

## Promoting water security at the city level: lessons from Lusaka

Topic Brief | August 2018



# Executive Summary

Water security has a critical role to play in preserving ecosystems, including those in urban areas. Through an in-depth case study of Lusaka, Zambia, this publication will explore how public authorities and their partners can work together to identify and respond effectively to risk by developing systems that protect water resources and therefore better plan for, manage, and supply a city.

In recent years, authorities in Lusaka have faced multiple challenges in providing a safe water supply, including a rapidly expanding urban population and cholera outbreaks exacerbated by contaminated groundwater; the most recent cholera outbreak lasted from October 2017 to March 2018, affecting seven provinces with nearly 6,000 cases declared, most in Lusaka.<sup>1</sup>

Several projects are now underway as part of a coordinated response to protect the city. The Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP) has been formed to better integrate the responsibilities of water resources management, water supply and sanitation as well as environmental protection. Lusaka Water and Sewerage Company is leveraging international funding to increase water production by building two new water treatment plants (and rehabilitating a third) on the Kafue, the main tributary of the Zambezi, and by reducing non-revenue water and promoting water efficiency. The role of safe sanitation in ecosystem protection has been acknowledged, with work underway to introduce faecal sludge management treatment plants and extend the sewer network.

This Topic Brief explores how organisations and governmental bodies across Zambia and Lusaka are now co-ordinating their approach to achieve city-wide water security and meet national and international goals. Stakeholders within bodies such as the Ministry of National Development Planning (MNDP) and the Lusaka Water Security Initiative (LuWSI) are now at the forefront of a synergistic planning and implementation process for managing urban water demand.

WSUP has worked in Lusaka for a number of years, and we have been struck by recent efforts to ensure that water supplies are managed holistically. This publication highlights these reforming initiatives undertaken by key Zambian stakeholders in the hope that they can provide lessons for others. We are therefore indebted to MNDP, MWDSEP, NWASCO, LuWSI and LWSC for their inputs.

<sup>1</sup> CDC Morbidity and Mortality Weekly Report (May 2018) 'Cholera epidemic – Lusaka, Zambia, October 2017-May 2018' 67 (19) 556–559

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# 1. Zambia's vision: achieving water security by 2030

## 1.1 Water security in Lusaka, Zambia

### 1.1.1 Water demand and water loss

Lusaka Water and Sewerage Company (a Commercial Utility and the mandated water and sanitation provider) currently serves just under 2,400,000 people across Lusaka city, Kafue, Chongwe, Luangwa, Rufunsa and Chilanga. The population of Lusaka district is estimated to be around 2.8 million. 60-70% of Lusaka's residents live in low-income informal settlements known as Peri-Urban Areas (PUAs). The government has recognised that the city's population will almost treble by 2030.

While more than 85% of Lusaka's residents can access safe water through LWSC's 100,000+ connections<sup>2</sup>, LWSC is struggling to meet demand, estimated to be around 340,000m<sup>3</sup> per day. The main water source is the Kafue river, which supplies Lusaka with around 100,000m<sup>3</sup> of water per day which is treated at the Iolanda water treatment plant. 130,000m<sup>3</sup> is supplied by LWSC through boreholes. Privately-owned boreholes also exist, but water from these is not likely to be properly chlorinated; in addition, these unregulated boreholes seem to be growing in number, making it hard for LWSC to provide continuous water supply, particularly during the dry season. There is therefore a shortfall between current demand and available supply of around 110,000m<sup>3</sup> per day, the equivalent of more than 450 million m<sup>3</sup> per year. This results in non-continuous water supply in areas across Lusaka.

Rates of leakage and ageing/poorly managed infrastructure worsen the issue, as safe water supplied by LWSC can disappear before it reaches customers, losing LWSC potential revenue and worsening the cycle of non-revenue water (NRW) and infrastructure dilapidation.

### 1.1.2 Impact on public health

Lusaka has a karst topography; groundwater can be accessed directly through thousands of shallow wells and openings in the rock layer. While this makes water extraction easier, this also means that groundwater is vulnerable to contamination, particularly if sanitation facilities leach their contents into the surrounding soil, and if informal pit emptiers dump sludge from latrines into open drains and water bodies. This is one of the major causes of cholera, which is endemic in Zambia. Following the 2017-18 outbreak in which 88 people died,<sup>3</sup> the government undertook to never allow another outbreak.

### 1.1.3 An action plan

To meet the growing demand of the capital city for clean water and to achieve Sustainable Development Goal 6, the government of Zambia is pursuing an ambitious plan to divert more water from the Kafue river rather than relying on boreholes to access groundwater. Initially, this will focus on increasing the availability of surface/groundwater, therefore filling existing gaps in supply and ensuring that all residents receive 24/7 water supply. The next phase will pursue a long-term gradual phasing out of boreholes, with LWSC using two expanded treatment plants to draw up to 75% of its water from the Kafue.

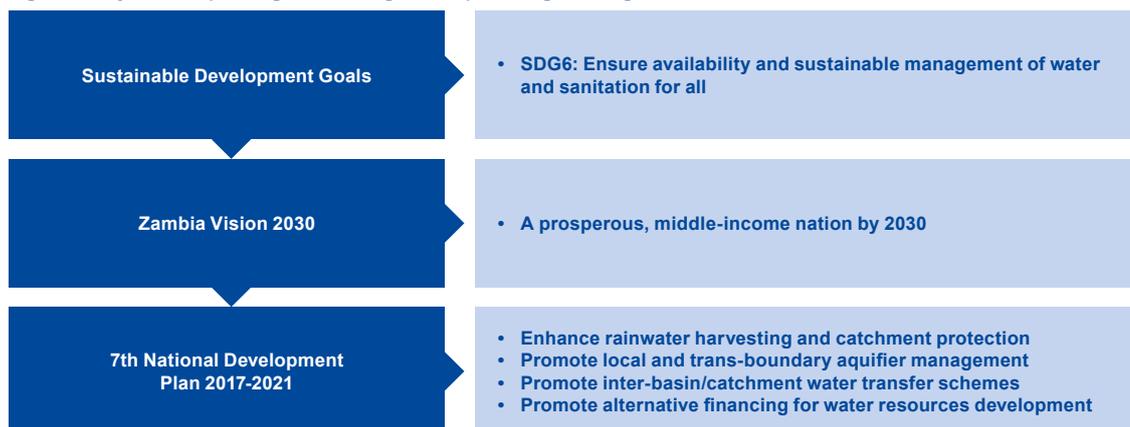
Ensuring enhanced access to a safe water source will mean that stakeholders in Lusaka will be better able to plan for improved water and sanitation service provision citywide – including for peri-urban areas.

This will require a coordinated, multi-stakeholder approach from governmental ministries, departments and their non-governmental partners.

<sup>2</sup> NWASCO (2018) Urban and Peri-Urban Water Supply and Sanitation Sector Report 2017. [http://www.nwasco.org.zm/downloads/Publications/Urban%20and%20Peri-Urban%20WSS%20Sector%20Reports/sector\\_report\\_2017.pdf](http://www.nwasco.org.zm/downloads/Publications/Urban%20and%20Peri-Urban%20WSS%20Sector%20Reports/sector_report_2017.pdf)

<sup>3</sup> WHO Zambia (2018) Zambia cholera outbreak report – 18-24 March 2018. <https://www.afro.who.int/publications/zambia-cholera-outbreak-report-18-24-march-2018>

Figure 1: Major development goals, strategies and policies governing Zambia's water sector



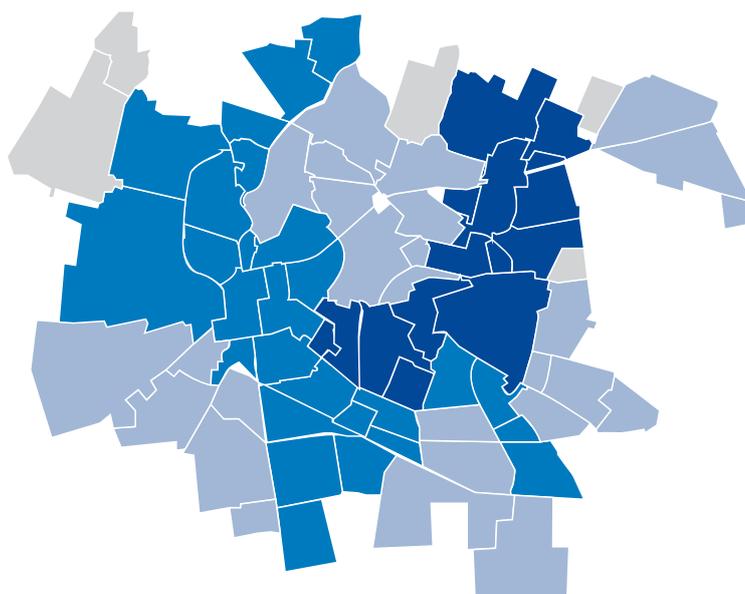
## 1.2 International investments in improving water supply

With funding from international donors, water supplied from the Kafue is being increased through infrastructure upgrades. These are tackling a variety of water resource management requirements, including raising the production capacity of the Kafue, improving water storage and treatment facilities and reducing NRW.

- Millennium Challenge Account Zambia's 'Lusaka Water Supply, Sanitation and Drainage (LWSSD) Project' is funded by United States Government through the Millennium Challenge Corporation. LWSSD is extending sewerage systems to un-connected areas, rehabilitating the Iolanda water treatment site, repairing the transmission line from the Kafue, reducing NRW, and constructing water kiosks in some PUAs. There is also a focus on strengthening the capacity of LWSC and Lusaka City Council.
- With funding from the Chinese government, the 'Kafue Bulk Water Supply Project' will increase the water supplied by the Kafue to 158,000m<sup>3</sup> per day, improving production capacity and storage systems.
- The Japanese International Cooperation Agency (JICA) is constructing a 200,000m<sup>3</sup>/day pumping intake and central distribution reservoirs to improve supply to PUAs in Lusaka's west and south.
- The 'Lusaka Sanitation Program' (LSP) is funded by the World Bank, the European Investment Bank, the African Development Bank and the KfW, and delivered by LWSC. While its focus is on improving off-site and on-site sanitation, the LSP is also rehabilitating the trunk mains from the water treatment plant and upgrading it from 90,000m<sup>3</sup>/day to 110,000m<sup>3</sup>/day. This will be joined by four additional faecal sludge treatment plants and 10 decentralised wastewater treatment systems to process waste from Lusaka's on-site sanitation facilities.

While these projects are very likely to contribute to a significant increase in the production capacity of the Kafue (460,000m<sup>3</sup> in total), whether these improvements are felt by those living in Lusaka's PUAs will depend on how that water is managed at the national and city level. Alongside the upgrading of infrastructure and the move away from groundwater resources, Zambia has therefore been undergoing a long-term institutional shift towards a more synergistic and multi-stakeholder development planning process.

**Figure 2: Water sources for Lusaka city and PUAs**  
 Dark blue = areas supplied solely by water from Kafue  
 Medium blue = areas supplied by Kafue and boreholes  
 Light blue = areas supplied solely by boreholes  
 Grey = independent water suppliers



Source: 'DMAs boundaries and priority', 2018. Produced by Seureca/Veolia for MCA Zambia and LWSC. Drawn by Gaëtan Coine

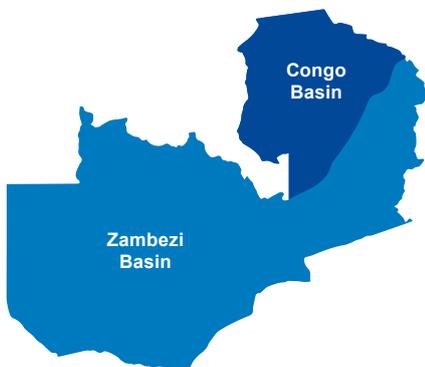
## 2. Water resource management sector reform

Zambia's water and sanitation sector has reformed gradually. Reforms started in 1993, and in 1994 the National Water Policy was promulgated. To support implementation of the Policy, the WSS Act No. 28 of 1997 was enacted. The Act established NWASCO and provided for the formation of water supply and sanitation utilities. LWSC was established in 1988 and started operations in 1990 prior to sector reforms. Water Trusts (now 11 in total) were constituted by NGOs, especially Care International. They were officially put under LWSC operating licence in April 2008 through a Management Service Contract (MoU). Water and sanitation have gradually grown in profile within the national government; originally only a sub-department within the former Ministry of Local Government, it was then upgraded to a department before becoming the standalone Ministry it is today.

### 2.1 Previous institutional structure for water resources management and service delivery

According to the draft National Water Policy 2010, the Water Resources Management Authority (WARMA) is responsible for managing, developing and protecting Zambia's water resources, which include the Zambezi, Chambeshi and Luapala rivers (the Kafue and Luangwa rivers are tributaries of the Zambezi).

Figure 3: River basins in Zambia

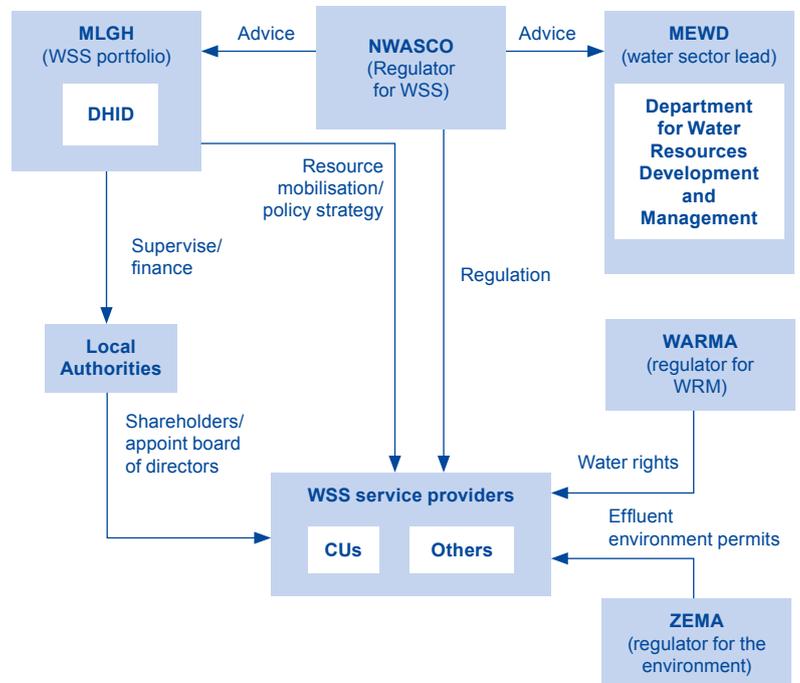


Source: Adapted from National Technical Task Force (2015) National non-revenue water management strategic framework. NRW-NTTF, MLGH

Until recently, WARMA sat within the former Ministry of Energy and Water Development. Other public bodies with water-related mandates sat separately. This included the Ministry of Local Government and Housing which oversaw the Local Authorities (such as LCC) who are responsible for water supply and sanitation, who in turn formed Commercial Utilities to provide the services themselves. The regulatory function sat with NWASCO, while the Zambia Environmental Management Agency (ZEMA) was responsible for environmental protection (see Figure 4).

Other key ministries included the Ministry of Finance and National Planning (MFNP), the Zambia Public Procurement Authority, the Zambia Revenue Authority and the Department of Housing and Infrastructure Development.

Figure 4: Water sector institutional framework, 2010-2017.



Source: Adapted from NWASCO (2017) Urban and Peri-Urban Water Supply and Sanitation Sector Report 2017

## 2.2 Ongoing reform, 2016-

As sector reforms continued to progress, it became apparent that the multiple actors and mandates operating in Zambia’s water sector required more cohesive management.<sup>4</sup> Bringing together actors from across the water resource management sector, water supply and sanitation sector, environmental protection and pollution control sector would enable the strategic aims outlined in the 7<sup>th</sup> National Development Plan to be attained more efficiently, and significantly contribute to the eventual achievement of SDG6 and the Zambia Vision 2030.



Image: LWSC installing dip tubes & data loggers

### 2.2.1 New ministries and mandates

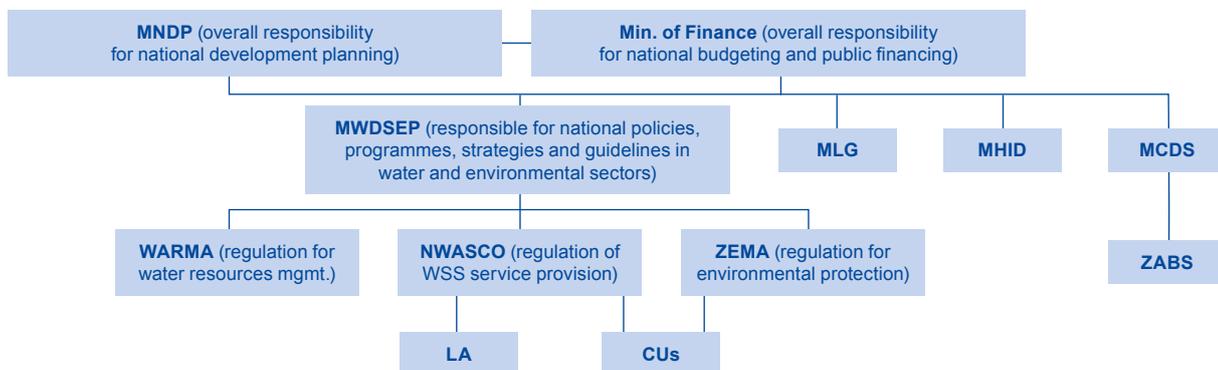
Following the 2016 national election, the government established new ministries in 2017 with the explicit stipulation to achieve the Zambia Vision 2030 and to align with the SDGs. ZEMA, NWASCO and WARMA were brought under the roof of the reconstituted Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP). MWDSEP sits under the Ministry of National Development Planning (MNDP) alongside 12 other Ministries including Local Government (MLG) and Housing and Infrastructure Development (MHID). The Zambia Bureau of Standards (ZABS) sits within the Ministry of Community Development and Social Services (MCDS) and provides standards for all sectors, including for NWASCO, ZEMA and WARMA (see Figure 5).

medium-term national development plans; monitoring and evaluating the implementation of national development plans, programmes and projects; and coordinating project identification, design and appraisal of public investments.

MNDP is broadly responsible for: coordinating the national vision, goals and development priorities and reaching consensus among the various stakeholders; preparing the long- and

Particularly key for Lusaka’s water security and supply, WARMA continues to issue abstraction licenses to farmers, hydropower producers, industrial users, mine operators and water utility operations. LWSC, for example, is licensed to abstract 820,000m<sup>3</sup> per day, although this is currently under review. WARMA recently established a Statutory Instrument that enforces the registration of all existing boreholes and the licensing of all proposed boreholes. The SI was signed in April 2017 and WARMA has since mapped all existing boreholes. All drilling companies must now make a formal application to WARMA before starting operations; the annual licensing fees will be a major facet of the sector’s future financial sustainability.

Figure 5: Governmental arrangements for provision and regulation of urban water supply and sanitation in Zambia, 2018.



Source: Adapted from NWASCO (April 2018) Urban onsite sanitation and faecal sludge management: Framework for provision and regulation in Zambia

<sup>4</sup> NWASCO (2017) Urban and Peri-Urban Water Supply and Sanitation Sector Report

## 3. An integrated approach to water management planning and development

### 3.1 The 7<sup>th</sup> National Development Plan

These structural reforms have been matched by a shift in approach to planning and development in Zambia. Now, MNDP emphasises the importance of a multi-sector approach, with bodies working in clusters to achieve strategic national aims. This systematic collaboration will ensure that activities related to industrial, regional and urban development bring benefits to all, including the poorest.

These clusters are formed according to the 'strategic areas' that must be developed if Zambia is to achieve its aim of reaching middle-income country status by 2030. These areas are outlined in the 7NDP, which provides guidance for Zambia's medium-term development from 2017-2021.

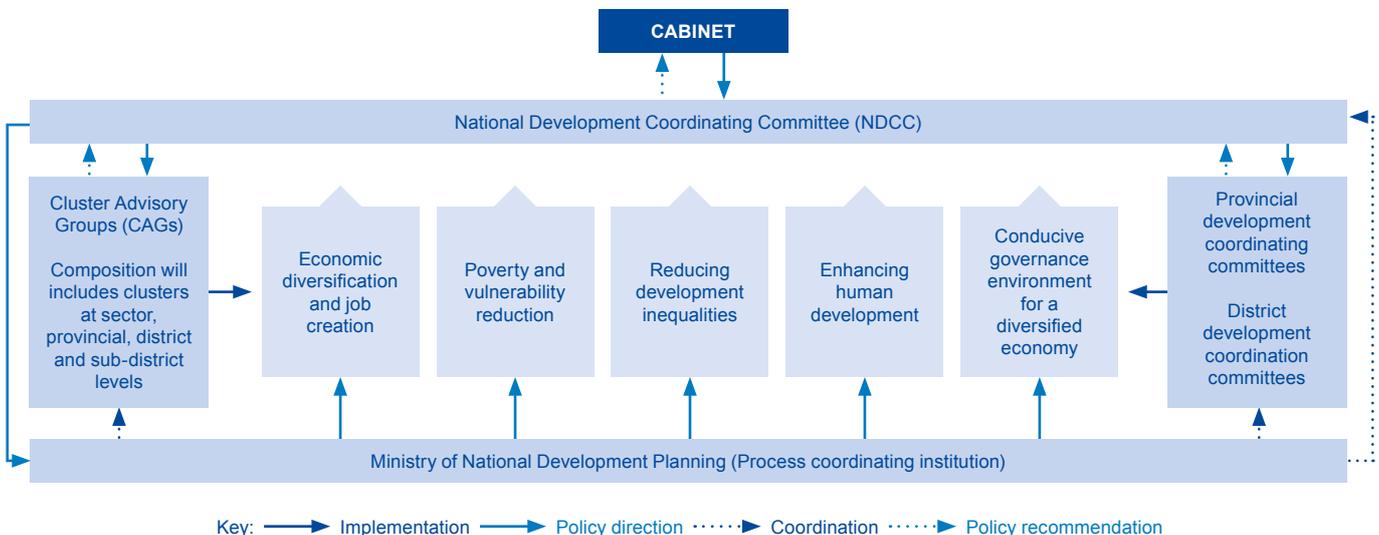
These strategic areas aim to deliver ambitious outcomes which require multi-sector coordination: economic diversification and job creation; poverty and vulnerability reduction; reducing development inequalities; enhancing human development; and conducive governance environment for a diversified economy. Improving

access to water supply and sanitation is a key development outcome of the 'Enhancing human development' pillar of the 7NDP (see Figure 6).

This holistic approach will be crucial for the development of the water sector, particularly regarding industrial pollution from mines and farms that threatens the safety of water drawn from the Kafue. The Kafue is recharged through rainfall but also receives significant recharge from mining activities, most notably in Zambia's Copperbelt province. This contaminated water is then used by those downstream.

This can be alleviated by, for example, introducing more stringent pre-treatment requirements for mines and mining companies. Bringing together those working on water security and industrial development (i.e. WARMA and ZEMA) within one ministry has improved coordination between these bodies, ensuring that water entering and leaving the Kafue can be monitored and protected at all stages. For example, WARMA and ZEMA both implement regulations that safeguard water sources, and are kept aware of what each other (and NWASCO) are doing.

Figure 6: Institutional arrangements for coordinating cluster advisory groups at sectoral/ministerial level



Source: MNDP (2017) 7 National Development Plan 2017-2021. <http://www.mndp.gov.zm/download/7NDP.pdf>

### 3.2 Lusaka Water Security Initiative (LuWSI)

LuWSI is a multi-stakeholder collaboration between public sector, private sector, civil society and international actors inspired by and working towards water security for Lusaka's residents and businesses. LuWSI partners engage in dialogue and leadership, analysis and knowledge generation, advocacy and awareness raising, planning and project development. The Initiative was founded in 2016 and now includes more than 20 partners. LuWSI therefore encapsulates the spirit of the SDGs and 7th National Development Plan regarding multi-stakeholder approaches, ensuring that resources and expertise are pooled in the pursuit of a commonly agreed agenda.

NWASCO hosts the LuWSI Secretariat and runs its affairs with the support of other LuWSI partners. The Secretariat provides technical, administration and partnership management and development functions in support of LuWSI's governance structures, which includes the Steering Board and two technical committees. The Secretariat also coordinates the implementation and monitoring of specific projects developed under or aligned with the LuWSI collaboration system.

LuWSI's enduring contribution towards Lusaka's water security has been the creation of a platform on which private companies (including the Zambia Chamber of Commerce and Industry, ZACCI), public sector players (such as NWASCO, Lusaka City Council and WARMA), and civil society can collaborate across different mandates and interests: water resources management; water supply, sanitation and hygiene; disaster monitoring and mitigation; development planning and land administration; community empowerment and those interested in service provision and improved mutual accountability and governance. These actors can now work with each other directly and align their policies and programmes within the water security agenda.

The resulting organisational and personal relationships allow solutions to complex water security challenges to be identified; for example, LuWSI has facilitated the development of multi-stakeholder projects such as the Wellfield Protection Project and the Education and Awareness Project. LuWSI is currently

implementing a planning process that will produce a multi-stakeholder-owned water security plan for Lusaka and specific groundwater development project proposals. The latter includes the Lusaka West Water Supply Project, which will address the water challenges in Lusaka's light industrial area.

### 3.3 Water and sanitation service provision in Lusaka

These institutional changes at the national level are still relatively recent and have yet to fully translate to all sub-national levels; for example, Development Committees have been established at the provincial and district levels, but not yet at the ward level. However, the steady progress of water management sector reform in Zambia over the last two decades or so has already led to incremental improvements to water and sanitation access in PUAs.

#### 3.3.1 Moving customers up the water and sanitation ladders

In Chainda, a PUA in the east of Lusaka, LWSC has provided an independent source of water through three boreholes. Pre-paid water kiosks were subsequently established, and customers given the choice to install pre-paid meters on their individual connections. Revenue by LWSC in Chainda subsequently quadrupled, and customers were able to choose how they were able to obtain their water. This had a knock-on effect on sanitation practices, as customers were encouraged to install a septic tank rather than continue to use a pit latrine.



Image: Lusaka. Credit: Jon Healey

The establishment of Water Trusts has also led to improvements in service quality and affordability in PUAs. The Water Trust model is, simply, for local communities to formally supplement the services supplied by LWSC. WSUP has played a role in the development of several Water Trusts: working with LWSC to improve the service management contracts with Water Trusts; improving the management model of Chainta Water Trust through the establishment of a delegated management unit; and launching a Water Trust in Mtendere East.

Most Water Trusts focus on delivering water in PUAs, but Water Trusts in two PUAs (Kanyama and Chazanga) also provide sanitation services. WSUP worked with LWSC, Kanyama Water Trust and Chazanga Water Trust to establish pit-emptying services and build treatment facilities. Sludge from households in these PUAs can now be collected by affordable emptiers and then transported to either a treatment plant in Chazanga or one of two treatment plants in Kanyama, where it is processed and treated before being disposed of safely or reused.<sup>5</sup>

### 3.3.2 Ensuring supply through land formalisation

Lusaka's PUAs were formally considered to be illegal settlements; as such, water utilities and power companies were not able to extend services into these areas. MLG, however, legalised the PUAs which paved the way for systematic service improvements.

Extending roads and water provision into these PUAs then gave residents an impetus to upgrade their housing and sanitation facilities, particularly once they were secure in their legal right to live in PUAs.

### 3.3.3 Regulating on-site sanitation services

Sanitation coverage in urban areas lags water coverage; in Lusaka, sanitation coverage stands at just under 74%, which is higher than the national average but below the sector benchmark of 80%.<sup>6</sup> However, only 15-20% of Lusaka's population are connected to sewerage; the remainder rely on on-site sanitation facilities such as pit latrines. Given Lusaka's high water table and frequent flooding, poorly constructed pits can easily leach their contents into the surrounding soil or into the streets during the rainy season. In PUAs where boreholes and shallow wells are used to access water, this is a significant public health issue.<sup>7</sup>

The role of safe sanitation in ecosystem protection has been acknowledged, with work underway to introduce faecal sludge management treatment plants and extend the sewer network. NWASCO has recently released a new framework for regulating on-site sanitation and faecal sludge management.<sup>8</sup> This framework acknowledges that on-site sanitation and faecal sludge management have been overlooked in terms of regulation to date, although it has been recognised in national policies and laws (such as the WSS Act 1997, which mandated NWASCO to regulate on-site sanitation, and the National Urban and Peri-Urban Sanitation Strategy 2015, which underlines LAs' mandate to provide sanitation alongside CUs).

<sup>5</sup> WSUP (November 2017) A guide to strengthening the enabling environment for faecal sludge management. Experience from Bangladesh, Kenya and Zambia.

<sup>6</sup> NWASCO (April 2018) Urban onsite sanitation and faecal sludge management: Framework for provision and regulation in Zambia.

<sup>7</sup> WSUP (February 2018) Towards citywide sanitation in Lusaka: The next phase of non-sewered sanitation.

<sup>8</sup> NWASCO (April 2018)

## 4. Next steps for Lusaka

The long-term aim is, of course, to increase overall safe water coverage across Zambia so that the country can meet the 2030 goals. Ensuring city-wide safe and secure water coverage in Lusaka, including in PUAs, will be a major step towards this.

However, immediate issues remain that must be resolved. These include:

- Capacity building and training for LWSC to manage the new treatment plants and distribution systems;
- Continuation of infrastructure development, while reducing leakage by 20%;
- Connecting water sources to the existing network through new distribution systems;
- Reducing NRW; and
- Improving hours of supply and water quality.

Managing water resources in the face of rapid urbanisation is a challenge for cities across the world, certainly not just for those in sub-Saharan Africa. Day-to-day planning is already complicated in Lusaka, a city which is extremely unlikely to fully transition to off-site sanitation in the near future and where most of the population live in PUAs which differ hugely from each other in terms of population density and area characteristics. Establishing long-term plans that are both achievable yet ambitious enough to reach targets is, for many public authorities, unlikely.

However, Zambian efforts to do just that are notable. Ministerial reforms are, so far, being matched by a change in institutional approaches to long-term national development. A new focus on multi-sector coordination, led by the MNDP, could ensure that Lusaka's water sources are managed in such a way that all residents of the city, including the poorest and most marginalised, will be able to access safe water, and will be able to for decades to come.



**Image:** Collecting water in Chazanga. **Credit:** Gareth Bentley

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Authors: Rosemary Campbell, Kameya Kashweka, Rosie Renouf. Series editor: Sam Drabble.  
Coordination and design: Amit Patel