

CRIDF

Case study:
Maseru, Lesotho

MARCH 2018

REDUCING LOSS OF TREATED WATER OFFERS SUBSTANTIAL FINANCIAL GAINS TO WATER UTILITIES

Managing water demand in Maseru, Lesotho

The Climate Resilient Infrastructure Development Facility (CRIDF) is supporting water demand management (WDM) in the city of Maseru that will save water, improve water quality and deliver transboundary flow benefits. CRIDF took a practical approach to supporting Lesotho's Water and Sewerage Company (WASCO), providing technical assistance and funds for designing and installing valves, meters and manhole chambers in a pilot water zone. Pressure flow logging in the pilot zone clarified leakage issues and helped to determine how and where to improve the water supply system. The model WDM system can be applied across the city and adapted to other urban areas in the Southern African Development Community (SADC).

The Orange-Senqu Basin, spanning Namibia, Botswana, South Africa and Lesotho, is one of the most water-stressed regions in Southern Africa. Precipitation varies considerably from year to year, mostly falling during highly localised, intense storms. Maseru, the capital of Lesotho, has a population of around 250,000. Water for the city is abstracted from the transboundary Mohokare/Caledon River, treated at the waterworks in Maseru and pumped to customers. Approximately half of the treated water is lost through water leakage. Reducing losses – the physical loss of water across the distribution system and the economic loss from unauthorised consumption, bypassed meters, inaccurate meter readings and ineffective billing – offers opportunities for Lesotho's water company to increase revenues and improve water supply services.





THE CHALLENGE

WASCO, which provides urban water across Lesotho, faces three main challenges:

- inadequate management of water pressure, which causes pipes to burst and leak;
- ineffective use of energy for treating and pumping water to customers; and
- insufficient capture of water use by the customer billing system.

WASCO wants to reduce water losses with minimal disruption, raise awareness among decision makers of the necessity for action to improve the sustainability of water services and improve revenues to allow re-investment in water demand management systems.

CRIDF, a water infrastructure facility funded by the UK Department for International Development (DFID), delivers sustainable infrastructure across 12 SADC countries. In Maseru, CRIDF worked with WASCO to pilot investments to reduce physical and economic water losses, known as non-revenue water.



ADDRESSING THE CHALLENGE

CRIDF's approach was to work closely with WASCO to improve understanding of how water moved through the distribution system and, building on this understanding, to identify interventions that could reduce losses.

Defining water demand management areas

The CRIDF team supported WASCO in revising and further developing its existing hydraulic network model to provide more detail and more accurate information about the water distribution system. This support meant WASCO had better information for demarcating water supply zones in Maseru City. Defining zones allows WASCO to break down information on the water produced, used and lost in each zone. With this information, WASCO is in a better position to identify ways to reduce losses and improve water services.

In discussions between WASCO and CRIDF, the Tikoe area was selected as a pilot zone to demonstrate the viability of the water demand management approach and its potential benefits. The Tikoe zone was chosen because, as it is a relatively new urban area, the pipe network was likely to be less complex than that in some of the older zones.

Isolating the pilot zone

To understand the flow of water, WASCO and CRIDF needed to isolate the Tikoe zone from other water supply zones in Maseru. This enabled WASCO to calculate the amount of water entering the zone and the amount of water being used. However, it required the installation of isolation valves and water meters, which could potentially severely disrupt customer supply. CRIDF took an integrated approach, engaging the WASCO planning and operation departments in deciding the best way to install the valves to ensure customers were not negatively impacted.

Using flow and pressure logging, the CRIDF team carried out a diagnostics test to get an understanding of the health of the water supply system in terms of efficiency, losses and pressures. The test results showed that the difference between the amount of water entering the zone and the amount of water used in the zone – the non-revenue water or water loss – amounted to nearly 60%, indicating that there was a huge opportunity to improve water management.

Analysing financial returns

A financial analysis showed that reducing water losses in the Tikoe zone from 60% to 25% would bring WASCO additional revenue of around 3% or £200,000 a year (net present value) over 20 years. Should WASCO embark on a programme to reduce water losses throughout Maseru, revenues could increase by 15% or £1 million a year. Higher revenues would enable WASCO to make ongoing improvements to water services.

Strengthening resilience

Hands-on training of WASCO staff during the project encouraged widespread buy-in and ownership. This enhanced capacity will deliver significant cost savings and improvements



to water services in the long term. The benefits from building capacity go hand-in-hand with the benefits derived from reducing leaks and saving water, and both are critical for sustainable water supplies. Moreover, strengthening WASCO's capacity may lead to wider improvements in Lesotho's water services and sanitation in low-income communities, in human and environmental health, and in resilience to climate change and transboundary water management.

Developing the business case across the Southern African Development Community

Given forecasts of more frequent and longer droughts in the region, and as of February 2018, the imminence of Day Zero in Cape Town, the importance of reducing water losses across Southern Africa cannot be overemphasised. Based on the Maseru experience, CRIDF and the Stockholm International Water Institute assessed the business case for investing to reduce water losses in nine SADC countries. Addressing water losses in these countries would save 275 million m³ of water and US\$75 million a year, benefiting around 20 million people now, including 6.7 million urban poor, and 40 million by 2038.

RESULTS OF THE MASERU WATER DEMAND MANAGEMENT PROJECT

Demonstrated the strategic value of investment in water management

The pilot project showed that WASCO could make significant savings by investing in water demand management systems. Currently, WASCO spends a substantial proportion of its budget on replacing and repairing old, dilapidated infrastructure – a reactive rather than a proactive approach. Focused, strategic investment in water demand information and management

would allow WASCO to leverage investment in infrastructure to save on repairs and replacements, free up resources to improve water services, and establish its financial viability and creditworthiness for further investment.

Increased stakeholder engagement

The pilot project showed that improving water supplies requires reducing non-revenue water losses. As a first step in improving water supplies in Maseru, CRIDF engaged and consulted with WASCO stakeholders to secure buy-in and assess water demand. This has led to an ongoing conversation among WASCO departments and the CRIDF team about the significance of water demand management in reducing losses.

Identified financial challenges

Estimates indicate that only half of the residential properties in Maseru and Tikoe are registered in the customer billing system. Currently, there is insufficient data to accurately calculate how much water is billed and how much additional revenue could be collected if billing improved. Once WASCO's property geographic information system and billing system database are fully linked, the next step will be to establish a robust billing system to improve revenue collection. Projections of likely income would enable WASCO to plan how to use revenues to improve water services, and to mobilise finance for the necessary infrastructure.

Identified priorities for investment in infrastructure

The project has enabled WASCO to better identify priorities for investing in infrastructure in the pilot zone and has demonstrated the potential benefits of further investment in water demand management systems. CRIDF is exploring the barriers and constraints to securing ongoing financing for these investments.

INVESTMENT OPPORTUNITIES

The project has opened two investment spaces to improve the delivery of water services by WASCO in Maseru.

Firstly, the project has demonstrated the potential benefits of investing in water demand management systems. Quantifying the institutional, technical and financial investments required to scale up improvements in water demand management across Maseru equips WASCO with evidence on which to plan and manage investments, as well as develop investment proposals.

Institutional investments include:

- setting up a non-revenue water department in WASCO;
- establishing ring-fenced budgets for each water zone and incentives for zone managers; and
- setting up an operations and management department for repairing leaks and logging flow pressures.

Technical investments to replicate the approach piloted by CRIDF in the Tikoe zone in other water zones in Maseru include:

- working with WASCO on the hydraulic model to define zone boundaries more effectively;
- installing additional valves and flow meters;
- diagnosing the nature and causes of variable flow pressures and leaks; and
- setting up systems to regularly record water balances and track progress in reducing water losses.

Financial systems investments would involve:

- linking geographic information system data on households to the WASCO billing system;
- improving the accuracy of water meter readings; and
- collecting and re-investing revenue effectively.

Secondly, addressing water demand management has enabled WASCO to identify infrastructure projects that could reduce non-revenue water, improve services and assist the company to become financially sustainable. More robust modelling

of the potential benefits of infrastructure investments will enable WASCO to demonstrate its creditworthiness and boost the likelihood of attracting financing. In the meantime, CRIDF continues to work, with WASCO and others, to address further barriers to financing.

Identifying viable areas for investment and developing robust models of potential benefits will allow WASCO, and similar water utility companies, to present sound business cases to investors and to demonstrate where public and private entities, grantors and lenders can invest to deliver significant returns. It is in these aspects, however, that utilities need the most support.

The business case for investing in **reducing water losses** in **9 SADC countries** shows that it could:

 **Save**
275 million m³
of water per year

 **Benefit**
6.7 million
urban poor

 **Benefit around**
20 million people now
and **40 million** by 2038

Contact us

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