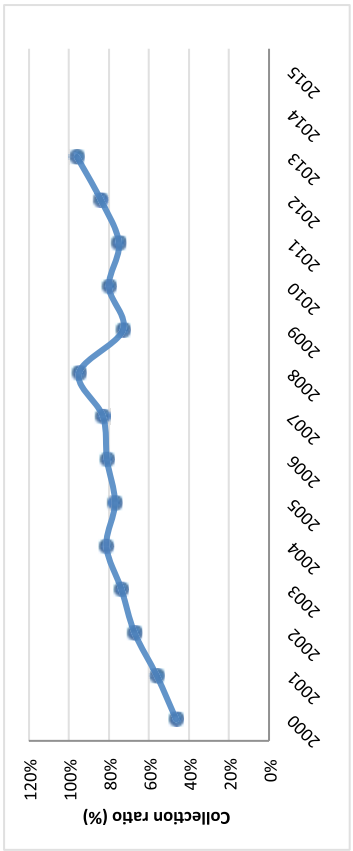

NRW (%)
100%
80%
60%
40%
20%
0%
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
20
15
10
5
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

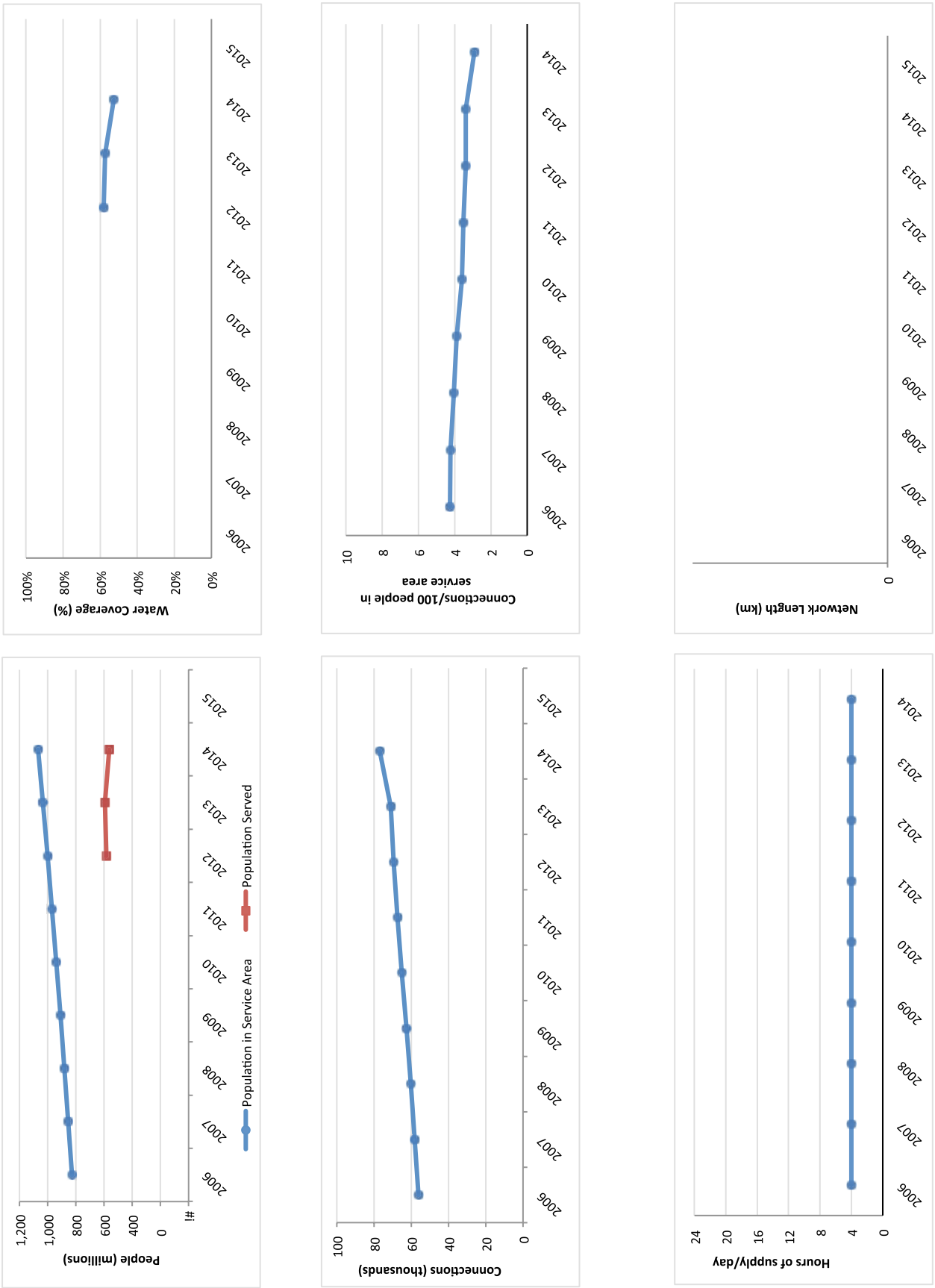

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

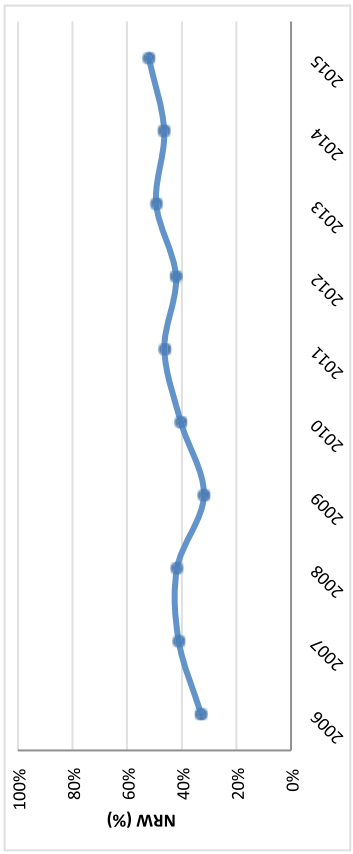

Million liters/day
300
250
200
150
100
50
0
Total volume water suppled into network
Total volume of water sold
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

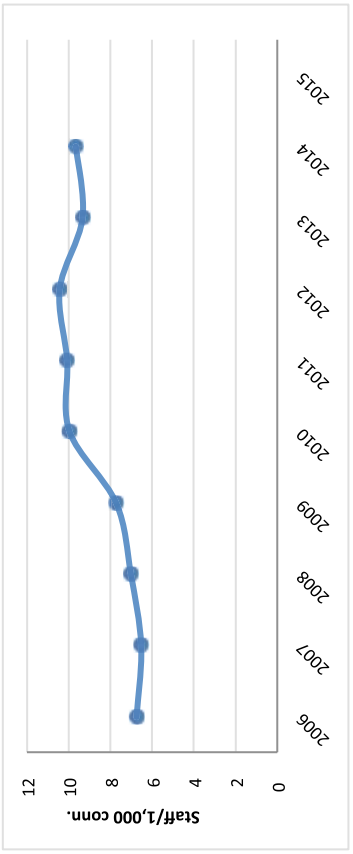

Staff
1,000
800
600
400
200
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

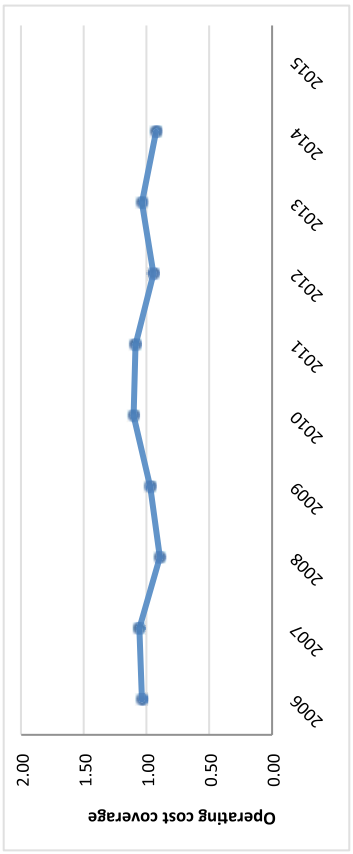

Collection ratio (%)
120%
100%
80%
60%
40%
20%
0%
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

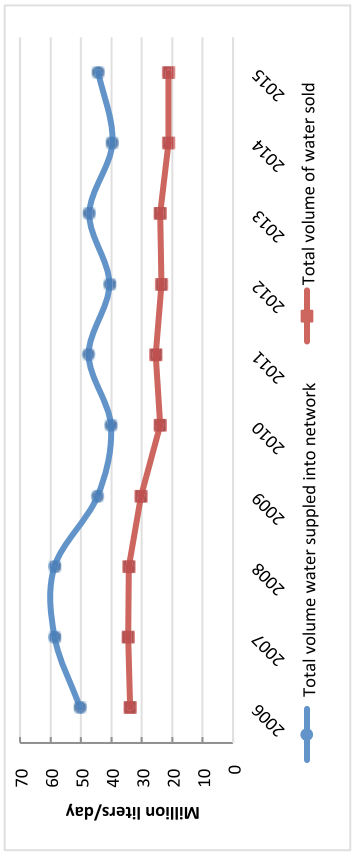
E.9 Mombasa Water Supply and Sanitation Company (MOWASCO)

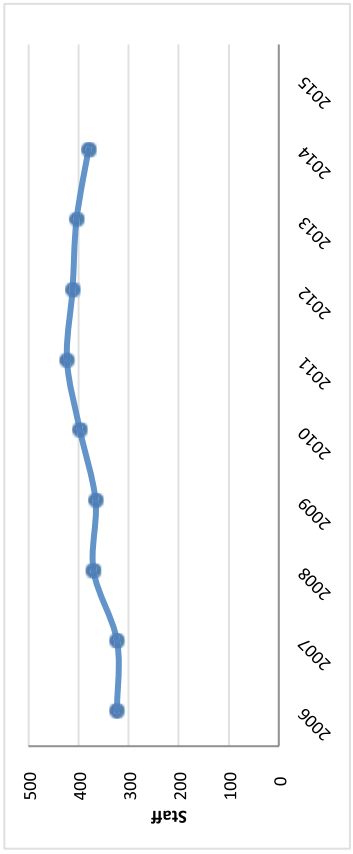


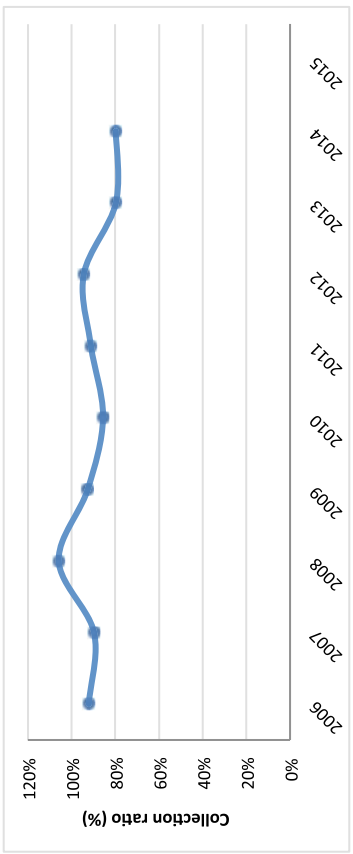

NRW (%)
100%
80%
60%
40%
20%
0%
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
12
10
8
6
4
2
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

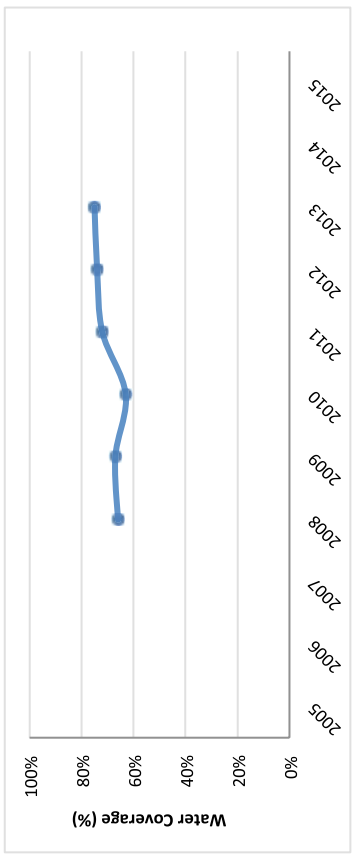

Operating cost coverage
2.00
1.50
1.00
0.50
0.00
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

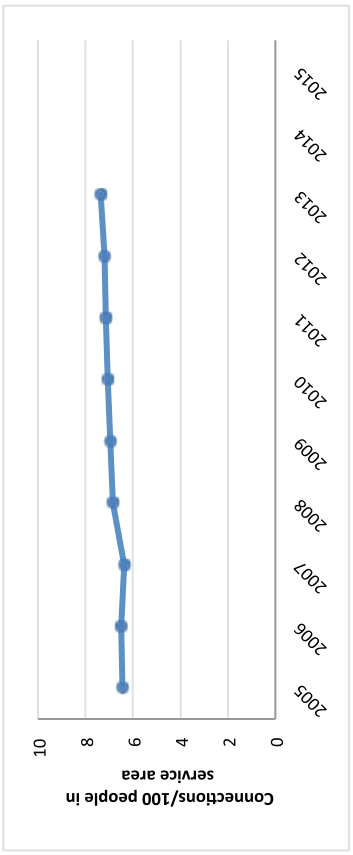

Million liters/day
70
60
50
40
30
20
10
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Total volume water suppled into network
Total volume of water sold

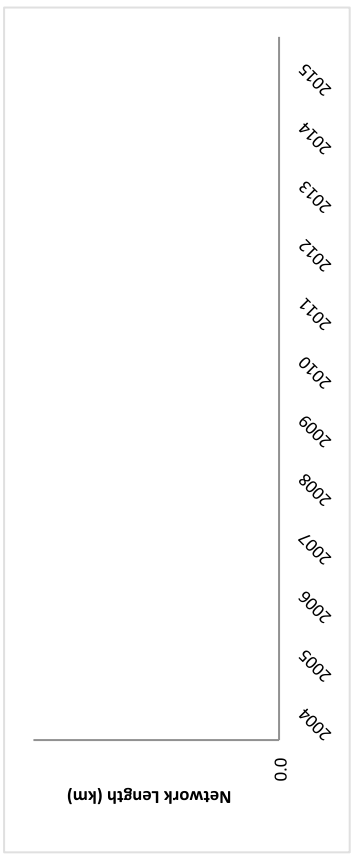

Staff
500
400
300
200
100
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

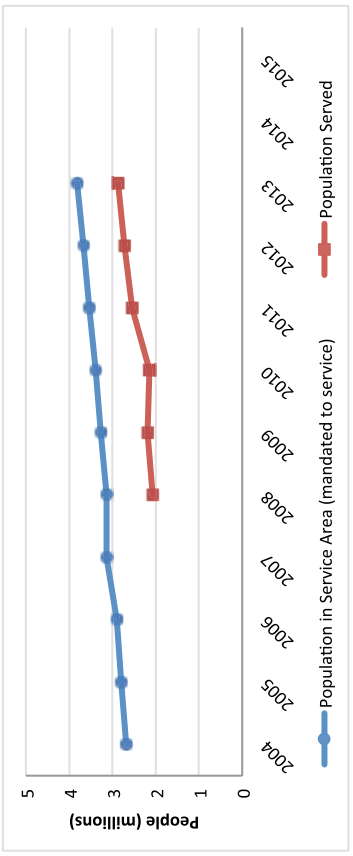

Collection ratio (%)
120%
100%
80%
60%
40%
20%
0%
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

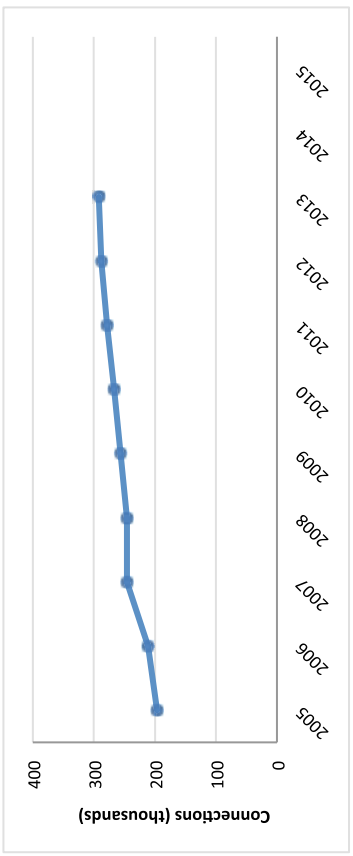
E.10 Nairobi City Water and Sewerage Company (NCWSC)

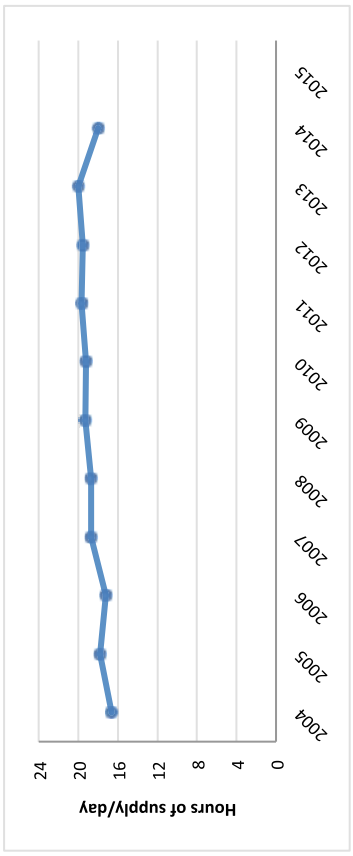


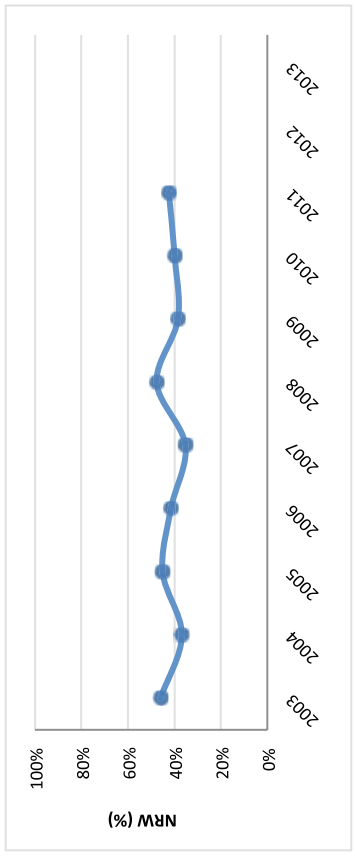


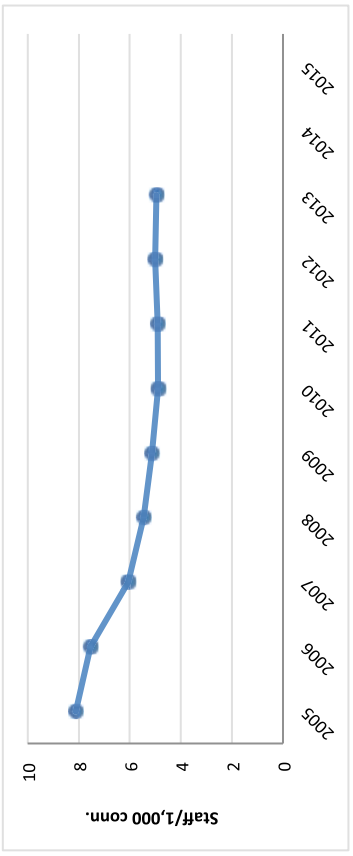


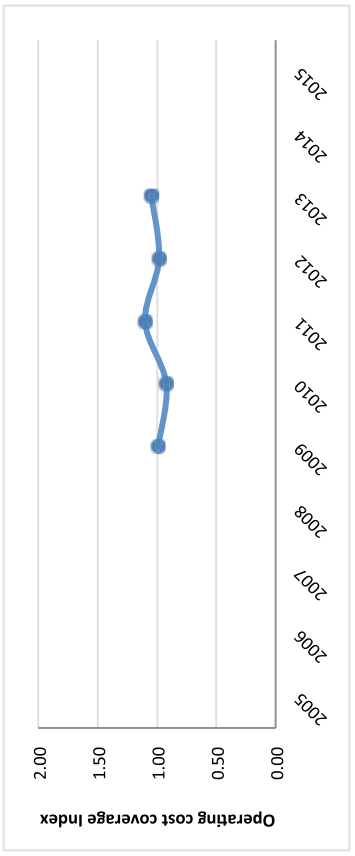


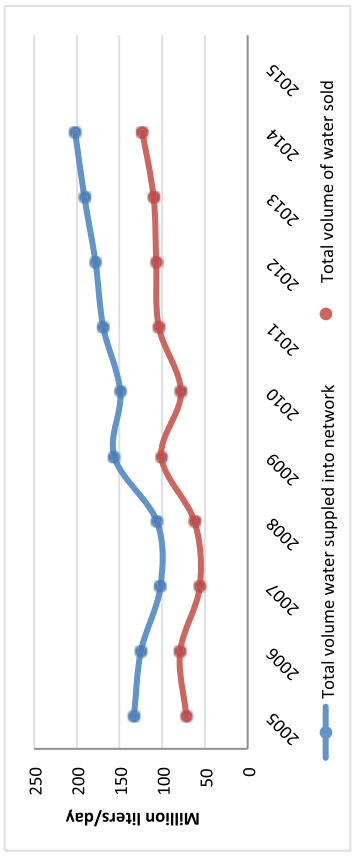


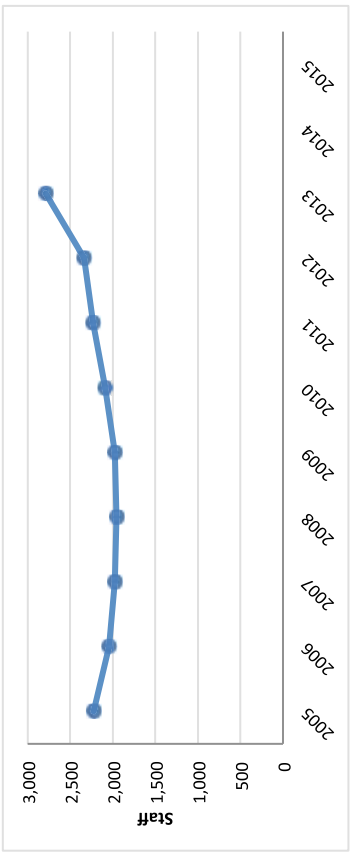


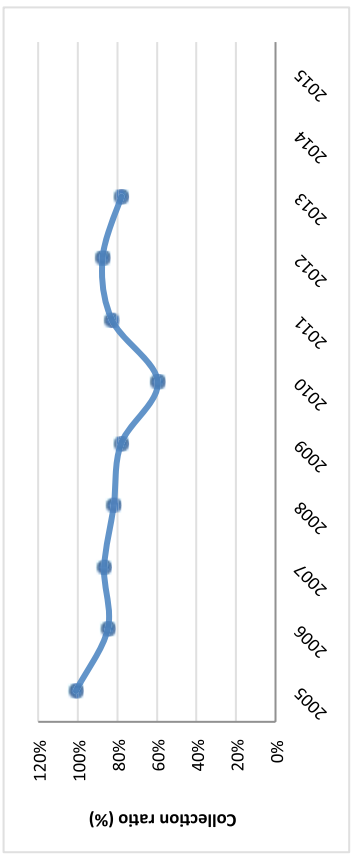

NRW (%)
100%
80%
60%
40%
20%
0%
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013


Staff/1,000 conn.
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

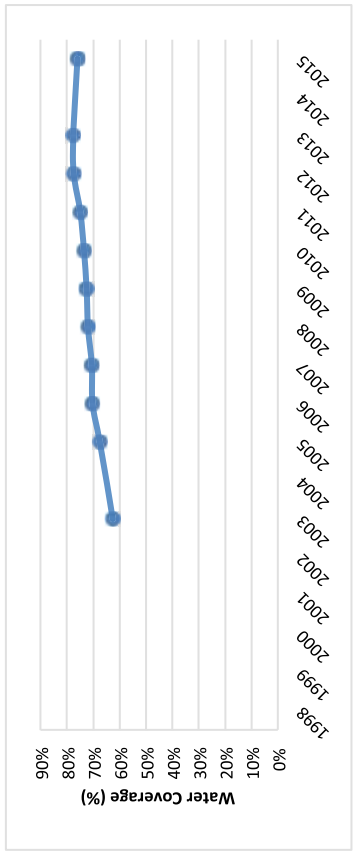

Operating cost coverage Index
2.00
1.50
1.00
0.50
0.00
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

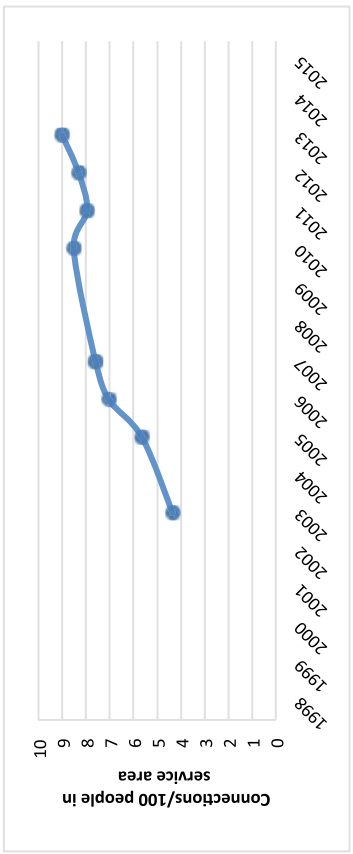

Million liters/day
250
200
150
100
50
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Total volume water suppled into network
Total volume of water sold

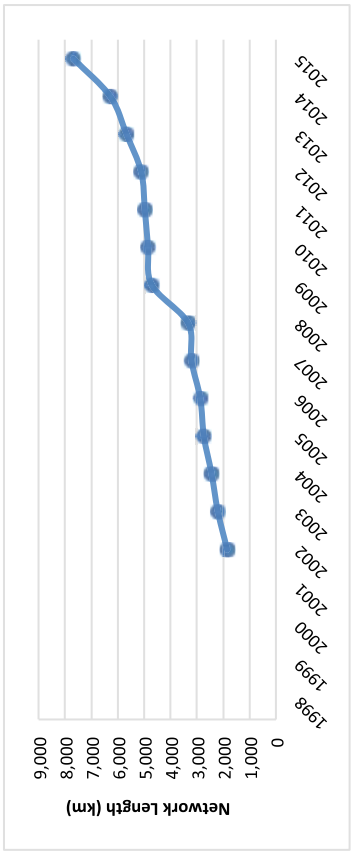

Staff
3,000
2,500
2,000
1,500
1,000
500
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

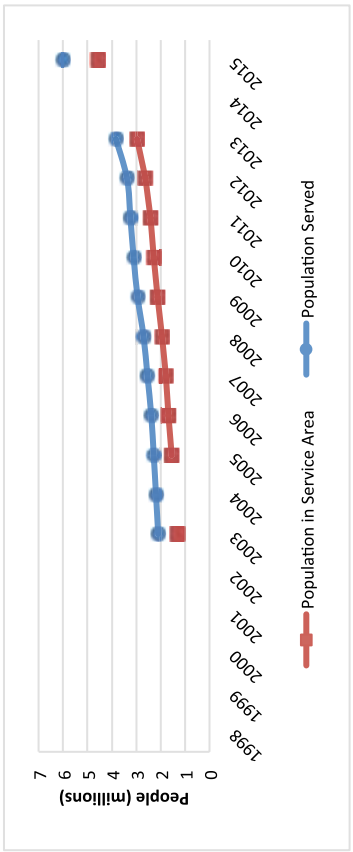

Collection ratio (%)
120%
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

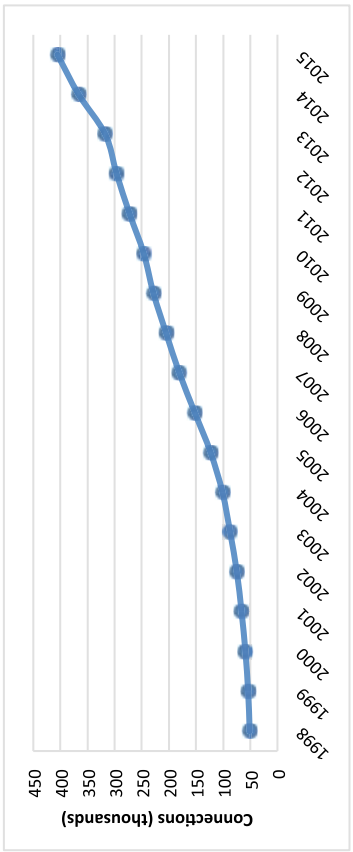
E.11 National Water and Sewerage Corporation (NWSC), Uganda

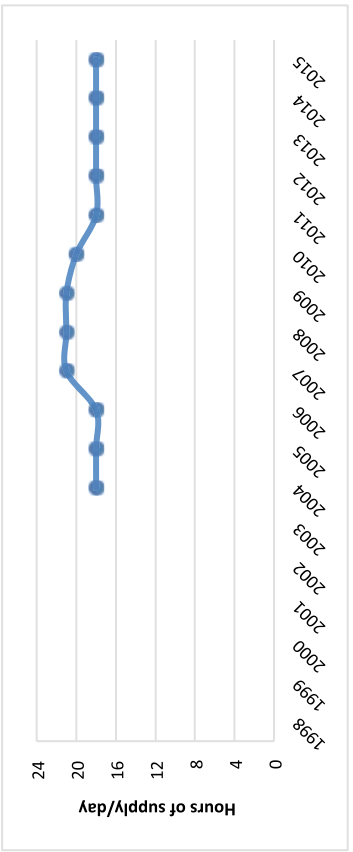


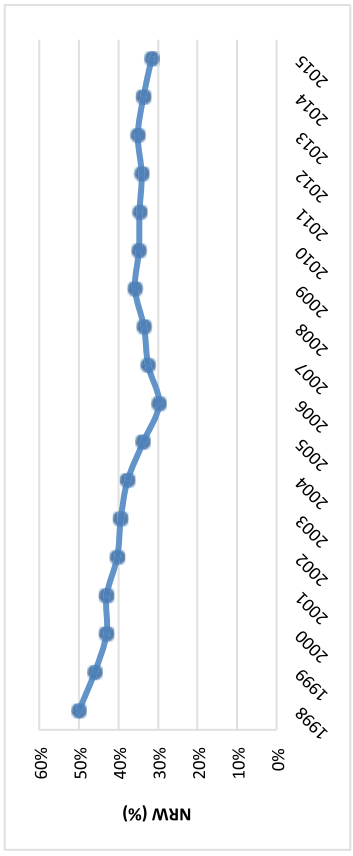


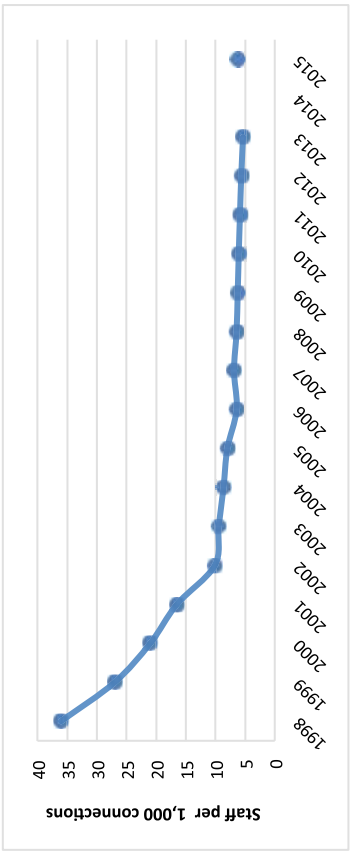


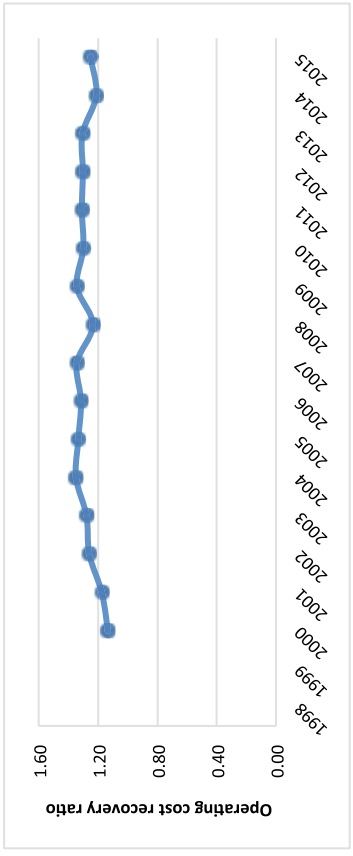


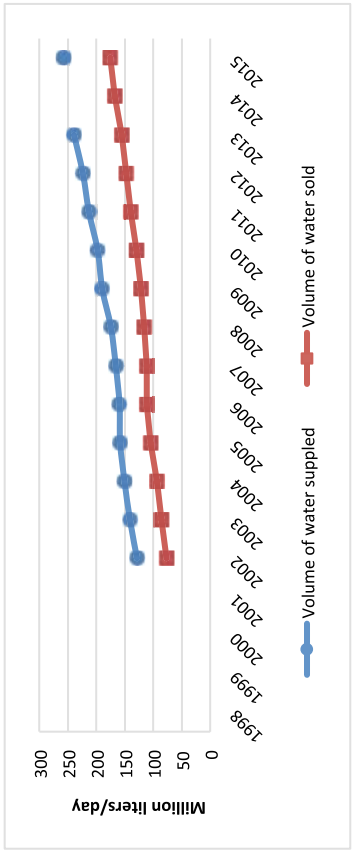


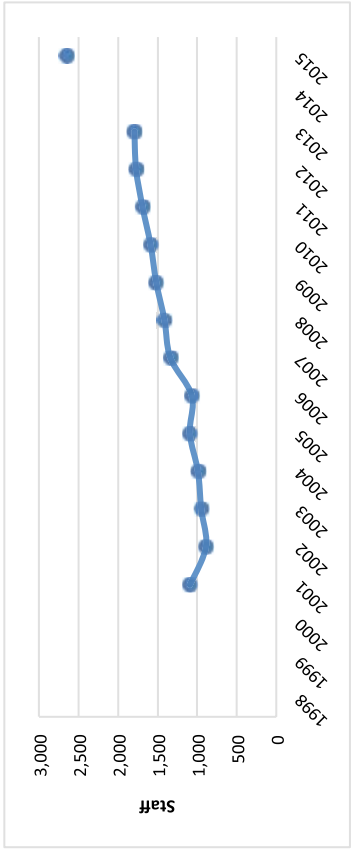


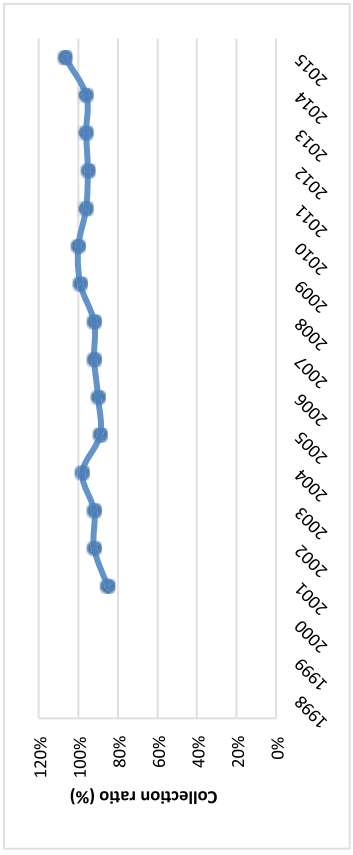

NRW (%)
60%
50%
40%
30%
20%
10%
0%
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff per 1,000 connections
40
35
30
25
20
15
10
5
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

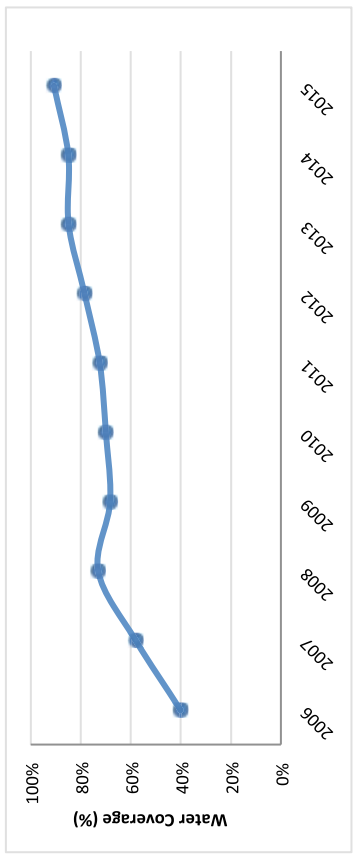

Operating cost recovery ratio
1.60
1.20
0.80
0.40
0.00
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

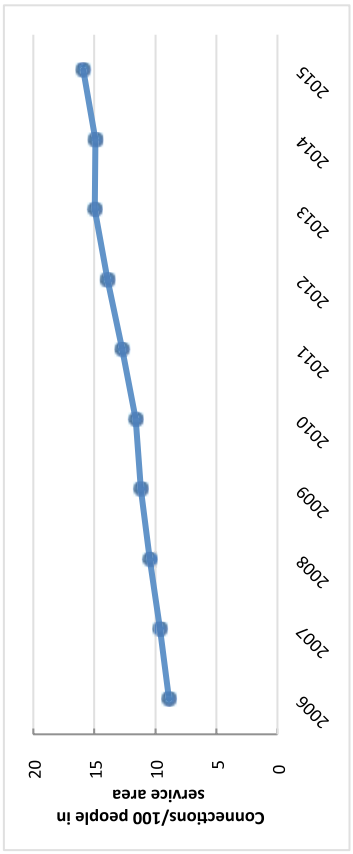

Million liters/day
300
250
200
150
100
50
0
Volume of water suppled
Volume of water sold
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

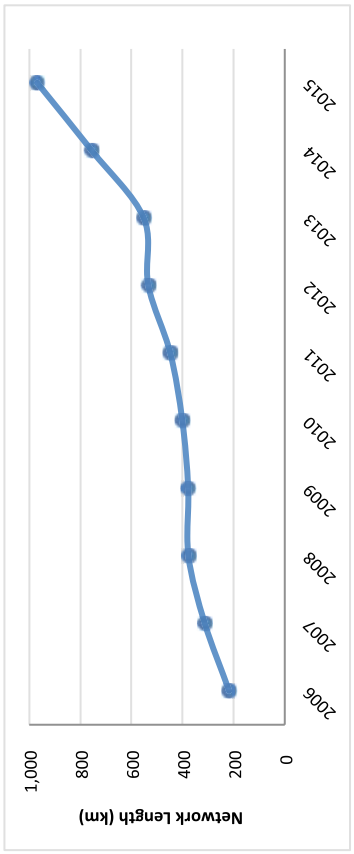

Staff
3,000
2,500
2,000
1,500
1,000
500
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

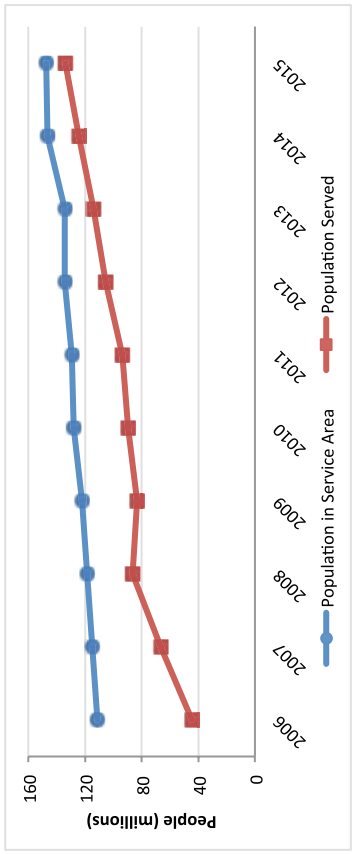

Collection ratio (%)
120%
100%
80%
60%
40%
20%
0%
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

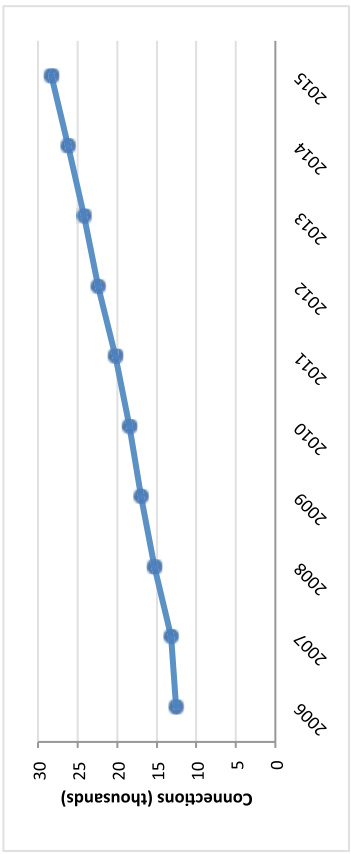
E.12 Nyeri Water and Sewerage Company (NYEWASCO)

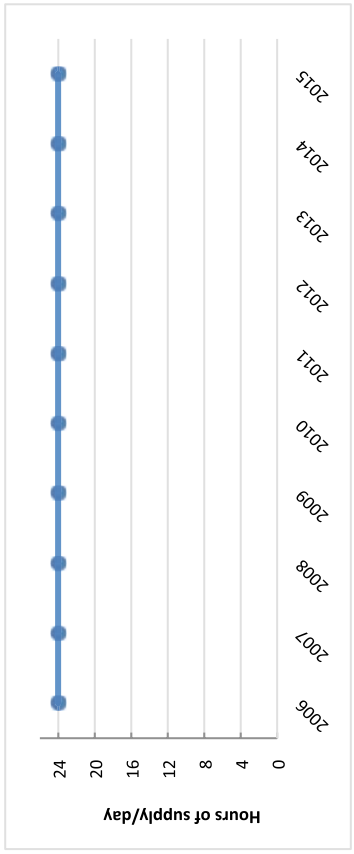


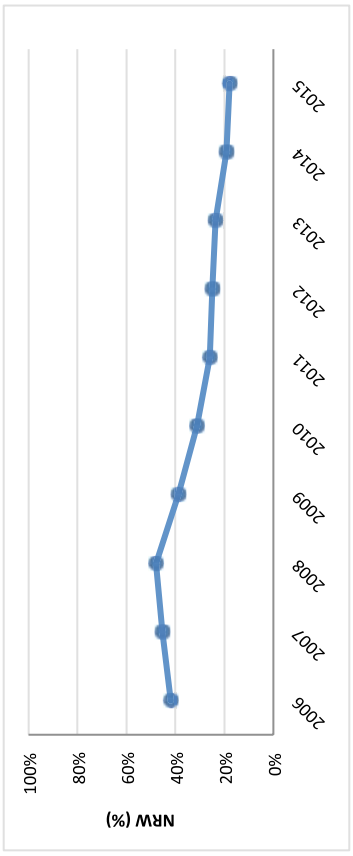


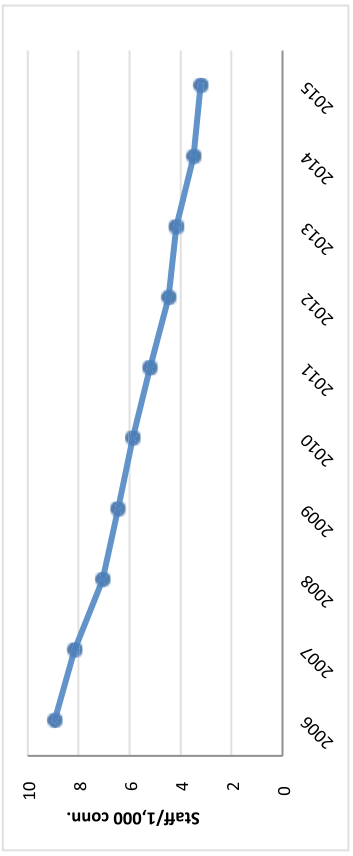


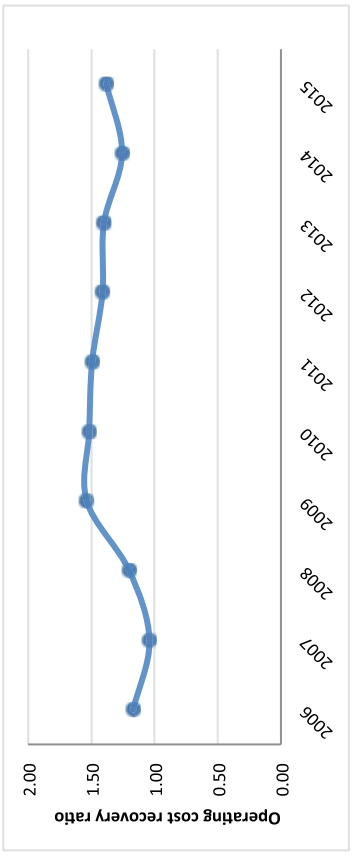


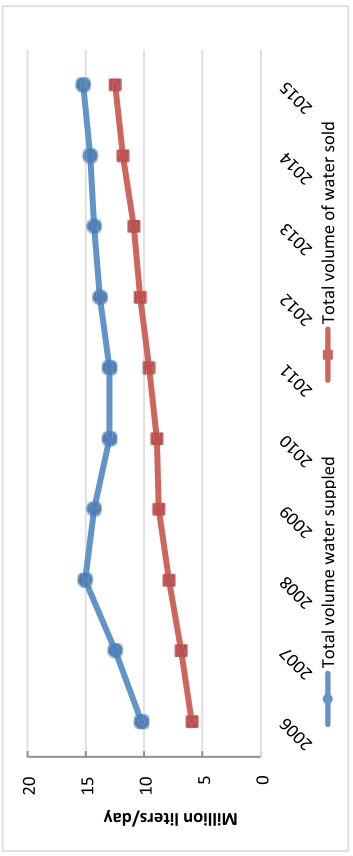


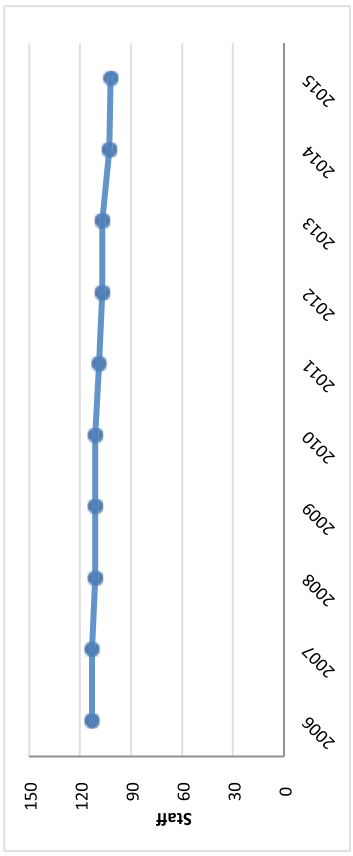


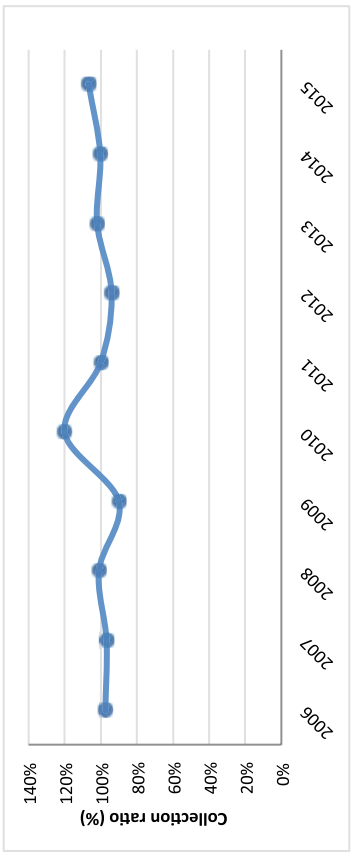

NRW (%)
100%
80%
60%
40%
20%
0%
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
10
8
6
4
2
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

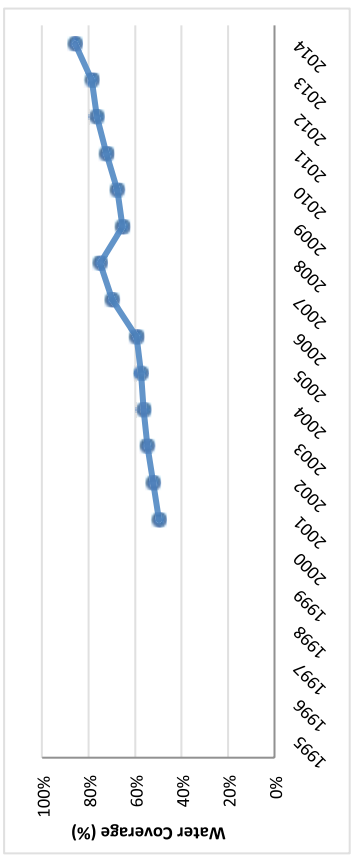

Operating cost recovery ratio
2.00
1.50
1.00
0.50
0.00
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

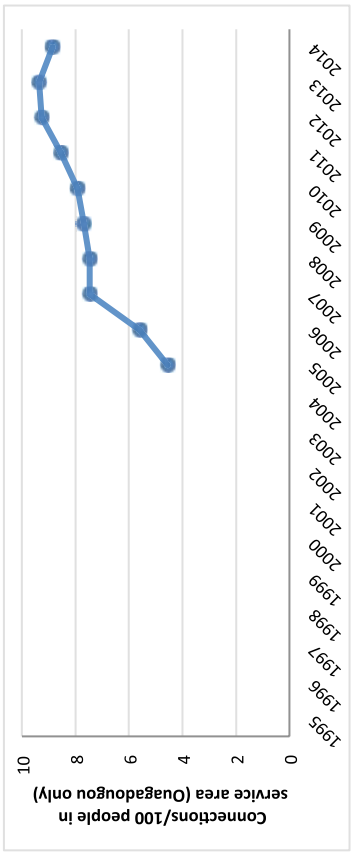

Million liters/day
20
15
10
5
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Total volume water suppled
Total volume of water sold

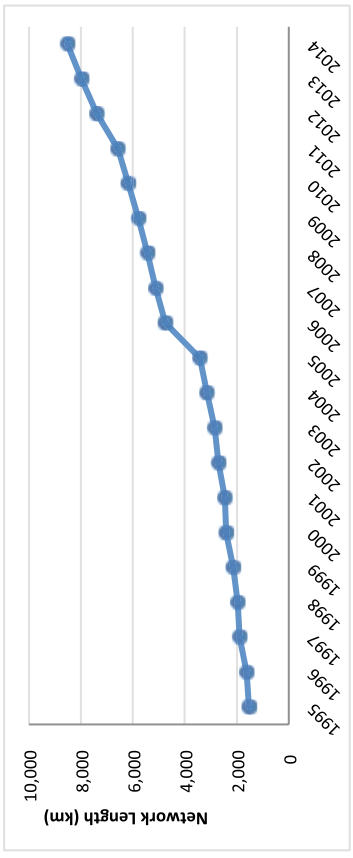

Staff
150
120
90
60
30
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

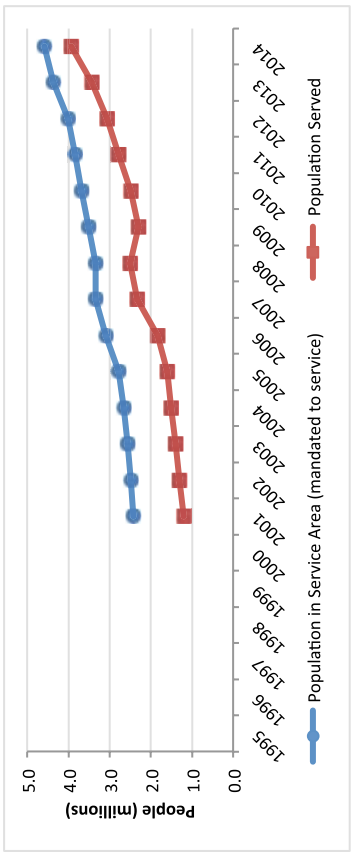

Collection ratio (%)
140%
120%
100%
80%
60%
40%
20%
0%
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

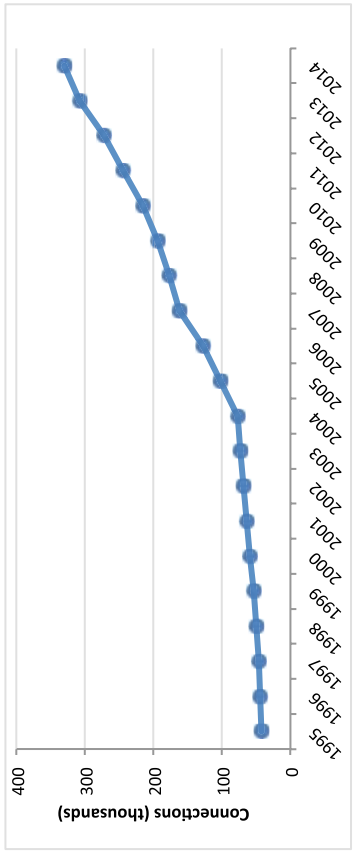
E.13 *l'Office national de l'eau et de l'assainissement* (ONEA)

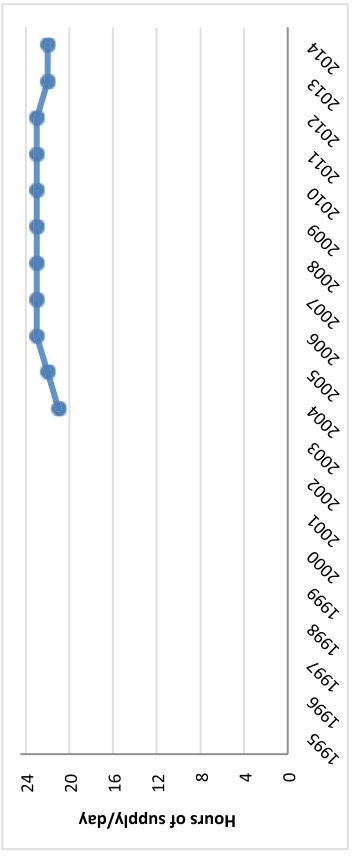


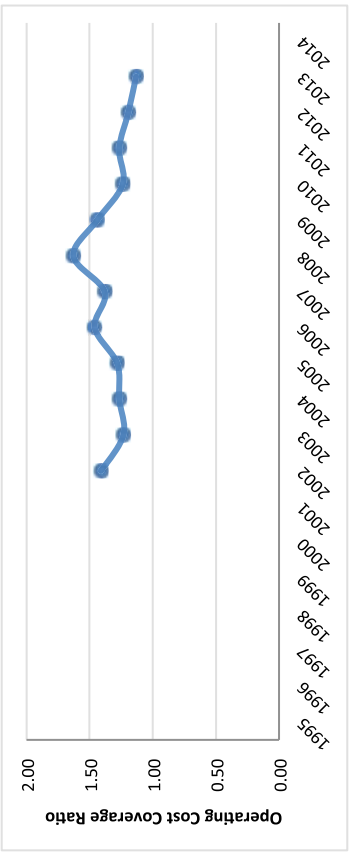


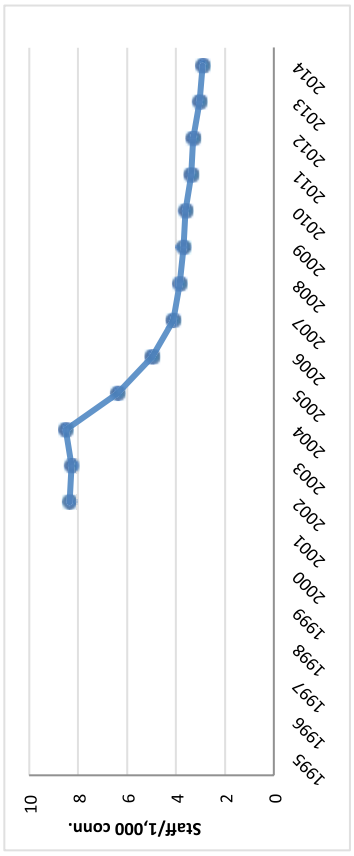


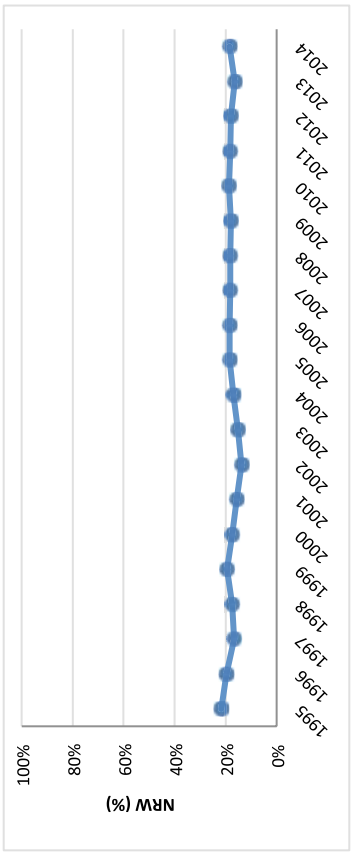


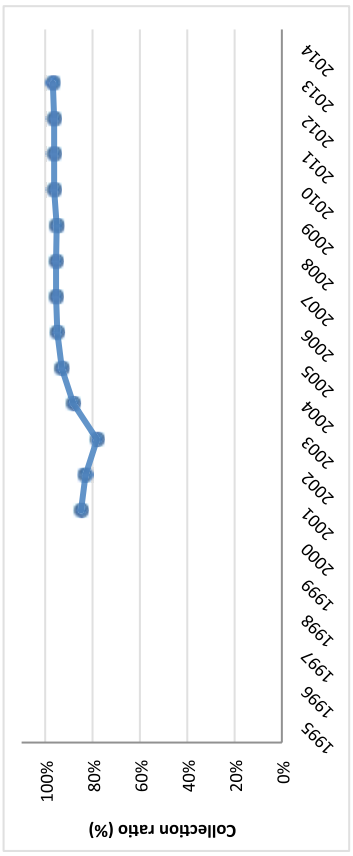


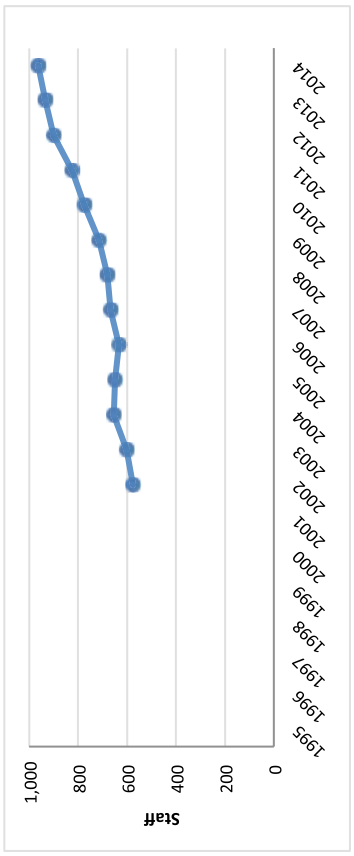


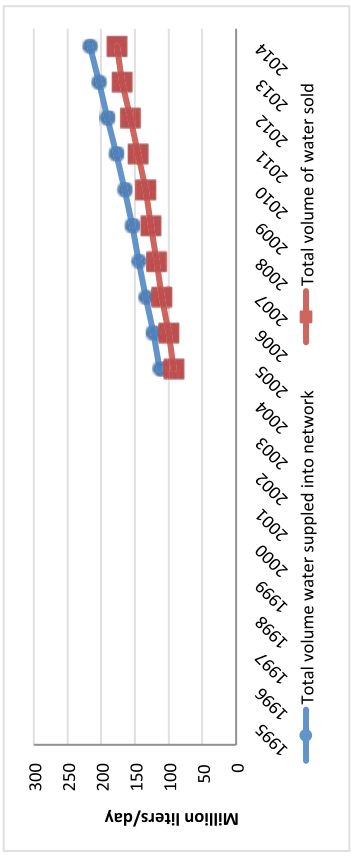

Operating Cost Coverage Ratio
2.00
1.50
1.00
0.50
0.00
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014


Staff/1,000 conn.
10
8
6
4
2
0
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

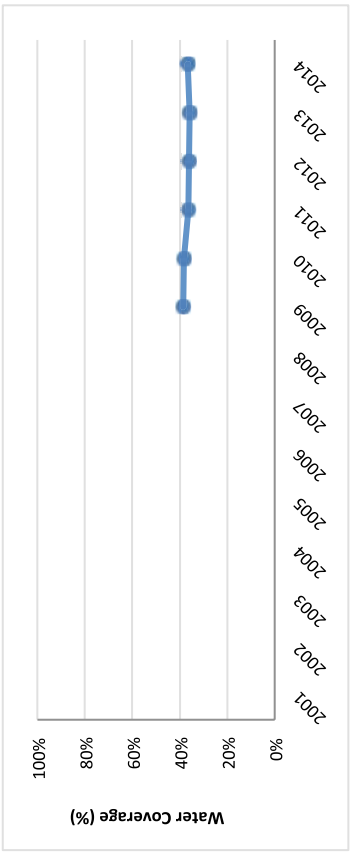

NRW (%)
100%
80%
60%
40%
20%
0%
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

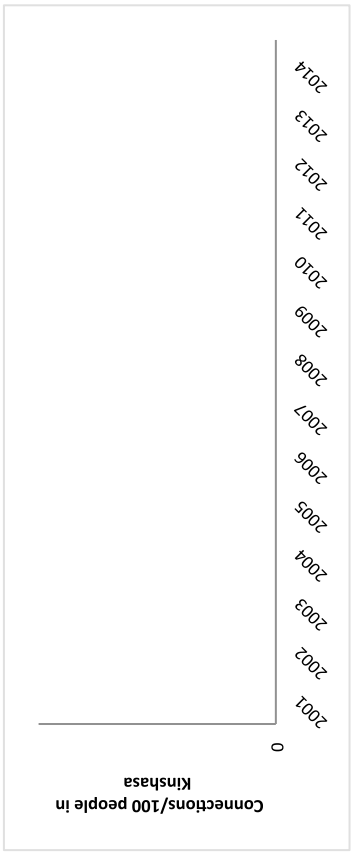

Collection ratio (%)
100%
80%
60%
40%
20%
0%
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

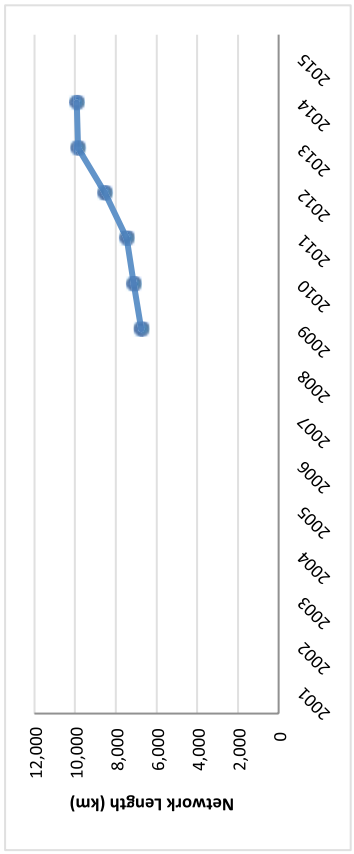

Staff
1,000
800
600
400
200
0
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

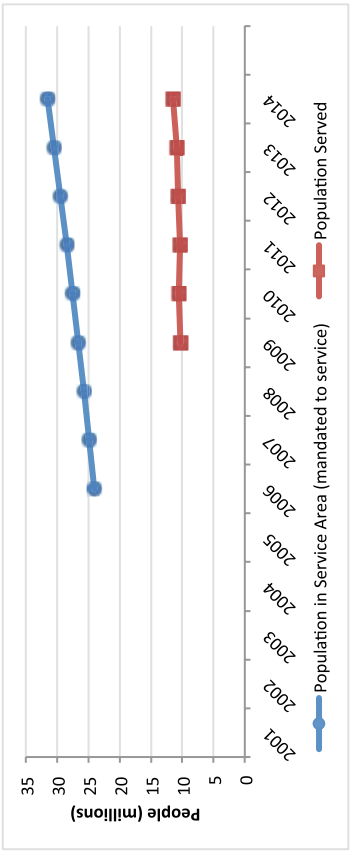

Million liters/day
300
250
200
150
100
50
0
Total volume water suppled into network
Total volume of water sold
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

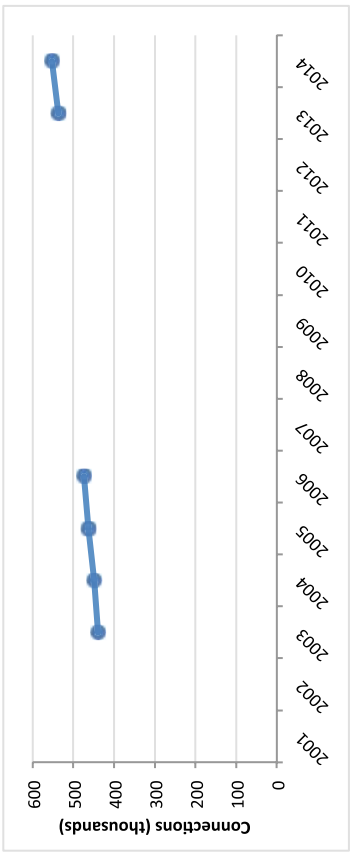
E.14 REGIDESO, Democratic Republic of the Congo

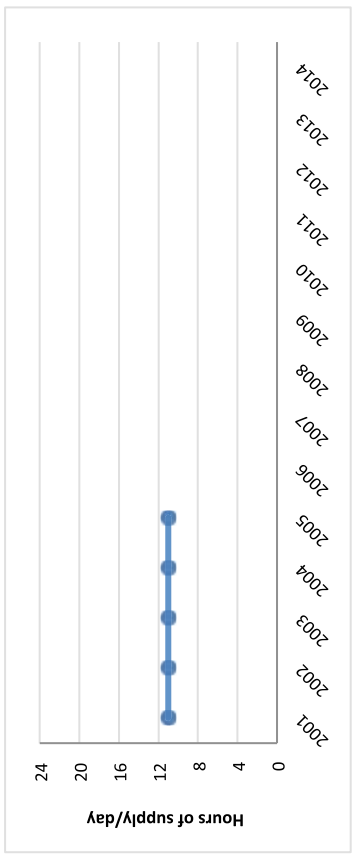


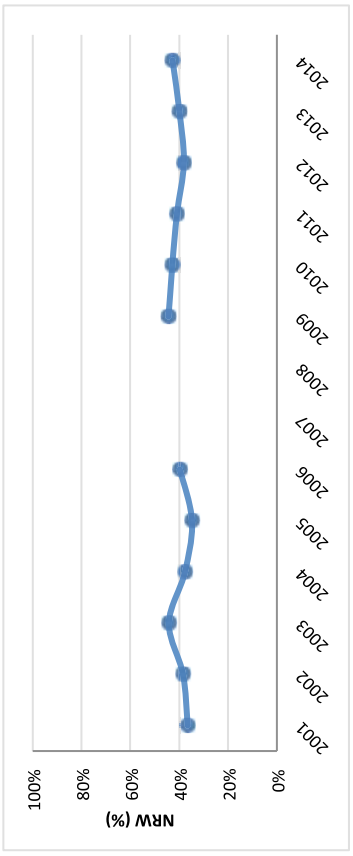


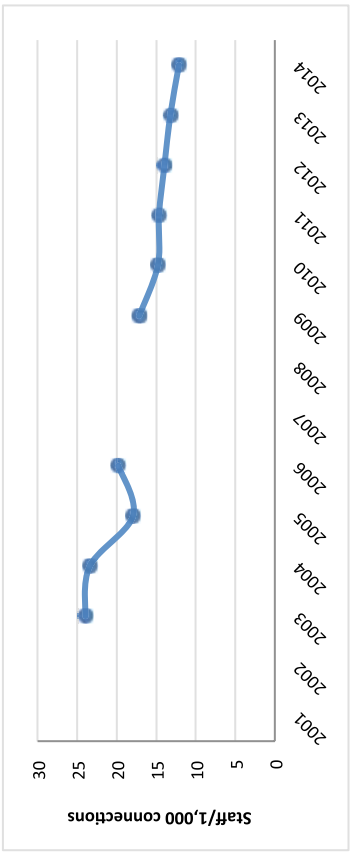


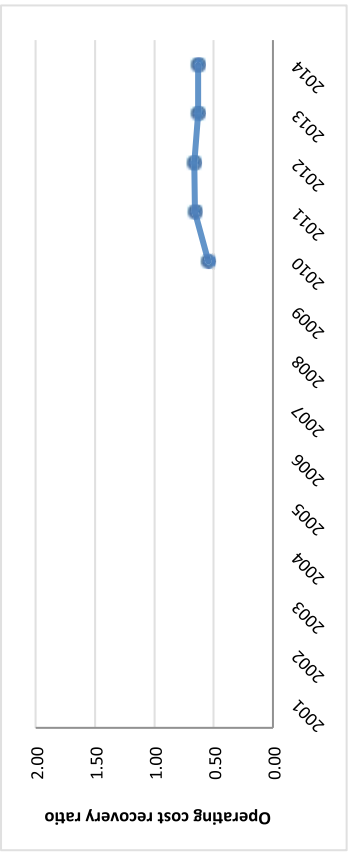


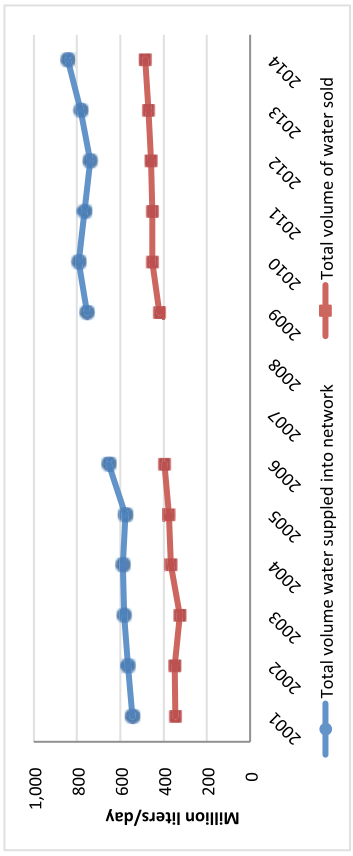


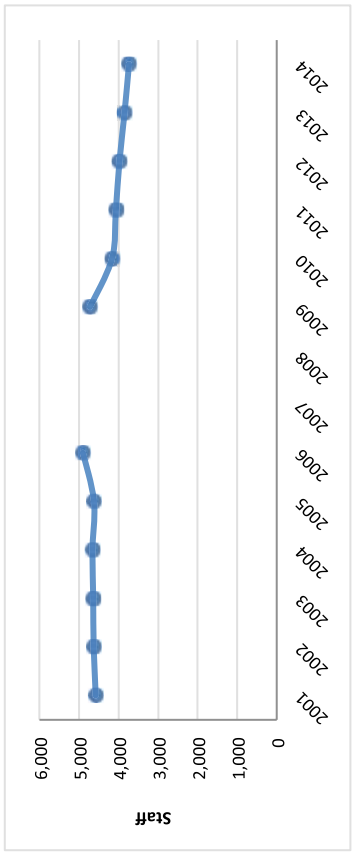


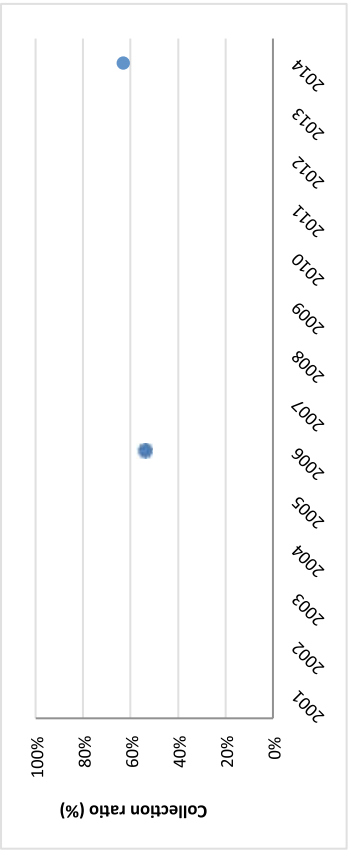

NRW (%)
100%
80%
60%
40%
20%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


Staff/1,000 connections
30
25
20
15
10
5
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

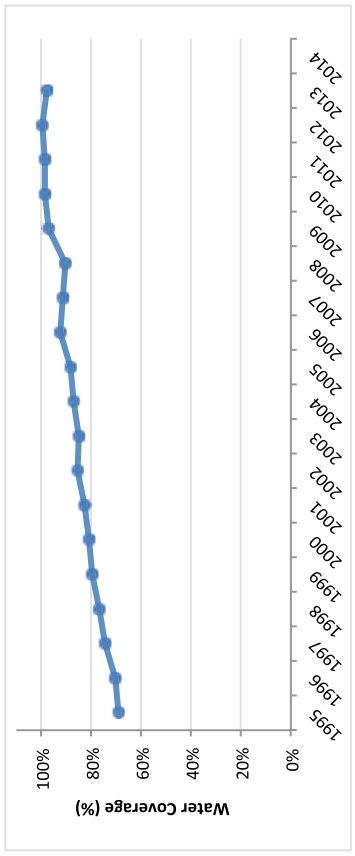

Operating cost recovery ratio
2.00
1.50
1.00
0.50
0.00
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

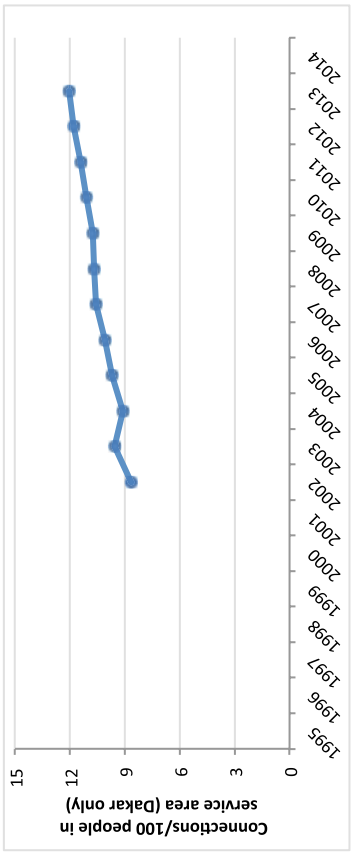

Million liters/day
1,000
800
600
400
200
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Total volume water suppled into network
Total volume of water sold

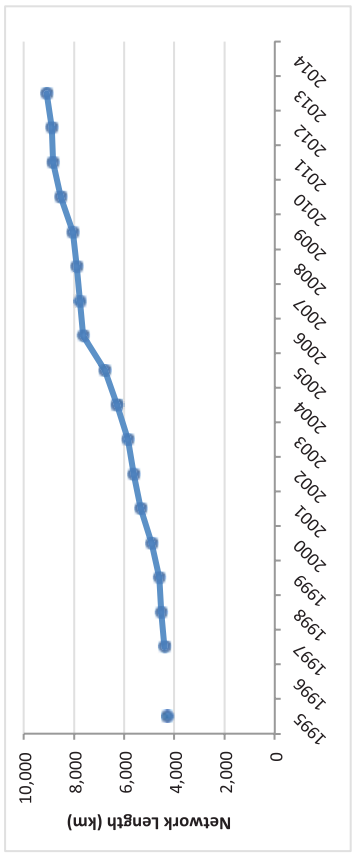

Staff
6,000
5,000
4,000
3,000
2,000
1,000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

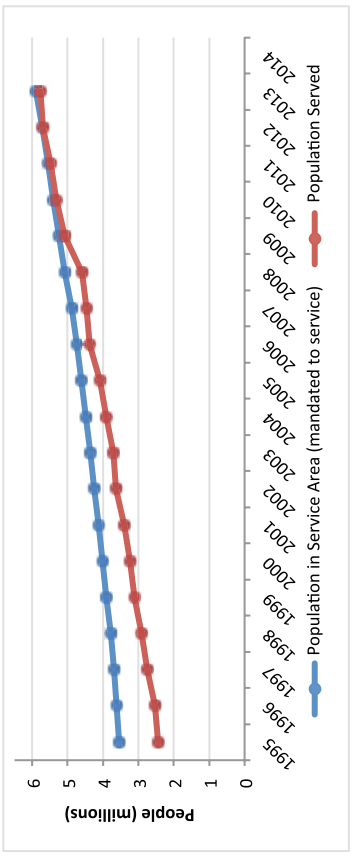

Collection ratio (%)
100%
80%
60%
40%
20%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

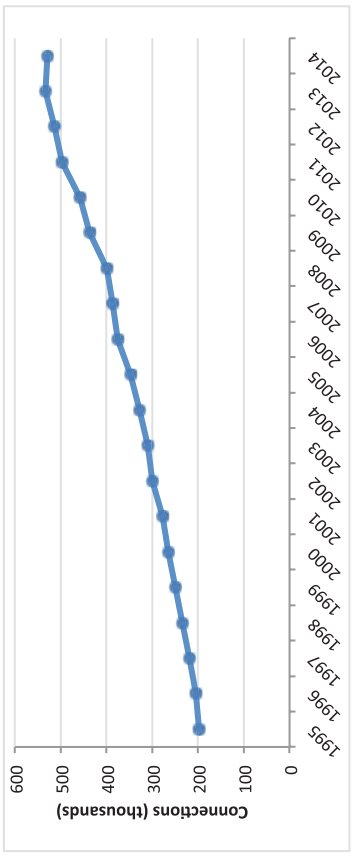
E.15 *Sénégalaise des Eaux (SDE) and Société Nationale des Eaux du Sénégal (SONES), Senegal*

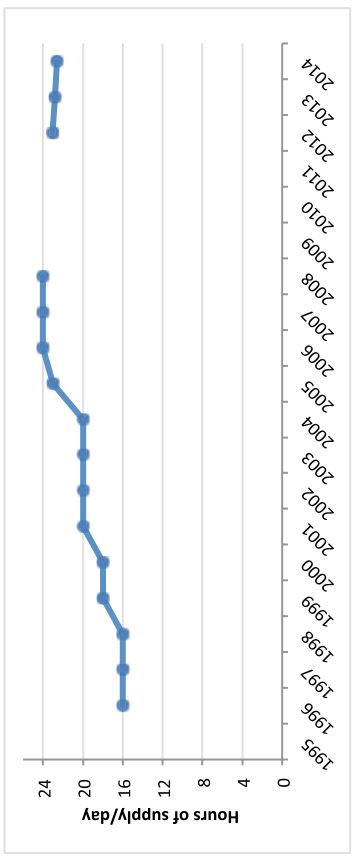


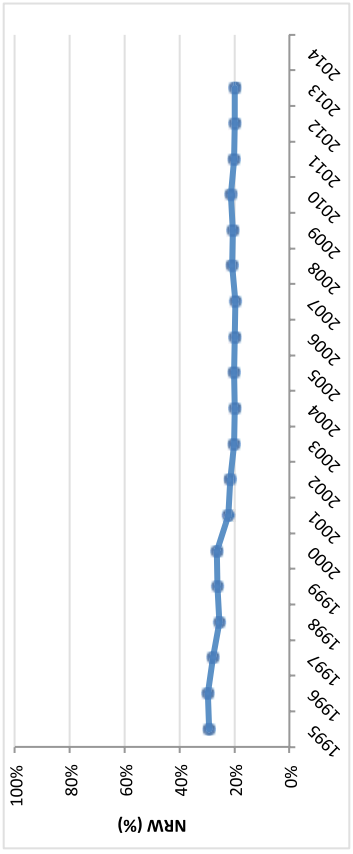


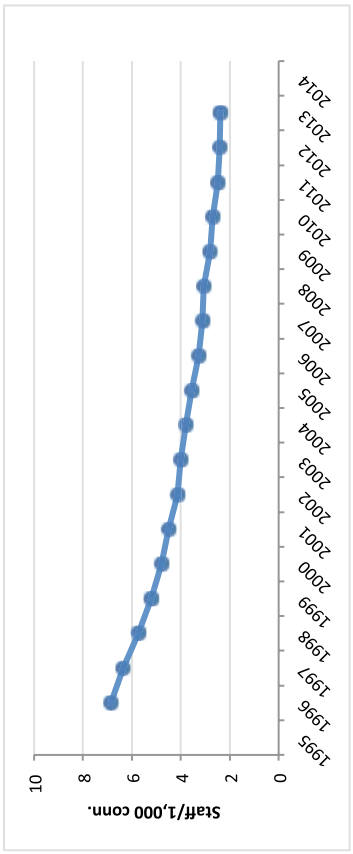


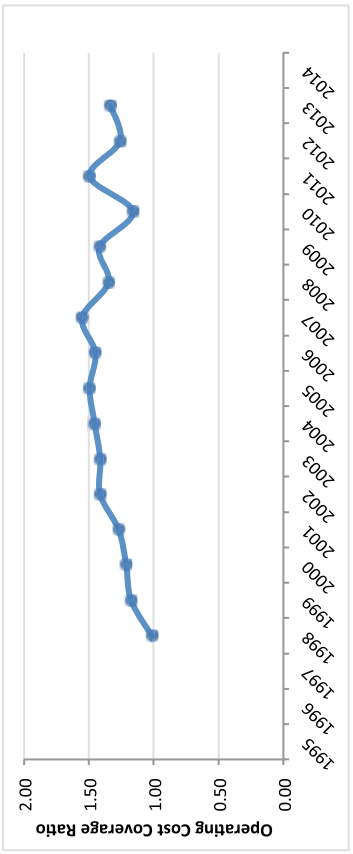


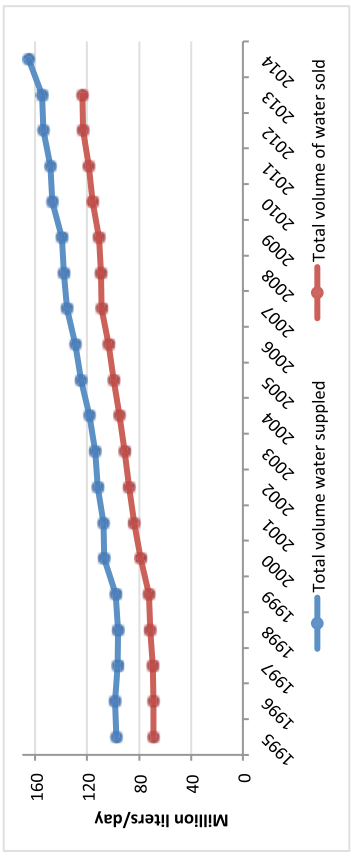


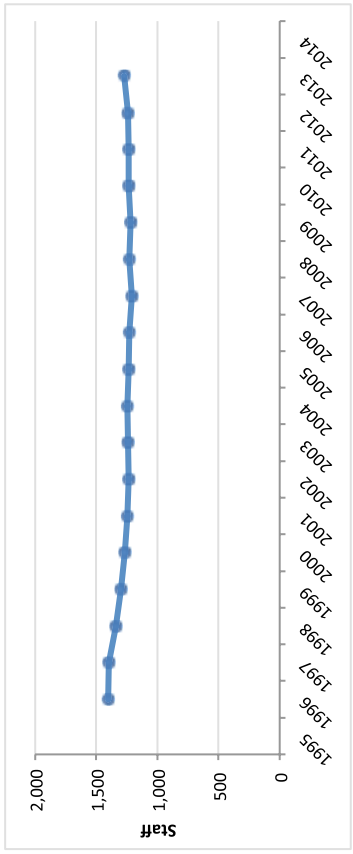


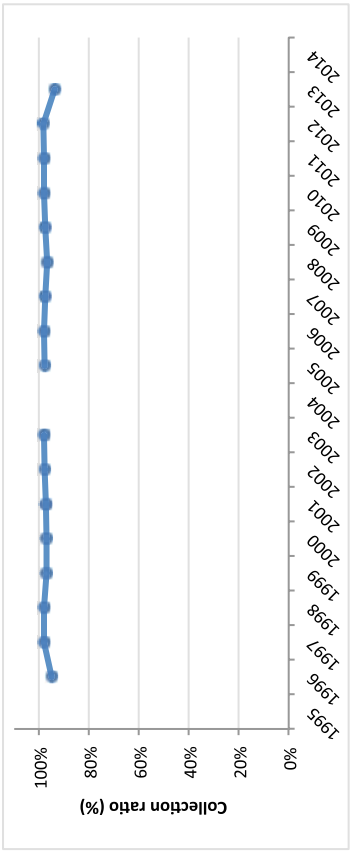

NRW (%)
100%
80%
60%
40%
20%
0%
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


Staff/1,000 conn.
10
8
6
4
2
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

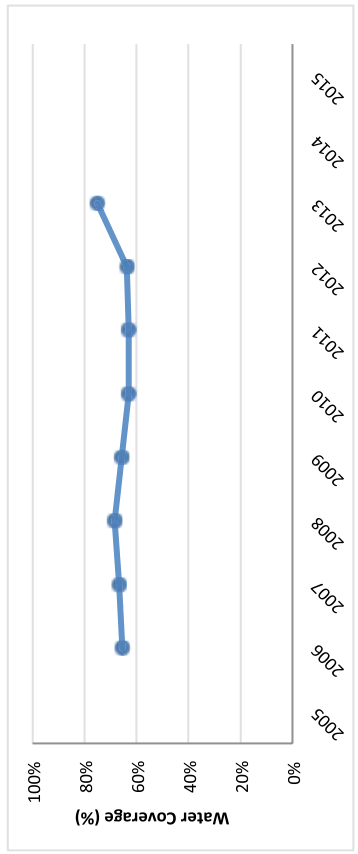

Operating Cost Coverage Ratio
2.00
1.50
1.00
0.50
0.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

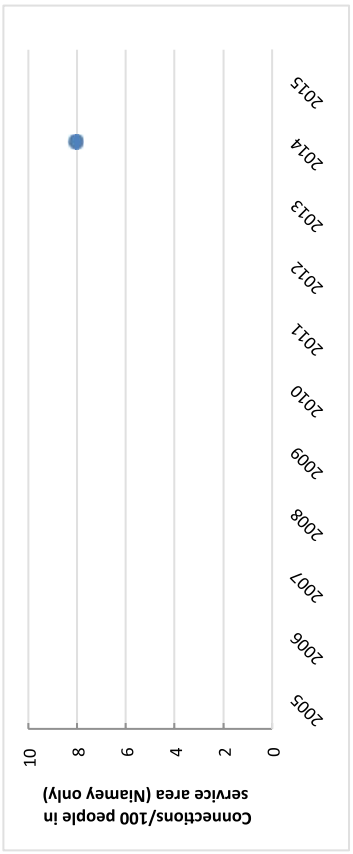

Million liters/day
160
120
80
40
0
Total volume water suppled
Total volume of water sold
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

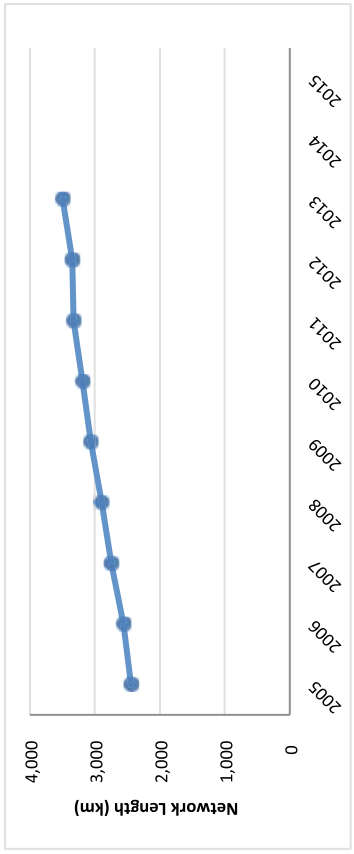

Staff
2,000
1,500
1,000
500
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

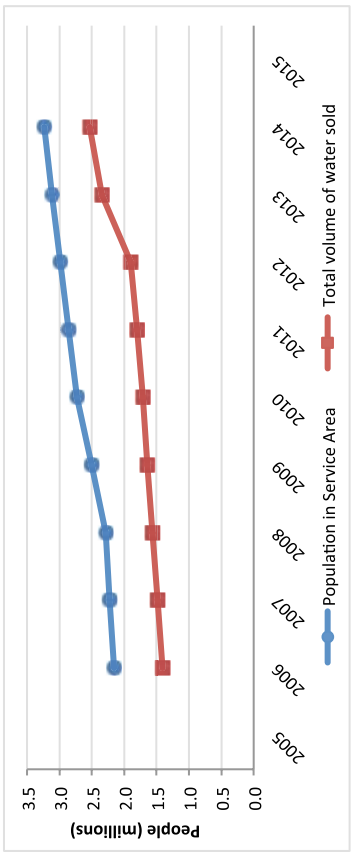

Collection ratio (%)
100%
80%
60%
40%
20%
0%
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

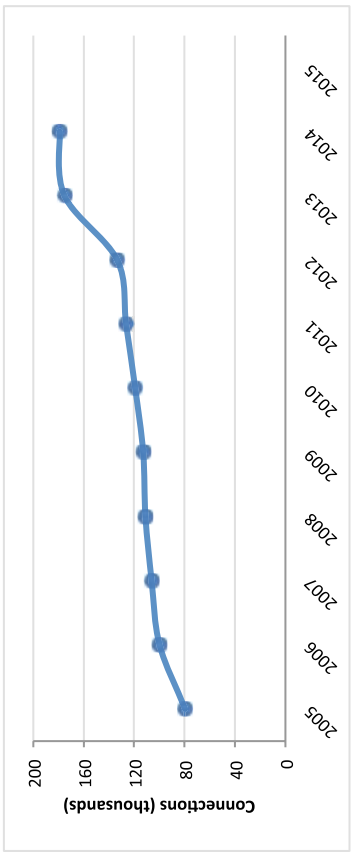
E.16 *Société d'Exploitation des Eaux du Niger (SEEN), Niger*

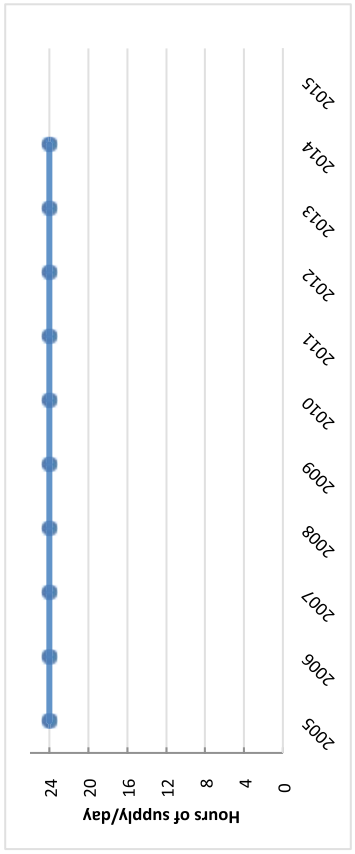


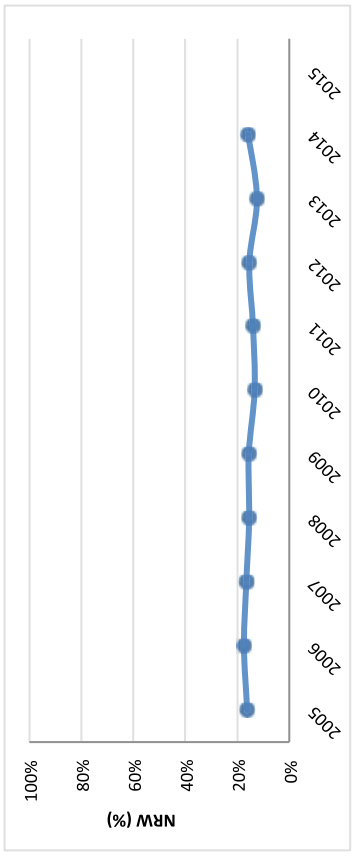


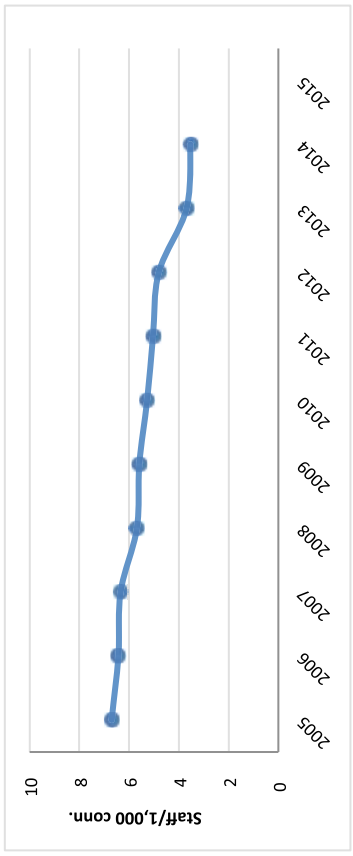


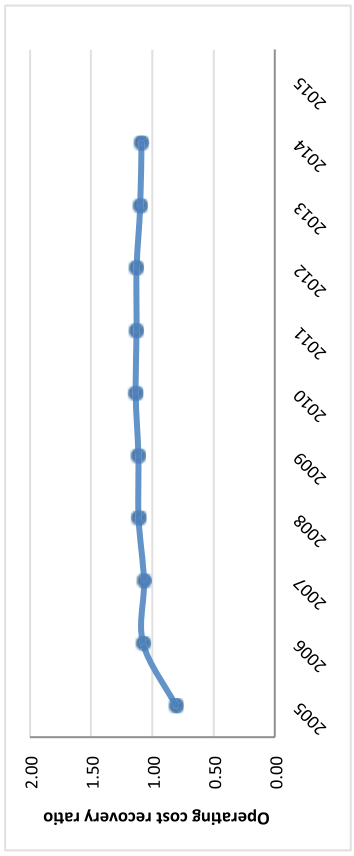


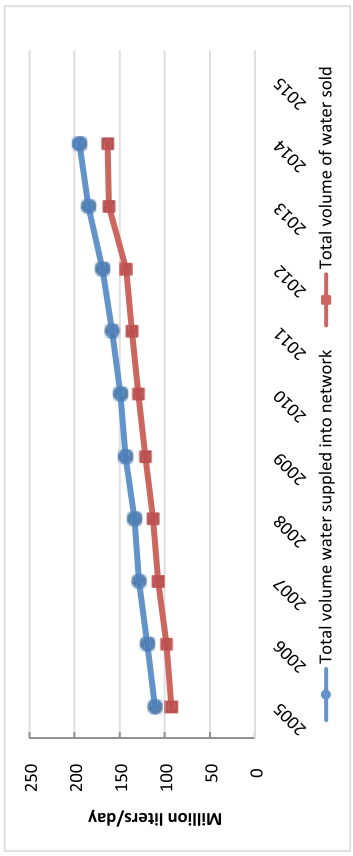


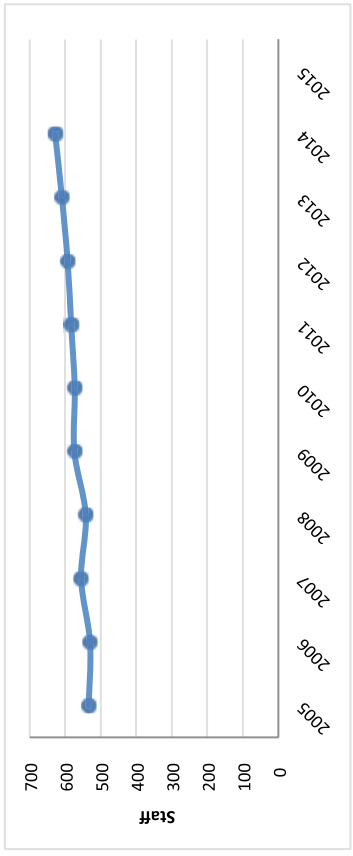


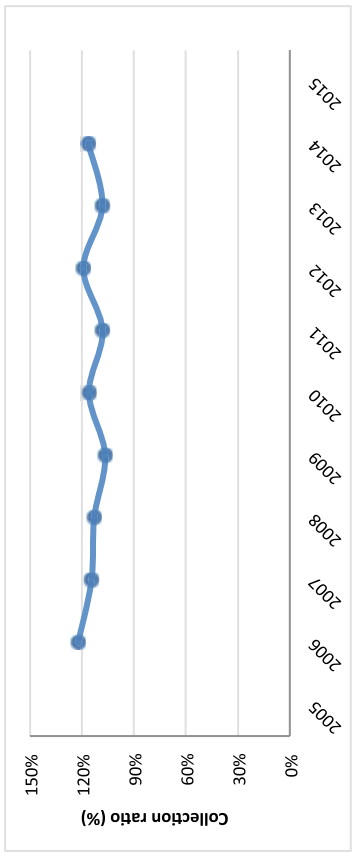

NRW (%)
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

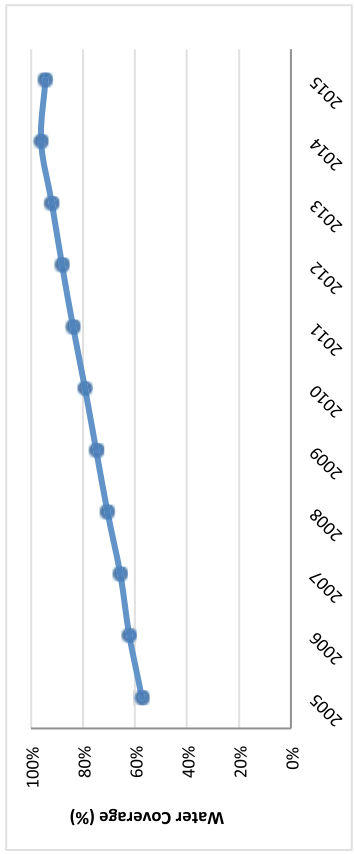

Operating cost recovery ratio
2.00
1.50
1.00
0.50
0.00
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

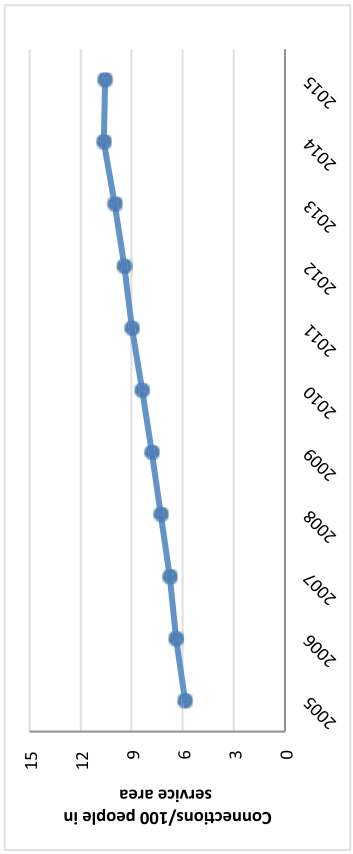

Million liters/day
250
200
150
100
50
0
Total volume water suppled into network
Total volume of water sold
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

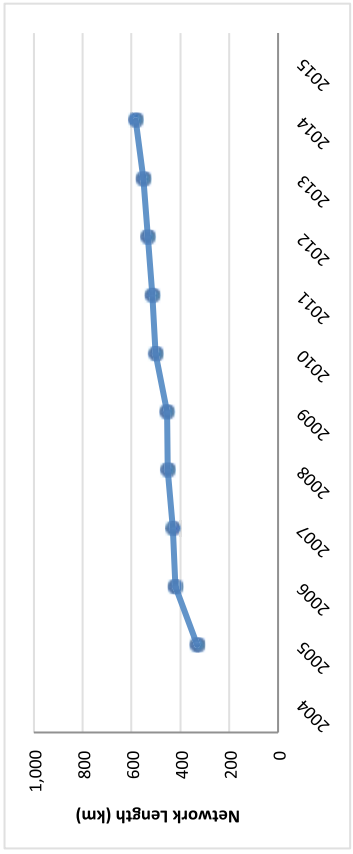

Staff
700
600
500
400
300
200
100
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

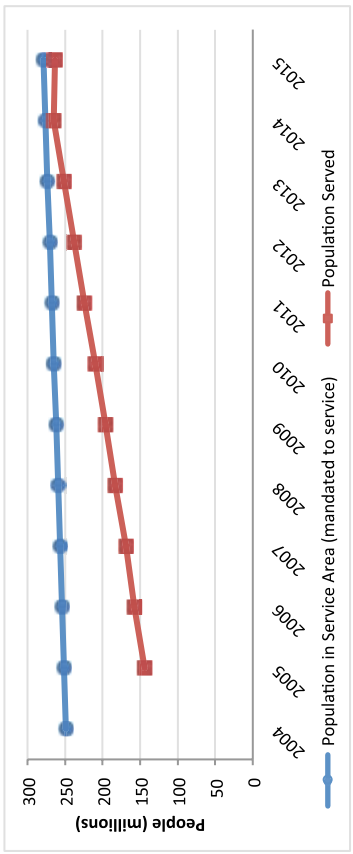

Collection ratio (%)
150%
120%
90%
60%
30%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

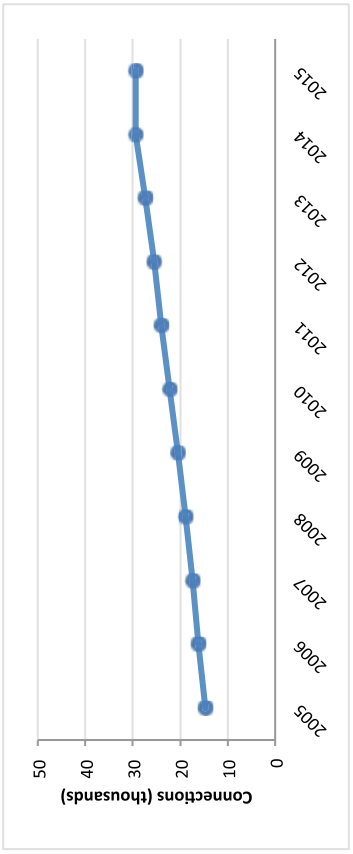
E.17 Tanga Urban Water Supply and Sewerage Authority (Tanga UWASA), Tanzania

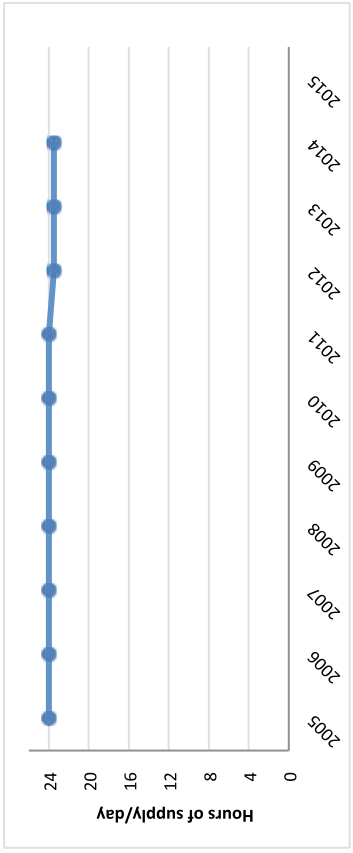


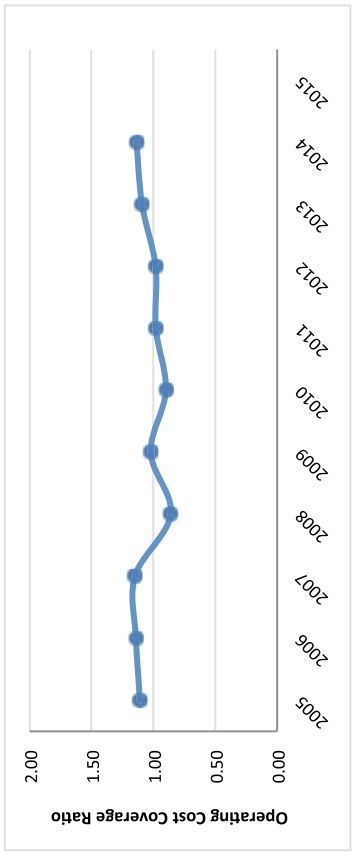


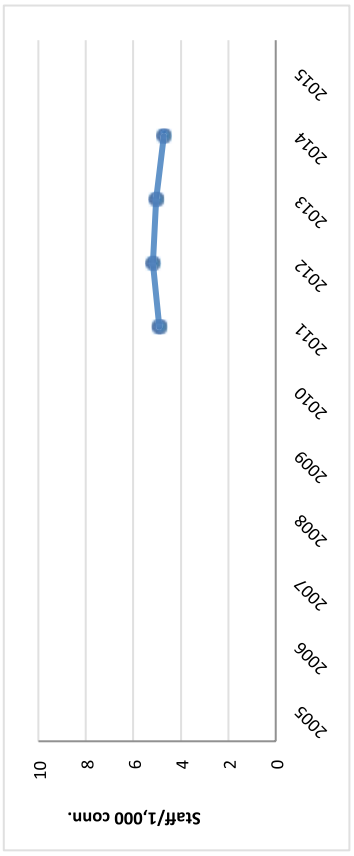


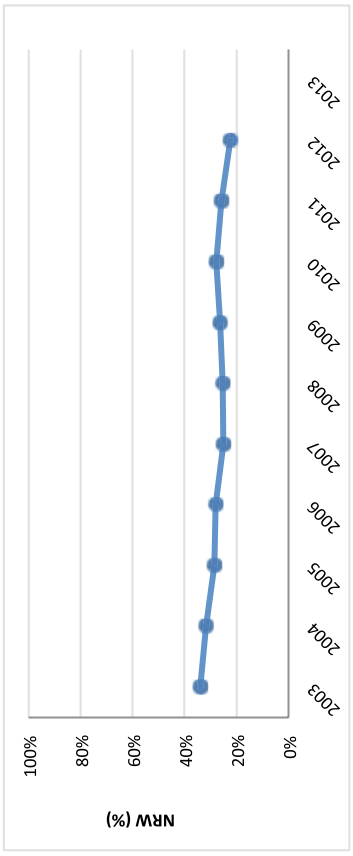


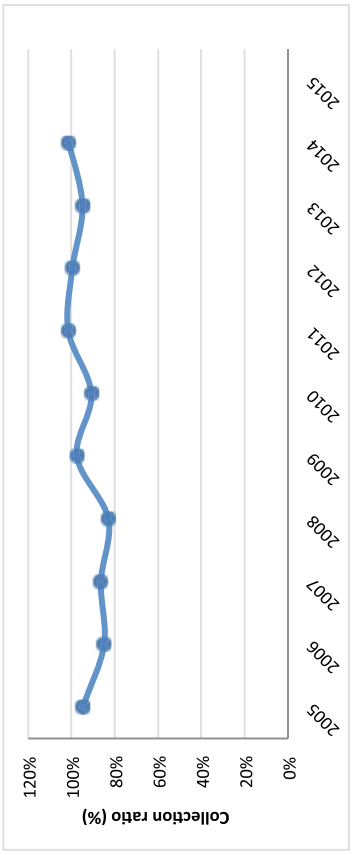


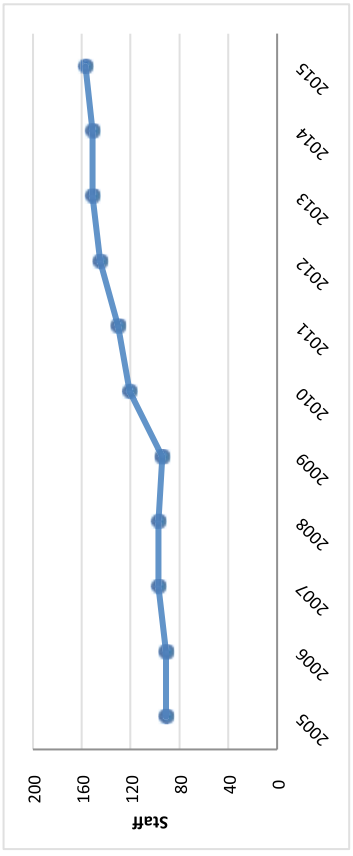


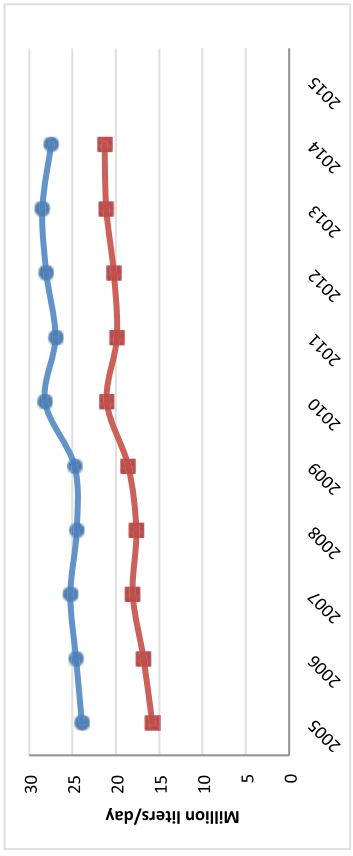

Operating Cost Coverage Ratio
2.00
1.50
1.00
0.50
0.00
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff/1,000 conn.
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


NRW (%)
100%
80%
60%
40%
20%
0%
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013


Collection ratio (%)
120%
100%
80%
60%
40%
20%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Staff
200
160
120
80
40
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


Million liters/day
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

Appendix F: Data Sources

Sources of data used in this study are listed in this Appendix.

F.1 Household survey data

Data on access and convenience were obtained from household surveys. The surveys used are listed in Table F.1.

TABLE F.1: HOUSEHOLD SURVEY DATA SOURCES

City	Source	Year
Accra	DHS	2008
Addis Ababa	DHS	2014
Dakar	DHS	2014
Dar es Salaam	DHS	2012
Durban	Census	2015
Hargeisa	MICS	2011
Kaduna	MICS	2011
Kampala	DHS	2011
Kinshasa	DHS	2014
Lusaka	DHS	2014
Maputo	DHS	2011
Mombasa	Kenya City Baseline Survey	2012-2013
Nairobi	Kenya City Baseline Survey	2012-2013
Niamey	DHS	2012
Nyeri	Kenya City Baseline Survey	2012-2013
Ouagadougou	DHS	2010
Tanga	DHS	2012

F.2 Utility data

The list of data sources used for utility-reported data is included in Table F.2.

TABLE F.2: LIST OF DATA SOURCES FOR UTILITY-REPORTED DATA

Utility	List of data sources
AAWSA	▪ AAWSA
Aguas Maputo	▪ CEO Self-Assessment ▪ CRA ▪ IBNET
DAWASCO	▪ EWURA ▪ IBNET
eThekwini	▪ eThekwini Water and Sanitation Unit ▪ eThekwini financial statements
Ghana WCL	▪ Ghana WCL ▪ IBNET
Hargeisa Water and Sewerage Authority	▪ Hargeisa Water and Sewerage Authority
Kaduna State Water Board	▪ Kaduna State Water Board
Lusaka WSC	▪ NWASCO ▪ Lusaka WSC financial statements ▪ IBNET
MOWASCO	▪ MOWASCO ▪ WASREB
Nairobi WSC	▪ CEO Self-Assessment ▪ WASREB
NWSC	▪ NWSC Annual Reports (with financial statements) ▪ NWSC Strategic Plan, 2013–2018
NYEWASCO	▪ NYEWASCO ▪ NYEWASCO financial statements
ONEA	▪ Sawadogo, Dieudonne. “Delivering City-Wide Wash Services-Reaching informal settlements in Ouagadougou, Burkina Faso.” Presentation, August 2015 ▪ Marin, Philippe, Matar Fall, and Harouna Ouibiga. “Corporatizing a water utility: A successful case using a performance-based service contract for ONEA in Burkina Faso.” GridLines note no. 53 (March 2010), PPIAF ▪ CEO Self-Assessment ▪ IBNET

Utility	List of data sources
Regideso	▪ Tribeche. "Democratic Republic of Congo: *Evolution institutionnelle de secteur de l'eau en milieu urbain: Investigations preliminiaires."* 2015 ▪ IBNET ▪ *Étude de l'effeicacite de la Regideso, du cadre institutionnel et de l'organization du secteur de l'eau urbaine en RDC: Phase 1, Diagnostic*
SEEN	▪ CEO Self-Assessment
SDE	▪ *"Indicateurs Senegal (18 08)",* Excel spreadsheet provided by the World Bank Dakar office ▪ Public-Private partnerships for Urban Water Utilities: The Senegalese experience, AFD. PowerPoint presentation, 2011 ▪ Trémolet, Sophie and Castalia. Case Study on Senegal's Water and Sanitation Sector Economic Regulation, May 2006, and interviews with SDE management team, November 2015
Tanga UWASA	▪ Tanga UWASA ▪ EWURA ▪ IBNET

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Water and Sanitation Program

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