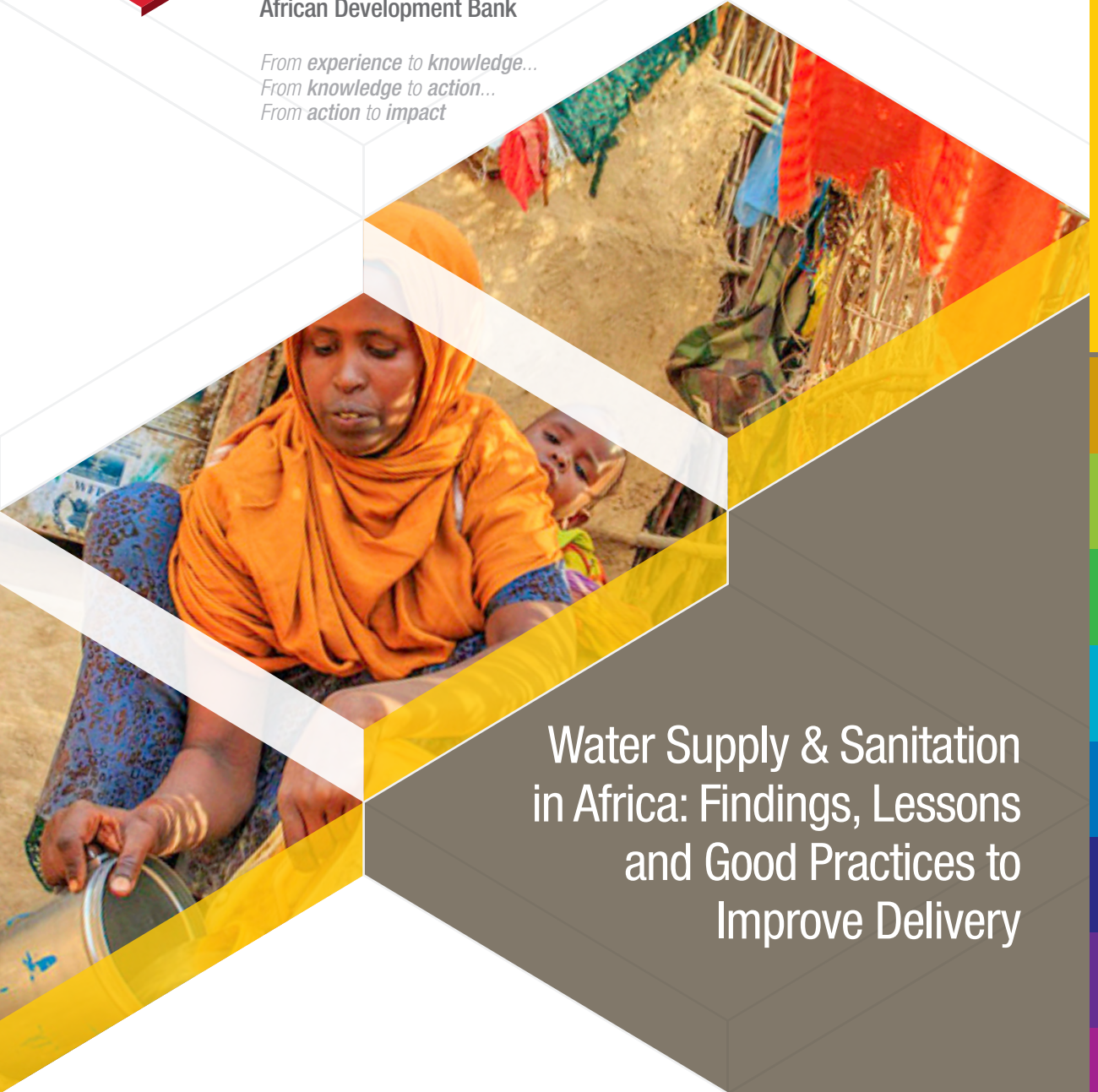


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## Water Supply & Sanitation in Africa: Findings, Lessons and Good Practices to Improve Delivery



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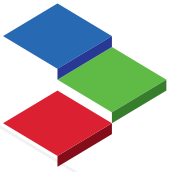
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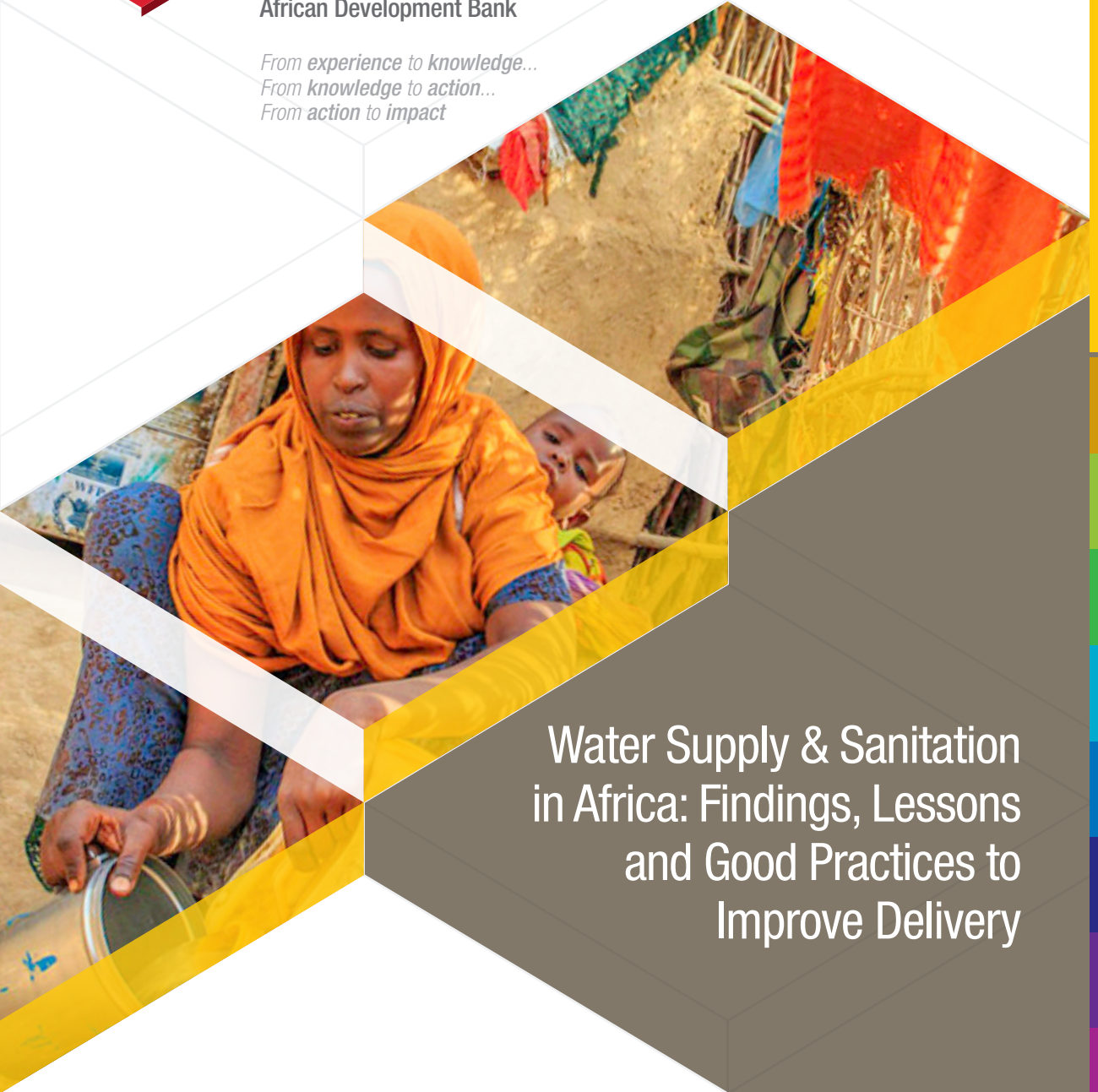
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June 2015

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June 2015

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The overarching objective of the African Development Bank Group is to spur sustainable economic development and social progress in its regional member countries (RMCs), thus contributing to poverty reduction. The Bank Group achieves this objective by mobilizing and allocating resources for investment in RMCs and providing policy advice and technical assistance to support development efforts.

### About Independent Development Evaluation (IDEV)

The mission of Independent Development Evaluation at the AfDB is to enhance the development effectiveness of the institution in its regional member countries through independent and instrumental evaluations and partnerships for sharing knowledge.

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# Acronyms and Abbreviations

<b>AfDB</b>	African Development Bank Group	<b>JMP</b>	Joint Monitoring Programme
<b>AFD</b>	Agence Française de Développement	<b>KFW/GIZ</b>	German Development Agency
<b>AICID</b>	Africa Infrastructure Country Diagnostic	<b>M&amp;E</b>	Monitoring and Evaluation
<b>AIWCL</b>	Akwa Ibom Water Company Limited	<b>MDG</b>	Millennium Development Goals
<b>AMCOW</b>	African Ministers' Council on Water	<b>MDWPP</b>	Multi-Donor Water Partnership Program
<b>AWF</b>	Africa Water Facility	<b>MoU</b>	Memorandum of Understanding
<b>CBO</b>	Community Based Organization	<b>MIS</b>	Management Information System
<b>CRSWBL</b>	Cross River State Water Board Limited	<b>MTS</b>	Medium Term Strategy
<b>DG</b>	Director Generals	<b>NEPAD</b>	New Partnership for Africa's Development
<b>DH</b>	Moroccan Dirham	<b>NGO</b>	Non-Government Organization
<b>EPIC</b>	Public Industrial and Commercial	<b>ODA</b>	Official Development Assistance
<b>EWSA</b>	Electricity Water and Sanitation Authority	<b>OBA</b>	Output-Based Aid
<b>GOE</b>	Group Operation Evaluation	<b>O&amp;M</b>	Operations and Maintenance
<b>GPOBA</b>	Global Partnership on Output-Based Aid	<b>ONAS</b>	L'Office National de l'Assainissement du Sénégal
<b>ha</b>	Hectare	<b>ONEA</b>	National Office of drinking water and sanitation
<b>ICPS</b>	Indicative Cooperation Programs	<b>ONEE</b>	Office National de l'Electricité et de l'Eau Potable
<b>IDB</b>	Islamic Development Bank	<b>ONEP</b>	Office National de l'Eau Potable
<b>IDEV</b>	Independent Development Evaluation	<b>OPEV</b>	Operations Evaluation Department
<b>INF</b>	Infrastructure Department	<b>OWAS</b>	Water and Sanitation Department of African Development Bank
<b>IsDB</b>	Islamic Development Bank	<b>PCR</b>	Project Completion Report
<b>IWP</b>	Independent Water Producer	<b>PCR-ENs</b>	Project Completion Report Evaluation Notes
<b>IWRM</b>	Integrated Water Resource Management		
<b>JICA</b>	Japan International Cooperation Agency		



Photo © Unicef

With only 5% of Africa's unevenly distributed water resources developed, massive investments in integrated water development and management are critical for sustainable water, food and energy security, and for green and inclusive growth.



# Preface

The *Africa Water Vision 2025*, launched at the Second World Water Forum in The Hague (2000), foresees an Africa where the use and management of water resources are equitable and sustainable and contribute to poverty alleviation, socio-economic development, regional cooperation, and the environment. Yet access to water and basic sanitation services has stagnated or worsened in some places.

As more people move to African cities, they are demanding better services, including clean water and basic sanitation services. These demands are putting pressure on local and regional water supplies. Moreover, inadequate water and sanitation supplies leave communities vulnerable to a broad range of risks and significantly affect the economic progress in most African countries.

Water security is a core driver of Africa's transformation, according to the African Development Bank's long-term strategy, *At the Center of Africa's Transformation*, which sees Africa as the next global emerging market. With only 5% of Africa's unevenly distributed water resources developed, massive investments in integrated water development and management are critical for sustainable water, food and energy security, and for green and inclusive growth.

This publication contributes to the broad inclusive and green growth agenda of the AfDB by sharing with development actors what has and has not

worked to sustainably improve access to safe drinking water and basic sanitation. By addressing the design quality and implementation of WSS projects, it seeks to encourage government officials and sector ministers, senior managers of utilities and water authorities, consultants and development partners to consider creative solutions to the water and sanitation challenges in urban and rural areas. Drawing from the evaluations of interventions undertaken by the Bank, governments and other development partners, this publication emphasizes emerging good practices and innovations and reflects on key lessons of successful and failed cases.

This desk review of evaluation reports of eighteen AfDB-funded WSS projects, completed between 2010 and 2012 and of the evaluation results of other development partners involved in WSS in Africa, is enriched by the exchanges during a regional workshop organized by the AfDB in Morocco in November 2013 to share evaluation experiences of WSS projects and programs.

The development community may not find all of these lessons entirely new. However, presenting them in the context of the project and its location is nonetheless useful for future WSS projects. Some findings and statements, are unrelated to specific evaluation products and have no guaranteed external validity, yet their good practices and key lessons are nonetheless useful for the design of future projects. ■



Photo © AfDB

The AfDB financed its first water sanitation operation in 1968. Since then, it has approved 360 loans and grants in the Water Supply and Sanitation (WSS) sector, which represents approximately UA5 billion (USD7 billion) or 7% of all loans and grants approved. Since 2003, Bank financing in WSS in Africa rose from an annual average of USD70 million to USD700 million in 2011.

# Introduction

By the end of 2011, 89% of the world's population used improved drinking-water sources. Slightly more than half the population (55%) enjoyed the convenience and associated health benefits of piped supply on their premises. Of the estimated 768 million people without sources of improved drinking water, 344 million people live in Africa. The situation of sanitation facilities is similar: nearly one quarter, or 612 million people, of an estimated 2.5 billion people in the world, are living without improved sanitation facilities live in Africa (WHO and UNICEF, 2013).

Providing safe drinking water and improved sanitation is one of the major challenges facing African countries. National, regional, continental, and international policy documents, strategy papers, declarations, and conventions clearly lay out the issues and make this a

priority. For many development partners, clean water and sanitation are a priority (Box 1).

In November 2013, as part of its evaluation learning series, the AfDB's Independent Development Evaluation (IDEV) organized a regional workshop in Rabat, Morocco in collaboration with the IsDB Group Operations Evaluation Department (GOE) to share experience from its evaluations of WSS projects and programs. AfDB's OWAS, the IsDB's Infrastructure Department (INF) and the AfDB and IsDB Moroccan Offices brought together participants from the Morocco National Electricity and Drinking Water Authority, Non-Governmental Organizations (NGOs) and members of the Water and Sanitation Thematic Group in Morocco, including the French Development Agency, the German Development Agency, the Japanese Development

## Box 1: AfDB and IsDB Contributions to Water and Sanitation Services in Africa

The AfDB financed its first water sanitation operation in 1968. Since then, it has approved 360 loans and grants in the Water Supply and Sanitation (WSS) sector, which represents approximately UA5 billion (USD7 billion) or 7% of all loans and grants approved by sector and amounts. Since 2003, Bank financing in WSS in Africa rose from an annual average of USD70 million to USD700 million in 2011. Between 2011 and 2013, investments rose to USD1.2 billion per year.

The Bank is also involved in initiatives and collaborations with other development partners designed to achieve water security and improved sanitation: The Rural Water Supply and Sanitation Initiative funds water sector projects and studies; the African Water Facility Special Fund, for which the Bank is a trustee, provides support to the New Partnership for Africa's Development Water and Sanitation Program; The Multi-Donor Water Partnership Program promotes effective regional and national water management policies and practices, and operationalizes the Integrated Water Resources Management (IWRM) Policy in the Regional Member Countries (RMCs). In 2006, the Bank created a Water and Sanitation Department (OWAS) to lead and coordinate water sector activities and to promote IWRM across all Bank WSS interventions.

In the Islamic Development Bank's 56 member countries, rapid urbanization and strong demographic pressure are raising significant challenges. An estimated 750 million people live in the urban and peri-urban areas of these member countries, where the growth rate was 29% between 2010 and 2020. This represents 216 million more people or an average of 60,000 more people per day. Drinking water and sanitation are priorities aligned with the IsDB's strategic vision 2020. In 2013, the overall volume of financing for WSS projects at the IsDB (including in the African Region) was an estimated USD5 billion or 14% of its portfolio.



**Box 2: Evaluation of Development Assistance**

The African Development Bank operations departments evaluate their activities and initiatives, which are also independently evaluated by IDEV. The Bank evaluation system include self-evaluation and independent evaluation. In both systems, the aim is to provide evidence-based assessments and lessons on drivers of success and failure. Therefore, appropriating and using evaluation results are essential first steps to better understanding and improving access to water and basic sanitation of all development partners and to avoiding repeating past errors.

As approaches to sustainable access to safe drinking water and basic sanitation have changed over time, new insights into the best possible performance and delivery of WSS services provided by the evaluations of WSS projects serve to improve services for beneficiary populations and to sustain results.

Agency, Spanish Cooperation and Italian Cooperation and sector specialists from Cameroon, Burkina Faso, Mozambique, Nigeria, Zambia and Rwanda. The experiences showcased during the workshop came from different countries and contexts in order to provide a broad view of the results of self-evaluations and independent evaluations of WSS projects in urban and rural Africa (Box 2).

The goals were to distill the determining factors for the success or failure of projects designed

to provide sustainable access to safe drinking water and sanitation for all, to provide drinking water in urban and suburban areas, and to find innovative solutions for a structural transformation of the urban sanitation and drinking water and sanitation for all. This publication brings together a summary of the rich insights and fruitful exchanges of the workshop (Box 3), and highlights the innovations and good practices, lessons learned, and recommendations from recent evaluations of WSS interventions funded by development partners, governments and NGOs. ■

**Box 3: Regional Learning Event Topics and Burning Issues**

Topics	Key Questions
Success Factors for Access to WSS for All	<ul style="list-style-type: none"> <li>What are the success factors and good practices in WSS?</li> <li>What are the regulatory, institutional, technical, and financial and other constraints in WSS? How can we surmount them?</li> <li>What does the future hold and what are the anticipated innovations in WSS?</li> </ul>
Opportunities and Challenges for Drinking Water in Urban and Suburban Settings	<ul style="list-style-type: none"> <li>What are the problems related to drinking water pricing schedules?</li> <li>What are the opportunities and challenges of supplying drinking water to suburban areas?</li> <li>What innovative water supply practices exist for urban and suburban areas?</li> </ul>
Innovative Solutions	<ul style="list-style-type: none"> <li>How effective are wastewater treatment plants?</li> <li>How effective are solid waste management systems?</li> <li>What are the innovative practices in urban sanitation?</li> </ul>
Rural Drinking Water and Sanitation for All: Lessons Learned	<ul style="list-style-type: none"> <li>What are the constraints and challenges of rural WSS projects?</li> <li>Are innovative practices illusory?</li> <li>What are the roles, effectiveness, and lessons learned from Public-Private Partnerships?</li> </ul>







**FEDERAL MINISTRY OF WATER  
RESOURCES  
REGIONAL  
WATER QUALITY LABORATORY, GOMBE**

Photo © AIDB

Between 2000 and 2010, 84 million urban Africans gained access to improved water supply and 42 million to improved sanitation, an impressive 3.9% average increase in access over the decade, but at the same time, urban populations grew by an average of 3.9%.

# Urban and Suburban Water Supply

## The Challenges of Supplying Improved Urban Water Services

The water sources available to provide clean drinking water to Africa's population are limited. As demand for water grows, the impact on water management and the ability of urban centers, where access is much higher than in rural areas, to provide an adequate supply of water and sanitation is tremendous.

While access to improved water sources has grown in urban areas, progress has stagnated at 85% (AMCOW 2012) as urban populations grow. Between 2000 and 2010, 84 million urban Africans gained access to improved water supply and 42 million to improved sanitation, an impressive 3.9% average increase in access over the decade, but at the same time, urban populations grew by an average of 3.9%. Urban water infrastructure lags behind population growth for several reasons: rapid urbanization and population growth, a rising share of informal settlements, inadequate infrastructure, institutional weaknesses including low cost recovery, inadequate governance, and deteriorating water sources.

### ***Rapid urbanization and poor urban planning***

Africa is urbanizing more quickly than any other region in the world and has faster growing urban slums. Over the next 20 years, its urban population is projected to double; growth rates will continue to be the world's highest. Currently, approximately 409 million Africans or 40% of the continent's population, lives in urban areas, more than twice the numbers in 1990. By 2030, that percentage will rise to half the continent's

population, or some 654 million people (Jacobsen *et al.*, 2013).

Approximately two-thirds of Africa's urban population is currently served by water utilities (AICD, 2011). Over the next quarter century, demand for water in Africa is projected to nearly quadruple — the world's fastest rate (Jacobsen and al., 2013). Rising industrial and commercial demand linked to industrialization and rising incomes for some have nourished expectations of higher quantities and better quality of water, increasing pressure for improved water management policies and implementation.

Rapid urbanization is accompanied by poor urban planning and expanding slum populations. Africa's share of the global slum population rose from 14% in 1990 to 20% in 2005. Densely crowded slums create not only institutional and financial challenges but also technical challenges in accommodating the machines to build traditional sewer or water supply networks.

### ***Inadequate investment and governance***

The dilapidated and aging infrastructure of most African utilities cannot meet the growing demand for water. Together with their inefficient management, African water utilities are unable to deliver continuous water service or adequate water quality. For African cities to provide water and sanitation services to meet social and economic demands, they need investments. Yet most African countries lack adequate local funding to expand or renew their utilities and current investments in urban services are insufficient given urbanization rates.

Low cost recovery and poor governance also thwart the expansion of water service coverage. For most utilities to fully recover their capital costs, tariff increases for consumers would be significant and affordable for only half of the population in Africa (Banerjee and Morella, 2011). Recovering full costs from existing customers and using the resulting cash flow to increase access for the poor would substantially increase equity, although associated political issues will be difficult to overcome (van Ginneken, *et al.*, 2012).

Further complicating the picture, urban water sources are being polluted by inadequate sanitation, poor wastewater management and human activities. The groundwater in most large African cities (e.g. Dakar, Abidjan, Lomé, Lagos, and Dar es Salaam) is contaminated and polluted mainly by the discharge of untreated wastewater and unregulated industrial pollution. Utilities must spend significant sums to treat the water whereas these resources could be used to provide basic services to citizens.

## The Opportunities of African Urban Water Supply Challenges

The World Bank's Africa Strategy (World Bank, 2011) sees an unprecedented opportunity for transformation

and sustained growth in Africa, primarily in cities, the traditional engine of economic growth. This growth could place Africa on the cusp of an economic takeoff, much as China experienced 30 years ago or India 20 years ago. The prevailing urban water challenges require improved water management, policies and service provision to be opportunities for African economic transformation.

### *Urban planning for booming African urbanization*

By 2030, Africa's urban population is forecast to rise to 654 million people from 320 million people in 2010. Most of those who will be living in African cities in 2030 have yet to arrive, making it important for city planners to prepare now (Jacobsen *et al.*, 2013) to make the best use of urban water planning principles (Box 4).

### *Toward a holistic view of urban water cycle components*

The evaluations constantly point to the need to adopt a holistic approach (Integrated water management) to urban improvement, including in slums, which are seen as integral to the city. In other words, an appropriate balance is necessary between

#### Box 4: Urban Water Planning Principles

- Deliver urban water supplies in accordance with agreed levels of service.
- Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
- Adopt a partnership approach so that stakeholders can make an informed contribution to urban water planning, including a consideration of the appropriate supply/demand.
- Manage urban water on a whole-of-water-cycle basis.
- Consider the entire portfolio of water supply and demand options.
- Develop and manage urban water supplies within sustainable limits.
- Where efficient and feasible, use pricing and markets to help achieve planned urban water supply/demand balance.
- Periodically review urban water plans.

Source: <http://www.environment.gov.au/topics/water/water-cities-and-towns/policy-and-reform-area-urban-water/national-urban-water-planning>



investing in water supply, sanitation and health education components to maximize achievement in urban water results. For example, in Mauritania, approximately three-quarters of consumed potable water is transformed into wastewater, which requires an appropriate sanitation system (AfDB/IsDB, 2013).

Investments must be balanced between production, distribution and connection of water supply systems and institutional support measures. Institutional support is critical as the water utilities constantly come under pressure from stakeholders, including partners, governments and customers, to improve the efficiency and effectiveness of their service delivery, notably for state corporations. Yet urban water supply investments have received neither the necessary institutional support nor efficient commercial and financial management capacity to ensure the delivery of sustainable services in the medium to long-term.

Some success experiences from AfDB and IsDB-funded projects that incorporated support to restructuring the water utilities in Cameroon (CAMWATER) and Burkina Faso (ONEA) illustrate the need to include an institutional component in water supply projects. Holistic approaches avoid double or multiple investments and speeds sector development as shown by the Mauritania Nouakchott City Drinking Water project (AfDB/IsDB, 2013), a tangible example where institutional support was not sufficiently taken into account. An evaluation of European Investment Bank (EIB) financing of water and sanitation projects outside the European Union similarly concludes, “The Bank should not only focus on tangible assets, but to the extent possible, define projects holistically and endeavor to incorporate institutional capacity building together with supply and sanitation aspects.” (EIB, 2009)

The World Bank’s *The Future of Water in African Cities: Why Waste Water?* (2012) aims to change policy makers’ thinking about urban water management, planning, and project design in Africa.

It argues that by adopting integrated urban water management (IUWM) approaches, policy makers in African cities will have a real chance to address such issues as increased competition for water with upstream water users, to improve urban planning by understanding water’s interaction with other sectors, and, in the face of a changing climate, secure resilience in an uncertain future by relying on diverse water sources.

### ***Engagement of development partners in urban and suburban water supply***

Even as African countries are being asked to mobilize domestic resources and properly manage investments to support the urban water and sanitation sector (UN-HABITAT, 2011), development partners continue to support African governments in implementing WSS projects to increase access to safe drinking water and basic sanitation services. Official Development Assistance, a major source of finance for water and sanitation infrastructure, accounts for between 60% and 83% of the total capital expenditure (EUWI 2012). In 2013, the AfDB approved WSS operations amounting to UA 356.8 million, including special funds transactions (AfDB, 2014b). However, African dependence on external funds does not provide a sustainable basis for a coherent WSS funding strategy.

### **AfDB Assistance to WSS Projects: The Urban Water Feature**

The AfDB has supported the implementation of many projects in Africa to improve access to water supply in urban and peri-urban areas. The summary report of eighteen recently-evaluated AfDB-funded projects (Annex 1) (AfDB, 2014a) showed that most urban water projects address similar problems as urban populations grow and the demand for water and sanitation services increases: (i) low water production capacity; (ii) low and unreliable supply

(water security), distribution and connection to users; (iii) poor water quality (unsafe or untreated); (iv) low levels of safe water consumption, and (v) inequitable access to improved water supply services among urban and peri-urban areas and socio-economic groups.

Most project objectives focus on supply issues and seek to “rehabilitate WSS infrastructure”, “improve the supply of water and sanitation services,” and “provide safe and reliable water”. The scope of objectives ranged from a very narrow focus on rehabilitating water and sanitation infrastructure to: (i) provide safe and reliable water supply and improved sanitation (explicitly added supply of WSS services); (ii) enhance access to reliable potable water supply (explicitly added access and introduces issues of water pricing and affordability in the objective statement), and (iii) provide reliable, affordable and sustainable water supply and sanitation services (explicitly added sustainability in the objective statement). These additional elements have substantial impacts on project size and complexity. The prime beneficiaries of the projects were mostly people living in the project areas.

### ***Uneven performance in improving access to urban WSS***

Expected project outputs included (i) rehabilitation and extension of WSS infrastructure and facilities; (ii) institutional building and training; (iii) construction of community water and sanitation facilities in low-income peri-urban areas, and (iv) human resources development, including technical assistance to project staff and private contractors. However, the outputs and outcomes delivery of the water supply projects were uneven. Performance was strongest in increasing water production capacity (by building water sources) followed by the expansion of water distribution networks. Performance was weakest in making water available through facilities. Table 1 illustrates these uneven results.

### ***Substantial risks to sustaining project benefits***

Sustainability is threatened by technical, environmental, financial, economic and institutional and regulatory risks. The sustainability of the project achievements was rated weakest. For example, the independent evaluation of Nouakchott Drinking Water (Aftout Project) reports that project sustainability was compromised. The evaluation revealed the need to: (i) further strengthen the commitment and socio-political support of the Government of Mauritania; (ii) overcome the enormous challenges faced by SNDE in independently ensuring the maintenance and optimal functioning of structures inherited from the Aftout project, and (iii) urgently finding appropriate solutions to sanitation problems in Nouakchott City (AfDB/IsDB, 2013).

*Technical viability* issues including the lack of a strategy for maintaining assets or problems associated with inadequate complementary inputs such as electric power or road connectivity negatively impacted WSS project results. The Zambia PCREN reports that the water in nearly 46% per cent of the sampled boreholes had a high iron content and that a significant number were abandoned or rarely used. Conversely, in Mauritania, the technical viability of the project was enhanced by a satisfactory level of conservation of the production source, low risk of conflict related to the use of water from the Senegal River, and quality technology adopted for structures and equipment, and for the management system. However, SNDE faces enormous challenges in operating and maintaining these facilities

*Environmental* risks arising from the natural degradation of water sources (i.e. lakes, springs and boreholes drying up) and/or increased environmental stress such as variability in water flows affecting supply. Accordingly, it is no longer sufficient to build more water storage or harness more surface water without considering long-term sustainability, the larger watershed, or how wastewater can best be returned to the water system (Jacobsen *et al.*, 2013).

Depending on each city's outdoor water use, up to 75% of water supplied becomes sewerage effluent that could be recycled to offset the input of additional water (Alan *et al.* 2011). This raises the issue of reducing the impacts of wastewater and storm water by developing a strategy to reuse treated wastewater.

*Financial* risk is generally associated with the capability of utility companies to optimize their operating costs, improve the revenue from the commercialization of water and to operate profitably with a margin sufficient to finance current and future operations, maintenance activities, and

**Table 1:** Uneven Results in Selected Urban and Suburban Water Projects

Project	Expected	Realized
Tanzania-Dar es Salaam	70% of customers get 24-hour water supply service with adequate pressure. 80% of sewage collected and treated to acceptable effluent quality.	Significantly improved water production and distribution, but only 25% of the city's population was getting water supply with adequate pressure. Majority of effluent samples fail in BOD5 and COD
Nigeria-Multi State Project	Water supply production for 12 towns in both states increased to average of 438,000 m <sup>3</sup> /day by 2015.	Daily supply of potable water available through pipe connections and water kiosks in 2008 was only 12% of the target daily water supply in the two states despite the project's achievement of about four-fifths of the planned water production capacity
Mozambique Urban Project	Latrines constructed at 80 schools and Health Institutions. Increased awareness of water, sanitation, and solid waste relations, and HIV/AIDS and malaria issues for an additional 246,550 people in the four towns	Marginally good overall delivery of project outputs. Achievement in outputs of the water supply system better than the poor delivery of the sanitation component (16 latrines built at 8 schools) and unclear institutional support was unclear.
Mauritania Urban Project (Aftout)	Anticipated expansion of potable water access to 70% of Nouakchott's population by 2010 (from less than 50% before the project), and 100% by 2030. Per capita consumption expected to increase to 85 liters per day by 2010. An additional 10,000 rural dwellers living along the transmission lines will also benefit. Available, inexpensive clean water will help ease urban poverty and reduce the incidence of water-borne diseases and develop economic activities.	All physical outputs expected from the production phase (intake structure, stations, reservoirs, pipes, remote management system, power supply, etc.) were completed. The distribution phase was ongoing at the time of the evaluation. Project impacts were limited in terms of improving access to drinking water for the beneficiary populations due in particular to: (i) the gap between the production and distribution phases; (ii) the existence of a functional but antiquated distribution network, and (iii) poor management of drinking water services. Average consumption in Nouakchott City remains below 50 liters/day/person recommended by some experts as the standard. Some Nouakchott households still face difficulties accessing drinking water, especially in areas not yet connected to the network and where private actors continue to speculate. In 2012, average per capita water consumption was about 45 liters per day.
Liberia Monrovia WSS	<ul style="list-style-type: none"> <li>Water production increased from 7,500 m<sup>3</sup>/d to 34,068 m<sup>3</sup>/d by 2009 and by 68,137 m<sup>3</sup>/d by 2010.</li> <li>350,000 people have access to a water supply by 2009 and 700,000 people by 2010</li> <li>Number of water house connections increased from 17,900 in 2007 to 50,000 by 2010</li> </ul>	<ul style="list-style-type: none"> <li>Water production increased to 13,400m<sup>3</sup>/day. (Treatment plant and pump station work under WB/EU to bring 31,000 m<sup>3</sup>/day capacity on stream by March 2012).</li> <li>34,200 people with water supply.</li> <li>3920 water house connections</li> </ul>

Source: AfDB Tanzania (PCR), Nigeria (PPER), Mozambique (PCR), Mauritania (PCR and PPER), Liberia (PCR)

minor investments, to some extent. Solid financials in water utilities provide the basis for sustainable future services thanks to adequate investments in infrastructure renewal, technical innovations and ecological measures (Andreas and al. 2014).

*Economic risks* arising, for example, from inflation (raising input costs) or currency depreciating causes the domestic currency cost of project inputs and debt service to rise or government financing to be withdrawn.

*Institutional and regulatory risks*, arising, for example, from finding workable public-private partnerships or the uncertainty about the continuity of community-based associations operating and maintaining a community water supply and sanitation schemes or the uncertainty about the effectiveness of community-based maintenance arrangements or the deregulation of water tariffs

Some mitigation measures were built into the projects: managing environmental risks through watershed management, enhancing financial profitability, regulating tariffs without stifling completion, and ensuring that community-based groups are sustainable by improving incentives. However whether or not these measures were effective is largely unknown.

### Good Practices and Pragmatic Solutions for Urban Areas

The projects offer some good lessons about legal and institution reforms, public-private partnerships (PPPs), cost recovery and financial sustainability, service provision to informal settlements, and stakeholder engagement.

#### **Legal and institutional reforms**

Urban water sector reforms were carried out as part of the Bank-funded projects to create an enabling environment, promote good governance, create

commercially oriented utilities and bring the sector under formal regulation. Good governance is critical in any urban water reform agenda and institutions must be accountable and clear about their roles. The other goal of the reform was to encourage PPPs (investment and management) in the sector. Most of the countries initiated major sector reforms underpinned by new sector legislation.

Burkina Faso's urban sector reform is a success story. The National Office of drinking water and sanitation (ONEA) was established in 1985 as a public industrial and commercial Establishment (EPIC)<sup>1</sup> and became a State company in 1994. It manages urban hydraulics in Burkina Faso across 49 centers. In 1990, the national urban water sector was facing several major challenges:

- *Institutional level*: strongly centralized State management and interference in daily management, high turnover of Director Generals, frenzied creation of centers without considering financial equilibrium, and having the guardianship department award contracts.
- *Operational performance*: low coverage (55% in Ouagadougou, 50% in Bobo-Dioulasso), water shortages, poor water quality, and sanitation coverage of only 5% in Ouagadougou.
- *Financial Performance*: very low tariffs (147 CFA/m<sup>3</sup> in 1990) that did not cover costs, tardy development of annual financial statements, and solvency issues (51 million FCFA available in 1990).
- *Human resource management*: overstaffing (21 staff per 1000 connections in 1990), inadequate staff and ineffective staff management.
- *Customer management*: the total absence of a customer care culture, poor customer management, and low levels of bill collection.

The need to ensure the company's survival, to increase service coverage and improve service



reliability, including in Ouagadougou, during a structural adjustment led to a reform seeking primarily to ensure the sector's financial viability. The reform affected all areas of management and improved ONEA's performance. The following actions were undertaken: (i) The institutional framework was redefined and roles for actors and the contracting relationships clearly defined, leading to greater autonomy of ONEA; (ii) Improved company organization including an organizational chart and informatics; (iii) a tariff policy promoting cost coverage; (iv) restored financial equilibrium of the sector; (v) stronger customer and financial functions, particularly with the involvement of a private professional (service contract); (vi) an international audit of ONEA's technical performance through the contract plan and of the service contract; (vii) a manpower audit that cut the workforce; (viii) launch of a cost optimization program; (ix) technological innovations including a Geographic Information System, magnetic counting, and remote management, and (x) strategic plans designed for sanitation, introducing a sanitation tax (Box 5).

The Uganda National Water and Sewerage Corporation (NWSC) shows how the implementation of innovative change management programs successfully transformed a loss-making organization into a profit-making government parastatal that has become a benchmark for best practices among water utility organizations both nationally and internationally<sup>2</sup>. Table 2 shows NWSC key achievement before and after reforms.

### ***Corporatization and private sector participation***

Corporatization is by far the most widely adopted reform measure with some degree of private sector participation. Some readiness was demonstrated for institutions designed along the lines of private sector participation, commercialization of water supply, and financial viability. As the cases of Dar es Salaam (Tanzania) and Maputo (Mozambique) suggest, some

urban water supply projects choose to operate under regulated public corporations (both as asset holders and operators) while others, like the Nigeria project, are evolving towards a PPP. The non-convergence of these institutional arrangements indicates that building institutions is often a country/project specific process.

The Dar es Salaam (Tanzania) and Maputo (Mozambique) water and sanitation projects considered alternative PPP arrangements. Both projects awarded lease contracts (medium risk where the private contractor is responsible for O&M) to private companies. However, these were later terminated and both reverted to public corporations to manage their water supply systems.

The Nigeria-Multi State Water Supply project supported the restructuring of the Cross River State Water Board and the Akwa Ibom State Water Corporation into limited liability companies – Cross River Water Board Limited (CRSWBL) and Akwa Ibom Water Company Limited (AIWCL). CRSWBL was subsequently transformed into a PPP. The Cross River State Government (CRSG) signed a tri-partite PPP management contract with ORTECH and the CRSWBL, with the State Government as guarantor. The main aim was to substantially improve operational efficiency and revenue collection levels and to provide reliable economic consumer service. Customer service standards and responsiveness to customers' needs have been improved significantly.

Overall, private sector participation in the projects reviewed had limited success and led, in some cases, to a renewed focus on strengthening the corporate governance of public utilities as in Dar es Salaam and Maputo. However, it is also important to note that the prevalence of good governance

### **WSS Regulation**

A functioning regulatory system is a central feature of good sector governance. It provides the rules, processes, and monitoring and enforcement mechanisms to ensure that service providers adhere

**Box 5: ONEA Succeeds in Burkina Faso**

State-owned ONEA has become a well performing entity thanks to reforms. Its rates of private recovery of 97%, financial balance ensures network performance by 82%, control policy of loads, coverage rate constantly improving. The difficulties are essentially to change the staff mindset, which is a long-term task that continues with the quality approach, the acceptance by the authorities of a new tariff policy, the choice of management style in agreement with the technical and financial partners. Success factors include: (i) Strong commitment from the political authorities and the Board of Directors; (ii) new staffing; (iii) stability and leadership of company leaders, and (iv) support of technical and financial partners.

ONEA relies on three levers to stabilize its results: (i) The consolidation of management by formalizing the strategic plan (updated for 2011-2015), ISO 9001 certification and the implementation of the information system integrating a new generation customer management software; (ii) audits of the plan contract status/ONEA and the financial model, and (iii) strengthening contractual arrangements in the framework of the decentralization and building ONEA's trade center into a center of real competence for private operators.

Burkina Faso's urban water sector reform has enabled ONEA to significantly improve access to drinking water and sanitation in urban areas and to create financial equilibrium in the sector. The reform remained in the public framework and benefited from a service contract for professional functions and customer financials. The results show that a public company can be efficient where there is political will and leadership.

Source: Ousmane Yida Yaya Bocoum (2013), "Experience from the Restructuring of the National Water and Sanitation Authority of Burkina Faso," Regional Learning Events on sharing WSS Evaluation Results.

to established service and quality standards. It also serves to level the playing field between users and providers in an otherwise monopolistic environment.

A number of countries — Zambia, Ghana, and Tanzania — established regulatory bodies for the sector as part of their reforms. Others, especially the francophone countries — Senegal, Côte d'Ivoire, and Burkina Faso — also developed regulatory frameworks without recourse to an agency. The regulatory frameworks in all of these countries, with the exception of Ghana, have been successful, indicating that "one size does not fit all" and that it is not about establishing an agency but rather about having an effective regulatory framework in place. The Government of Uganda, with the support of the USAID and GIZ proposed to create an autonomous water and sewerage regulatory authority.

***Urban water utility reforms and performance***

Urban water utilities can adopt different paths to reform. Development partners such as the World Bank have strongly pushed to privatize urban water

national utilities within the Water Sector Reform in Côte d'Ivoire, Senegal, Niger, Gabon, Gambia, Ghana, Guinea, Kenya, Mozambique, etc. but these remain contested with regard to access, quality of service, operational efficiency, and tariff levels. Indeed, in the 1990s, many governments in the developing world embarked on ambitious reforms of their urban WSS services that often included contracting management to private operators (World Bank, 2009a).

PPPs in Western and Central Africa registered both success and failure. Countries like Côte d'Ivoire and Senegal performed well whereas in Guinea and Cape Verde the outcome was mixed. Other countries' PPPs, including the Gambia, Central Africa, Chad, Guinea Bissau and Sao Tomé failed (World Bank, 2009b). Still others — Uganda, and Burkina Faso — preferred "home-grown alternatives" to the World Bank's "misleading ready-made solutions" (Muhairwe, 2009) and met with great success.

Most utility reforms aim to enhance governance as well as the utility's technical, commercial and financial performance. Countries that have adopted well-designed water utility reform plans have substantially

increased access to services, financial sustainability, and the quality of services provided. The types of reform that have demonstrated the greatest success in fixing troubled urban water utilities include:

- Introducing incentives for employees that directly tie bonuses to performance.
- Introducing improved commercial systems, including metering and metered billing.
- Introducing knowledge and information systems for monitoring and evaluation.
- Services for poor consumers that are financially sustainable and tailored to local needs.

Successful reforms, such as ONEA Burkina Faso (Box 5), include real political will, leadership by leadership teams (Board of Directors, senior management, etc.), staff agreement, and the accompaniment of the development partners, etc.

The impact of the reforms can be reflected by a utility's performance. Performance can be judged indirectly by evaluating the extent to which the

utility can: (i) expand and bill customers (or reduce non-tariff water users); (ii) reduce physical water leakage, and (iii) effectively collect current and outstanding bills. In addition, the company's financial rate of return gives a comprehensive measure of performance by capturing water consumption and tariffs, as well as operating costs. Utility companies were expected to reduce their operating costs, improve revenues from selling water and operate profitably with sufficient margin to finance current and future operations and maintenance. With respect to the first three criteria, the utilities performed well albeit with substantial shortfall in raising revenue (and reducing operating costs) to achieve financial viability. Technical risks such as lack of a strategy for maintaining assets or problems associated with inadequate complementary inputs like electric power or road connectivity were also experienced (Table 3).

### Capacity building interventions

Good governance and strong financial management policies must be accompanied by the requisite tools and capacities to implement them (Butterworth *et al.*, 2011). Most urban areas need infrastructure

**Table 2:** The Turnaround Account: Reforming Uganda National Water and Sewerage Corporate

Performance Indicator	NWSC Key Achievements	
	1998	2011
Service coverage	48%	75%
Total connections	50,826	272,406
New Connections per year	3,317	25,626
Metered Connections	37,217	271,734
Staff per 1000 Connections	36	6
Collection Efficiency	60%	96%
NRW	60%	32.8%
Proportion Metered Accounts	65%	99.8%
Annual Turnover (million USD)	11	50
Profit (Before. Dep) (Millions USD)	4.0 (loss)	11.0 (Surplus)

Source: Prof Dr. William T. Muhairwe, the NWSC Power Point Presentation during the OECD Global Forum on the Environment, Paris (France), 26th October 2011.

development to meet access targets and long-term sustainable outcomes. Infrastructure development should be accompanied by the necessary capacity building interventions. The institutions and performance of water utilities in the projects were enhanced by integrating infrastructure improvements with training and capacity building and by adopting a long-term strategic planning approach based on a performance improvement plan.

Substantial capacity building programs targeting key stakeholders were also incorporated into water and sanitation infrastructure development programs (Burkina Faso, Tanzania and Kenya). In some cases, capacity building interventions were used as platforms to engage key stakeholders in the design and implementation of project interventions, thereby enhancing their ownership. However, capacity building was occasionally inappropriate. For example, in the Mauritania urban water supply, the project helped to strengthen the private sector by helping to create a very favorable environment for creating small enterprises in the WSS (network installation works, plumbing and various services) but has not provided enough capacity building to SNDE, a key player in the water sector institutional framework. Institutional support measures have very limited impact. Although outcomes at the physical level are increasingly visible, the organizational and institutional situation at SNDE is different.

In past interventions, AfDB capacity-strengthening assistance took various forms, including the application of loan conditions to bring about improved institutional, operational and financial performance, studies (master plan studies, pre-feasibility studies, feasibility studies and/or detailed engineering design studies). Results on the ground were mixed. Initiatives such as NEPAD, which is spearheaded by the Bank, the Millennium Goals, the Bank's Integrated Water Resources Development Policy, and the African Water Vision of 2025 all aim to address WSS institutional weaknesses (AfDB/OPEV, 2004). The impact of such initiatives on WSS capacity development is not yet evaluated. Therefore, some major lessons from the Bank's experience<sup>3</sup> may remain relevant and should be highlighted (Box 6).

### *Financial sustainability and cost recovery*

Operational efficiency and financial profitability influence the achievement and sustainability of project objectives, and are restricted by several factors in water supply projects: (i) low sales revenue due to low consumer connection, registration, metering, and billing; (ii) limited flexibility to set tariff structures and rates, and (iii) weak operational efficiency. The challenge for utility companies is to improve their operating margin sufficiently to be able

**Table 3:** Urban Water Sector Performance

Indicator	Uganda NWSC 1998-2010			Zambia Urban water sector 2002-2010		
	1998	2004	2010	2002	2006	2010
Service coverage	..	..	..	60%	73%	75%
Total connections	34,272	100,475	246,459	182,600	213,053	293,796
Metering ratio (metered/total connections)	3,317	..	..	21%	39%	55%
Water losses (unaccounted for water)	49%	37.6%	33.3%	51%	48%	45%
Collection efficiency	71%	98%	100%	60%	77%	86%
Staff productivity (total staff per 1,000 connections)	36	10	6	12	11	11

Source: Dorcas Mbuli & Klaas Schwartz (2013).



to finance operational and maintenance costs, cover depreciation on new investments, and service debts on schedule to minimize arrears.

For want of clear incentives to deliver responsive services, revenue management has also been weak in most utilities. Indeed, most urban water authorities or water companies in Africa are neither financially strong nor self-sufficient. They depend in most cases on transfers of tax revenues from higher tiers of government that are inadequate or insufficiently predictable to compensate for insufficient tariff revenues (Jacobsen and al., 2013). The consequences are under-investment, inadequate maintenance, and the deterioration of assets.

A financial assessment of the utility companies showed substantial shortfalls in raising revenue (and reducing operating costs) to achieve financial viability. Tariffs remain a challenge for most utilities given political sensitivity, but as the ONEA case shows, effective reforms and political will make it possible to revise tariffs to reflect a certain level of cost recovery.

With inadequately regulated water pricing and limited flexibility, financial profitability can only be improved by reducing inefficiency and increasing revenues from sales. Improved water infrastructure (enhancing production and distribution capacity) is bound to reduce the physical loss of water. Stronger institutions and incentives are bound to reduce non-revenue water consumption by improving the customer base, billing and collection. However, there are still sizable deficiencies to overcome: (i) missing water distribution networks that connect production to consumption points (e.g. the Nigeria Multi State project); (ii) limited success in some projects in supplying water to consumers (Nigeria and Tanzania-Dar es Salaam managed to supply less than 25% of the target population despite significant achievements in building water production capacity), and (iii) sizeable unbilled water consumption and/or uncollected bills.

Although water tariffs are regulated to ensure some balance between maximizing operating profit margins (and implied resource efficiency) and accessing basic services at affordable costs, the current pricing in unregulated informal water markets indicates the scope for increasing tariff rates without a substantial decline in water consumption (water is typically a price inelastic commodity). For example, as the PCR evaluation note for the Mozambique urban project states, the current tariff structure has elements of cross-subsidization where tariff rates are progressively tied to consumption levels to protect less privileged community members. Furthermore, USAID's Sustainable Water and Sanitation in Africa (SUWASA) collaborated with utilities in Hawassa (Ethiopia) and Bauchi (Nigeria) where new tariff structures were adopted and cost recovery improved. As a result, the Hawassa utility is now able to cover all its operations and maintenance costs, and have a surplus to repay its loans; operating revenues have increased by over 80%<sup>4</sup>. The tariff review was carried out in line with Ethiopia's Water Policy on making water service providers autonomous, including being able to charge full cost recovery tariffs.

### ***Service provision to informal settlements***

In most urban areas, informal settlements have grown rapidly, leaving a large proportion of the population outside a formally planned urban system. An estimated 40% of the urban population in Africa lives in slum-like conditions (peri-urban and informal settlements). Water authorities and utilities are responsible for providing water services to these informal settlements, but lack of planning and congestion create serious challenges for reaching the populations through centralized systems.

Urban water projects commonly include targeted services to low-income households in peri-urban (informal settlements) such as the community water and sanitation services in Dar es Salaam, Maputo, Kigali and the project towns in Kenya's Rift Valley. The

### Box 6: Major Lessons from Evaluations of AfDB Assistance to Strengthen the Capacity of Urban WSS Entities in RMCs

- Capacity building/strengthening has come to be seen as an integrative concept combining policy, legal, regulatory, institutional and human resources and other crosscutting issues in a holistic approach to sustainable water resources development. The conventional approach of strengthening the water sector by concentrating solely on hard investment may not always yield the expected results.
- Piecemeal provision of loan conditions and technical assistance cannot result in comprehensive institutional development.
- Improved sector performance depends increasingly on strengthened institutions and greater involvement of stakeholders.
- A key component of the institutional environment that enables utilities to perform efficiently is the degree of their operational and financial autonomy.
- Public awareness of activities such as hygiene and health education and civic responsibility is essential for creating the willingness to pay for services and safeguard public goods.
- Applying appropriate staff incentives and reward systems that respond to the goal of capacity building can enhance institutional performance.
- The success of public or private utilities depends on running services with a new corporate culture that blends traditional concerns with technical and engineering priorities and the socio-cultural fabric of employees, customers and communities.

Source: AfDB/OPEV, 2004

design and implementation of some of the projects indicate that they recognize that low access to WSS is related to affordability, which is in turn related to income poverty.

Institutional arrangements in peri-urban areas blend urban and rural institutional features. The water supply facilities operate on commercial terms where customers are registered, water use is metered, and fees are assessed and collected. But as in rural projects, the community manages the facilities. Numerous informal vendors in peri-urban areas provide important outreach and equity functions, but they are unregulated and do not contribute to government revenue. The utility's entry into peri-urban areas to expand their customer base is, in most cases, bound to squeeze the informal vendors.

Some interventions geared to improve safe drinking water to peri-urban areas in Africa include subcontracting with small private operators accompanied by a cost recovery mechanism adapted to their financial capabilities; improved access of the poor to water using appropriate technological options (stand pipes, yard taps and

pre-paid meters) and subsidized to the modalities of flexible payments and adapted to income levels of poor households; creating dedicated management units to respond to the special needs and demands of vulnerable groups (urban poor).

### *Gender equality and poverty reduction*

Projects have goals in addition to objectives, such as gender equality, poverty reduction, and reduced vulnerability to risks such as drought. Some projects explicitly identified gender equality as a goal. For example, the Government of Tanzania stipulates that women must comprise at least 25% of village government entities. The Malawi project required that at least 50% of water committee members be women who get involved in all stages of the project cycle. Sixty percent of the members of the 2,000 water point committees were women. In Rwanda, the installation of washtubs at developed water sources spared women the physical effort of carrying water for laundry. In addition, the community approach (Ubudehe) adopted for program implementation made it possible for women to participate actively in decision-making. ■







Photo © Oxfam

What makes WSS interventions successful? This publication concludes that achieving project outcomes is strongly affected by the quality of the project design. “Getting it right from the beginning strengthened implementation whereas sub-optimal design and quality at entry (QAE) often resulted in additional complications and project inefficiency”.

# Treating Urban Waste Differently

According to the UN, approximately 2.6 billion people, including almost one billion children, lack access to basic sanitation. Diarrhea, the leading cause of illness and death in the world, is attributed to lack of access to improved sanitation facilities, unsafe drinking water and inadequate availability of water for hygiene.

The 2010 Joint Monitoring Programme (JMP) report indicates that about 546 million people in Sub-Saharan Africa have no access to basic sanitation. The United Nations Environment Programme (UNEP 2010) forecasts that only nine countries in Africa are expected to attain their sanitation targets for the MDGs. The number of people practicing open defecation in the region is estimated to have risen by 33 million. The JMP 2013 report also shows that, in 2011, about 42% of urban dwellers in SSA depended on on-site sanitation technologies consisting mainly of pit latrines, pour flush toilets and septic tanks, in ever increasing numbers. Consequently, large quantities of fecal sludge (FS) are produced within urban settlements and are not properly disposed of. Untreated FS threatens the wellbeing of humans (especially children and the urban poor) and the environment (AWF, 2014).

With regard to urban sanitation, a few cities in Africa have functioning wastewater treatment plants, but most are ineffective. Consequently, only a proportion of wastewater is collected, and an even smaller fraction treated. Most of the big cities in Africa such as Lagos, Abidjan, Accra, Lomé, and Dakar have inadequate sewerage treatment systems and discharge untreated

wastewater and, sometimes, unregulated industrial pollution directly into natural water sources. This has had a significant effect on water source contamination and the pollutant load is costing the water companies dearly to treat the water.

Sanitation services also depend on income, with upper income groups serviced with water-borne sewers, and the poor resorting to open defecation or traditional latrines. Urban sanitation services serve fewer people than are served by piped water. In fact, a little more than half of all households with piped water also have flush toilets, which are often connected to septic tanks rather than to sewers. In other words, the richest parts of the population use improved latrines and septic tanks while most urban dwellers use traditional pit latrines. While less than 10% of the urban population mainly resorts to open defecation (Dominguez-Torres, 2011), this figure is likely to be higher in peri-urban areas.

Sanitation monitoring is a major concern. The development of robust monitoring systems should be supported. Other challenges facing urban sanitation management in Africa are presented in Box 7.

Population growth and urbanization has outpaced the development of sanitation infrastructure in most cities in Africa, making the management of urban waste and wastewater ineffective and resulting in widespread water pollution. The sanitation challenge brings opportunities, and the most important is to develop a sanitation value-chain approach.



### Box 7: ONEA Succeeds in Burkina Faso

- In Sub-Saharan Africa, 65%-100% of sanitation access in urban areas is provided through onsite technologies.
- In Africa, more than 40% of households share their toilets with others.
- 50% of those who need FSM are urban and predominantly in slums.
- Functional FSM (storage, collection, transport and treatment and safe end use system) is rare.
- HHs cannot afford professional emptying services.
- Collection and transport trucks cannot access narrow lanes.
- Operators not able to afford the transport of FS over large distances to treatment facilities.
- Lack of FS discharge locations or treatment facilities.
- High levels of waterborne diseases.

Source: African Water Facility Presentation, 2014 World Water Week

## AfDB Interventions to Transform Urban Sanitation

The AfDB, like other development partners, has supported RMCs in implementing a number of projects in Africa aimed at improving access to basic sanitation in both urban and rural areas. Up to March 2014, AWF committed EUR 11.87 million to urban un-sewered sanitation projects expected to directly benefit 2.9 million people in Sub-Saharan Africa (AWF, 2014). However, actions for more than 20 years in the sanitation subsector did not provide any significant impact on access and environment/health. The existing sanitation systems are inefficient, and financing the sub-sector remains challenging. Institutional, financial, technical and behavior innovations are critical to improve the urban sector performance.

The synthesis report on the eighteen recently evaluated AfDB-funded projects (AfDB, 2014a) revealed that the projects emerge from common problems that include: (i) poor solid waste management and environmental pollution; (ii) low sewerage infrastructure; (iii) low sanitary facilities available at institutions, communities and households, and (iv) exposure to disease because of unhygienic practices. All occur in the face of increasing demands for water and sanitation services from growing populations.

The scope of the projects focused on: (i) the rehabilitation and expansion of sanitation infrastructure; (ii) enhanced access to sanitation services, and (iii) the provision of reliable, affordable and sustainable sanitation services. The expected project outputs included: i) rehabilitation and extension of sanitation infrastructure and facilities; (ii) institutional capacity building; (iii) construction of community water and sanitation facilities in low-income peri-urban and rural areas, and (iv) hygiene and health education.

There are a number of lessons and good practices to share from the projects, from AWF experience and from other cases outside the projects but in similar contexts. The cases highlighted in the subsequent section were sited in various locations and regions each with its particular socio-economic conditions, level of institutional capacity, and environmental context. Differences notwithstanding, several crosscutting lessons and innovations can be observed.

## Innovative Solutions and Lessons for Urban Sanitation

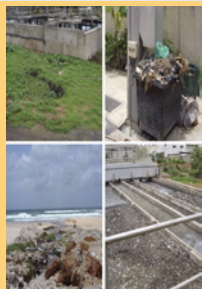
### *Adopting a value-chain approach*

Solving urban sanitation issues requires

innovative sanitation value chain approaches that integrate production, capture and collection, transport, treatment, processing, and reuse. A multi-stakeholder approach is essential for sustainable sanitation services. The evaluation of the Dakar City Sanitation Project (AfDB/OPEV, 2012i) showed that the project failed to provide an efficient treatment plant in Cambérène for lack of an effectively implemented strategy for the development and efficient reuse of sanitation by-products (treated wastewater, sludge and

reuse, PPP, private sector financing and business models. “The AWF-funded urban sanitation portfolio includes a broad mix of projects that are intervening at different steps of the sanitation value chain, both on the demand and on the supply sides of the market, with a view to promote an integrated approach to urban sanitation service provision. Although all the projects correctly identified the need to strengthen municipal governments, the projects are being implemented through a mix of institutional models (business-

#### Box 8: Dakar City Sanitation Project: An unfinished agenda



Insufficient wastewater treatment capacity for the volume of incoming wastewater forced a diversion of a portion of the pre-treated effluent (bypass) and rejected much of the excess sludge with the treated effluent that could not be treated because of incomplete equipment, which severely undermines its effectiveness. Given the water mixing with treated water by-passed, the level of raw sewage discharged directly to the sea and the low valuation of sewage by-products, the project is part of a system that does not currently meet the environmental standards for the quality of releases. The situation is further exacerbated by the failure to resolve the problem of sea outfall: the current discharge is much too close to the shore to protect the coast from pollution. This performance was more or less predictable, given the technical and energy requirements of activated sludge processes and their extreme sensitivity to changes in flow and load and the low level of investment relative to the scale of needs.

biogas). Moreover, it was noted that the adoption of a holistic approach that includes storm water and solid waste in a wastewater treatment project would have provided more comprehensive solutions to the city’s liquid sanitation and insalubrity problems.

The value-chain approach is being endorsed by the AWF to promote innovations along the sanitation value chain for the urban poor with

led, NGO-led or municipality-led). The projects test and implement different approaches to improving the sustainability of sanitation services along the complete value chain, including through testing alternative business models and safe reuse approaches, as well as social, institutional, financial and technical innovations.” (AWF, 2014).

Experience and lessons from the IsDB on the structural transformation of urban sanitation also

#### Box 9: AWF Building Blocks to Promote Sustainability in Municipal Sanitation Services

- The starting point to build sustainable sanitation services is to stimulate demand for sanitation products and services, including for FS reuse products
- The second “building block” for sustainability of urban sanitation projects is to develop service providers’ capacity.
- The third “building block” aims at facilitating access to finance, for users to finance their latrine and for service providers to develop their business.
- The fourth building block is to develop an integrated business approach to sanitation service provision.
- Finally, the fifth and last building block is to strengthen municipal institutions

Source: African Water Facility Portfolio Report, 2014

### Box 10: Innovative Solutions from the IsDB on the Structural Transformation of Urban Sanitation

IsDB experience in urban sanitation recommends that innovative solutions be integrated as much as possible in the design, implementation, and operation of urban sanitation systems.

- Applied research techniques, recycling treated water for agriculture, and enhanced sludge drainage by the production of biogas, electricity and organic fertilizers.
- Institutional by involving private operators in the funding mechanism and management of sanitation infrastructure.

These solutions help to increase the economic and financial profitability of projects. At the evaluation phase, the funder must ensure the availability of financial and technical resources for maintenance and servicing the sanitation infrastructure to ensure its sustainability. It is recommended that all players agree on the need to boost the development of sanitation infrastructure so as to reduce the significant delays around drinking water infrastructure construction.

#### Advantages of Each Component of Waste

SUBSTANCES	Yellow Water	Black Water	Grey Water	Organic Solid Waste	Storm Water
TREATMENT	Storage for Hygienisation	Anaerobic Digestion Drying Composting	Constructed Wetlands, Gardening, Wastewater Ponds, Biol. Treatment, Membrane-Technology	Composting, Anaerobic Digestion	Filtration, Biological Treatment
REUSE	Powerful Agricultural Fertilizer	Biogas and Soil Consolidation	Irrigation, Groundwater-Recharge or Direct Reuse	Soil Improvement, Biogas	Water Supply, Ground-Water-Recharge

Source: Ecosan GTZ

offer innovative solutions for wastewater treatment and recycling treated water as alternatives for meeting the demand for irrigation water. Some undertakings have been more successful than others. In Bahrain, 100,000 m<sup>3</sup>/day of water are recycled to irrigate 2,940 ha of land by 400 farmers. In Lebanon, the sewage treatment plant is completed but the manifolds are not fully installed due to land availability for the station. In Chotrana and South Meliane, Tunisia, purified water recycled partially for irrigation is underused because of high pumping costs to deliver it to irrigated perimeters.

### *Institutional mapping and stakeholder engagement*

In order to implement large-scale sanitation programs, create local demand for sanitation, and deliver noticeable health benefits, all stakeholders must be involved, all channels need to be applied, and all relevant sectors must be engaged to implement hygiene improvement. Physical interventions should be conceptualized, designed, and implemented in close collaboration with relevant key stakeholders to ensure buy-in, promote sustainability, and contribute to building local capacity.

Institutional mapping and stakeholder identification are pivotal steps at the outset of the project and should be informed by a cohesive strategy to identify and engage key stakeholders. In addition to mapping relevant stakeholders, there is a clear need to take cognizance of other stakeholders, including NGOs, CBOs and Water Users Association (WUAs). Such agencies often have established relationships in the municipality and the community and can contribute to better buy-in, involvement and participation of the end users and the community.

As a project progresses, new stakeholders can be identified and engaged, where appropriate, to ensure collaboration with all local key actors. It is important to improve the integration between key participating actors/stakeholders for improved sector governance and sustainable project results.

Some projects developed detailed stakeholder identification criteria, profiling all pertinent information for identified sector actors, and databases to capture relevant information were vital in growing the institutional memory of the sector. Efforts were made to ensure that the stakeholder identification and relationships forged as a result of the project were maintained. Some stakeholders continue to play their roles beyond the end of the project.

### ***Political support and interdepartmental coordination***

Strong political support and commitment from the highest levels of local government and the utility are critical if sanitation programs are to succeed, especially when political and social sensitivity exist. Political will is a principle obstacle to implementing sanitation programs and successful nationally-driven sanitation programs depend largely on general commitment, coordination and cooperation of government, local authorities and service providers in addition to other key role players. In some of the projects, political support from participating municipalities was courted by signing a formal Memorandum of Understanding to ensure commitment to the project. In addition, a single department needs to be identified from the outset to take the lead and ensure effective interdepartmental coordination.

### ***Systematic capacity building programs***

Capacity-building for key stakeholders (government, service providers, local government, CBOs etc.) included one-off training workshops, focused mentoring over time that moves to internal mentoring and technical assistance, staff attachment to well-performing institutions; frequent use of performance indicators and other elements that build and maintain performance over time.

#### **Box 11: Improving FS Management Through a PPP and Reuse in Grand-Nokoué, Benin**

The Municipality of Sèmè -Podji (Benin) received a total of USD5.3 million including a grant of USD1.1 million from the AWF to finance the rehabilitation and improvement of waste management in Grand-Nokoué using a PPP arrangement. The project is expected to improve the lives and living conditions of the people of Grand-Nokoué by reducing the spread of water-borne diseases while treating waste to use it as fertilizer sold to farmers at competitive prices. The project will improve fecal sludge collection and transport services for the town of Sèmè-Podji and the surrounding villages, through reuse, and also looks at improving treatment services and developing strategies for marketing treated by-products.

The innovative aspects of this project include involving a private partner for the rehabilitation and extension of the single operating fecal sludge treatment plant in Grand-Nokoué and institutional and financing arrangements (21% contribution by Sèmè-Podji and 79% from AGETUR-SA & SIBEAU) and reuse for fertilizer, energy and water.



These programs were informed by a compressive capacity needs assessment conducted prior to the project start.

A strategic sanitation plan is an integral part of capacity building in sanitation programs. Most projects recognized the need for Strategic Sanitation and Waste Plans that are frequently reviewed during the project and beyond. The plans were usually developed using a participatory consensus-building process with key stakeholders and accompanied by priority Action Plans and Investment Plans linked to project activities. Strategic plans took into consideration current infrastructure (as a baseline assessment) and expected new infrastructure development as well as long-term O&M of facilities.

Some capacity building challenges were noted. For example, the Senegal-Dakar City Project helped start building ONAS' organizational, technical and financial capacity but had only limited institutional impact, especially as ONAS had no genuine infrastructure maintenance and development plan, the sanitation levy was not reviewed and the project had no major impact on planning, implementation or monitoring capacity.

### ***Partnership and collaboration with private sector***

Partnerships and collaboration with the private sector on sanitation programs can contribute to greater financial and technical capacity. PPPs are also useful in developing/creating a market for sanitation services and products and may have wide-reaching advantages, such as income generation, increased service provision, and the development of products to treat sludge as in the Benin project (Box 10). The degree of private sector participation will depend on the local context and should be analyzed in detail at the outset of the project. Examples include outsourcing aspects of the sanitation chain that the municipality does not have the capacity to

implement. In the Benin example, a municipality sought to develop a local sanitation plan and, during the baseline, identified several private organizations and SMEs that could be responsible for solid waste management.

Where private sector operators are present, they should also be involved in developing strategic sanitation plans that include a performance management component to ensure regular monitoring and evaluation and the standardization and achievement of targets in the sanitation sector. Encouraging a competitive market also leads to improved service delivery. Opportunities to develop these markets should be considered when sanitation plans are being developed.

### ***Recovery of by-products and generation of additional resources***

To minimize the environmental and health risks created by discharging untreated wastewater and to create added value from the treatment, the most appropriate technology for sewage treatment plants needs to be determined, given a vulnerable environment and socio-economic context.

Developing sanitation infrastructure makes it possible to recover by-products and generate additional resources and revenues to help service providers optimize their operating costs:

recycling treated wastewater for agricultural irrigation, watering public areas and gardens, nurseries, investments using sewage sludge as agricultural fertilizer, and producing bioenergy.

### ***Sanitation services in informal settlements***

A growing, unplanned urban population poses enormous challenges for sanitation, especially for disposing of liquid and solid wastes. One focus

**Box 12:** Using TSE for Green Landscapes in Bahrain

Bahrain receives only 72 mm of rainfall per year. However, the processing station and sewage recycling of 100,000 m<sup>3</sup>/day of purified water allows 400 farmers to irrigate 2940 ha and to beautify urban landscapes.

Horticultural crop production has increased, as a result, along with green landscape areas. While reusing water carried some social stigma initially, awareness raising and capacity building calmed the concerns. For reuse technologies to be effective and sustainable they must be accepted and adopted by the local communities, which requires intensive awareness raising and education.

Source: IsDB

area for sanitation programs is improving basic sanitation services in informal settlements, typically by using innovative sanitation technological options that are encouraged as part of large sanitation programs. However, technology options alone do not guarantee improved access and sustainable sanitation services: they are part of the solution and must work well in the broader physical, social and economic context. To achieve an effective, sustainable impact of expanded access to sanitation services requires that sanitation programs be designed to reflect a reasonable balance and allocation of resources among several components: physical infrastructure/technology options, basic sanitation and hygiene promotion, sanitation services to vulnerable groups, training and capacity-building for service providers, institutions and CBOs, and skills training for women and youth.

It is also important to understand the challenges and advantages of each technology within the larger sanitation system. Some projects developed criteria to provide decision-makers with a comprehensive evaluation of sanitation technology options in order to assist them in the planning process and ensure that stakeholders could select a suitable option for the local context given the costs and ability of users to understand, own, operate and maintain the technology.

Operational sustainability depends on the ability of the community or local government to mobilize resources if a large repair is needed. "Community-

based management is popular but with more complex technologies, it is more difficult for communities to perform maintenance and manage breakdowns." (RiPPLE, 2008) It is also important, when replacing or improving existing sanitation systems, that the relevant maintenance and operation costs be fully considered to ensure that they are economically viable in the longer term to replace the technology. In rural and peri-urban areas, the choice of technology/hardware must take into consideration the social and economic contexts, long term viability, and sustainability. This requires considering not only capital costs but also long term O&N.

Land rights are a challenge of sanitation services in informal settlements. Where communities do not own the land, there may be no provision for building sanitation facilities.

### ***Communication and awareness programs***

Major sanitation programs must be supported by and emphasize communication/awareness-raising programs to clarify their aims, objectives, and proposed beneficiaries. This was very important in the sanitation projects undertaken to minimize the risk of focusing solely on program hardware.

Providing toilets does not suffice to achieve sustainable sanitation and improved public health without improved hygienic awareness and behavior. Changing established hygiene patterns

and practices also requires intensive activity at the household and community levels. Greater attention was given to community awareness and sensitization, including hygiene education for the correct use of latrines and cleaning of hands following defecation.

Reporting and communication play an important role in ensuring that all stakeholders understand a program well. Regular feedback to stakeholders was emphasized to provide project status and progress, challenges and interventions.

Creating demand for sustainable sanitation, awareness raising campaigns, and sensitization was often integral to the project, reflecting an understanding that the whole community may not share the municipal administration's acceptance of improved sanitation.

### ***Community involvement and community-led initiatives***

Community involvement in projects is critical to their success and sustainability. Communities need to be involved in planning and have the capacity to understand new technologies that are introduced so as to enhance their acceptability and adopt new associated behavior. Furthermore, building local capacity in communities to make repairs and maintain infrastructure is also important to reduce lag time and costs when repairs are needed.

Identifying local champions is essential for promoting the local adoption and sustainability of a project. Building inclusivity around sanitation projects is key to success. The projects observed that a large team of local partners working for it helped to insure that it achieved its goals. Their knowledge of local procedures and processes enabled them to upscale both the local context

and key challenges, ensure that actions were well targeted, and facilitate implementation on the ground.

Community-led initiatives to change behavior are complemented and further enhanced by the creation of a market for sanitation products and services, and building capacity and financing options so that these markets can develop and flourish. When the management of sanitation services is delegated to local communities, it is important to take into account the capacity of local structures to undertake their responsibilities (local government, governed, subcontracting etc.).

Project activities that endure do so because they have been adopted locally. In Kenya, the established school latrines remained functional beyond the scope of the project because training on maintenance, good practice and hygiene was incorporated into the school curriculum. In Arusha, Tanzania, many individuals from the project are now on the municipal payroll and have been successful in ensuring that local systems are running and maintained, in building institutional memory, and in promoting resource orientated sanitation in the region at annual trade fairs.

By contrast, the sustainability of investments in the sanitation component of the Mozambique urban project is questionable. In some pilot schools (Chókwè, Xai-Xai and Maxixe), facilities were observed to be unfinished (not in use) or severely degraded with deficient access. Poor hygiene practices were observed. However, even if school children are interested in adopting better hygiene practices, when water facilities, soap, and tissue are unavailable or available in limited amounts, they will not change their habits. Some challenges are beyond the project's scope, as for example the structural and organizational aspects of the education sector, namely financial

constraints and the capacity to manage and maintain infrastructure.

### ***Targeted subsidy systems for sanitation***

In most cases, sanitation projects are not intrinsically financially profitable. To promote financial equilibrium, the right institutional framework must be found and financing mobilized (local communities, State grants, grants from private operators) while creating an economic model that makes it possible to improve direct and indirect benefits in the short, medium, and long terms.

National policies on subsidy for sanitation vary widely and do not necessarily align with sanitation outcomes. Putting a tariff policy in place with mechanisms for equalization and public subsidy would make tariffs affordable for vulnerable households whatever the technology chosen.

Some projects took a revolving fund approach to expand access to basic sanitation for the poor, which has enormous benefits for mobilizing community savings for investment in sanitation. However, management and oversight arrangements must be carefully designed and the schemes must include a strong sanitation social marketing component.

### ***Baseline assessment and framework for monitoring sanitation coverage***

There is a strong case for undertaking rigorous baseline assessments as the first step in any project. Baseline assessments allow for targeted funding in the long term, and a strategic allocation of financial resources to address the key challenges. Baselines were a key step for most projects that used them to inform the strategic sanitation plan, funding strategies, infrastructure designs, and O&M schedules.

A comprehensive framework for monitoring sanitation coverage is necessary to help track progress in meeting the goals set out in the strategic sanitation plan and ensure that investments are targeted to achieve their goals. Some projects developed specialized monitoring tools and projection models, which made a major contribution to the strategic planning process and implementation of the projects. The monitoring and evaluation (M&E) framework incorporated a baseline household survey, Management Information System (MIS) tools, and built the capacity of relevant personnel to maintain and update the information. The M&E framework and strategies included both project and post-project strategies to ensure that the framework was maintained after the project period. ■





Photo © Tales of Water

Some projects studied in the course of this publication explicitly identified gender equality as a goal. For example, the Government of Tanzania stipulates that women must comprise at least 25% of village government entities.



# Rural Drinking Water and Sanitation for All

## Rural Water Supply

Most Africans (62%) live in rural areas where access to rural water supply and sanitation (RWSS) services is low (47% for water supply; 44% for sanitation). These populations endure preventable water and sanitation-related diseases. Moreover, women and children spend considerable time and effort fetching and carrying water, which prevents them from embarking upon productive economic activities. These problems accentuate poverty in rural areas (AfDB/OWAS, 2003).

Impact studies show that the impact of RWSS on health in many cases is surprisingly limited for many reasons that are political, economic, institutional and behavioral: safe water sources are used only partially; there is a domestic water contamination issue, drinking water and water used for hygiene purposes are not consumed in large quantities, improved sanitation infrastructure is not well adopted and used because it is considered too costly, and technical and sanitary flaws, etc.

For rural populations to benefit from the full potential of RWSS health impacts, several conditions must be met simultaneously: (i) drinking water must be safe (uncontaminated) and available near the home all year round; (ii) access to and hygienic use of toilets must be large-scale, and (iii) hands must be washed with soap or ash after using the toilet and before eating, etc. However, all of these mutually reinforcing conditions are rarely met, resulting in limited health impacts (OCDE/DAC, 2012).

## Challenges and Constraints Facing RWSS

The principle challenges and constraints facing RWSS services include inadequate policy and institutional frameworks, inadequate investment, inefficient management, inadequate capacity, poor cost recovery, and financial sustainability.

- *Poor policy and institutional framework to foster effective, efficient implementation and management of RWSS services:* Most African countries lack adequate policy and institutional frameworks to provide an enabling environment to foster effective, efficient implementation and management of RWSS services. Poorly defined institutional responsibility is quite common. To address this, many countries have introduced or are actively working on strengthening their sector reforms.
- *Inadequate investment for sustainable service delivery and access:* One of the major challenges facing RWSS services in Africa is limited investment to enhance sustainable access. Declining external financing and restricted domestic budget allocations have led to inadequate RWSS financing over the years. Urban WSS takes priority, whereas the largest proportion of the population lives in rural areas with no access.
- *Inefficient Operation and Management (O&M) of WSS services:* Many facilities have fallen into disrepair due to lack of spare parts and maintenance. Most rural WSS facilities do

not function because of poor management, exacerbated by low capacity for preventive maintenance, ineffective supply chains for spare parts due to inappropriate technology, lack of standardization, and poor planning. Some countries are making efforts to build human capacity to establish community-managed RWSS services and engineering and drilling/construction capacity to deliver WSS facilities.

- I *Lack of human capacity to establish community-managed RWSS services and lack of engineering and drilling/construction capacity to deliver WSS facilities:* Rural WSS is affected by low road connectivity to small, scattered communities. Administrative capacity is weak and private contractors with technical and financial capabilities are lacking. Organizing communities into groups such as V-WASHes and engaging them voluntarily in a bottom-up demand driven process is necessary but slow. Building these institutions while simultaneously developing WSS infrastructure and facilities puts a heavy demand on weak capacity.
- I *Poor cost recovery and financial sustainability:* Tariffs for most rural areas in

Africa do not cover O&M costs or generate sufficient funds for system rehabilitation and expansion. This results in poor maintenance leading to frequent breakdowns and dysfunctional water supply systems. Only an estimated 70% of rural water supply systems in Africa are functional at any given time.

### AfDB Interventions in Rural Water Service Provision

To respond to Africa's rural drinking water and sanitation crises, the Bank assists RMCs in developing and implementing country RWSS programs mainly within the Rural Water Supply and Sanitation Initiative (RWSSI), a common framework for resource mobilization and investment for rural water and sanitation delivery in Africa (Box 12).

Bank interventions depend on the country assessment and the country's expressed demand. An intervention is one or a combination of the following: i) Policy reform and institutional strengthening (sector support); ii) country program preparation; (sector

#### Box 13: RWSSI: A Common Framework for Resource Mobilization and Investment

The Bank conceived the RWSSI in 2002 within the framework of its strategic plan (2003-2007) and in response to the Africa Water Vision and the UN Millennium Development Goals. This donor-led program is coordinated by the Bank and financed by donors, partners and RMCs to accelerate access to water and sanitation services in rural Africa sanitation for 66% of the population by 2010, 80% by 2015, and full access by 2025.

Launched in 2003, RWSSI was adopted by African governments and international development partners as the common framework for resource mobilization and investment at the First International Conference on Rural Water Supply and Sanitation in Africa, held in Paris in April 2005. A RWSSI Trust Fund was also created, and managed by the Bank, to raise additional resources for financing RWSSI activities. The Initiative has received backing of the international community including the G8 Summit at Evian, the World Panel on Financing Water Infrastructure and the African Ministerial Council on Water and several bilateral donors.

Between 2003 and 2014, 49 projects in 33 countries were approved under the Initiative. By the end of 2014, the RWSSI had provided access to water supply for more than 107 million people and access to improved sanitation services to more than 72 million people. Fifteen operations have been completed and the remaining 34 have been carried over to 2015.

support); iii) capital investment (hardware), and iv) capacity-building and training (software).

To spur economic growth, the AfDB has supported a series of rural water supply programs, including through the RWSSI, that invest in productive assets, social services, infrastructure and technology knowledge and information. As a result of Bank support and support from other development partners and RMCs, several countries have recorded a positive trend in access to improved water sources in rural areas.

## RWSS Innovations and Lessons

The challenges facing RWSS services in Africa require different, innovative approaches to ensure sustainable services. Investment programs and projects should be accompanied by intensive grass roots capacity building using participatory approaches to increase the effectiveness and sustainability of WSS services. Several good practices/innovations and lessons have been noted regarding a program approach, policy and institutional reforms, capacity building interventions, cost recovery, private sector participation, technology options, O&M practices, community involvement and environmental considerations.

### A program approach

Adopting a program approach ensures that a single long-term RWSS country program be prepared with easier processing cycles for subsequent sub-programs. As demonstrated by the Morocco countrywide program to develop a rural water supply (PAGER<sup>5</sup>), a program approach safeguards against repeated, uncoordinated preparation of multiple projects in the same sector and country, reduces duplicate efforts at the country level, and supports the achievement of the national goals. It also brings consistency, national ownership, and local empowerment<sup>6</sup>.

In 1995 the Government of Morocco launched PAGER with a targeted access rate of 80% in 2010. The General Directorate of Hydraulics largely implemented while the National Potable Water Authority-ONEP focused on larger rural centers and villages (*douars*) located near its regional pipelines. While the rural water supply coverage rose to 50%, many challenges remained. In 2001, during the 9th session of the Higher Council of Water and Climate chaired by the King of Morocco, a series of water sector reforms were put in place to supply water to rural areas by 2004. In addition, the government transferred responsibility for PAGER to ONEP and set an ambitious access rate target of 90% for 2007 (compared to 80% by 2010 set by PAGER) despite the lack of effective absorption capacity and requisite financing. In 2011, following the merger of the National Electricity Office (ONE) and the National Office of Drinking Water (ONEP), the National Electricity and Drinking Water Office (ONEE) was established.

Morocco ONEE-branch water is now the main interlocutor for coordinating, supervising and overseeing all actions for developing the WSS sector. In response to its new mandate, ONEE-Branch Water restructured and decentralized its services by adopting a demand-driven, participatory approach that provides what users want and are willing to pay for.

Morocco adopted a new planning and programming process including:

- Defining the demand based on the sector assessment, requests from local authorities, elected representatives and studies of beneficiary populations, and field investigations.
- Setting priorities, defining and implementing a program of studies of provincial master plans: planning criteria include low access rate and difficulties of water supply.
- Establishing a project bank and definition of a priority program: the priority given to areas with

the lowest access rates, and to projects with low per capita cost that make it possible to have a significant impact on access rates.

- Defining a multi-year program (contract program) and search for funding for projects with at least a feasibility study located in areas with identified, confirmed water resources.
- Establishing an annual program (finance law) for those projects with well-developed studies, mobilized funding, and water resources whose quantity and quality are confirmed.

■ *Private sector:* a greater role for providing goods and services and technical assistance to communities in sub-project implementation and O&M.

■ *NGOs:* support and complement government efforts by investing in RWSS projects with support from international NGOs and other sources of funds. NGOs also provide technical assistance to communities to prepare and implement sub-projects, which is very important given their decentralization and grassroots work.

### ***Legislative and institutional reforms***

Legislation reforms within the context of RWSS address the legal basis for water use rights, quality standards for WSS, water management and conservation, and a sound legal framework for RWSS services delivery. The institutional reforms under the projects articulated clear roles and responsibilities for the key RWSS stakeholders with legal backing for bodies to operate the service, set tariffs, manage funds, and undertake functions necessary to ensure the continuity of RWSS. Roles and responsibilities of the key players included the following:

- *Communities:* as owners of WSS assets responsible for O&M that could be delegated to a private operator.
- *Local government:* responsible for supporting communities in accessing funds for WSS sub-projects and assisting in planning and procurement of goods and services.
- *Central government:* normally represented by a parastatal agency, responsible for facilitating access to WSS services by setting clear national policies and strategies, capacity building and mobilizing funds for investment.

### ***Capacity building interventions***

The lesson from many of the successful projects was that effective capacity building is key for RWSS interventions. Many countries often have little capacity to mobilize, organize, and implement community-based RWSS projects. Successful RWSS projects included community and local capacity building to plan, design, and construct/install RWSS systems.

### ***Financial sustainability and cost recovery***

The only way to keep WSS services running continuously is to have users/communities pay. Tariffs should be designed to ensure financial viability. Some communities achieve O&M cost recovery at a minimum by payment at the stand-post/borehole to designated vendors.

Improved WSS carries the risk of reduced consumption because more expensive services are hard to pay for, especially by the poor, who sometimes resort to unsafe sources to avoid paying. During program design and implementation, efforts were made to ensure flexible project rules and to provide broader levels of service that were accessible to the poor to avoid excluding them.

The Malawi RWS project used poverty targeting/mapping to identify high priority districts. Given the high incidence of poverty among women, including women in the projects strengthens the poverty focus. The Mozambique urban project was concerned with making water affordable to the poor and led in instituting a progressive water tariff structure that subsidized them.

### ***Private sector participation***

No one-size-fits-all solution exists for managing water facilities, but PPPs have a strong potential to deliver and develop improved water services. Community-based management seems more appropriate for point sources (springs or hand pumps) than for piped systems. The Rwandese experience, for example, showed that WUAs offer limited accountability, and that maintenance and cost recovery are quite challenging, and that local private operators can be found anywhere (Box 13). However, PPP in rural water supply requires a favorable environment.

- A legislative framework so that private operators can be effectively monitored.
- Strengthening the capacities of private operators and promoting competition.
- Establishing a subsidy system so that private operators can offer affordable pricing.
- The existence of a regulatory mechanism.

In the Rwanda Rural projects (AfDB/OPEV, 2012; World Bank, 2008), the deteriorating community management of piped systems led the district authorities to seek private operators. The establishment of the Energy, Water and Sanitation Authority (EWSA) also instituted new competition conditions between “private” operators entrusted with managing rural district WSS services.

Developing and supporting SMEs also greatly enhances local entrepreneurship for building wells and latrines, providing repair services, and supplying spares parts. The availability of well-managed WSS-

### **Box 14: PPP in Rwanda's Rural Water Supply**

Community management was implemented in Rwanda from 1987-1994, and community water management boards were established in all districts. Standpipe users were grouped into committees whose members were elected by the users. The model very quickly showed its limits: (i) volunteering among water point committee members; (ii) lack of technical skills (lack of professionalism); (iii) absence of user responsibility, reflecting non-ownership of facilities; (iv) failure of users to pay fees on a regular basis, and (v) poor financial management (including embezzlement of funds). This situation and the lack of skills, accountability and funds led to poorly maintained water systems.

A 2004 evaluation of DWSS infrastructure management concluded that the community management model had failed. Rwanda essentially abandoned the method and adopted a private-operator management method under PPPs, which the government encouraged. In this system, the local authorities (districts) own the system by virtue of the powers vested in them by the decentralization process. In 2010, the government support of the World Bank's Water Supply Program updated the WSS Policy and emphasized sustainability and improved WSS and established EWSA to operate in urban areas and oversee water and sanitation service provision in rural areas. EWSA supports district the transparent procurement of private operators to operate and maintain WS infrastructure. The government is considering water sector restructuring, capitalizing on EWSA's experience in utility management to extend its mandate to engage the private sector directly to manage rural water infrastructure and big PPP projects where feasible. The role of the private sector in WSS will still include delegated management and be extended to models such as the Independent Water Producer and thereby attract big investors into the sector.



related support services would ensure sustainability and increase real incomes.

Introducing PPPs to improve the operations of piped rural water supply systems has been an unprecedented success in Rwanda. In 2011, private operators were managing 356 of the 847 rural WSS (42%), and the number is rising yearly. The 2008 assessment indicated that the systems are now better managed. There is an incentive to do water business because with private operators, water bills are paid and the districts get lease fees without investing in daily O&M. Banks are starting to consider the water business as viable. The PPP model also provides jobs in the communities.

Before delegating a WSS to a private operator, however, facilities must be fully functional and in good condition. Procurement must be transparent with the winning bidder presenting a sound business plan. In addition, the delegation service contract between the district and the private operator should cover at least 10 years. There should be also an effective regulatory framework to guide and enforce a rational tariff. Developing technical, managerial and financial capacity is critical for sustainability and good levels of WSS services.

As resettlement plans move people from their traditional settlements to grouped settlements, the capacity of local private operators is stretched as they continue to provide good services.

### ***Using Output-Based Aid to Subsidize Rural Individual Household Water Connections***

Established in 2003, the Global Partnership on Output-Based Aid, administered by the World Bank, is a multi-donor trust fund to develop output-based aid (OBA) approaches across infrastructure, health, and education. OBA subsidies are designed to create incentives for efficiency and the long-term success of development projects.

In Morocco, for instance, demand for house connections in rural areas is high and correlates strongly with the cost of the connection fee, which threatened the financial sustainability of the rural water supply and, therefore, the interests of the private sector. Seeking to increase household connections, Morocco decided to add an OBA to the proposed PPP, which lowered the connection fee and subsidized house connections developed by the private operator. The innovation is that the private operator must pre-finance the outputs such as the working connections to the piped water supply service. The operator receives a subsidy after the outputs are delivered and independently verified. (Table 4)

### ***Appropriate and standardized technology for rural water supply***

A wide range of technology options are available to improve RWSS solutions. Choices are location specific and depend on community demand, affordability and willingness to pay, community size and household density, and the availability of resources and electricity.

The projects adopted various technological options for community RWSS: i) improved shallow wells (with or without hand pumps); ii) boreholes equipped with hand pumps; iii) spring development; iv) motorized boreholes connected to standpipes or house connections; v) surface water catchments (with treatment facility) connected to pipe system; vi) gravity flow pipe systems, and vii) rainwater harvesting. For sanitation, the range of technology options included ventilated improved pit latrines for households, sand-plat latrines, small bore sewers, and, simplified sewerage.

Examples of good practice show that some approaches in sanitation, such as the UNICEF community-led total sanitation approach (with popular sanitation infrastructure approval) in rural

**Table 4:** Performance Targets and Outputs Required to Receive an ONEP OBA Subsidy

Contract Objective	Output	Measuring unit	Targets	Subsidy available for the first
Minimize initial operation deficit	Water sales in pilot area	m <sup>3</sup> sold	3 million m <sup>3</sup>	3 years of operation
Expand service area to 14 new <i>douars</i>	New <i>douars</i> or settlements reached	Linear meters (ml) of expanded network	Initial estimates: 40.000 ml	4 years of operation
Increase customer base through new house connections	New working house connections to piped water supply	House connection	8.500 new house connections	5 years of operation

Source: World Bank, 2009c.

Mozambique, are more promising than other approaches (e.g. sanitation facilities built and funded by donors are often too costly to set an example). In Rwanda, the individual latrines promoted by the project are a ventilated improved pit (VIP) design whose unit averages RWF 135,000, or roughly USD240, which is beyond the means of rural households (AfDB/OPEV, 2012h)

### ***Effective and efficient O&M practices***

Operation and maintenance are crucial for sustaining physical infrastructure. RWSS involves providing potable water to rural communities for domestic uses and requires that the water be of good quality and available all year round. The most common RWSS problem is ensuring a continuous supply for the life of the system through effective and efficient O&M systems.

When local private operators are used, they are contractually responsible for O&M. In addition to appropriate RWS technology, effective O&M practices, emphasized during the capacity-building programs, must also include i) O&M system planning; ii) cost recovery and tariff structure; iii) O&M training; iv) performance-based service contracts; v) community ownership and participation, and vi) effective supply chains for spare parts and repair services.

### ***Community ownership and participation***

Examples of good practice include process facilitation by an acceptable party to carry out constructive, respectful collaboration among all parties (donors, government, NGOs communities) that contribute to the desired solution is key, particularly in poor rural areas. In addition, a clearly defined approach, supportive regulation, detailed planning of work, and risk management are also essential. The projects reviewed adopted a demand-responsive approach that emphasized community participation in planning, design, and implementation, leading to community ownership and, in some cases, management of services to enhance sustainable O&M of RWSS services.

A number of water user associations (WUAs) or water point committees (WPCs) and Water Supply, Sanitation and Hygiene Education (WASHE) were formed and the members trained in O&M for RWSS projects. However, there were some challenges in forming, running and assuring the durability of these community-based institutions. They were slow to be built, as membership is contingent on a willingness to participate and contribute resources. There was also some uncertainty about their continuity in some groups, for example, in the Zambia case where most of the V-WASHes became inoperative. In the Madagascar case, there was a fear that the WPCs and VOU motivation to organize would drop over time, reducing the willingness to contribute to maintenance of the facilities. In Rwanda, the community

management model very quickly showed its limits and resulted in poorly maintained water systems. This management method was abandoned and a private-operator management method was adopted.

In the Zambia-Rural project, the project organized rural communities into district and village WASHE committees. Beneficiaries were trained in project initiation, preparation, O&M, and maintenance. The Madagascar Rural Project supported the set-up and training of WPCs in districts and villages to manage, operate, and maintain the water infrastructure. In addition, VOUs were set up to provide health and hygiene education to the community.

In some projects, the communities were required to contribute in cash and in kind towards capital investments of their water supply and sanitation schemes as demonstrations of their commitment to sustainable O&M, which reduced the level of external financing required. The level and nature of contributions were modulated according to the situation on the ground. Under this arrangement, communities take full responsibility for O&M. Morocco's basic infrastructure programs for rural areas are an outstanding example of how to create a close partnership among the state and local councils and civil society (Box 14).

Social investment funds with autonomous community-driven projects were also encouraged, with flexible procurement of goods, works, and services. Disbursement procedures are kept simple and easy to use, making them suitable vehicles for implementing RWSS projects, especially in the very remote areas in which only such structures would operate.

### *Environmental considerations*

RWSS programs can have environmental repercussions. They must consider the following: i) environmental hazards when used water is not properly disposed of; ii) pooling of excess water where mosquitoes breed; iii) latrines can contaminate the groundwater if groundwater sources are not properly sited and built; and iv) reduced groundwater aquifers by over-pumping.

RWSS programs were designed to substantially improve the environmental sanitation conditions in all communities by improving the water supply, storm water drainage, and public and private sanitation facilities. Community-based environmental management practices were actively supported to improve living conditions and to protect water resources.

#### **Box 15:** Improving Access to Drinking Water in Rural Areas in Morocco

When PAGER was launched in 1994, only 14 percent of the rural population had access to potable water. Since then, PAGER has provided over 87 percent of the rural population with access to drinking water, typically through public fountains.

The program adopted very innovative management. The State provides equipment, pays investment costs, and hands management and maintenance over to recipients who also pay fees. Taking a participatory approach, a consultative team comes to discuss with the potential project beneficiaries to provide information and awareness-raising. Before the project is carried out, diagnostic teams meet with the beneficiary populations to present the results of technical studies and the conditions of project access including costs, choice of service mode, management, etc.), identification and implementation in place management units and their training prior to completion; (ii) signature of the management agreement and training of unit managers) or associations.

Since 2010, the financial arrangement in rural WSS includes a contribution from local councils and recipients (15% for rural WSS projects using standpipes; 50% of the cost of the work for the internal network and connections, for rural drinking water by individual connections); users' fees that consider the limited household incomes in rural areas (500 DH per household for communal fountains and 3500 DH per household for individual connections).

In the Rwanda RWSS project (AfDB/OPEV, 2012h), for example, the Strategic Environmental Social Impact Assessment indicates that for the drinking water supply component, which received an aggregate rating of 67%, the program appears satisfactory with respect to a favorable environmental impact (no impacts, positive impacts and negative impacts of very minor significance and duration, strictly limited to the construction phase). The sanitation component scored 54%. The bid documents for building all DWSS systems included provisions on environmental protection. However, the independent evaluation noted that the demarcation of perimeters to protect natural water sources and standpipes from human and agricultural pollution from fertilizers and pesticides should still be generalized. In addition, the presence of homes, cropping with fertilizer and pesticides, and, more importantly, the use of unhygienic latrines uphill and upstream from water collection areas could adversely affect water quality.

In general, evaluation findings show that the environmental sustainability of rural water supply programs has not yet received enough attention, especially in the context of climate change. One possible explanation may be its unclear immediate and long-term financial importance. Therefore, more environmentally integrated approaches to RWSS are needed, for example as part of IWRM. (OECD/DAC, 2012; IEG, 2010).

### ***Gender considerations and women's empowerment***

RWSS projects undertaken by the Bank have had a strong positive focus on gender and women's participation. Focusing on gender leads to benefits that go beyond good RWSS project performance as demonstrated in by better procurement, O&M, cost recovery, and hygiene awareness. Particular benefits accrue to women and children including

more time for income-generating activities, attending to the needs of family members or their own welfare and leisure. The economy, as a whole, therefore also benefits: children are healthier and girls can be spared the drudgery of water collection and management, and go to school.

Involvement in WSS projects empowers women, especially when project activities are linked to income-generating activities and productive resources, such as credit. Women's involvement was addressed in the project/program design, construction, and O&M: i) representation of women in capacity-building and training sessions; ii) project rules requiring that women be represented in WUGs and strongly encouraged to play leading roles in executive positions and cost recovery, and iii) focusing on the linkage between gender and poverty, by identifying, for example female-headed households and special needs households.

For example, the Government of Tanzania stipulates that women comprise at least 25% of village government entities. The Malawi project required that women comprise at least 50% of water committees and be involved in all stages of the project cycle. Women comprised 60% of the members of the 2000 water point committees.

While main impact level in many cases for rural facilities is to save time spent collecting water by women and young girls, the few available studies show that time savings does not substantially contribute to economic empowerment and development unless specific complementary efforts are made to this end. Rather, the women engage in other unpaid work such as collecting firewood or agricultural labor.

The Morocco PAGER project has somewhat improved health conditions and increased access to education, particularly for girls, by reducing the time spent fetching water by 50%-90%, freeing girls for schooling and women for income-generation. ■





Photo © ADB

“Political stability has heavily influenced progress in improving access to water supply and sanitation in Africa,” concludes the report.



# Success Factors for Achieving WSS Access for All

The interventions undertaken by the RMCs with support from the Bank and other development partners have improved access to WSS in Africa overall, but the disparities between countries and projects, in some cases, are significant. What factors contribute to the success or failure of WSS projects?

## Factors Common to Successful Projects

### ***Appropriate QAE and Project Design***

*Achieving project outcomes is strongly affected by the quality of the project design.* Although it is not always explicitly stated, there are sets of principles that have apparently influenced project: (i) government plays a minimal role in enabling, coordinating and regulating the provision of basic social services and in environmental safeguarding; (ii) the private sector participates at least in building WSS infrastructure and delivery of services; (iii) commercialization of water supply where markets exist; (iv) community participation in owning, managing and sustaining the project; (v) integration of complementary social services like water supply, sanitation and health, and (vi) the inclusion of social equity such as gender equality and targeting poor areas or populations and environmental safeguarding.

The Bank contributed to achieving project outcomes by improving the QAE of several projects that registered satisfactory performance. Getting it right from the beginning strengthened implementation whereas sub-optimal design and QAE often resulted in additional complications and project inefficiency. Good relations and cooperation with

government bodies and other stakeholders were crucial for developing a project design that could be implemented effectively. Evaluation results showed that for the projects with satisfactory performance, the Bank successfully strengthened its relations with relevant stakeholders and was partly successful in incorporating stakeholder inputs effectively. However, performance could have been further improved by involving relevant stakeholders directly during the project formulation phase to facilitate a proper needs assessments and to select appropriate, affordable technologies adapted to local conditions.

### ***Effective cooperation and coordination with key stakeholders***

WSS services are social services, in principle. Consequently, the Bank shares many interests with the governments providing them. Increasing the impact of Bank projects and meet government agendas often requires surmounting ineffective inter-ministerial cooperation and coordination, and the limited cooperation between governments and donors and among donors in planning and implementing programs. Increasingly complex and demanding aid frameworks often aggravate these obstacles.

In some projects with satisfactory performance, the Bank promoted an integrated approach by establishing priorities among different ministries and sectors to overcome weak institutional coordination and to stimulate the governments to adopt a coordinated multi-program approach. However, the review showed that these initiatives depend on stable political will and the use of planning documents,

such as urban master plans, without which, Bank efforts were rarely effective, especially in urban settings. The review also pointed to cases where the Bank consistently ensured that its own actions were part of a comprehensive program in conjunction with other financial partners. In Madagascar, the Bank held consultations with government, local authorities, other donors, NGOs, and the target beneficiaries to establish the needs and success conditions of the project.

### ***Appropriate Institutional Frameworks and Reform***

*Institutional frameworks and reforms are fundamental for empowering institutions and ensuring achievement and sustenance of project objectives.* Some degree of readiness was demonstrated for institutions designed on principles of private sector participation, water supply commercialization and financial viability. As the examples of Dar es Salaam (Tanzania) and Maputo (Mozambique) suggest, some urban water supply projects choose to operate under regulated public corporations (both as asset holders and operators). Others, like the Nigeria project, are evolving towards a PPP. In Rwanda, the use of PPPs, as an alternative to the community management method, contributed to the effective upkeep and maintenance of facilities, and in general improved the administrative, technical and financial management of DWS systems. The non-convergence of these institutional arrangements indicates that building institutions is a country/project specific process.

In some projects where performance was rated satisfactory, institutional reform was associated with decentralization and the creation of entities with clear mandates and responsibilities. Most national water companies tended to be supported by local (semi-private) enterprises that were fully responsible for operations (technical and commercial services) and financial management (fundraising, contracts, investments). The review showed that successful decentralization seems to depend on efforts to build

institutional capacity at all levels of government and on the existence of clear performance contracts between local and central government departments.

### ***Adequate and quality information, knowledge, and skills***

*The satisfactory projects were consistent regarding “information, knowledge and skills” and hence in the quality of technical attributes.* The influence of “information, knowledge and technical skills” is evident in various stages of project development: (i) establishing a project rationale based on analytical problem analysis and lessons learned; (ii) conceptualizing a project’s internal logic and expression in a causal results chain; (iii) a detailed engineering design; (iv) the alignment of project size and complexity with the capacity to implement; (v) an adequate analysis of risks and mitigation measures; (vi) administrative skills and efficacy, and (vii) the design of a complete M&E system that generates timely information for action.

Some projects that were rated unsatisfactory were notably deficient in: (i) engineering design; (ii) matching project size and complexity with the capacity to implement, and (iii) designing project monitoring to provide real-time information for action.

### ***Environmental factors***

*Environmental factors such as climate, topography, soil and water influence the design, placement and performance of WSS projects.* Overall, better performing WSS projects mitigated their effects on the environment and were designed specifically to address such environmental concerns as the degradation of water sources (for example, lake and river siltation) and unreliable water supply due to seasonal rainfall (or river flow). Physical terrain, soil type and hydrology influence the scope and placement of WSS projects. For example, the

degradation of the nearby lake, the primary source of water for Harar, Ethiopia, required drilling a borehole in a lowland area 75 kilometers away and raising the transmission lines.

### Factors Common to Projects with Unsatisfactory Performance

Some crosscutting factors common to the reviewed projects whose performance was unsatisfactory were identified but the extent to which they determine performance depends on the country context and project characteristics (e.g. age, size and complexity).

#### **War, politics, and policy**

*Political stability has heavily influenced progress in improving access to WSS service. Stable low-income countries outperform fragile and resource-rich low-income countries.* For some projects that registered unsatisfactory performance, the effect of war on the nation's human and institutional capacities constrained project design and implementation and consequently contributed to the underachievement of the WSS objective. When Liberia emerged from a decade-long civil war, its WSS infrastructure was extensively damaged and its institutional and human capacity weakened.

With the exception of Liberia, all of the governments represented in this review had WSS sector policies and legislations to reform the sector before the projects were formulated; they were designed in line with the sector policies. The governments were also committed to project objectives, witness the guarantee and signing of long-term external loans, compliance with loan and disbursement conditions, a commitment to share project financing, and supporting institutional reform. However, these commitments were unevenly translated into action as the delays of loan

effectiveness and/or contribution of counterpart funds in agreed time framework attest.

#### **Slow Institutional Reforms**

Various institutional arrangements influence project performance directly or indirectly: including management structure (e.g. a semi-autonomous public utility or a regulated private company), community-based associations, and private sector institutions such as input suppliers, private consultants and contractors, and informal water vendors. Slow institutional reforms in, developing workable PPPs for example were a major factor in projects with unsatisfactory performance.

#### **Operational inefficiency and non-financial profitability of WSS projects**

*Operational efficiency and financial profitability influence the achievement and sustainability of project objectives.* Several factors restrict the operational efficiency and financial profitability of water supply projects: (i) low sales revenue due to low consumer connection, registration, metering and billing; (ii) limited flexibility in privately setting tariff structures and rates, and (iii) weak operational efficiency. Utility companies must improve their operating margin to be able to finance O&M costs, cover depreciation charges on new investments, and service debts on schedule to minimize arrears.

Given the regulation of water pricing and limited flexibility, financial profitability requires reducing inefficiency and increasing sales revenues. Improved water infrastructure (enhancing production and distribution capacity) is bound to reduce physical water losses. Strengthening institutions and incentives are bound to reduce non-revenue water consumption through an improved customer base, billing, and collection. But sizable deficiencies remain: (i) absent water distribution networks

connecting production to consumption points (e.g. the Nigeria Multi State project); (ii) limited success in some projects to supply water to consumers (Nigeria and Tanzania-Dar es Salaam managed to supply less than 25% of the target population despite significant achievement in building water production capacity), and (iii) sizable unbilled water consumption and/or uncollected bills.

Although water tariffs are regulated to ensure some balance between maximizing operating profit margins (and implied resource efficiency) and accessing basic services at an affordable cost, current pricing in unregulated informal water markets indicates scope for increasing tariff rates without a substantial decline in water consumption (water is typically price inelastic). For example, as stated in the PCR evaluation note for the Mozambique urban project, the current tariff structure has elements of cross-subsidization where rates are progressively tied to consumption levels in order to protect less privileged people in the communities.

A tariff policy that enables the most vulnerable households to pay affordable rates can be adopted using targeted subsidies mechanisms, a pricing mechanism based on recurrent costs and using appropriate terms of payment.

*Hard infrastructure such as roads need to be improved to overcome or at least ease delivery problems for WSS services, shortages of private contractors, or attracting skilled labor like engineers, input supply (e.g. spare parts for maintaining community-owned water and sanitary facilities) and the absence of financial intermediaries.* As the experiences of rural Kenya, Malawi, and Mozambique water supply projects show, the challenges of implementing the provision of basic social services include: (i) the geographical dispersion of small communities; (ii) remoteness and physical accessibility; and (iii) an undeveloped private sector with private contractors, and input supply chains.

In addition, unreliable electric power affects the performance of WSS projects. For example, the use of the available water supply of the Nigeria Multi was limited by a highly unreliable national power supply. The project's relatively poor performance in supplying water to water facilities resulted primarily from the combined effects of the limited investment for expanding and maintaining the water mains and distribution network, the unreliable national power supply, and high fuel costs for running power generators. Similarly, electricity surges damaged the water pumps and equipment in the district towns in Mozambique (urban project), which interrupted water supplies. These same problems required the water and electricity supply in the Rwanda-Kigali project to be integrated.

### ***Weak technical capacity of project partners***

Some projects that had unsatisfactory performance lacked implementation capacity appropriate to the project's size and complexity. The review indicates that in most cases the Bank had to contend with the limited capacities of NGOs, government, and private institutions. In these cases, there was no adequate capacity assessment at appraisal, as was evident, for example, from the assumptions made about available capacity that often proved to be inaccurate (for example, the duration of project implementation or pace of institutional change or underestimates of the time necessary to procure works and services). Some projects deferred capacity assessment to the implementation phase and had to be restructured and matched, which often delayed implementation. In short, these projects were insufficiently prepared.

### ***Poor adherence to timeliness***

*Start-up activities are particularly important to ensure that project implementation conforms to loan conditions and requirements and meets the technical and financial specifications determined at appraisal.*

Getting financial and technical data right from the beginning of a project proves to significantly affect timeliness significantly. In general, project schedules were overly optimistic, especially about procurement, tendering, and technical design activities. Several showed the importance of improving the detail and quality of cost estimates during the design phase, considering evolving prices of raw materials, service provision, and exchange rate fluctuations.

Several projects showed that the implementation timeliness of the Bank's project portfolio was negatively impacted during project initiation. Delays usually begin immediately when the Bank does not initiate project start-up promptly by organizing launch missions immediately after loan approval.

### ***Weak M&E***

The M&E design should reflect the logical framework and the results chain in particular. An adequately defined results chain makes it possible to identify key project activities, outputs and outcomes, specify indicators and their target levels, and develop baseline data to benchmark indicators at project entry that are monitored over the life of the project

to assess performance and influence decisions affecting project implementation.

Project M&E plans are rated poor (1) to fair (2) because most lack a completely specified logical frame and limit their focus to few indicators. For example, the Mozambique Urban PCREN used indicators in the M&E plan that only partly covered output indicators for the water component and none at all for the sanitation and institutional reform components. In some projects, even incomplete indicators lacked baseline data or data reliability was questionable.

The implementation of M&E system requires setting up institutional arrangements, staffing and equipping with the right incentive systems, and gathering and converting data into a useful information system. None of the projects reported adequate staffing or incentive systems. Gathering data was not timely and most of the projects did not implement mid-term reviews. The data that was gathered was used mainly to prepare reports on procurement and financial performance and project inputs and outputs. It is also not certain how much the information in these reports influenced decisions affecting project operation and results. ■





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Success and sustainability require a holistic approach based on capacity development and sustainable models of integrated development.

# Conclusions and Lessons Learned

Structural transformation requires a new approach that involves profound changes in the behavior of the various players in the sector. This publication has summarized the main challenges, innovative practices and solutions, and the success factors in providing WSS in urban, peri-urban, and rural areas based on the experience of projects in different countries.

In replicating any solution or meeting any of the challenges described here a project must reflect its context and be owned by the key stakeholders. Success and sustainability require a holistic approach based on capacity development and sustainable models of integrated development. If we are to identify solutions to the challenges of WSS projects, we must understand them holistically.

## Lessons Learned

The following lessons or practices are drawn from innovative projects that have demonstrated success, have had an impact, and can be replicated.

### *Factors shaping WSS interventions theories of change*

- I The integration of safe water supply, sanitation and health education, a key design feature of the majority of the projects, promises to generate benefits where the whole is greater than the sum of the benefits of individual components because of their complementarity. Project sustainability can be improved by considering large-scale, multipurpose integrated water projects that contribute to regional water development rather than individual, smaller projects.
- I There must be an appropriate balance between investing in water supply, sanitation and health education components to maximize the achievements in outputs and outcomes. Similarly, investments within each component must also be appropriately balanced i.e. between production, distribution and connection of water supply system as well as institutional support measures. A holistic approach avoids double or multiple investments and speeds sector development.
- I Institutions designed on principles of private sector participation, commercialization of water supply, and financial viability demonstrate some degree of readiness.
- I Project components must be sequenced appropriately where implementation capacity is limited. For example, building institutions while investing in WSS infrastructure and delivery of services puts pressure on weak implementation capacity and thereby diminishes performance effectiveness.
- I For urban sanitation projects to be efficient, a value chain approach and reuse can generate additional resources for large recurrent costs.
- I Effective capacity building is a key factor for successful RWS interventions. Similarly, efforts at institutional capacity building at all governmental levels and clear performance contracts between local and central government departments are successful. Sector capacity building is long term,



and in most cases, extends beyond the WSS project timeframe therefore requires long-term policy.

- An innovation is not only technological but can also be behavioral at the institutional or community level. For example, in Rwanda, prohibiting the use of plastic bags has made Kigali one of the cleanest cities in the world. Other countries (Côte d'Ivoire, Congo, and Mali) are following this example more or less successfully.

### ***Quality at Entry (QaE)***

- Project design such as engineering details must be carefully detailed to minimize rescaling due to design deficiencies at appraisal or producing technically suboptimal outputs (e.g. a high percentage of boreholes were polluted by the high iron content of water in rural Zambia).
- An adequate assessment of implementation capacity and a realignment of project size and complexity at appraisal, or developing an implementable mitigation strategy significantly improve project QaE (institutes realism in project implementation).
- M&E design mirrors the details in a project's internal logic as specified in the objective statement, results chain, assumptions, and risks. Where these elements are incomplete, an M&E design is incomplete and its implementation and information value are partial.

### ***Public-Private Partnership***

- Conditions for private sector participation are typically weak in rural areas. Community-based institutions could play the important functions of asset ownership, project management, and financing in these cases but the process of

building these institutions is slow and involves sensitization, mobilization, and securing a willingness to participate, including in financing O&M.

- Delegating drinking water supply networks management in rural areas to private operators, as an alternative to community management, is advantageous only if there is genuine competition and an effective system to monitor the quality of services provided and the prices charged.
- The participation of the private sector in PPPs depends on its technical and financial capacities, risk tolerance (the extent to which it is willing to absorb the risk in asset holding and financing O&M) and incentive structure (benefit expected from the partnership). Where capacities and risk tolerance are low, the private sector can still participate in the delivery of WSS services.
- Informal water vendors have important functions that consumers find important: more channels to access water, affordability, and suitable payment arrangement. What is missing in institutional reforms is the integration of informal water vendors into urban water supply systems (or, at least their attributes).
- In order to provide sustainable drinking WSS, cost recovery must be examined systematically and strategically. Setting regulated tariff rate depends on whether the purpose is to cover O&M only or O&M plus depreciation charges or O&M, depreciation charges plus debt serving (if project financing includes borrowed funds). The premium increases progressively at each level.

### ***Sustainability***

- Effective community participation in WSS and rural and peri-urban areas in particular

is critical for enhanced ownership and for the successful implementation and sustainability of WSS facilities and results. Lack of stakeholder ownership reflects weak WSS project design.

- An effective participatory process during the conceptual phase of a project is essential for better identifying needs and select the technologies best suited to local conditions to guarantee the sustainability of project results. The choice of appropriate technologies for WSS facilitates the feasibility and O&M, both of which are critical to the sustainability
- High tariff rate ensures project profitability and sustainability, but may stifle demand for water among low-income households. One way of

managing the trade-off between efficiency and affordability, as practiced in one of the projects reviewed, is to combine progressive tariff rates tied to water consumption levels with targeted subsidies at the lower end of the consumption distribution.

- Incorporating environmental sustainability into project design and implementation is likely to influence success increasingly, as time goes on.
- In addition to the availability of personnel, and managerial and financial resources, improved incentives are fundamental for motivating project staff and enhancing management efficiency, i.e. reducing staff turnover and delivering quality outputs. ■



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On Sustainability, this publication states that effective community participation in WSS and rural and peri-urban areas in particular is critical for enhanced ownership and for the successful implementation and sustainability of WSS facilities and results. Lack of stakeholder ownership reflects weak WSS project design.





## Annex 1 — Projects Evaluated

Country	Project Name	Area
Ethiopia	Eastern Nile Irrigation and Drainage Study	Rural
Kenya	Rift Valley Water Supply and Sanitation Project	Urban
Liberia	Monrovia Water Supply and Sanitation Rehabilitation Project	Urban
Madagascar	Grand Sud Drinking Water Supply and Sanitation Project	Rural
Malawi	Integrated Rural Water Supply and Sanitation Project for Ntchisi and Mzimba	Rural
Mauritania	Nouakchott City Drinking Water Supply "Aftout Essahli"	Urban
Morocco	Eighth Drinking Water Supply and Sanitation	Urban
	Seventh Drinking Water Supply and Sanitation	Urban
Mozambique	Urban Water Supply, Sanitation & Institutional Support Project	Urban
	Integrated Water Supply and Sanitation Project for Nampula and Niassa Provinces (ASNANI)	Rural
	Maputo Water Supply Rehabilitation Project	Urban
Nigeria	First Multi State Water Supply Projects	Urban
Rwanda	National Rural Drinking Water Supply and Sanitation Programme - PNEAR (Launching Phase)	Rural
Senegal	AfDB Rural Drinking Water Supply and Sanitation Initiative - Launching Sub-Programme	Rural
	Dakar City Sanitation Project (PAVD)	Urban
Tanzania	Monduli District Water Supply and Sanitation Project	Urban
	Dar es Salaam Water Supply and Sanitation Project	Urban
Zambia	Central Province Water Supply and Sanitation Project	Urban

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## Endnotes

1. A state-controlled entity of an industrial or commercial nature.
2. The organization was named "Employer of the Year 2003 for Ethics and Corporate Social Responsibility" and again got a Golden Award for Management Excellence in June 2004 and Employer of the Year 2004 for "Productivity and Performance Management". In 2005, URA presented to the organization with the "URA Vantage Award" for exemplary Tax Compliance on the Tax Payers' Appreciation day. In 2007, NWSC was recognized as the East Africa's Most Respected Company in the Service Sector. In 2014, NWSC won the Golden Europe Award for Quality and Commercial Prestige, the Global Water Leaders Awards and the Best African Water Utility. In 2015, NWSC is again Africa's water utility of the year.
3. Based on a sample of 104 projects and studies selected from 244 urban water supply and sewerage projects and studies financed by the Bank through 2002.
4. [http://www.tetrattechintdev.com/index.php?option=com\\_k2&view=item&id=444:suwasa&Itemid=55&lang=us](http://www.tetrattechintdev.com/index.php?option=com_k2&view=item&id=444:suwasa&Itemid=55&lang=us)
5. Programme d'Approvisionnement Groupé en Eau Potable des Populations Rurales
6. Morocco is a water-scarce country confronted with dwindling groundwater reserves and a strong dependence on rain-fed agriculture. In 1994, access rate to drinking water in rural areas was only 14%. Key constraints and challenges included socio-economic constraints: (i) illiteracy, making it difficult to send messages regarding membership and management of facilities; (ii) poverty, in that the supply of drinking water is generally seen as a new load rather than a solution under operation of installations in service (poverty); (iii) absence of urbanism and spatial planning documents; (iv) low return on investment compared with urban areas (significant investments against low volumes of water sold) and, (v) increased difficulty in managing more and more scattered facilities with difficult access, leading to a growing operating deficit.





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## About this Publication

This publication brings together a summary of innovations, good practices, and lessons learned from recent evaluations of interventions in the water supply and sanitation sector. Drawing from the evaluations of interventions undertaken by the African Development Bank, governments and other development partners, it highlights emerging good practices and innovations and reflects on the key lessons of successful and failed cases. It is informed by (i) a desk review of the evaluation reports of eighteen AfDB-funded water supply and sanitation projects completed between 2010 and 2012 and of the evaluation results of other development partners involved in water supply and sanitation in Africa, and (ii) the exchanges during a regional workshop organized by the AfDB in Morocco in November 2013 to share evaluation experiences of water supply and sanitation projects and programs.

By sharing with development actors what has and has not worked to sustainably improve access to safe drinking water and basic sanitation, the publication aims to contribute to the global body of knowledge in this area, and to the broad inclusive and green growth agenda of the AfDB. It seeks to encourage government ministers and officials, managers of utilities and water authorities, consultants and development partners to consider creative solutions to the water and sanitation challenges in urban and rural areas.



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