

# A GLOBAL WATER BENCHMARKING STUDY FOR KENYA

**Lessons of water sector transformation from around the world**



THEMATIC REPORT:

## **WATER SERVICES DELIVERY**

JULY 2021



Better Markets, Better Lives

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## THE GLOBAL WATER BENCHMARKING STUDY FOR KENYA

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Kenya Markets Trust (KMT) undertook this study to capture examples of good practice from countries that have successfully transformed aspects of their water sector. The purpose of the study is to provide a rich source of information for Kenyan water stakeholders to draw upon while developing strategies for strengthening Kenya's water sector. The study will also inform KMT's work and how we might bring new ideas and practical recommendations to our partnerships.

The study consists of 5 reports:

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- |                               |  |
|-------------------------------|--|
| <b>3 thematic reports</b>     | <ul style="list-style-type: none"><li>• Governance</li><li>• Water Service Delivery</li><li>• Water Resources Management</li></ul> |
| <b>2 country case studies</b> | <ul style="list-style-type: none"><li>• Colombia</li><li>• Republic of Korea</li></ul>   |
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# ACRONYMS AND ABBREVIATIONS

BOT	Build Operate Transfer
CBM	Community-Based Management
CSBAG	Civil Society Budget Advocacy Group (Uganda)
CUs	Commercial Utilities (Zambia)
DARD	Department of Agriculture and Rural Development (Viet Nam)
DWS	Department for Water and Sanitation (South Africa)
GoR	Government of Rwanda
GoS	Government of Senegal
FEPEAR	Forum of Private Operators for Water and Sanitation in Rural Areas or Forum des Exploitants Prives pour l'Eau et l'Assainissement en milieu Rural (Rwanda)
IU	Innovation Unit (Israel)
KMT	Kenya Markets Trust
LEAP	Livelihood Empowerment Against Poverty (Ghana)
MARD	Ministry of Agriculture and Rural Development (Viet Nam)
MDGs	Millennium Development Goals
MEMD	Ministry of Energy and Mineral Development (Uganda)
MWE	Ministry of Water and Environment (Uganda)
MWI	Ministry of Water and Irrigation (Jordan)
NCERWASS	National Centre for Rural Water Supply and Sanitation (Viet Nam)
NDP	National Development Plan (Uganda)
NTP	National Target Program (Viet Nam)
NWSC	National Water and Sewerage Corporation (Uganda)
ODA	Official Development Assistance
OFOR	Rural Borehole Management Office or Office des Forages Ruraux (Senegal)
OECD	Organisation for Economic Co-operation and Development
PCERWASS	Provincial Centre for Rural Water Supply and Sanitation (Viet Nam)
PPCs	Provincial People's Committees (Viet Nam)
PPP	Public Private Partnership

RET	Renewable Energy Technology
JREEEF	Renewable Energy and Energy Efficiency Fund (Jordan)
SDE	Senegalaise des Eaux (Senegal)
SDGs	Sustainable Development Goals
SIASAR	Rural Water and The Sanitation Information System or <i>Sistema de Información de Agua y Saneamiento Rural</i> (Colombia and global)
WAJ	Water Authority of Jordan (Jordan)
WSDP	Water Services Development Plan (South Africa)
WRC	Water Research Commission (South Africa)
WRM	Water Resources Management
WSA	Water Services Authorities (South Africa)
WSC	Water Supply Companies (Jordan)

# 01

## Introduction

As part of Kenya Market Trust's (KMT) ongoing mission to catalyse the transformation of the Kenyan water sector, it commissioned an international study of countries that have successfully transformed parts or aspects of their water sectors.

Examples of good-practice and lessons from what has worked elsewhere will, it is hoped, provide useful insights as to how Kenya can continue to strengthen its water sector.

### **The Kenyan water sector**

Starting with the reforms in 2002, Kenya has laid the foundations for the transformation of the water service delivery sector, including for improved governance and coordination, particularly considering the relative development of the sector at that time. These include decisions which some countries only arrived at years or decades later and partly still struggle to implement.

One of the most critical decisions is to have one ministry at national level which consolidates the mandate for both water resources management and water services. Secondly, Kenya went down the pathway of professionalisation of utilities and not allowing urban water services to be provided by municipal departments. Lastly, Kenya has made significant strides with the establishment of the regulator, the Water Services Regulatory Board (WASREB), which has already made notable progress in the professionalisation of utilities, and the flow – and accessibility – of data, performance monitoring and more recently consolidation of service providers. The regulator is also spearheading efforts to expand good practices, for example through the roll out of the guidelines for provision of water services in rural and other marginalized, underserved communities in Kenya in 2019. In short, there is much to be positive about in terms of water service delivery in the country.

However, despite these positive reforms and policy positions, the sector still faces significant challenges in operationalising the coordination and decision-making frameworks that cut across different levels of government and the competing demands of different water users. Current average national water coverage stands at 62%, against the government's ambition to achieve universal access to water by 2030 (SDG 6). Progress has been made in reforming the urban water sub-sector, but further improvements are needed, and the rural sub-sector faces persistently high levels of non-functionality and technical problems emerging within only three to five years following construction (WASREB; 2019). To compound the challenge, Kenya is ranked by the UN as having one of the lowest water replenishment rates in the world; if the business-as-usual approach prevails,

Kenyans are projected to face a 30% gap between demand and practically available water supply by 2030 (WASREB; 2020). In short, a resilient water sector is needed to address challenges of growing population, climate impacts, demand pressure from industry and consumers and under-managed water resources.

## Focus of the study

The purpose of the benchmarking study is to provide a rich source of information for Kenyan water stakeholders to draw upon while developing strategies for strengthening Kenya’s water sector. The study will also inform KMT’s work and how we might bring new ideas and practical recommendations to our partnerships and interventions.

Following consultation with key sector stakeholders in Kenya, it was agreed to focus on the two main sub-sectors of water service delivery and water resources management (WRM), which is the subject of a parallel report. For each of these two main reports, three thematic areas of interest have been identified as being of most relevance for Kenya in this benchmarking exercise:

- Firstly, **governance** arrangements, both in terms of national intra-sectoral and intra-ministerial relations and the vertical integration between central and decentralised levels of government, particularly considering the strong devolution process in Kenya.
- Secondly, experiences with **investment planning** undertaken in other countries particularly where these have been systematic in nature and looked at long-term costs required to sustain services, as well as the commensurate measures to generate **financing**, both from public sources through repayable financing as well as attracting private investments.
- Lastly, examples where there have been successful **innovations** in the use of technologies and data production and – as importantly – the use of better data for improved decision making.

In consultation with Kenyan water stakeholders, 14 countries were selected for the benchmarking exercise, as outlined below:

*Table 1: Selected benchmarking countries*

Income Classification Groupings (World Bank, 2020)	Long-list case study countries
High income (> \$12,535)	Israel, Japan, The Netherlands, Republic of Korea and Switzerland
Upper middle income (\$4,046 - \$12,535)	Colombia, Malaysia and South Africa
Lower-middle income (\$1,036 - \$4,045)	Cambodia, Senegal, Vietnam and Zambia
Low-income (< \$1,036)	Rwanda and Uganda
Note: for comparison purposes, currently Kenya ranks as a lower-middle income country with GNI per capita of USD 1,750 (2019)	

1 Examples are largely drawn from the shortlist in Table 1; however, a number of additional cases are included such as the UK (England and Wales), Jordan and Ghana where the 14 countries did not provide a sufficiently strong example.



This report concerns the **water service delivery** sub-sector and presents positive examples from different countries for each of these three thematic areas, illustrating details of current arrangements and evidence of success that may provide insights for the Kenyan water sector<sup>1</sup>. Where relevant (and according to space limitations) this analysis also refers to key aspects of the transformation process over time for the topic in question, providing further context for Kenyan stakeholders.

The benchmarking study follows the conceptual framework for understanding and analysing a water sector developed for this study (see Annex 1). The findings with examples from countries for each of the three themes of governance and decentralisation, financing and investment planning, and data and innovation are presented in the following three chapters. The fifth and final chapter concludes with the most salient lessons for Kenya for strengthening its water service delivery sub-sector.



*A woman watering cabbage seedlings in Senegal*

*Source: Flickr Images, ©FAO/Olivier Asselin*



# Governance and Decentralisation

Along with technical capacity and financing, many of the most entrenched challenges in the water sector, at multiple levels, are related to governance and the political economy of decision-making. Governance influences many aspects of water service delivery from the equitable distribution of resources, sharing of data and information, accountability measures, financing and regulation. The OECD defines water governance as the “range of political, institutional and administrative rules, practices and processes (formal and informal) through which decisions are taken and implemented, stakeholders can articulate their interests and have their concerns considered, and decision makers are held accountable for water management” (OECD, 2015). More specifically, governance (and good governance) of water utilities means the removal of political influence over operators, managerial autonomy, the establishment of an independent board free from political bias, as well as ring-fenced revenues for reinvestment in the improvement of the utility and its internal systems (Soppe et al; 2018). Good governance matters at all levels, from utilities in the effective and efficient performance of service delivery, to policy and decision-making at the highest levels of government.

Most countries globally are now decentralised to a greater or lesser extent, therefore governance challenges in water policy and implementation are both multi-level and multi-stakeholder, including not only public entities, but the private sector and civil society groups amongst others. Decentralization in the most general sense is defined as the transfer of authority and responsibility for public functions from the central government to subordinate or quasi-independent government organizations and/or the private sector. It is a complex, multifaceted concept and different forms of decentralization should be distinguished because they have different characteristics, policy implications, and conditions for success, as well as being shaped by the particular context in which they are occurring. The World Bank identifies specific types of decentralization including political, administrative, fiscal, and market decentralization<sup>2</sup>. The power and authority that is devolved to lower levels of government may overcome some of the governance challenges, not least through application of the subsidiarity principle, but can throw up new challenges in the tension between centre and lower tiers over mandate, control of resources and share of liability and risk.

In common with many other countries, Kenya is facing challenges to its governance frameworks in water service delivery and finding the right balance of roles and mandates between central and devolved County governments. Against this backdrop, there is a trend toward consolidation of urban operators within County boundaries, but with continued fragmentation of rural water service provision. While the Constitution of 2010 devolved the responsibility for service provision and development of water works to the County governments, central government retains a role in the same; for example, for national water works through the existence of the Water Works Development

2 For further information see: <https://www.worldbank.org/en/topic/communitydrivendevelopment/brief/Decentralization>

Agencies, thereby raising the potential of conflict over coordination and implementation of policies and development objectives. Governance challenges are exacerbated by the fact that the sector still remains reliant on external financing, which is channelled via central government in part through repayable lending. For example, for the period 2016 to 2018 on average the central government provided just 39% of financing directly, with the remainder made up of external funding, but with a much higher proportion of repayable loans than grant funding (80%-20% ratio in FY 2015/16) (KIPPRA; 2019).

This chapter on governance and decentralisation contains 5 examples of global good-practice as summarised below.

Sub-theme	Country	Summary of case study
2.1 Coordination and collaboration between levels of government	Israel	An independent inter-ministerial body, the Water Authority Council, comprising senior officials from relevant government ministries (Finance, Agriculture, Interior, Environment, Water, Energy) is responsible for approving all policy-setting and decision-making in the water sector (and is self-funded from a share of water tariffs)
	Vietnam	Vertical coordination through the National and Provincial Centres for Rural Water Supply and Sanitation
2.2 Professionalizing rural water service provision	Rwanda	Decentralised PPP arrangements, clustering service provision areas and limiting number of private operators to less than two per district – to achieve consolidation and economies of scale
	Senegal	A national asset holding agency implementing regional concessions through PPPs and by clustering rural populations into zones based on technical, economic, geographic and socio-cultural criteria
2.3 Accountability mechanisms	Uganda	Civil Society Budget Advocacy Group (CSBAG) – a network of over 100 Ugandan civil society organisations (CSOs) – established in 2004 to influence government decision-making and resource mobilisation





## 2.1 Coordination and collaboration between levels of government

Coordination is the process of enabling actors to work in a harmonised and efficient manner. It entails a diverse set of actors working collaboratively and adhering to a common set of principles and practices to conduct their activities in an efficient and mutually reinforcing manner.

While substantial progress has been made globally – and in Kenya – in establishing institutional arrangements and policy frameworks, persistent challenges remain in ensuring effective coordination and moving beyond simply information sharing.

Indeed, overlapping mandates, institutional rivalries and scarce resources frequently result in competition between actors, the failure to capitalise on synergies and maximise the benefits of collaborative action, with the resultant divergence of approaches. This can ultimately result in the inefficient use of resources and incoherent decision-making processes.

Challenges are common regarding two aspects of coordination:

- Horizontal coordination. Intra-ministerial and agency coordination between ministries and agencies with related responsibilities.
- Vertical coordination. The flow of information, resources and support vertically between the national and sub-national levels of government.

Many countries have overcome common horizontal coordination challenges by creating inter-ministerial bodies and agencies on water responsible for convening institutions in the water supply and related sectors and acting as a decision-making or advisory entity (OECD, 2017). Conversely, examples of effective vertical coordination are scarcer, with substantive progress in this area proving difficult to achieve, especially in low- and lower-middle-income countries.





## Background

The Israeli Water Authority is the pre-eminent actor in Israel's water supply sector. It is an autonomous government agency with responsibilities spanning the management, operation and conservation of natural water resources and the regulation of the water sector. The Israeli Water Authority's creation has been linked to several stages of improvement in the evolution of the country's water supply sector (World Bank, 2017). A range of other national ministries also hold important responsibilities pertaining to the delivery of water supply services that impact the Israeli Water Authority; these include: Ministry of Environmental Protection, Ministry of Health, Ministry of Finance, Ministry of Interior Affairs, Ministry of Agriculture, and Ministry of National Infrastructure, Energy and Water Resources (World Bank, 2017).

## Institutional arrangements

In part as a response to this institutional fragmentation, the Water Authority Council was established in 2007 as an independent inter-ministerial body to serve the Israeli Water Authority board of directors. It comprises senior officials from relevant government ministries (Finance, Agriculture, Interior, Environment, Water, Energy) and two representatives of the public. The Water Authority Council is responsible for approving all policy-setting and decision-making by the Israeli Water Authority and the water sector more broadly. Accordingly, it acts as a focal point for channelling decision-making by the ministries of Health, Finance, Environmental Protection, Infrastructure and Interior Affairs and ensuring a smoother and more harmonious decision-making process (OECD, 2017). Indeed, a core driver behind the creation of the Water Authority Council was alleviating the frequent deadlocks that resulted from the diverging interests of each ministry, the involvement of many organisations in the water supply sector and the unclear division of responsibilities (OECD, 2017; World Bank, 2017). Any plan or policy proposed by the Israeli Water Authority – or any other Ministry – must be presented to the Water Authority Council for approval before it can move forward through the legislative process.

The Water Authority Council benefits from a strong legislative mandate to perform its policy-setting and decision-making role. As a governmental entity with representatives from different ministries the Water Authority Council is self-funded from a share of the water tariffs paid by consumers in their regularized billing. Subsidies for government entities were removed around ten years ago in Israel.

However, regardless of this enabling legislative aspect, the Water Authority Council's ability to effectively bring together and represent actors from related sectors is contingent upon ensuring the equal representation of all interested groups and simultaneously acting as an effective and timely decision-making body (OECD, 2017).

Indeed, intentionally or unintentionally, coordination always entails some form of redistribution of power amongst actors, and coordination platforms must create incentives for all actors brought together by the coordination body if they are to truly foster enhanced cooperation (Lieberherr & Ingold, 2019). Ultimately, the channelling of decision-making through the Water Authority Council is reported to have unified decision-making responsibility for water service delivery (among other aspects of the water supply sector) and significantly improved the efficiency and timing of decision-making. In turn, this more cohesive approach to decision-making helps to ensure effective policy implementation.

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3 Prevention of water resource contamination and effluent discharge monitoring

4 Drinking water quality and reuse standards; regulates permits for agriculture reuse

5 Responsible for budgeting

6 Responsibilities pertaining to local government

7 Sets the criteria for the Israeli Water Authority to allocate water use between crops and ecological regions

8 Supply of energy and management of natural resources of the State of Israel





## Background

Vietnam has made considerable progress in expanding access to rural water supply services<sup>9</sup>, which has largely been achieved through a series of National Target Programmes. The coordination and support mechanisms from the national to the provincial levels that supported the implementation of these programmes – and now ongoing service delivery – have been critical to their success and illustrate how vertical coordination challenges can be overcome.

The National Centre for Rural Water Supply and Sanitation (NCERWASS) is an apex body located within the Ministry of Agriculture and Rural Development (MARD) with responsibility for setting the strategy for the sub-sector, steering its implementation and providing technical support to the lower administrative levels. Vietnam comprises 63 Provinces, and provincial administrations termed Provincial People's Committees (PPCs) which have devolved responsibility for delivering water supply services. The PPCs sit above District People's Committees and Commune People's Committees. PPCs are generally supported by provincial representatives of MARD, termed the Department of Agriculture and Rural Development (DARD), which a Provincial Centre for Rural Water Supply and Sanitation (PCERWASS) usually sits within. Within this institutional arrangement, several factors have enabled strong and effective vertical coordination between the national and provincial levels, especially between NCERWASS and the PCERWASS.

## Connection between National and Provincial entities

The close connection between comparable entities at the national and provincial levels enables effective vertical coordination in Vietnam's rural water supply sector. NCERWASS occasionally provides direct technical assistance to PPCs; however, this is generally done by permanent entities at the provincial level. These are the deconcentrated provincial arms of NCERWASS for rural water supply, the PCERWASS, which are the provincial technical units for water (and sanitation). While closely connected to NCERWASS (for example, NCERWASS assigns the staff required for each province), the PCERWASS' operations and staff fall within the PPCs' authority and budget. Because of their permanent position at the provincial level, these provide a comprehensive set of technical support functions to PPCs while simultaneously retaining a close connection with NCERWASS. More specifically, the PCERWASS' role covers key functions such as preparing plans (including capital investments) for rural water supply and designing rural water supply schemes. The PCERWASS also lead data collection and monitoring and report to NCERWASS, which results in the effective centralisation of data.

## Coordination mechanisms

Vertical coordination between NCERWASS and the PCERWASS benefits from the proper application of several coordination mechanisms that are common – at least on paper – to most water supply sectors. This includes regular visits from NCERWASS to the provincial level as well as frequent workshops, which help to ensure the adoption of harmonised approaches, information sharing and a culture of lesson learning. Indeed, facilitating agreement on the nature of challenges and problems and how they should be addressed, helps to overcome one of the most common causes of poor coordination, namely divergent understanding and ideas across different actors about good policy and how to address problems (Peters, 2018).

Vertical coordination also benefits from a variety of well-established processes that foster collaboration between entities and institutional levels. These include engaging national, provincial, district and

<sup>9</sup> The percentage of the rural population accessing at least a 'basic' service increasing considerably from 76% in 2000 to 93% in 2017 (JMP, 2021)

commune level stakeholders in PPCs' planning processes as well as collaborative efforts between separate agencies at the provincial levels in collecting and collating monitoring data and reporting this to the national level. Beyond these coordination mechanisms, effective vertical coordination between NCERWASS and the PCERWASS is also enabled through the existence of a cadre of high-quality and comparatively skilled staff within the PCERWASS, with further capacity building of staff undertaken as required.

It is important to acknowledge, however, that these mechanisms for vertical coordination emerged in response to the much-touted National Target Programmes, which predominantly focused on infrastructure provision. Consequently, they are not geared towards ongoing service delivery. For example, reporting requirements and templates do not sufficiently focus on aspects relating to ongoing service delivery. Of note, the rural water supply sector lacks a Management Information System and there is insufficient monitoring of PPCs' annual provincial plans to ensure the adequacy of these plans in relation to the national policy.

## Hierarchy

Effective vertical coordination in Vietnam's rural water supply sector is also closely connected to Vietnam's comparatively hierarchical nature in terms of both political cadres and administrative lines of authority. Simply put, national entities retain a relatively high degree of autonomy over provinces. Nonetheless, Vietnam's PPCs benefit from substantive fiscal decentralisation, accounting for 55% of overall government spending, which is very high by international standards. However, they are required to propose annual provincial plans that are first submitted to MARD and subsequently to the Ministries of Planning and Investment and Finance prior to funds being disbursed. This dependency creates a clear need for provincial actors to meaningfully engage with their counterparts at the national level, to acquiesce to their demands and buy-in to coordination channels. More broadly, avoiding parallel sovereignty over a policy issue or sector is critical to enabling effective vertical coordination.



*A group of children happily playing with water. | Source: Google Images*



## 2.2 Professionalizing rural water service provision

Despite major advances in coverage and large-scale capital investments by governments, donors and NGOs over many years, outcomes largely remain poor in terms of the continuity and quality of water services experienced by rural populations globally. Meta-data analysis looking across 38 countries in Sub-Saharan Africa estimates that approximately one quarter of all water points are non-functional (Foster et al; 2015). This situation is mirrored in Kenya where the rural sub-sector faces similar challenges of high levels of non-functionality and widespread technical problems emerging within only three to five years following construction (WASREB; 2019).

Conventional approaches to operation and management of rural water supply have typically focused on voluntary community-based management (CBM) arrangements with limited, if any, support for operation and maintenance from external agencies or local government. This CBM model has struggled to ensure that rural water supply infrastructure is adequately operated or maintained (Chowns; 2015), with “fix on failure” becoming the default approach in many cases. The dual challenge for Kenya, as in many other countries, is therefore one of continuing to close the first-time access gap and at the same time improving rural water service management.

The trend toward greater professionalisation in O&M is growing across many rural sectors around the world and includes greater (technical and commercial) competency on the part of operators, better structured and more transparent contracting arrangements, long-term business capacity support and increasingly clustering or aggregation of schemes to increase economies of scale. Outsourcing and professionalisation of maintenance services is also a growing phenomenon, including in Kenya itself (Lockwood; 2019).



*A man fetches water from a stream in western Kenya. | Source: KMT/Alex Kandie*



**RWANDA**

## Decentralised PPP arrangements

### Background

The Government of Rwanda (GoR) has committed to achieve the SDGs and has national targets to reach 100% access to improved water by 2035. Early progress towards these goals have been hampered in rural areas by the fragmentation across some 20,000 improved water points and 1,000 piped schemes managed by community providers, the majority of which are unable to adequately operate and maintain the infrastructure resulting in persistently high levels of non-functionality. The GoR was an early adopter of attempts to professionalize the rural water sub-sector and in 2004 introduced a delegated management model to address the inefficiency of community-based management. Under these arrangements, district governments play a critical role and already have high levels of decentralised authority, including legal and financing autonomy. The institutional framework has evolved and adapted to cope with the challenges facing the sector and was further underpinned by legislation passed in 2016 defining the architecture for Public Private Partnerships (PPPs) and share of risk allocation in the Rwanda context. Data based on Demographic and Health surveys indicate a progression from 54% of the rural population having access to improved supplies in 2005 to 69% by 2015 (JMP; 2019).

### Institutional roles and responsibilities

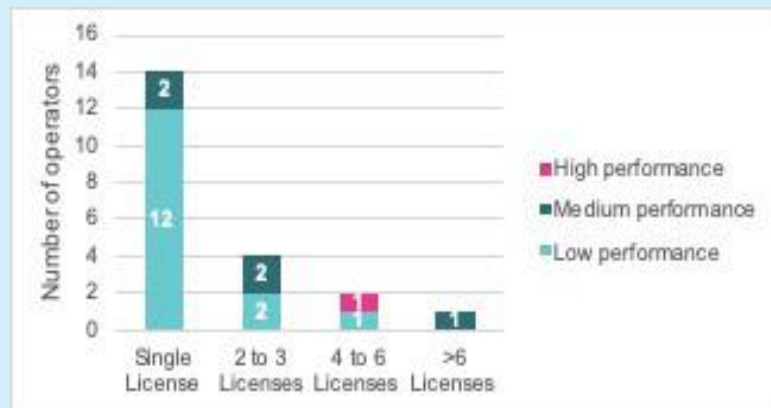
Districts can contract private operators with existing licenses let by the Rwanda Utilities Regulatory Authority (RURA) after competitive bidding for the O&M of piped water schemes, which are segregated into 'clusters', grouping all services in a given geographic area. Currently, there are 45 clusters across 27 districts. District government retains ownership of the assets, and the private service provider takes on operation, maintenance and administration functions. The delegated contracts are based on the "affermage" legal model, with the operator responsible for O&M and remuneration depending on revenue from sales of water, thereby transferring risk to the operator. The district also receives a fee, or royalty, for each cubic metre of water sold under delegated contracts, currently set by the regulator at 10% of revenue (MININFRA; 2018). There are two main variants for delegation; under the first option the operator assumes all functions to run and manage the water scheme and under the second option they work to strengthen existing CBM entities. In both cases higher level technical support is provided by the national level parastatal, Water and Sanitation Corporation. Each District has a District Water Board in charge of the tasks decentralised to the local level. District Water Boards are also the contact point for water user committees and act as the consumers' voice, as well as the contact point for reports and complaints.

### Scale and scope of PPP arrangements

A stock take of rural water operators was carried out and reported on in early 2020 based on data from RURA and triangulation carried out by researchers, finding a total of 66 registered and licensed operators. Of these, two cover urban areas and bulk water supply respectively with the remainder licensed by the regulator to operate in rural areas. Out of the remaining 40 licensed operators, 19 no longer operate and 21 currently work across all four provinces and the rural parts of Kigali province (Water For People; 2020). In terms of performance, the assessment grouped the operators into three performance brackets, from high performing operators with more sophisticated operating procedures, including customer monitoring software, to low performers which either work at much more limited scale or are inexperienced businesses with poor financial management. Figure 1 below shows the profile of operators by range of numbers of licenses held and performance category; note that it does not include the 19 non-functional licensees.



*Figure 1: Distribution of licensees under PPP arrangements in Rwanda*



The above data highlights a predictable trend in that where companies expand to hold more licenses and cover more service areas they tend towards the better performing end of the spectrum in terms of professionalised capacity for technical and financial management. Several operators stand out including the Ayateke Star Company created in 2008 as a cooperative with 200 staff with multiple licences, holding nine licences across eight districts serving about one million people. Aquavirunga is another of the larger water service providers, receiving technical and financial support from PWN/Aquanet from the Netherlands. This data aligns with the GoR strategy of clustering service provision areas and progressively restricting the number of licences being issued by the regulator per district, and where possible combining more than one district under one private operator to encourage larger and more competent companies to enter the market.

### Impact and current challenges

The government’s National Water Supply Strategy aims to increase the percentage of rural water supply systems managed by private operators from 50% in 2015/2016 to 90% in 2019/2020 at an incremental pace of 10% per year. As of 2021, all districts in the country have a delegated PPP framework in place and there are now no more than two private operators allowed in each district, thereby moving towards a planned process of consolidation. A study carried out in 2017 of eight districts, including five with a total of 15 PPP contracts and three without PPPs, found the average population served under one PPP contract is 43,000, but varies from a minimum of 5,000 to a maximum of 267,000 people. The average annual turnover amounted to FRW 30 million or USD 40,000 (Aquanet/AqauRwanda; 2017).

This approach faces challenges, including the poor technical state of some schemes at the point of handover to private operators, capacity constraints of smaller operators, as well as the districts in playing their full roles and the short duration of licenses (all being five years for rural areas), which makes this arrangement less attractive for private operators to make investments that cannot be recovered. However, the recent GoR move to greater clustering of contracts, experiences with joint ventures between local and foreign companies, and the revitalization of the leadership and financing of the “Forum of Private Operators for Water and Sanitation in Rural Areas” (FEPEAR or *Forum des Exploitants Prives pour l’Eau et l’Assainissement en milieu Rural*) are encouraging signs.



## SENEGAL

### Asset holding company and regional concessions

#### Background

Senegal was one of the few countries in Sub-Saharan Africa to meet the Millennium Development Goals (MDG), reducing by half the proportion of people without access to safe drinking water by 2015 (WHO/UNICEF,2015). The Government of Senegal (GoS) achieved this by engaging the public and private sectors to invest and report on investments effectively, with a focus on larger population centres. This intervention framework has proven to be effective, and the GoS continues to leverage private sector engagement to achieve the SDGs for universal access to clean water by 2030.

Senegal's political decentralization<sup>10</sup> differs from many others in the region, offering the opportunity to develop and cluster water supply schemes across political boundaries to attract larger, more professional operators and to gain much greater economies of scale. Since 1999, Senegal's rural water services gradually moved from community-managed boreholes and small-scale schemes to delegated managed services. In the subsequent years, the Government examined a new approach to professionalizing the management of rural water services. It involved replacing Community-Based Management committees (CBMs) with users' associations, known as ASUFORs (Motorized Rural Borehole Users' Associations).

In 2014, the GoS established the Rural Borehole Management Office, or OFOR (Office des Forages Ruraux), a national asset holding agency responsible for managing, monitoring, and delegating rural water supply assets. The OFOR replaced the ASUFORs and led to the introduction of PPPs in the form of lease (affermage) contracts clustering rural populations into zones based on technical, economic, geographic and socio-cultural criteria. OFOR has signed a number of Service Delegations (DSPs) to date, including the very first in 2015, with various private companies in rural areas. The government's strategy for supplying drinking water in rural areas focuses mainly on groundwater usage (97%) and significant investments have been made, with nearly 2,000 schemes now in place across the country. The schemes are composed of boreholes with mechanical pumps and piped distribution networks. Each scheme serves on average 2,500 persons.

#### Scale and scope of PPP arrangements

The PPP arrangements are designed to take advantage of economies of scale by featuring a clustering of schemes over a sufficiently large customer base (Table 2). The private operator's revenue is derived from the sale of water at a tariff determined by the affermage contract, with a portion of it returned to the contracting authority as a licence fee.

The privatization of water management started in 1996 for urban areas, and in 2014 for rural areas. In rural areas, the private sector is involved through affermage contracts with OFOR in eight delegation zones (Figure 2), and currently, four out of eight planned Public Service Delegations areas have started their operation. The most recent contract, signed in July 2019, was with Senegalaise des Eaux (SDE), a private operator operating in urban and peri-urban areas for over 23 years. The SDE will be operating in two zones Louga, and Saint-Louis/ Matam. This represents the most significant share of the public service delegations with 544 schemes spread over 93 municipalities and more than 2,000 densely populated rural villages. The other three contracts have not been established for various administrative and procurement reasons, such as awaiting the signature and approval of the Ministry of Finance or tenders being recently relaunched.

<sup>10</sup> In Senegal, the decentralization process was progressive. In 1972 Senegal established rural communes that had limited responsibilities. In 1996, it introduced the second decentralization Act and created regional entities like local governments. The 2013 Law on Decentralization is articulated around three main elements: (i) all rural communities are transformed into communes, (ii) the department becomes a local government and at the same time, remains an administrative division of the central Government, and (iii) the region loses its status of local Government, and regional clusters are created. Water and sanitation assets remain the responsibility of the Government.

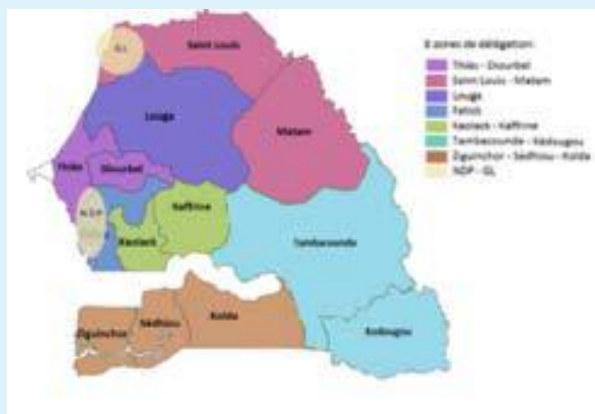


Figure 2: Map showing the divisions of the delegation zones in Senegal (Source: regional workshop OFOR, 2021)

Table 2: Table detailing the zones covered by private operators

Private operator	Zone(s) covered	Population served	Production capacity	Number of schemes
SEOH	NDP/GL	500,000	54 Mm3/year	-130
Aquatech Senegal	Thies /Diourbel	1,600,000	14 Mm3/year	265
FlexEau	Kaolack /Kaffrine	1,250,000	14.5 Mm3/year	294
SONES	Tambacounda/ Kedougou	Appr. 4,000,000	49.8 Mm3/year	-1,000
SDE	Louga & Saint louis/ Matam	Not yet operational		

### Impact and current challenges

Senegal’s sector reforms have improved governance and financial resource allocation, and the private sector involvement expanded and improved the quality and sustainability of service delivery. Development has been progressively improving in rural water supply, with access to basic water service covering more than 81.5% of the population in 2020. This progress can be explained by the synergies between public and private actors under affermage contracts, which share the risks. The public sector deals with infrastructure construction risks and facilitates an enabling environment, while the private sector manages commercial and operational risks. Having such robust frameworks in place has triggered the release of significant funding by international financial institutions and other donors such as the World Bank and African Development Bank. However, this financing is conditional on partial privatization of the water service delivery sector; funding was granted without interest but will have to be repaid by the state.

More than 374 new water reservoirs, 17 treatment units, 608 boreholes, 4,068 water points, and 13,860 water networks have been built since OFOR’s inception, with a total investment of more than USD 110 million. The first DSP, signed with the private operator SEOH in 2015, is already having an impact with much improved performance metrics: overall water supply yield has increased significantly and has reached 64% production, 90% of the population has access to drinking water, 88% recovery rate of investment from revenues and a water tariff reduction of just over 29% or by 100 CFA/m<sup>3</sup>.

Nevertheless, several challenges remain in accelerating increases to basic access and improving the quality of service in all areas. These include aging infrastructure, limited capacity to meet growing demand, difficulty setting and applying realistic tariffs to cover costs, and evident regional and income disparities in access to drinking water, with low-income areas facing the most significant gaps in access.

## 2.3 Accountability mechanisms

Accountability in the sector refers to ensuring elected officials and other actors, or the duty-bearers, involved in water supply are held responsible for their actions and answer those they serve, or the rights-holders (UNICEF, 2016). It reduces opportunities for – and raises the costs of – corruption and other integrity failures while also improving decision-making and budgeting processes and aiding implementation (WIN, 2016). In more strategic terms, meaningful and lasting development outcomes can only be achieved if decisions on the part of duty bearers shift from a culture of investment to justify expenditure, to investing for greater development outcomes and achieving long-term impact.

There are many ways to strengthen accountability (Accountability for Water, 2021), which can be grouped into horizontal and vertical forms (TAI, 2017; UNICEF, 2016). Vertical accountability exists where non-state actors hold national and sub-national governmental actors accountable – it is crucial to supplementing regulatory frameworks and other government-led mechanisms to promote good governance. At the same time, strengthening forms of accountability is one piece of the puzzle of increasing integrity and reducing corruption. Meaningfully addressing issues in this area also requires a comprehensive set of ongoing measures to improve transparency and participation and ensure anti-corruption rules are enforced (WIN, 2016). Civil society networks can play a vital role in strengthening vertical accountability, while also increasing transparency and participation.



### UGANDA

#### The Civil Society Budget Advocacy Group

##### Background

The Civil Society Budget Advocacy Group (CSBAG) is a network of over 100 Ugandan civil society organisations (CSOs). It was established in 2004 out of a desire to influence government decision-making and resource mobilisation on the part of international and local CSOs promoting equitable and sustainable development. CSBAG members and partners include pre-eminent WASH-sector organisations, as well as other members working across ten thematic working groups: Health; Education; Agriculture; Energy; Justice, Law and Order; Accountability; Roads; Trade and Tourism; Water and Environment; and Social Development.

CSBAG utilises an outreach structure running from the grassroots to the national level, enabling the targeting of decision-makers and resource mobilisation bodies at the national, regional and district levels at an impressive scale<sup>11</sup>. It coordinates a diverse membership through a range of separate networks for each sector CSBAG engages in, providing members with key resources, advocacy materials and an advocacy roadmap to guide their activities. CSBAG also has periodic (i.e. quarterly) engagements with member CSOs to ensure they are on the right track and to provide training on advocacy activities as required. CSBAG receives an overwhelming majority of funding through donor programmes.

A variety of techniques are employed by CSBAG and its members to improve government decision-making and resource mobilisation. However, CSBAG does not only represent an interesting example of the sort of activities required to strengthen vertical accountability and increase participation and transparency; it is also a good example of how CSOs can be organised to achieve improvements in these areas. Notably, by operating across multiple thematic areas as opposed to only water supply, CSBAG provides a collective – and ultimately more influential – voice for CSOs and citizens on cross-cutting issues such as public financial management and the transparency of budget making

<sup>11</sup> In 2017, for example, CSBAG members conducted budget advocacy activities in 61 of Uganda's 111 districts



processes that impact most sectors. This is critical in achieving the required standing with Ministries to meaningfully engage with and inform sector debates.

### Activities and Achievements

CSBAG and its members conduct a series of activities to improve and increase accountability over decision-making and resource mobilisation processes. These include the following three main sets of activities.

#### *i. Improving Transparency and Accountability in Public Financial Management*

CSBAG members have effectively advocated for District administrations to implement mechanisms to increase accountability over resource allocations and their utilisation (see Table 3 below). Before these measures, Districts typically only employed mechanisms such as internal audits and quarterly District Public Accounts Committees. Beyond increasing accountability around this key issue, these activities have increased the timely release of funds (CSBAG, 2020). Members monitor procurement processes at the sub-national, checking whether key provisions in procurement guidelines and Bills of Quantities are adhered with.

*Table 3: District-Level Measures to Promote Accountability*

District	Accountability Measure
Agago	<ul style="list-style-type: none"> <li>Feedback mechanism to ensure the proper flow of information from the district to the sub-county, parish and village levels.</li> </ul>
Apac	<ul style="list-style-type: none"> <li>Website providing up-to-date information on the district’s budget and resource mobilisation.</li> <li>Weekly programmes on local FM radios to inform citizens on budget releases and expenditures.</li> </ul>
Kagadi	<ul style="list-style-type: none"> <li>Monthly meetings with sub-county chiefs to review the performance of the budget.</li> </ul>

CSBAG members also work directly to ensure national and sub-national Government entities adhere to public finance management laws. Members conduct quarterly budget performance monitoring exercises geared towards increasing government adherence to transparency and accountability principles at the district-level. This entails actively participating in – and seeking to influence – policy level meetings, local government strategic financing meetings and budget consultative workshops. At the national level, activities have centred on supporting the Ministry of Finance, Planning and Economic Development to strengthen public financial management. Achievements have included the Ministry introducing additional training for Accounting Officers, as well as shifting all local governments to Integrated Financial Management Systems to improve the quarterly budgetary release process.

#### *ii. Enhancing Citizen Participation*

Citizen participation in budgeting processes – at the national and sub-national levels – is critical to ensuring services are provided in the right quantities, quality and in a timely manner. This enables citizens to hold decision-makers accountable meaning corruption becomes harder to sustain, and service delivery improves when citizens are more engaged in planning and budgeting processes. CSBAG uses Participatory Budget Clubs that form District Budget Coalitions to empower citizens at the sub-national level. These coalitions are trained in budget analysis, monitoring and service delivery tracking to generate evidence on the status of service delivery, which is subsequently used

12 By way of comparison, Kenya scored 50 out of 100, which is classified as limited information available

to influence local and national spending priorities and practices. This increases accountability as citizens are aware of what resources are meant for and can monitor their utilisation over time.

Uganda has a moderate Open Budget Index score (58 out of 100)<sup>12</sup>, which is higher than the global average (45) and most of its neighbours (Open Budget Survey, 2019). However, its budget documents remain largely inaccessible – especially at the sub-national level – and written in an exclusive language ordinary citizens struggle to comprehend. To address this situation, CSBAG produces simplified and analysed budget information, which helps citizens to shape key government decisions on the budget and public finance management.

### iii. Constructive Dialogue with Government

CSBAG and its member CSOs deliberately adopt a constructive and collaborative approach with Government at different levels, rather than being confrontational. CSBAG serves on 11 government public finance management bodies and benefits from a formalised relationship with the Ministry of Finance, Planning and Economic Development as a representative of Ugandan CSOs on budgetary and public financial management matters. These positions enable CSBAG to support the implementation of a series of policy reforms in public financial management, using data from the sub-national level and its networks of CSOs to help the Ministry address challenges such as ghost salary payments and challenges implementing strategic objectives (CSBAG, 2020). Additionally, CSBAG has worked with like-minded MPs to establish a Parliamentary Forum on Public Finance Management to have Uganda’s Parliament at the forefront of supporting prudent public management reforms.

This more collaborative relationship with Government also helps CSBAG when mobilising its member CSOs every financial year to shape national budgets. Table 4 details how CSBAG successfully redirected the Government’s position, with 152 of the 328 CSO alternative budget proposals made from FY 2014/15 – FY 2017/18 being adopted by the Parliamentary Committees.

*Table 4: CSBAG – Alternative Budget Proposals*

Financial Years	Adopted Budget Proposals	Submitted CSBAG Proposal	% adopted
FY 2014/15	35	77	45
FY 2015/16	35	80	39
FY 2016/17	35	90	44
FY2017/18	47	81	52

Specific achievements have also been made regarding the budget for Uganda’s Water and Environment Sector. Of note, the following modifications were made to the FY 2018/19 budget:

1. UGX 10 billion (USD 2.8 million) reallocated to financing the funding gap to extend piped water in urban areas.
2. UGX 20 billion (USD 5.6 million) reallocated to address water shortages in rural areas.
3. UGX 100.9 billion (USD 28.2 million) on access to safe water in rural areas.

# Finance and Investment Planning

Adequate sector financing is critical to sustainable water services. Financing is essential to cover investments, operation and maintenance costs, as well as support costs (i.e. building and sustaining institutional capacity, policy development, regulation and monitoring) and other key sector activities. In many countries, however, the water sector suffers from chronic underfunding. In addition, considering the limited funds often available to the sector, funds must be used in the most efficient manner, providing the most “bang for the buck” for investments that are carried out. To ensure maximum efficiency, sector financing should be based on clear national investment plans with identified priorities, including building institutional capacity and reaching poorer consumers. For countries with a decentralised governance system, this requires a functioning and participatory planning framework involving all levels of government.

This chapter on financing and investment planning contains 10 examples of global good-practice as summarised below.

Sub-theme	Country	Summary of case study
3.1 National sector investment and financial planning	South Africa	Five-year water sector development plans formed by the Water Services Authorities (municipalities) – these form the basis for formulating a national investment plan and funding strategy
	Vietnam	National programme aiming to close the access gap by developing rural infrastructure – funded by central and provincial governments, with concessional credit from World Bank and other donors
3.2 Subsidy policies and operationalizing subsidies in practice	Chile	Means-tested water (consumption) subsidy programme funded by central government via municipalities who determine the list of beneficiaries and level of subsidy (based on beneficiary needs)
	Ghana	An unconditional cash transfer arrangement targeting households living in extreme poverty (establishes applicants’ eligibility using socioeconomic proxies)
	Togo	Mobile phone usage data used to identify beneficiaries for emergency cash transfers
3.3. Incentives to encourage private sector financing	Indonesia	The central government facilitated the preparation, tender and implementation of five PPPs for bulk water (since 2005) – with de-risking provided by Indonesia Infrastructure Guarantee Fund
	Philippines	The government and multiple development agencies have designed a Water Revolving Fund that enabled local commercial finance institutions to provide loans to water service providers
	Bahrain	Performance-based contracts where part of the payment was linked to NRW reduction targets
3.4 Legacy debt and asset and liability transfer	Zambia	Central government absorbed the liabilities for the smaller and less viable utilities during the decentralisation process
	England and Wales	When the UK government privatised 10 national utilities in 1989 it transferred assets to the newly formed companies and also wrote off significant levels of the debt

## 3.1 National sector investment and financial planning

Planning and budgeting are critical sector policy implementation tools. In the context of limited public funds, the water sector naturally competes with other sectors for national and local budget allocations. A well-designed investment plan can help prioritise investment needs and help mobilise funding in a coordinated manner as part of a financing strategy. The importance of such an investment plan and financing strategy is recognised in Kenya's Water Act, which stipulates (Government of Kenya, 2016): *"The Cabinet Secretary shall in consultation with county governments, provide a national water sector investment and financing plan aggregated from the county government plans which shall include, among other details, the time frames for the plans and an investment programme based on the investment plans."*

Several countries have introduced such national frameworks for investment planning and financing, with varying degrees of success. The main challenge is how to make the national framework work in practice, with the implementation of a bottom-up planning process based on priorities identified at local levels. South Africa and Vietnam provide examples of countries where national-level planning and budgeting is designed to be informed by local level plans.



### SOUTH AFRICA

#### Five-year water sector development plans

In South Africa, the Water Services Act of 1997 mandates Water Services Authorities (WSA – local government bodies) to prepare a five-year Water Services Development Plan (WSDP). According to legislation, WSDPs should be updated on an ongoing basis and submitted annually to the line national sector institution (Department for Water and Sanitation or DWS) for comment. These then feed into the mandatory integrated development planning of local authorities. Effectively, WSDPs are comprehensive business plans for WSAs that include annual performance targets in terms of access to services, infrastructure development and maintenance, water resources management and water demand management, among others (see Box 1). In principle, WSDPs form the basis for formulating a national investment plan and funding strategy.

The South African model has, however, witnessed some implementation challenges. Despite WSDPs being a legal requirement, at least half of the WSAs did not submit any plan. For those WSAs who did, some were either of poor quality or formulated by consultants with little buy-in from local governments themselves. Multiple factors account for this situation:

- i. The extent of the WSDPs requirement (data requirement, level of details in the planning).
- ii. Lack of appreciation of WSAs of the benefits of going through this thorough process.
- iii. Lack of or limited capacity (human and financial resources) to gather data and plan.

Consequently, WSDPs did not translate into local action plans with corresponding budgets. Although a national investment plan exists at the national level, it bears limited links with local level planning. National programmes for water and sanitation formulated by DWS are not fully based on long-term local planning or on a clear prioritisation of investment needs. South Africa is in the process of revising this national framework for investment planning to account for these lessons. An important factor contributing to lack of enforcement is the high autonomy of municipal governments and their water authorities, which implies that guidelines from the DWS are suggestions only, as DWS has little enforcement power.



## Box 1: Elements of a Water Sector Development Plan - South Africa

WSDPs are comprehensive documents that provide detailed information on water and sanitation services (and water resources) at baseline, together with expansion plans as well as O&M requirements. Key contents of a WSDP include:

- Baseline data:
  - » Demographics.
  - » Topography, climate change impact and other environmental factors.
  - » Socio-economic indicators, including urban development rates, poverty rates, growth prospects.
  - » Access to water services (access to connection and type of connection, e.g. private).
  - » Access to sanitation (including type of toilets).
  - » Water needs by settlements and households.
  - » Type of water needs (e.g. water resources, infrastructure, O&M needs).
  - » Type of sanitation needs (type of infrastructure needed).
- Water and sanitation assets and development plans (e.g. km of bulk pipelines) with annual costed maintenance requirement.
- Water assets management plan (with risk analysis). Water resources and water production capacity assessment.
- Conservation and water demand management practice, including water balance.
- Financials:
  - » Past and future capital expenditure.
  - » Tariffs and charges policy.
  - » Implementation of the national subsidy policy.
- Institutional arrangements.
- Customer services requirements.
- Forecasted budgets by water supply and sanitation projects.

*Source: WSD (2015): WSDP manual of practice Volume 3 "Using the Water Services Development Planning System"*



VIETNAM

## National programme for water aiming to close the access gap

In Vietnam, the government has made good progress developing rural water supply infrastructure via the formulation of a multi-year national programme, the National Target Program (NTP). As a national programme, the NTP was formulated in consultation with decentralised provinces. These Provinces are in charge of planning asset expansion; some also directly operate rural water infrastructure (under direct municipal management), although the trend has been in recent years to form provincial water companies in joint ventures with private investors.

During NTP formulation, consultations with provinces helped identify and prioritise investment. The NTP was an efficient vehicle for mobilising the significant funding required to accelerate access to water. It was co-funded by national and local governments, together with development partners. Launched in 2000, the programme was implemented through three funding rounds: NTP I (2000-2005), NTP II (2006-2010) and NTP III (2011-2016). NTP III targeted to reach 85% of the rural population with hygienic water, of which 45% would access clean water (as per the government's standards). The NTP III budget was initially estimated at VND 27,600 billion (USD 1.23 billion). But the programme surpassed expectations by mobilising additional funding from development partners, with close to 36% additional funding committed.

The bulk of financing for the NTP was mobilised through concessional credit (including from the World Bank and the Asian Development Bank), which accounted for 60% of overall funding. Provincial governments contributed 5% of the total funding and the central government 35%. The programme helped accelerate access to rural water supplies, increasing from 75% in 2000 to 92% in 2019.

In Vietnam, national and local planning was too focused on infrastructure development, resulting in high rates of poorly functioning water systems as of 2021. The NTP made very little provision for capacity building for managing water systems and investments under the programme. Capital allocated was not conditional on establishing local tariffs or funding mechanisms that would enable systems to function sustainably.

Like many countries, Vietnam has a comprehensive legal framework for tariff setting; however, the application of tariffs remains under the purview of local authorities, which are not always willing to make adjustments to reflect true operating costs.



## 3.2 Subsidy policies and operationalizing subsidies in practice

Subsidies are increasingly acknowledged as part of any country's funding strategy to achieve national objectives and international commitments (World Bank, 2019). A subsidy occurs when a user or customer pays less for a product or service than the service provider's cost, leaving a third party (e.g. government, other users, future generations) responsible for covering the difference. In the water sector, subsidies can be provided for capital investments ("access" subsidies) or to cover (some or all) operating costs ("consumption" subsidies). Such subsidies can be justified where they address clear affordability constraints that prevent potential users from using services. However, in many countries, subsidies are poorly targeted, meaning that those who need them the most are unlikely to benefit. This is because subsidies are often allocated to networked services, which lower-income households may not access.

Another risk of poorly designed subsidies is for water services to run financial deficits. In South Africa, for example, there is a blanket policy of "free basic water" applied to the first 6 m<sup>3</sup> of water consumed; however, many South African water service providers struggle to recover the costs of services through cross-subsidisation from higher income consumers (Calfucoy et al.; 2009). Similarly, in Kenya, most water utilities do not apply full cost-recovering tariffs, meaning that the full-cost of services remain (implicitly) subsidised, eventually to be repaid from public funds or by future generations that will bear the brunt of capital rehabilitation.

Subsidies, therefore, need to be better targeted but also transparent and explicit. Very few countries provide examples of well-targeted subsidies for water services. Approaches that are commonly used are:

- Geographical targeting, where populations of specific areas benefit from the subsidy; this approach is particularly used for "access" subsidies.
- Increased block tariffs, a structure widely present in Kenya, relevant for "consumption subsidies".

Both these approaches carry the risk of subsidies being misallocated, for example, inclusion risk (richer households benefiting from the policy) or exclusion risk (poorer households not benefiting).

Means-tested subsidies, where subsidies are allocated to identified households and groups based on established income level/socio-economic categories, are potentially also an effective way to allocate support to those who need it the most. The most common approaches for targeting means-tested subsidies rely on identifying specific socio-economic categories. This can be done in several ways, including:

- I. National or regional socio-economic surveys carried out by central government to inform the design of a whole range of social policies (other than access to water only).
- II. Proxy-indicators to identify beneficiaries on a number of "visible" indicators such as housing type, gender or age group.
- III. Mobile data – this approach is only emerging as an alternative to household surveys (see the example of Togo below).



## CHILE

### Means-tested water (consumption) subsidy programme

Chile introduced a bill to allow a subsidy system for water and sewerage in 1989. In Chile, all water services are provided by private operators, and there is a strict policy on full cost-recovery. As the subsidy was introduced, the central government committed to funding it via municipalities that are responsible for establishing the list of beneficiaries and communicating the list to the private water companies. Beneficiaries are identified based on the national *Caracterización Social* (CAS) programme that uses detailed surveys and home interviews to assign a priority score for each household applicant. Eligibility is re-assessed every two years, with beneficiaries selected based on the CAS results. The water subsidy targets water consumption, with the subsidy amount being deducted from the water bill received by targeted customers. Municipalities then transfer the funds to water companies. The subsidy system for water was not fully operational until the 1990s, in part due to municipalities' administrative limitations but also due to different tariffs levels existing in the country. In the mid-1990s, the subsidy system was adjusted to reflect different tariffs (and different regions). It can cover from 25% to a maximum of 85% of the water bill and is applied to 20m<sup>3</sup> of water consumed by the household (Joulayley, 2004).



## GHANA

### Proxy indicators in the Livelihood Empowerment Against Poverty (LEAP) programme

The LEAP programme in Ghana is an unconditional cash transfer arrangement targeting households living in extreme poverty. LEAP initially allowed communities themselves to identify households in need of support, then later transitioned to a model that establishes applicants' eligibility using socioeconomic proxies. Eligible households are included in cases where they have a single parent caring for an orphaned or vulnerable child, someone 65 or older with no means of financial support, or someone with an extreme disability who cannot work. Second-stage screening is based on means-testing using information collected through in-person interviews (similarly to Chile's CAS program). One recent evaluation of LEAP concluded that the transition from community-based targeting to proxy-based screening plus means-testing reduced errors of inclusion from 62% in 2010 to 36% in 2015. UNICEF programmes for water in Ghana use results from LEAP to identify beneficiaries of financial support for sanitation (Stanford, 2020).



## TOGO

### Mobile data usage analysis for cash transfers

In Togo, mobile phone data usage metrics have been used to partly inform prioritisation of financial assistance throughout the COVID-19 response (Mobile for Development, 2021). The government launched "Novissi", a social assistance programme to provide cash emergency transfers. These transfers were all provided via mobile money transfers, with data on mobile phone usage key to identifying beneficiaries. The government partnered with researchers from the University of Berkeley, USA, to design a targeting method at scale. The initiative also received financial support from the World Bank. Researchers carried out a mobile phone survey (targeting 10,000 mobile phone users) with questions on their daily consumption of mobile phone data. The information was also verified with mobile network operators. Researchers constructed patterns of mobile phone use for each subscriber, including information correlated with wealth such as international calls or mobile money balance. Algorithms were used to then generate a consumption pattern of 5.7 million mobile subscribers in the country; those who were estimated to consume less than USD 1.25/day were prioritised for Novissi.



### 3.3 Incentives to encourage private sector financing

In many developing countries, private sector investments in water services remain limited. Bottlenecks to greater private sector participation include low water tariffs, inadequate governance and legal frameworks, and the lack of “shovel ready” projects. Despite large investment needs, whether in water production, distribution and treatment, countries face a dearth of bankable projects based on sound feasibility studies. However, governments are also increasingly aware that public funds alone will not be sufficient to meet the sector’s financing needs, especially where large infrastructure is required to secure water availability (OECD, 2019).

Emerging approaches to facilitate private sector financing tend to shield their involvement from demand-side risks. Whilst PPPs for water distribution have tended to phase out in many countries, a new generation of PPP related to water production is emerging. In countries such as Rwanda, South Africa and Indonesia, government institutions, with support from development partners, are heavily involved in PPP project preparation. Whilst not strictly related to private sector finance, contracts are also being tendered for Non-Revenue Water (NRW) reduction and wider operational efficiencies. Examples of both these approaches are provided below.



#### INDONESIA

#### PPP for bulk water supplies

In Indonesia, the central government has facilitated the preparation, tender and implementation of five PPPs for bulk water since 2005. Operations include the “Umbulan water PPP project”, which aimed to serve 1.3 million people with 93 km of transmission pipeline at an estimated cost of USD 143 million.

The project was procured as a PPP in which the private sector’s role is to build and operate the water production system and main transmission lines, under a Build Operate Transfer (BOT) agreement with a 25-year concession period. Private sector revenues came from the provincial water supplier (PDAB) via payments from multiple municipalities that would benefit from the scheme.

To make the project more affordable for municipalities, the Ministry of Finance provided IDR 818 billion (USD 57 million) through a viability gap funding scheme to ensure communities can access water at affordable tariffs. Besides the Ministry of Finance’s fiscal support, the Indonesia Infrastructure Guarantee Fund also provided a guarantee to increase the credit enhancement for the implementing business entity or special purpose vehicle in the face of the provincial water supplier and water off-taker PDAB’s default risk. The national development bank (PTSMI), through its Project Development Facility, assisted the East Java Provincial Government to prepare and execute the project transactions.

The project closed financially in 2016, and assets were under construction in 2021 (World Bank, 2016). This type of project demonstrates that government institutions can help mobilise private sector finance for large-scale investments in the water sector. However, de-risking instruments such as guarantees (to facilitate the provision of private capital to project developers) are likely to be necessary, in addition to project preparation work.

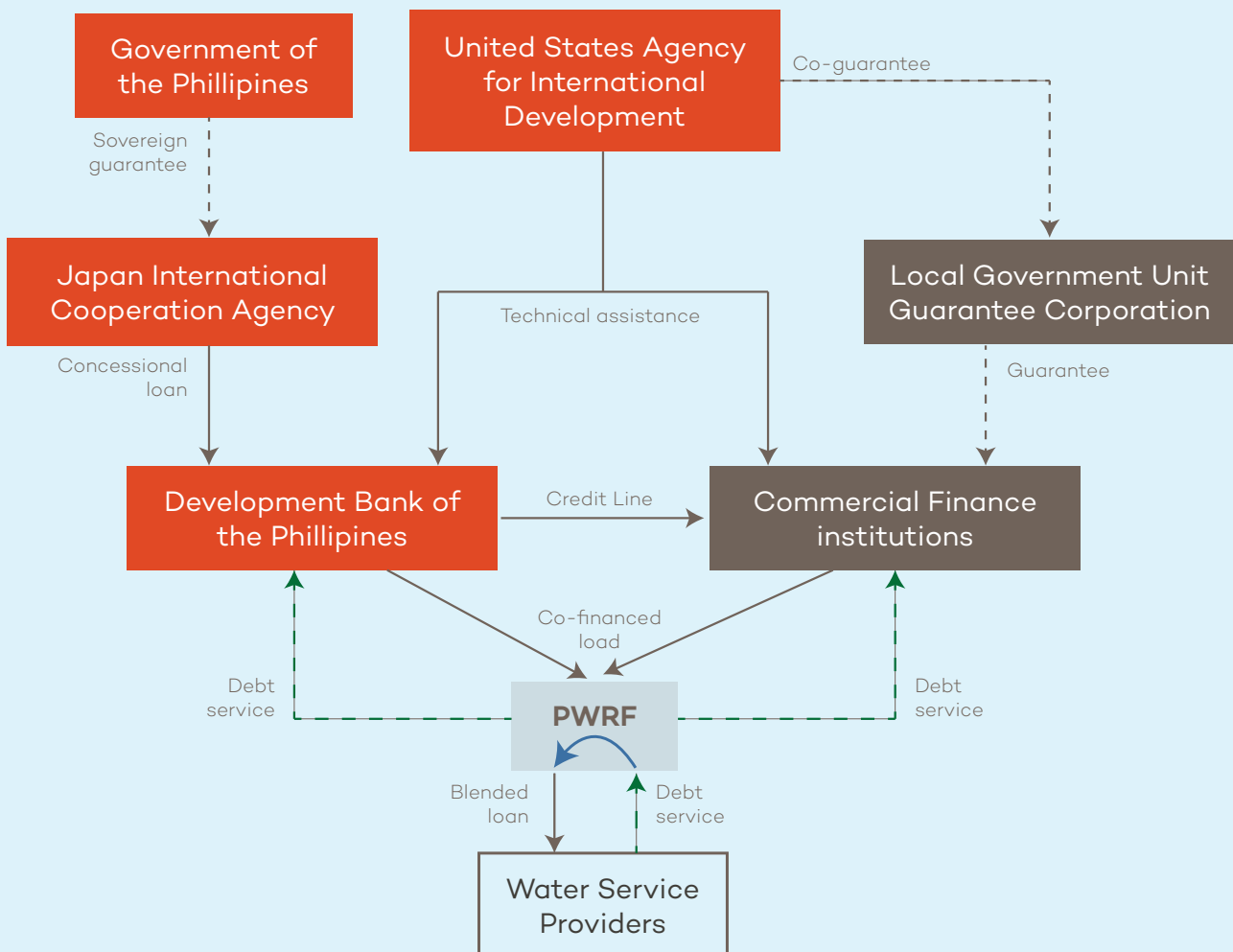


## PHILIPPINES

### Financial instruments to facilitate access to commercial finance for service providers

Governments and development partners can deploy financial instruments that help de-risk investments, enabling service providers to access commercial finance, or access it at a cheaper rate. In the Philippines, the government and multiple development agencies have designed and mobilised financial instruments that enabled local commercial finance institutions to provide loans to water service providers. The Philippine Water Revolving Fund (Figure 3) brings together: (i) a sovereign guarantee to enable the national development bank to access a concessional loan for on-lending to commercial finance institutions, which then on-lend to service providers, (ii) an additional guarantee from another development partner to further decrease commercial lending risks to service providers, and (iii) technical assistance to finance institutions and service providers.

Figure 3: The Philippine Water Revolving Fund financing structure



Source: OECD (2019): Making blended finance work for water and sanitation



## BAHRAIN

### Performance-based contracts for NRW

A performance-based contract for NRW reduction was executed in the Muharraq Governorate of the Kingdom of Bahrain between 2013 and 2016. The contract included a mixture of fixed and performance-based payment terms. The performance element included establishing 35 District Metered Areas (DMAs) and the targeted reduction of NRW by 15 percentage points within the project catchment. The contract was a partnership between the contractor and the utility: the contractor was to conduct all necessary investigative fieldwork to identify all sources of NRW, both real and apparent (commercial) losses and authorised unbilled consumption. All necessary construction activities (e.g. DMA installation, leakage repair) were the responsibility of the utility.

The contract implied two main phases over a project execution period of 18 months: (i) establishing the DMAs and confirming the baseline (NRW was assumed at 35%), (ii) works, monitoring and NRW reduction. The USD 3 million contract was awarded to the private provider MWH, now part of Stantec. Remuneration was partly fixed and partly performance-based, with 15% of Phase II payment linked to NRW reduction to 20%. The utility retained full operational control over the network, with the contractor only authorised to make recommendations. The decision on whether to implement these recommendations rested with the utility.

Contract implementation was a challenge. Parties did not manage to achieve substantial NRW reductions during Phase II, with the utility in charge of procuring and overseeing works possibly contributing to slow progress. Both parties then agreed to work more closely together, with contractor staff seconded into the utility. The contract was further extended for seven months, during which significant results were achieved. The total NRW saving was approximately 16.6 million litres per day, or 441 litres per connection per day, over the three-year period of project activities, discounting for time during which little work was carried out. The financial value of NRW savings was estimated at over USD 32,800 per day or over USD 12 million per year (Daltron, 2018).

## 3.4 Legacy debt and asset and liability transfer

In the context of sector reforms, there is a question of whether all liabilities should be transferred to newly formed utilities or lower levels of government. In many countries that have undergone decentralisation processes or even aggregation of services, utilities have also been transferred with corresponding financial liabilities. Although these liability transfers are, in theory, good practice with ownership and liabilities fully transferred, the approach is problematic on many levels:

- Utilities (and decentralised governments) are liable to debts which they may have been contracted prior to sector reforms, and therefore without being consulted on the nature of the investment and without their consent.
- Not all utilities have the financial capacity to meet these liabilities and repaying these loans puts them at risk of insolvency, and more crucially in a position where they cannot deliver the level of services required.
- Requesting all debt contracted for capital investments to be repaid by local governments may increase inequalities.

International experience indicates that a more flexible and nuanced approach to liability transfers should be adopted, as highlighted below.



## ZAMBIA

### Assets and liability transfers

In Zambia, the central government did not transfer financial liabilities to Commercial Utilities (CUs) when they were formed in the 1990s. Until today, the practice is for the central government to shift financial liabilities to utilities or local governments only when they are deemed able to repay. For example, Lusaka Water Supply and Sewerage Corporation, the largest utility in the country, is considered capable of repaying the government loans that have been taken out from various development partners. However, the central government also provides a generous grace period (as long as 20 to 30 years). For smaller utilities, government contracts loans which are then passed on as grants.

This approach is justified on the grounds that the large costs of investment requirements to close the access gap cannot be the sole responsibility of smaller utilities or those with a weak financial position. The Zambian central government also intervenes as a guarantor for CUs to obtain loans from development partners. This means that the debt sits on the government's balance sheet. In summary, while CUs in Zambia are considered commercialised and owned by local governments, central government policy is to assist them to develop water services, particularly the weaker ones, as local governments alone (their owners) cannot bear all capital costs. The central government's aim is to reduce this dependency over time.



## ENGLAND AND WALES

### Assets transfer as part of privatisation

In England and Wales, the ten publicly owned water and sewerage authorities were privatised in 1989. Privatisation was achieved by transferring the water supply and sewerage assets and the relevant staff of the ten existing regional water authorities into limited companies (the water and sewerage companies). This was accompanied by:

- i. Raising of capital by floating parent companies on the London Stock Exchange.
- ii. A one-off injection of public capital (a "green dowry" to meet the environmental standards required by the EU).
- iii. Provision of capital tax allowances.
- iv. Writing off significant levels of government debt.

By writing off the debt, the UK government contributed to making water utilities more attractive for private investors, but similarly provided a big benefit to the incoming private utilities and their shareholders. The final value of the debt write-off was worth over £5 billion (or around USD 9 billion) and the green dowry £1.5 billion – roughly equivalent to the total received for the sale of the companies. These public subsidies alone financed about one-third of all the investments in the first 10 years of privatisation. Tax relief on the companies' profits was worth £7.7 billion. The total amount of public finance injected into the privatised water companies was over £14 billion (Hall & Lobina, 2008).



CHAPTER

# 04

## Technological Innovation, Research and Use of Data

This chapter on **technological innovation, research and use of data** contains 5 examples of global good-practice as summarised below:

Sub-theme	Country	Summary of case study
4.1 Engagement between research and innovation and the water sector in practice	South Africa	Water Research Commission (WRC) – mainly funded through a research levy applied to consumer billing – commissions research and translates knowledge into innovations for the water sector
	Israel	The national utility (Mekeorot) has an Innovation Unit that develops and takes to market new technologies and products to make Israeli water utilities more efficient, reliable and safe
4.2 Improved capacity for data collection, use and decision-making	Honduras, Nicaragua and Panama	<i>Sistema de Información de Agua y Saneamiento Rural</i> (SIASAR) is a joint initiative – originally launched in 2011 by the governments of Honduras, Nicaragua, and Panama (with technical and financial support from the World Bank) – to track and report against data and information on rural water and sanitation services
4.3 Innovation for renewable energy	Jordan	The government creates an enabling environment through incentives such as tax breaks for investments in renewable energy and through a water sector specific ‘Energy Efficiency and Renewable Energy Policy’ developed by the Ministry of Water and Irrigation (MWI) and the Water Authority of Jordan (WAJ)
	Uganda	The government is promoting solar energy in the water sector such as solar water pumping – by providing grant financing for renewable energy projects and offering tax exemptions on solar generation components such as solar panels

## 4.1 Engagement between research and innovation and the water sector in practice

The development of new knowledge, products and services through research efforts is vital for any sector to continue to evolve and to respond to on-going and new challenges. Research efforts are often led or coordinated by government sanctioned entities, but also rely on linkages with other sector institutions, universities and private sector consultants.

The outputs of research efforts may be of very high quality, but ultimately the utility of such outputs will not be maximised until and unless they can be translated into applicable technologies, products or services which are used by sector players, such as utilities, local government, water resource managers and households.

It is this last step in the chain that is often lacking, but which is essential to maximise the investment in research and innovation. However, this is also a two-way responsibility in the sense that utilities and other sector players should only actively demand research and innovation if they are ready to invest in the outputs, for example, by supporting their human resources to acquire the new knowledge and skills.

Increasingly public research institutions are working with private sector companies to ensure that this link is being made and that their outputs can make an impact.



**SOUTH AFRICA**

**Water Research Commission funded by levy on water sales**

### Background

The Water Research Commission (WRC) was established under the Water Research Act (Act No 34 of 1971), following a period of serious water shortage. It was deemed to be of national importance to generate new knowledge and promote research to address the serious water challenges facing South Africa. The primary functions of the WRC are to fund and steer the water research agenda in South Africa, and to disseminate and communicate findings. The strategic direction of the WRC is focused on the following priorities: an integrated approach to meeting South Africa's societal and water-sector R&D needs; provision of integrated solutions to complex, inter-disciplinary problems; ongoing strategic identification of short, medium and long-term needs; and investment in knowledge creation, transfer and dissemination in key strategic areas. It is important to note that the WRC does not carry out research itself but administers research funds at a national level and commissions research across a range of themes.

### Themes and research focus

The WRC addresses three dimensions of the water and sanitation challenge, namely, (i) new knowledge, (ii) human capital, and (iii) technological solutions. Through its research projects the WRC aims to create a high concentration of activities that support each of these dimensions. It also has flexibility to take up new challenges, for example, in 2020 it has added a dimension to address the emergence of the novel coronavirus (COVID-19). Within the R&D branch of the WRC the technical focus is on the following three strategic areas: (i) water resources and ecosystems, (ii) water use and wastewater, and (iii) water utilisation in agriculture. Outputs from the R&D branch are taken up by the WRC's Innovation and Impact programme which seeks to translate new knowledge into innovations in water technologies, improved

policies, boosting the skill base of sector organisations and contributing to new finance arrangements and good governance. In addition, the WRC has several programmes such as promoting career prospects for young professionals, linking to post-graduate education (334 students in 2019/20) and both regional and global partnerships (WRC; 2020). According to its latest annual report the WRC managed a portfolio of 344 R&D innovations projects in 2019/20, resulting in 44 innovations, products or services being made available to the sector.

### **Scale of operation and financing**

In the financial year 2019/2020, the WRC had an overall budget of Rand 325 million (some USD 21.1 million) of which 76% was derived from a Water Research Levy as the main source of revenue. This levy is applied to consumer billing based on a formula and is approved by the Ministry of Human Settlements, Water and Sanitation on an annual basis. The financing model whereby funds are levied directly from water use charges is cited as a key feature for the independent operation of the WRC. This effectively allows for financing to be ring-fenced from political interference and affords protection from cuts to the general treasury budget, which has affected other research bodies funded directly by the state in South Africa.

As part of a strategic corporate decision to leverage funding from innovation and commercialisation of research outputs, the WRC is working increasingly with a partnership approach that brings in alternative funding sources; these efforts are spearheaded by the Innovation and Impact unit. This diversification strategy appears to be working, with the share of other income increasing from 17% in the FY 2018/19 to 24% for the most recent financial year reported. Other income streams include interest earned on cash reserves, and various funded projects, the largest of which is a multi-year contract with the Bill and Melinda Gates Foundation amounting to USD 3 million (ibid).

For much of its history the WRC had a core staff of under 60, but this has increased lately to focus more on the uptake of research outputs and working on commercialisation with new partnerships; current staffing is now around 95 people. Although the WRC remains a commissioning body, staff are proactively engaged with the research efforts and in working with partners and to lead reference groups, and are often cited as co-authors on outputs. This is reflected by the fact that of some 16 technical managers 12 or 13 hold PhDs in various fields relating to water.

### **Governance and accountability**

The WRC is covered by its own unique legislation; however, it ultimately sits under the Ministry of Human Settlements, Water and Sanitation. As such the board is appointed by the minister and the Act stipulates ministerial representation on the board. The board itself is currently comprised of nine members, and is reported to have a good spread of sector stakeholders from academia, sector experts and branches of central and local government. There is no direct representation of private sector or industry on the board.

The research focus and direction of the WRC is set out in a series of five-year strategic plans, which are then subjected to a more detailed annual planning process, which is initially developed by commission staff. This plan is then put out to a consultative process which draws on a wide range of water stakeholders from both service delivery and water resources, as well as soliciting feedback from large-scale consumers of water from the agricultural and industrial sectors, all of which are used to inform and influence the research agenda for the coming year.

Because of its financing model, the WRC has an in-built line of accountability directly back to water consumers from which it derives the lion's share of its income. This reportedly acts as a positive counter-balance to the management of the commission and ensures that the WRC has to 'prove its worth' in terms of relying on consumers who foot the bill for the institution. Individual householder consumers may not

## Box 2: Linking WRC research with real-world impact via Local Government Technology and Innovation Platforms

In September 2020 the WRC, in collaboration with the South African Local Government Association (SALGA), launched the Municipal Water and Sanitation Technology and Innovation Platforms initiative to improve access to, and impact of, research outputs for local government partners. This mechanism not only allows for research findings, products, and services to be applied by municipal authorities, but also allows the same local government stakeholders to identify priorities from their own perspective and to influence the research agenda of the Commission.

The platforms consist of web-based access and classification of technological solutions, access to funding instruments, online advice and help desk, integration with a global network of innovation partners, on site demonstrations, match-making and hosting of annual events with partners.

*Source: Launch of Municipal Water and Sanitation Technology and Innovation Platforms; SALGA. 2020*

be directly aware of the actions of the WRC, but utilities, bulk water consumers and agricultural organisations are all aware of its existence and its role in promoting research.

### Impact and linking research outputs with sector

Although there is no recent independent assessment of the WRC, stakeholders interviewed for this research indicate that the impact of the commission is considered positive.

Whilst some of the research outputs do not always find traction, much of what is commissioned does get picked up and is very useful for the sector.

The model of being a commissioning body, rather than a direct research agency, means that this has generated a healthy degree of competition between universities and consultancies that apply for funding.

Recipients of WRC research grants, including many university departments, have benefited from broader capacity building, and promoting the work of graduate researchers.

To enhance 'real-world' impact, the WRC is looking at positioning itself further down the R&D chain, to promote uptake of technological and other innovations.







**ISRAEL**

## **Innovation Unit sitting within the national utility, Mekorot**

In 2004 Mekorot, the national water utility of Israel, established WaTech, or the Centre for Entrepreneurship and Innovation of Water Technologies. WaTech was intended to serve as a platform for business ventures and emerging collaborations, mostly in the fields of water technology, control and management.

In 2019 the name WaTech was dropped, and the centre is now referred to as the Innovation Unit (IU), which sits within Mekorot. Another important development came in 2018 when there was a change in the law that allowed any Israeli government entity to invest in private companies as a shareholder.

Prior to this change, WaTech was barred from investing in companies that were taking its research outputs to market. The aim of this change in the law was to encourage investment and growth in the Israeli commercial sector and this has in turn shifted the strategy of the IU from more of a research focus to one of taking technologies and services to market. It also allows Mekorot to be a shareholder in joint ventures with private companies.

The IU is the inhouse unit of Mekorot whose core aim is to improve the company performance by researching and developing technologies and products that can make Mekorot processes more efficient, reliable, and safe. As such it acts as a focal point to incubate and accelerate early-stage technologies for the local water sector and ultimately the global water market. By being housed within the national utility, the IU can adopt a holistic approach, including a deep understanding of the water sector and related markets and link this with its business development expertise.

The IU cooperates with start-ups and well-established companies, research institutes, universities, technological incubators, investors and venture capital funds. One of the main characteristics of the unit is that it sits within, and works very closely with, the national utility as well as the 54 urban or municipal utilities, giving it an intimate relationship and insights with the workings of the operator.

### **Focus of research and development**

The focus of the IU's work spans a number of areas critical to water and wastewater, including water quality, desalination, wastewater treatment and effluent reuse, water safety, engineering services, models for optimized water system operation and management, digital and cyber security. The unit is comprised of four main functional areas, namely: Business Ventures and Collaborations; Applied Research; Intellectual Property Development and Patenting, and; Information Management.

The focus of research is driven by the operational needs and gaps of Mekorot and there is a strong focus on solving challenges identified by technical and field staff. Such internal innovation is supported by encouraging staff to brainstorm on digital platforms and suggest ideas for consideration. The management of Mekorot is also very focussed on promoting digitalisation of technologies and processes for the company, which is then fed into the IU's planning.

All potential research and production projects must be related to the core business of Mekorot and for the water industry more broadly. Once the IU has gone through various proposals it comes up with a short-list for Mekorot management for final approval. Applications from companies wanting to work with the IU are also subject to a screening process, including: they must be Israeli owned, have the capacity to actually produce the technology or other products, and be stable and mature enough to move products to market (within ~ one year).

In terms of scale of operation, historically the centre has screened more than 1,300 initiatives and collaborated with more than 50 early-stage companies, the majority of which have taken products to market. An earlier report on WaTech states that the centre conducts approximately 50 applied research studies each year (OECD; 2012). Over the past 15 years or so more than 750 proposals for joint ventures and projects in the field of water technology have been examined at WaTech, and contracts have been entered into regarding approximately 28 joint ventures.

More recently according to the IU, under the new investment-led approach, which is less focused on research (although this is still carried out), the unit has the capacity to carry out two major projects per year but could double this over time; the IU only started investing in companies in 2020, so it is early on in the commercialisation journey (IU staff interview; 2021).

### **Institutional structure**

Effectively the Innovation Unit is the in-house R&D arm of Mekorot, which is itself a 100% state-owned company and is accountable to the Israeli Water Authority, which oversees the management, operation, development and regulation of the sector. The Water Authority has much autonomy but falls under the auspices of the Ministry of National Infrastructures, Energy and Water Resources; it also has representation from the ministries of Finance, Agriculture and Health.

The IU has just six professional staff and one secretary but can rely on the broader administrative support of Mekorot, which has some 2,200 staff (World Bank; 2017). Staff profiles include the head of unit who has a commercial background, one economist and several engineers, which ensures a mix of skills to both understand the research content and ability to take on contract negotiations and commercial processes, including patenting. The IU actively works with around 50 employees of Mekorot who 'volunteer' to engage with on-going research, as well as with external researchers and universities and some 3,000 water facilities operating around the country. The senior management and ultimately the board of Mekorot approve the work plans and strategy of the IU.

### **Financing**

The IU has an annual budget of around USD 3 million, which is provided from Mekorot and also wins approximately USD 600,000 from research grants from the Israeli government's innovation fund, the European Union and other sources, but this research revenue stream is variable. There is no core funding for the IU provided by government.

In terms of the research and innovation projects which it funds, the IU has an annual amount of around USD 1.2 million to invest but this is flexible and can be increased. The only limit is from the constitution of Mekorot which blocks any investments on a scale that would threaten the financial stability of the company. The average amount to date for investment in joint ventures for the production of innovative technologies or services is USD 200,000, but the IU points out that the potential gain for companies is in the implementation and potential market for products with Mekorot and other companies which can run into the millions.

With the new phase of joint ventures and shareholding, Mekorot can also potentially benefit financially from highly successful innovations and the sale of technologies, both domestically and globally. In this sense, the IU provides a form of circular benefit for both national companies and Mekorot, as well as the Israeli water sector and companies world-wide.

## 4.2 Improved capacity for data collection, use and decision-making

Improved data collection, both in terms of the quality and quantity of data is a fundamental building block of the water sector, allowing for effective monitoring of service performance.

Most importantly, monitoring outputs should feed back into both local level planning and decision-making process (i.e. corrective actions for operators) and to national level to inform resource allocation decisions and policy reforms. Reliable and regular data collection is also critical for effective regulation of the sector and compliance at all levels.

Monitoring functions are generally assumed both at national and decentralised levels and ideally rely on a comprehensive and commonly agreed upon – and respected – framework being set out to collect and analyse data.

Kenya has made substantial progress in data collection and monitoring across urban water providers and WASREB provides regular performance reporting and ranking of utilities, but in common with many other countries, major gaps remain in the rural sub-sector in terms of infrastructure coverage, service quality and performance of providers.

### CENTRAL AMERICA – HONDURAS, NICARAGUA AND PANAMA

#### Sistema de Información de Agua y Saneamiento Rural – SIASAR

The *Sistema de Información de Agua y Saneamiento Rural* (or SIASAR which in English means Rural Water and Sanitation Information System) is a joint initiative, originally launched in 2011 by the governments of Honduras, Nicaragua, and Panama with technical and financial support from the World Bank. The primary aim of SIASAR is to produce a unified, easy to use, updated and comparative interface to access data and information on rural water and sanitation services in a specific country. It has now expanded to cover 14 countries including current pilots in Tanzania and Uganda. To assess the functionality of water supply and sanitation services over time, field data are collected (and updated) using four basic questionnaires that analyse the level of service from the perspective of four core entities: community, service provider, infrastructure, and technical assistance providers. Data is collected on the following:

- i. Access to basic services across populations.
- ii. Quality of service: a composite index which covers factors such as accessibility, continuity of supply, seasonality and water quality.
- iii. Performance of service provider (operator): a composite index which includes organizational, technical, financial and environmental dimensions; and
- iv. Effectiveness of technical support for service providers: which assesses the presence and competency of entities providing technical support to service providers, including staffing levels and logistical and other resources.

The SIASAR framework provides a detailed perspective of different aspects concerning water and sanitation services and defines methodologies to aggregate the information into thematic indices. A battery of 60 indicators, classified into 24 components and grouped into six dimensions (water service level, sanitation and hygiene service level, water system infrastructure, service provision, technical assistance provision, and schools and health centres) are aggregated into two sub-indices: the Water, Sanitation and Hygiene Service Level Index and the Water Services Sustainability Index aggregated in turn to give rise to the final Water and Sanitation Performance Index.

Since its launch, a second iteration of SIASAR 2.0 was revised in 2017 and a third iteration is currently under review which aims to expand the applicability of the platform for different country contexts, including a tiered level of recommended data collection, from 'standard' which allow the indicators, maps and reports to be generated; an 'intermediate' level and an 'advanced' level, which includes more detailed fields for information that is aimed at decision-makers.

Funding support comes predominantly from the Global Water and Sanitation Partnership, a multi-donor trust fund within the World Bank's Water Global Practice. The model has evolved, and involves a focus on TA, coaching and training by the World Bank, but with government agreeing to finance everything else at country level, including data collection and entry.

One of the conditions for being signed up to SIASAR is for the system to be institutionalised, meaning a commitment by central government to allocate budget lines for monitoring and support of personnel dedicated to working on SIASAR. Ownership of data collected by individual countries is retained by the respective governments and once validated by them is publicly disclosed and available on the website via the global platform. The quality of data is mainly the responsibility of government, but other stakeholders can play a role in quality assurance. The fact that the data is public, which is one of the core SIASAR principles, allows anyone to check data, make analysis, verify data and let respective governments know when any errors are found.

### **Application and use of data for decision-making**

The front end of SIASAR is open access via a global portal for any user interested in accessing the data, but the system is primarily designed for national and local government users along with service specialists and international NGOs or private sector bodies involved with rural water and sanitation provision.

The major use of SIASAR data outputs has been to illustrate the status of services and to change the way a sector is understood collectively, moving beyond data for coverage only. It has also been used for resource allocation and investment planning decisions, for example in Nicaragua the government used data to prioritise regions, departments and districts to support infrastructure provision.

In Nicaragua, as well as the state of Ceará in Brazil, municipal plans that had previously never included investment data for the rural sector, relied on SIASAR data to create municipal (district) diagnostics, including the status of rural water to focus investment towards these areas. Data produced by SIASAR and the insights it brings have also been used successfully in some cases to inform policies and resource allocation, as for example in the case of Colombia.

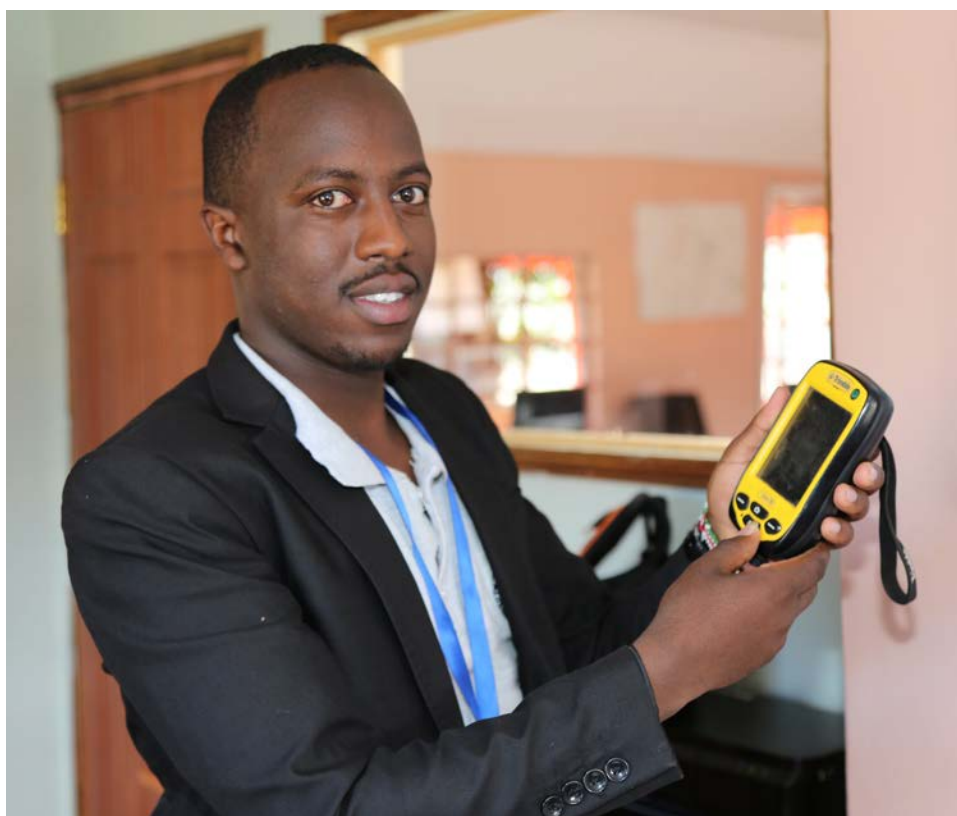
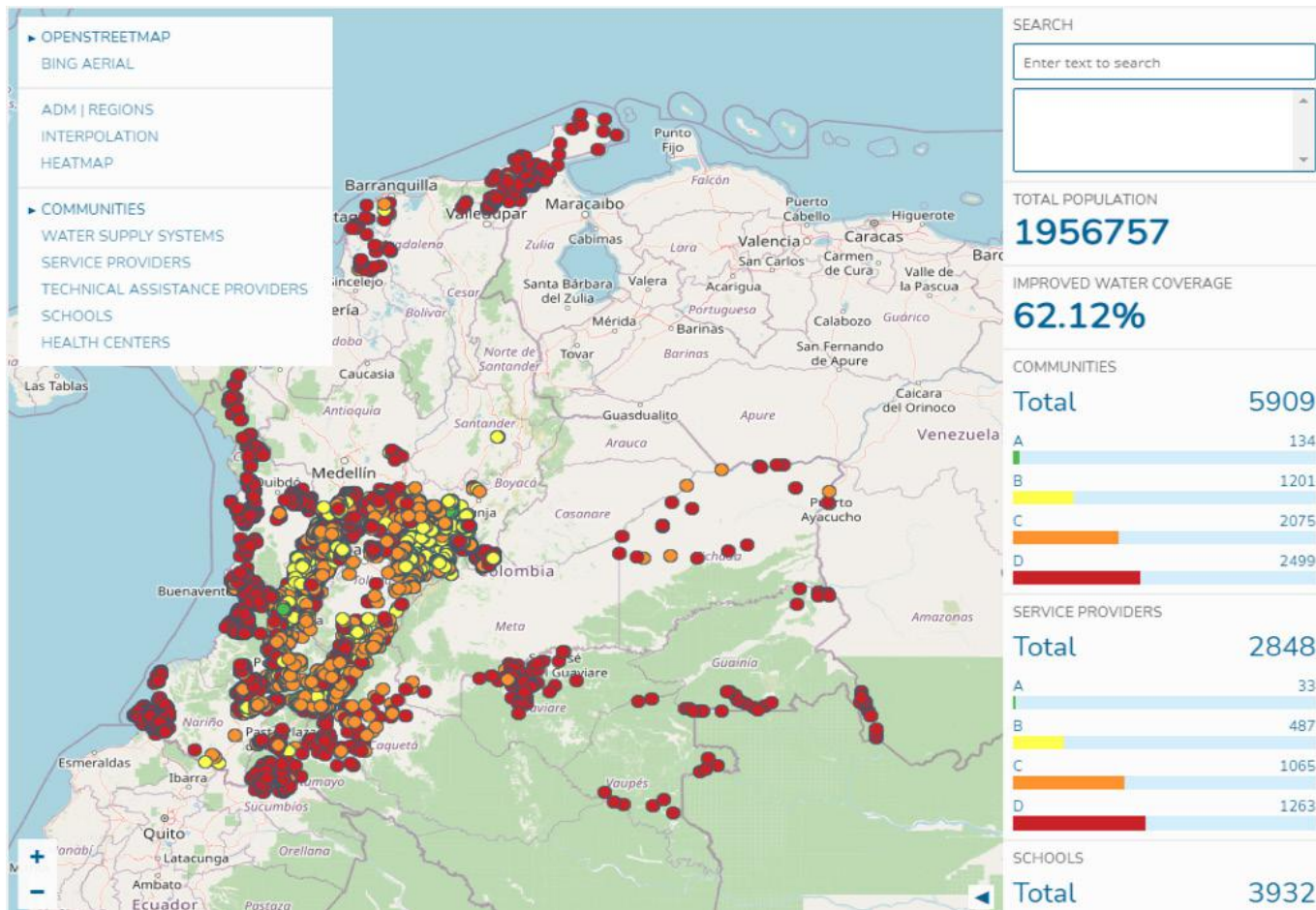
### **Box 3: SIASAR Global Application**

As of July 2020, the SIASAR platform globally had amassed data on: 12 countries, approximately 16.71 million water users, 30,659 communities, 24,958 schemes, 21,318 service providers, 144 technical providers, 11,178 school facilities and 2,479 health centre facilities.

*Source: Interview with Antonio Manuel Rodriguez Serrano, Sr. Water and Sanitation Specialist, World Bank, August 2020*



Figure 4: Example of data visualisation from SIASAR Colombia



A GIS Officer in Nanyuki town showcases one of the GPS devices used at the facility to capture utility data

Source: KMT

## 4.3 Innovation for renewable energy

Water use is intertwined with energy supply, as energy inputs are required for all critical steps in the water supply chain. In 2014, about 4% of global energy consumption was used to extract, distribute, and treat water and wastewater (IEA,2020).

Industry reforms, rising demand, and, most recently, climate change, are bringing the links between water and electricity into sharp focus in unprecedented ways. The adoption and scaling of Renewable Energy Technologies (RETs) can help address some of the most complex challenges associated with the water-energy nexus.

Renewable energy can be particularly useful in off-grid applications to improve access to reliable water services and has the potential to significantly reduce the energy intensity and costs of the processes, as well as their environmental impact. (IRENA,2015).

In Kenya, there is an increasing understanding of, and support for, the critical importance of renewable energy sources in the water supply sector. This is primarily derived from rising electricity costs and the role renewable energy sources can play in improving service delivery through reducing operational costs.

Historically, many interventions promoting renewable energy in the water sector have been limited in scale and one-off, projectized attempts. More recently the concept of 'solarisation' particularly for water lifting has become more mainstream.

To function at scale and to have a significant impact, more strategic approaches to promoting renewable resources are required, including carefully planned measures and the involvement of policymakers at all levels, from local to global.

A wide variety of policy options, including tradable emission rights, taxes, and subsidies, as well as legislation including feed-in-tariffs for renewable energy production have been applied. Strong government support is needed to design policies and establish supportive environments to attract investment and help speed up adoption of renewables for the water sector.



*A solarised water borehole in Isiolo County  
Source: KMT/Alex Kandie*





## Background

Jordan's water sector suffers from a growing financial deficit, which presents severe challenges across several sectors and affects Jordanians' well-being and economic future. Non-revenue water in Jordan triggers a financial loss of more than USD 700 million per year (USAID,2020). These challenges are driven by the scarcity of both water and fossil fuel resources and their increasing demand from across a range of sectors. Jordan is one of the world's most water-scarce nations. Groundwater is used twice as fast as it can be recharged, and the country's clean water source only meets about half of the population's water demands (ibid). Jordan imports nearly all its fossil fuels from other countries<sup>13</sup>. The Water Authority of Jordan (WAJ) is the country's largest energy user, consuming 15% of Jordan's total energy (approximately 2,000 GWh per year) (Komendantova, et al., 2020). Energy consumption for Jordan's water supply is a significant driver of operational performance, accounting for up to 55% of overall operational costs (ibid). As a result, Jordan's water supply is threatened by both depleting water supplies but also by rising energy prices.

In 2012, with the unsustainably high cost of energy supply, the government embarked on a significant subsidy reform programme, eliminating subsidies on petroleum products. Reforms in Jordan's energy and water sectors helped improve water service delivery. Jordan's growing implementation of renewable energy technologies has been successful in recent years, and it has optimized and increased the water and energy sector's efficiencies.

## Government energy sector reforms

The use of renewable energy increased from 1% in 2007 to 8% in 2019 (MEMR, 2019) due to continuous governmental reform. The water industry was one of the sectors that benefited from renewable energy support due to the availability of resources and energy policies.

To promote greater efficiency and sustainability, reforms removed the government's energy sector monopoly. Power generation, transmission, and distribution sectors in Jordan were privatized in 1999, with production companies operating under 25-year distribution licenses. Privatization allowed independent power producers to sell electricity generated from renewable energy to the National Electric Power Company (NEPCO)<sup>14</sup>. The government has also taken several steps to encourage investments in renewable energy. The "Renewable Energy and Energy Efficiency Law" amended in 2014 allows investors to identify and develop grid-connected electricity production projects through direct proposal submission. A range of further measures also remove crucial barriers to investment in renewable sources of energy.<sup>15 16</sup>

Tax incentives and customs are also provided to remove further obstacles to the widespread use of renewable technologies, for example a ten-year tax exemption for investments in renewable energy construction in all sectors, including the water sector. Additionally, a Renewable Energy and Energy Efficiency Fund (JREEEF) was developed in 2015 to help with the infrastructure development of renewable energy facilities. In collaboration with various development partners, JREEEF pursues several funding mechanisms, including financing programmes developed with the Central Bank's support in partnership with commercial banks and Jordanian companies. The fund also offers loan guarantee services on behalf

13 According to the Ministry of Energy and Natural Resources (MEMR), energy accounted for 17.6% of the Kingdom's GDP in 2014

14 NEPCO is operating under the government, purchases electric power generated by all the power producers in the Kingdom and manages the transmission sector as a single buyer

15 The electricity regulatory commission publishes with complete transparency the "Reference Price List" for the investors to evaluate their project's feasibility and future revenue with minimum risk. The "Reference Price List" shows the suggested prices (Tariff) for generated power from different renewable energy sources

16 In addition, if the winning bidder installs an entirely local renewable energy supply, an additional 15% tariff will be awarded. This will promote technology transfer and improve the country's renewable energy industries

of these institutions to provide the necessary financing for renewable energy and energy efficiency projects at a zero-interest rate.

### **The Energy-Water Nexus**

In response to Jordan's national water supply challenges, the Ministry of Water and Irrigation (MWI), in collaboration with the WAJ, released the "Energy Efficiency and Renewable Energy Policy for the Jordanian Water Sector" in 2015 that provides a detailed reform strategy for the water sector. The plan introduces renewable energy technology to increase energy efficiency, reduce water supply costs, and contribute to the country's economic development. Additionally, these interventions seek to reduce the volatility of energy prices, which are driven by the cost of fossil fuels, by gradually increasing the proportion of renewable energy supplies. The MWI's sustainability goals for 2025 include reducing overall energy use in public water facilities by 15% and increasing the share of renewable energy to 10% of the total power supply. According to the policy, the water sector should make direct investments in renewable energy by:

- i. Implementing photovoltaic technology supplying the largest share of power to the water sector.
- ii. Establishing hydropower stations at water dams and canals, wind energy farms, and solar energy to supply power economically.
- iii. Utilizing sludge from wastewater treatment as a biological resource to cover part of the energy needs of wastewater treatment facilities.

In an associated move, MWI introduced an updated National Water Strategy 2016-2030 to ensure that national goals and priorities are realigned to the country's needs. The updated strategy creates momentum for the sector to improve intersectoral linkages and generate greater synergy between energy and water. The strategy includes plans to install solar power technologies to supply the energy needed to pump water from different parts of Jordan.

### **Results and impact**

The government of Jordan's strategies have created an enabling environment to promote renewable energy source generation, including from the abundant solar and wind resources. With the efforts made to develop renewable energy options, clean energy's contribution is currently around 8% of total energy production (MEMR, 2019). Subsequently, Jordan has ranked first in the Middle East and North Africa region in renewable energy adoption (Abu-Rumman, et al., 2020). Energy costs have also reduced by 10% due to the adoption of energy efficiency measures and increased contribution of renewable energy sources (ibid). Jordan is now a leader in renewable energy investments in the region, with projects totaling 2061 MW (including small scale projects).

The increased capacity for renewable energy production has had a direct benefit for the water sector, given that energy costs are the largest controllable expense. It is estimated that over a 20-year period, solar photovoltaic technology will generate power at a fixed rate of USD 0.1 /kWh, which is lower than the cost of power produced by conventional fossil-fuel plants. In comparison, electricity produced by fossil fuels typically ran to USD 0.17 per kWh. The (IRENA,2015) report predicts that within the coming years, solar will be able to generate electricity for as little as USD 0.03 per kWh.

In addition, the new renewable energy policy for the water sector enabled managers from the WAJ and selected Water Supply Companies to make strategic decisions on the use of RET in the water sector. The government action plan included the objective that Jordan's five main water plants would operate on solar power by 2020 to reduce the water sector's energy consumption. They are to generate a total of 25-30 MW per year and were funded by a grant worth USD 36 million from the European Union. This long-term project will help the partners analyse the potential and limits of RET in the water sector and serves as a basis for strengthening the conceptual, technical and economic skills. The focus is also on providing expert advice and training to experts from selected water supply companies enabling them to implement the selected RET in close cooperation with the private sector or research institutions.





## UGANDA

### Solar powered water systems in the rural water sector

#### Background

Uganda has one of the lowest electricity access rates globally, with just over 28% of the population being able to link to the electricity grid (NPA, 2020). Furthermore, using energy supply, from the grid or fossil fuel-powered generators, has increased the National Water and Sewerage Corporation (NWSC) water pumping bills by USD 9 million per year, accounting for 35% of total operating expenditure (Oirere, 2015).

Like many Eastern Africa countries, Uganda has an abundance of sunlight (about 4-5 kWh/square meter/day of solar radiation) and has the potential to transition from fossil fuel usage to renewable energy. The Ministry of Water and Environment (MWE) recognizes the need for renewable energy to address water supply quality issues and expand water coverage. As a result, the water and environment sector is shifting from fuel-powered motorised pumps and handpumps to solar-powered supply systems, with the 2020-2025 National Development Plan (NDP) (National Planning Authority, 2020) listing this as a core priority.

#### Government strategies to strengthen legal and institutional frameworks and enhance fiscal policy for renewable energy

The government of Uganda's policies create the required enabling environment to enhance the penetration of renewable energy into the water market. In the first instance, to facilitate renewable energy investments, the government of Uganda is undertaking a series of measures. The Ministry of Energy and Mineral Development (MEMD) publishes a Standardized Power Purchase Agreement with feed-in tariffs for renewable energy generation projects (of up to 20 MW installed capacity) and develops appropriate regulations for grid connections. Additionally, the government introduced legislation and regulations to promote the use of Renewable Energy Technologies (RETs) in all sectors, including the water sector, and is integrating energy issues into non-energy sector policies and planning.

To attract more investments and enable RETs to penetrate the water sector, the government has taken steps to increase green energy implementation in the water supply sector by providing grant financing for renewable energy projects. Additionally, Uganda is developing financing schemes adapted to local needs, such as revolving funds that enable market development for small renewable energy technologies for rural development. The government also offers tax exemptions on solar generation components such as solar panels.

#### Renewable energy for water supply in rural areas

In 2020 the country concluded the preparation of its third NDP for the five years (2020-2025). The NDP-III aims to increase access and consumption of clean energy as well as stop and reverse the degradation of water resources and the effects of Climate Change. In order to achieve the above objectives, the National Development Plan promotes the use of new renewable energy solutions such as solar water pumping.

In an effort to enhance water pumping in rural and small-town areas, the MWE is promoting solar energy for rural piped water supply. It is implementing numerous solar-powered piped water supply projects with the support of grants and loans. Donors and development partners are financing capital expenditure and construction. Following that water committees become responsible for typical service provider functions, including operations and management, tariff collection, preventive maintenance, and minor repairs. Solar

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17 The five solar power plants serve the treatment plants in Zai Water and Zara-Maean Water, and three pumping stations at Wadi Al Arab, Zaatari and Azraq

pumping systems are popular in communities due to their low day-to-day operating costs and long-term durability. When compared to other pump types, solar pump breakdowns appear to be far less common.

Uganda is now in the third phase of the 2016-2021 World Bank financed “Energy for Rural Transformation Program Project”, which aims to increase access to electricity in rural areas. It covers off-grid energy access, including the installation of solar PV systems for public institutions in rural areas, enabling communities to power their water pumping systems using solar PV. It also benefited from a four-year project funded by the African Development Bank’s “Water Supply and Sanitation Program”. The project, which ended in 2016, helped serve an additional 2.4 million people in Uganda’s rural areas and small towns. This included the construction of solar-powered water supply systems to replace 1,250 hand-pumped wells.

MWE also successfully implemented development projects using District Water and Sanitation Development Conditional Grants, where 34 mini solar-powered piped water supply systems are currently under construction. In 2019, the government borrowed up to €101.88 million from UK Export Finance for a solar-powered irrigation and water supply system project. These experiences highlight that the wholesale implementation of solar pumping is a viable and cost-effective intervention for rural water supply and the shift to solar-powered facilities has the potential to reduce water tariffs by a factor of 10 from 500 to 50 Ugandan Shilling per gallon (Interview with MWE; 2021).

## **Capacity development**

Solar energy has been adopted by MWE as an alternate technology for delivering water supply services. As a result, the capacity to build, install, run, and manage solar water supply systems is a new challenge for the sector.

In February 2019, MWE signed a Memorandum of Understanding with Engineers Without Borders - USA for institutional strengthening and capacity building of water sector stakeholders to manage water supply systems across the country. The Solar Powered Water Systems Design Manual (MWE, 2019) is the earliest significant deliverable under this MoU. It is envisaged that the document will strengthen sector professionals’ capacity and provide standards and guidance in the design of solar water systems.

Engineers Without Borders - USA has also developed training workshops in collaboration with District Local Governments and Authorities. Although this example illustrates the country’s national strategy for transitioning to renewable energy, as well as the ambition to integrate the use of green energy into the water sector at scale, to date, however, no written water-energy nexus strategy has been developed.

# Key Lessons to Consider for the Kenyan Water Sector

The following provides a summary of the key lessons and insights from the various examples set out in the preceding three chapters as a resource for Kenyan water sector stakeholders as well as other parties interested in water sector strengthening. For convenience these are numbered in alignment with the original section headings and sub-headings.

## 2. Governance and decentralisation

### 2.1 Coordination and collaboration between levels of government (Israel, Vietnam)

- More countries have taken steps to resolve common horizontal coordination challenges compared to the vertical coordination challenges that often remain prevalent, especially in low- and lower-middle-income countries.
- Apex national institutions or inter-ministerial bodies can play a critical role in strengthening both horizontal and vertical forms of coordination.
- Coordination platforms must create incentives for all actors convened if they are to truly foster enhanced cooperation.
- A lack of coordination venues and mechanisms, parallel sovereignty between several rule-making bodies or institutional levels, and complex governmental structures are all common barriers to effective vertical coordination.
- Reinforcing coordination mechanisms and protocols within sector policy or national legislation can improve participation and meaningful engagement in coordination processes.

### 2.2 Professionalisation of rural water service provision (Rwanda, Senegal)

- Advances in professionalisation of service provision require a degree of aggregation, both to attract larger, more competent operators into commercially viable markets and to achieve economies of scale in terms of pooling infrastructure and associated risks.

- Contracting based on clustering of schemes over geographic areas can be a viable approach, but may require inter-administrative scale to be viable (i.e. contracts covering more than one County in some cases in the Kenya context).
- Establishing and growing rural service providers, whether public or private, to operate at scale will require parallel investment in support functions and the institutional arrangements to deliver them, whether through state agencies or professional associations.
- Subsidies will be required for the foreseeable future and should be delivered in a transparent and targeted manner, including supply side subsidies to help operators bridge the gap between costs and tariff revenue income.

In the context of Kenya, it is important to note that there have been promising examples of organisations working to establish more professional and sustainable water services, including the professionalisation of delegated maintenance, using KPIs to track performance and payment of subsidies. Although these remain donor-driven and are heavily supported by international NGOs, there is traction with County government, and it would be worth examining these more closely.<sup>18</sup>

## 2.3 Accountability mechanisms (Uganda)

- Collaborative action is required when strengthening vertical accountability – one civil society organisation (CSO) is unlikely to deliver meaningful change at scale by working in isolation. Likewise, there are clear benefits to pooling resources across related sectors as comparable challenges are often present and can be addressed in a harmonised and resource-efficient manner.
- Promoting integrity and reducing corruption requires a holistic set of interventions spanning a variety of areas and administrative levels. CSO networks can play a vital role in this by adopting a broad spectrum of mutually reinforcing activities to increase transparency and participation and strengthen forms of vertical accountability.
- An approach rooted in constructive dialogue and collaboration with Government rather than direct confrontation and opposition will likely yield greater and more sustainable impacts.

## 3. Financing and investment planning

### 3.1 National sector investment and financial planning (South Africa, Vietnam)

- National authorities have an important role to play in making the case for water sector development plans; this role implies:
  - » Promoting their adoption by local governments by communicating the benefits of local level planning for water, clearly indicating how the effort will pay-off for local governments.

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<sup>18</sup> Most notable examples include FundiFix operating in Kwale and Kitui Counties (see: <https://fundifix.co.ke/>) and Oxfam/Turkana County (see: An Outcomes-Based Approach to Addressing the Human Impact of Climate Change in Kenya | ([socialfinance.org.uk](https://socialfinance.org.uk)), both of which include innovative, performance-based financing mechanisms



- » Allocating resources for building capacity for local planning, especially for smaller and weaker local government authorities.
- » Increasing national authority resources for following-up/review of the water sector plan development process where necessary.
- Sustainable water sector development plans should embed strategies for water services cost-recovery.
- Water sector development planning frameworks should consider the capacity of certain local governments; this may include consideration of simplifying planning requirements (including the level of data collection required).

### **3.2 Subsidy policies and operationalizing policies in practice (Chile, Ghana, Togo)**

- Internationally, the water sector is lacking easy and effective solutions to target subsidies. All existing approaches have their strengths and weaknesses. Means-tested approaches, though potentially more effective, usually must be linked to a highly capacitated public administration and to a broader set of social services to justify the significant resources required to identify eligible households.
- Using mobile phone technology might help to bring down those costs in the future.
- In the meantime, improvements to existing approaches of geographical targeting or rising block tariffs are possible: for example, using strict proxy-indicators on the housing type or gender/age of recipient in addition to geographic targeting.
- Subsidies provided to poor households for access to improved water services should be fully paid for by the government, at either national or devolved levels, in a structured manner, but not in the form of directives or political declarations.

### **3.3 Incentives to encourage private sector financing (Indonesia, Philippines, Bahrain)**

- While private sector involvement in operation of urban water supply has often not met expectations and has been phased out in many countries, a new generation of PPP approaches in the urban context use fiscal support measures to de-risk investments, shielding the private sector from demand-side risks. Such arrangements are particularly relevant for bulk water supplies and wastewater services contracts.
- Private sector expertise is also relevant to support utilities managing their water losses; performance-based contracts that link remuneration to NRW targets are increasingly being used.



### 3.4 Legacy debt and asset and liability transfer (Zambia, England and Wales)

- A nuanced approach is required when transferring assets and liabilities to newly devolved governments: the expectation that liabilities can be fully transferred to and immediately repaid by all utilities or local governments might not be realistic considering their financial positions.
- Central government also has an important role to play in facilitating access to capital for investments – including by taking on the debt burden, especially for local government authorities and utilities with significant investment needs.

## 4. Technological innovation, research and use of data

### 4.1 Engagement between research and innovation and the water sector in practice (South Africa, Israel)

- Anchoring R&D entities closely with – or within – water operators and other sector implementers provides direct and short pathways for channelling research outputs and ensuring that they are applied in practice. This model also works in the reverse direction, meaning that research agendas can be informed and influenced by real-world challenges and gaps in knowledge and working practices of utilities.

- Financing of research entities through sector revenue (e.g. levies on water consumption) can provide both fiscal independence for the institution and take away reliance on government, and a direct line of accountability for the outputs and value for money provided.
- A strong, transparent commissioning role for research entities can facilitate healthy and strong competition from those seeking grants to develop new and innovative technologies and processes.
- Establishing transparent mechanisms for R&D institutions to move along the production chain allows them to work more closely with private sector companies, including ability to invest in joint ventures and to aim for marketable outcomes, but this requires effective governance and fiduciary risk management to be in place.

## **4.2 Improved capacity for data collection, use and decision-making (Central America)**

- To improve the quality and sustainability of service provision, particularly in rural areas, data collection should include not only access, but track service quality and performance of operators and service authorities.
- Having a robust and relatively easy to use framework for data collation, analysis and visualisation can encourage better data sharing and consolidate fragmented data sets under one, commonly 'owned' platform.
- Following approval by relevant authorities, open-source data housed on an accessible platform can facilitate better decision-making at different levels, including by those fulfilling service authority functions (County and sub-County governments in the case of Kenya).

## **4.3 Innovation for renewable energy (Jordan, Uganda)**

- Given the inter-related directives and roles for using renewable energy in the water sector, national and sub-national government must improve horizontal coordination to identify collaborative interventions and synchronize strategies and targets.
- Fiscal policy interventions such as tax incentives and subsidies are vital in reducing barriers to renewables and encouraging their uptake. Reducing barriers to the uptake of renewable energy sources in general is often a pre-requisite to supporting their uptake in the water supply sector.
- A move toward introducing renewable energy into the water sector to reduce operating costs and increase efficiencies, requires a complete strategy, beyond only the technological components, including access to financing, skills development and a set of incentives for uptake.
- Providing awareness and training to build capacity to improve stakeholder knowledge and skills is an important element in the transition to adopting renewable energy in the water sector at scale

## ANNEX 1: CONCEPTUAL FRAMEWORK FOR ANALYSING WATER SECTOR

**1. Country context:** decentralisation and macro-level governance; economic growth; population distribution and urbanization; market reforms; geographic and hydrogeological conditions; aid dependency

### 2. Water System

#### CENTRALISED WATER SUPPLIES (URBAN)

##### Institutional and policy:

- Governance
- Legislation
- Institutional arrangements and mandates
- Monitoring
- Sector coordination
- PSP
- Regulation
- Standards

##### Service delivery:

- Governance in service delivery
- Institutional capacity
- Service delivery models
- Aggregation & consolidation
- Professionalisation

##### Financing:

- Funding sources: public (budgetary allocations), private, equity, bonds
- Pricing and tariff structures
- Subsidies
- Sanctions and fines

##### Water Resources Management:

- Coordination and demand management
- Climate resilience and water security

#### DECENTRALISED WATER SUPPLIES (RURAL)

#### WATER FOR ECONOMIC DEVELOPMENT

##### Data and innovation/technology

### 3. Triggers and drivers of reform (both inside and outside water system)

- Sector evolution, status and maturity: Coverage, separation of functions
- Reform triggers: Efficiency? Response to failures? External conditionalities?
- Main objectives of transformation: Political vision? Human rights? Economic drivers? Societal good?
- Drivers of transformation process: Technocratic? Political?
- Comprehensiveness of transformation: One sub-sector or multiple? Stand alone or integrated?



## ANNEX 2: REFERENCES

### Section 2

OECD (2015). *OECD Principles on Water Governance*. Retrieved from: [www.oecd.org/governance/oeecd-principles-onwater-governance.htm](http://www.oecd.org/governance/oeecd-principles-onwater-governance.htm)

Soppe, Gerard, Nils Janson, and Scarlett Piantini (2018). *Water Utility Turnaround Framework: A Guide for Improving Performance*. World Bank, Washington, DC.

The Kenya Institute for Public Policy Research and Analysis (2019); *Water and Sanitation Budget Brief*, Policy Brief series; No. 66/2018–2019

### Section 2.1

Adam, C., Knill, C., Hurka, S., & Steinebach, Y. (2019). *Introducing Vertical Policy Coordination to Comparative Policy Analysis: The Missing Link between Policy Production and Implementation*. *Journal of Comparative Policy Analysis*.

JMP. (2021). Viet Nam: *Rural and Urban Drinking Water Service Levels (2000 and 2017)*. Retrieved from <https://washdata.org/data/household#!/dashboard/new>

Lieberherr, E., & Ingold, K. (2019). *Actors in Water Governance: Barriers and Bridges for Coordination*. Water.

OECD. (2017). *Enhancing Water Use Efficiency in Korea: Policy Issues and Recommendations*.

Peters, G. B. (2018). *The Challenge of Policy Coordination. Policy Design and Practice*.

USAID. (2019). Kenya - Devolution: Factsheet.

World Bank. (2016). *Global Study on Sustainable Rural Water Service Delivery Models - Country Brief: Viet Nam*.

World Bank. (2017). *Water Management in Israel: Key Innovations and Lessons Learned for Water Scarce Countries*.

### Section 2.2

Aquanet/AquaRwanda (2017). *Final Sector Review Report Rwanda - Water and Sanitation Corporation Rural Water PPP Assessment*; September 2017

Chowns E. (2015). *Is Community Management an Efficient and Effective Model of Public Service Delivery? Lessons from the Rural Water Supply Sector in Malawi*; in *Public Administration and Development* volume 35, 263 – 276 (2019).

Diallo, O. (2015). *Levers of Change in Senegal's Rural Water Sector*.

Foster, T., Furey, S., Banks, B. and Willetts, J. (2015) *Functionality of handpump water supplies: a review of data from sub-Saharan Africa and the Asia-Pacific region*. *International Journal of Water Resources Development*, March 2019; <https://www.tandfonline.com/doi/abs/10.1080/07900627.2018.1543117?journalCode=cijw20>

Frade, J. (2019). *Finance Assessment of the WASH Sector in Rwanda*; IRC Netherlands, 2019

Lockwood, H., and Smits, S. (2011). *Supporting Rural Water Supply: Moving Towards a Service Delivery Approach*. Rugby: Practical Action Publishing.

Lockwood H. (2019). *Sustaining rural water: a comparative study of maintenance models for community managed schemes*. Sustainable WASH Systems Learning Partnership, Research Report, USAID, 2019; <https://www.globalwaters.org/resources/assets/sws/sustaining-rural-water-comparative-study-maintenance-models-community-managed>

OFR (2021). *Partenariat de l'Office des Forages Ruraux (OFOR) avec les communes et la décentralisation des services de l'hydraulique rurale pour la réalisation de l'ODD6 au Sénégal . Gouvernance de l'eau et Objectifs de Développement Durable: avancées et défis à l'échelle des Collectivités Territoriales dans l'Espace UEMOA .*

USAID. (2017). Water for Africa through Leadership and Institutional Support (WALIS).

MININFRA (2018). *Water and Sanitation Sector Strategic Plan 2018 – 2024*; Ministry of Infrastructure, Government of Rwanda; May 2018

WASREB (2019). *Guideline for Provision of Water and Sanitation Services in Rural and Underserved Areas*. Water Services Regulatory Board, Kenya, December 2019.

Water For People (2020). *Rural Water Supply Service Providers assessment in Rwanda*. Unpublished, June 2002

WHO/UNICEF. (2015). JMP Joint Monitoring Programme for Water Supply and Sanitation Annual Report

World Bank (2017). *Sustainability Assessment of Rural Water Service Delivery Models: Findings of a Multi-Country Review*. World Bank, Washington, D.C. <http://documents.worldbank.org/curated/en/558871503590535744/Sustainability-assessment-of-rural-water-service-delivery-models-findings-of-a-multi-county-review>

## Section 2.3

Accountability for Water. (2021). *Explore the Data*. Retrieved from Accountability for Water: Action and Research Programme: <https://www.accountabilityforwater.org/data-search>

CSBAG. (2020). CSBAG Annual Performance Report 2019.

Open Budget Survey. (2019). Open Budget Survey 2019: Uganda. Retrieved from <https://www.internationalbudget.org/open-budget-survey/country-results/2019/uganda>

TAI. (2017). *How do we Define Key Terms? Transparency and Accountability Glossary*. Retrieved from <https://www.transparency-initiative.org/blog/1179/tai-definitions/>

UNICEF. (2016). Accountability in WASH: Explaining the Concept.

WIN. (2016). Water Integrity Global Outlook 2016.

Personal communication with Mitchell Ainebyoona, Civil Society Budget Advocacy Group, April 2021.

## Section 3.1

WSD (2015). *Using the Water Services Development Planning System*. WSDP manual of practice Volume 3

Government of Kenya (2016). The Water Act, 2016.

## Section 3.2

Calfucoy et al. (2009). *Improving Free Basic Water Provision in South Africa*. University of Wisconsin-Madison.

World Bank (2019). *Doing More with Less - Smarter Subsidies for Water Supply and Sanitation*.

Joulavlev (2004). *Drinking water supply and sanitation services on the threshold of the XXI century*. Cepal. United Nations.

Stanford (2020). *Effective Targeting of Water Supply Subsidies*.

Mobile for Development (2021). *Smart Subsidies and Digital Innovation: Lessons from Togo's Off-Grid Solar Subsidy Scheme*. Available at: <https://www.gsma.com/mobilefordevelopment/blog/smart-subsidies-and-digital-innovation-lessons-from-togos-off-grid-solar-subsidy-scheme/>

## Section 3.3

OECD (2019). *Making Blended Finance Work for Water and Sanitation. Unlocking commercial finance for SDG 6*.

World Bank (2016). *Public-Private Partnership Development in Southeast Asia*.

Dalton (2018). *Performance-based contract for non-revenue water reduction – case study Bahrain*.

Hall and Lobina (2008). *Water Privatisation*. PSIRU.

## Section 4.1

OECD (2012). *Entrepreneurship, SMEs and Local Development: Clean-tech clustering as an engine for local development in the Negev Region, Israel 2012*; OECD Local Economic and Employment Development (LEED) Papers 2012/11

<https://youtu.be/O2pl63m7aSO>

<http://www.gwtha.com/introducing-the-watech-center-mekorot/>

Personal communication with Relly Bar-On, Innovation Unit, Merokot, April 2021

Personal communication with Barbara Schreiner, Water Integrity Network Association, April 2021

Personal communication with Mandla Msibi, Group Executive for Innovation and Impact and Mamhlosing Thlagale, Head of International, Water Research Commission; April 2021

SALGA (2020). *Launch of Municipal Water and Sanitation Technology and Innovation Platforms*, powerpoint document, South African Government Association, September 2020

WRC (2020). *Proposed Technology and Innovation Implementation Plan*; internal planning document, WRC

WRC (2020). *Annual report 2019/20*; Water Research Commission, South Africa, 2020; <http://wrcwebsite.azurewebsites.net/mdocs-posts/annual-report-2020-final/>

World Bank (2017). Marin, Philippe, Shimon Tal, Joshua Yeres, and Klas Ringskog. *Water Management in Israel: Key Innovations and Lessons Learned for Water-Scarce Countries*. World Bank, Washington, DC; 2017.

## Section 4.2

Personal communication with Antonio Manuel Rodriguez Serrano, Sr. Water and Sanitation Specialist, World Bank, April 2021

Requejo-Castro, D., Gine-Garriga, R., Flores, Banquero, O., Martinez, G., Rodríguez, A., de Palencia, A.J.F & Perez-Fouget, A. (2017) *SIASAR: a country led indicator framework for monitoring the rural water and sanitation sector in Latin America and the Caribbean*. *Water Practice and Technology*, 12(2), 372-385.  
<file:///C:/Users/officeadmin/Downloads/Requejo-Castroetal2017SIASARacountry-ledindicatorframeworkLatinAmericaandCaribbean.pdf>

SIASAR Data: <http://data.globalsiasar.org/>

SIASAR Home: <http://globalsiasar.org/en>

World Bank (2017). *Consolidation, Improvement and Expansion of the Rural Water and Sanitation Information System (SIASAR)*: <http://documents1.worldbank.org/curated/en/930481514358304158/pdf/AUS11483-WP-PUBLIC-SIASAROutputReportFinal.pdf>

World Bank (2019.) *Blogs. From Colombia to Kyrgyz Republic and Uganda: how we help countries adopt state-of-the art information systems for better management of rural water services* <https://blogs.worldbank.org/water/colombia-kyrgyz-republic-and-uganda-how-we-help-countries-adopt-state-art-information-systems>

## Section 4.3

Abu-Rumman, G., Khdaïr , A., & Khdaïr, S. (2020). *Current status and future investment potential in renewable energy in. Heliyon*

IEA. (2020). Retrieved from <https://www.iea.org/data-and-statistics/charts/electricity-consumption-in-the-water-sector-by-process-2014-2040>.

IRENA. (2015). *Renewable energy in the water, energy, and food nexus*.

Komendantova, N., Marashdeh, L., Ekenberg, L., Danielson, M., Dettner, F., Hilpert, S., Al-Salamyeh, A. (2020). *Water-Energy Nexus: Addressing Stakeholder Preferences in Jordan*. Sustainability.

Lane, J., Hudson, W., Gous, A., & Kuteesa, R. (2018). *Mini-Grid Market Opportunity Assessment: Uganda*.

MEMR. (2019). *Energy Sector Annual report Jordan*

MWE Ministry of Water and Environment (2019). *Solar Powered water systems design guidelines annex to water supply design manual second edition, 2013*

National Planning Authority (2020). *THIRD NATIONAL DEVELOPMENT PLAN (NDPIII) 2020/21 - 2024/25*.

Oirere, S. (2015). *In Africa, Clean Energy Provides a Route to Clean Water Uganda and South Sudan use solar PV to lower cost of Pumping water*. Earth Island.

USAID. (2020). *Investing in a water secure future Jordan*

Personal communication with Carolyn Kasisira, Ministry of Water and Environment , May 2021







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