POLICY BRIEF

WATER DEMAND MANAGEMENT IN THE LIMPOPO RIVER BASIN

The Limpopo River Basin (LRB) is one of the most vulnerable transboundary basins in the Southern African region, because of water scarcity and climate-related risks, as well as in its limited capacity to adapt. Water Demand Management (WDM) can reduce these risks through conservation and re-use of water resources. In 2016 the Resilience in the Limpopo River Basin program (RESILIM), funded by USAID-Southern Africa, carried out a cost benefit analysis (CBA) of Water Demand Management (WDM) options for the Limpopo River Basin. The goal of the CBA was to understand households' and farmers' preferences in adopting and using WDM options in the basin, and to assess their ability and willingness to make trade-offs and adapt when faced with reduction in water supply. This policy brief shares recommendations and policy options derived from the study, and provides key messages for decision-makers about the benefits of implementing WDM options as a critical strategy in building the climate resilience of people and ecosystems in the basin.

*This brief is based on the **Limpopo River Basin Disaster Preparedness Action Plan 2016**, produced by the Global Water Partnership Southern Africa for the USAID Southern Africa Resilience in the Limpopo River Basin (RESILIM) Program, collaborating with institutions in the four riparian states to improve water management, promote biodiversity conservation, and support climate change adaptation. The Program is made possible through the support of the American people through the United States Agency for International Development (USAID). The contents of this document do not necessarily reflect the views of USAID or the United States Government. Full document available at:* https://www.usaid.gov/documents/.

FAO

IMPLEMENTING WDM OPTIONS IN THE LRB

The Limpopo River Basin supports 18 million people across four riparian countries (Botswana, Mozambique, South Africa and Zimbabwe), and has a total catchment area of approximately 408, 000 km^2. The basin is characterized by water scarcity and a growing demand arising from both rapid population and economic growth. Large urban centers such as Gaborone, Pretoria, Johannesburg and Bulawayo are the major users of domestic water in the basin. Irrigated agriculture is the largest overall user of water, accounting for approximately 50% of the total water demand.

The basin has approached water resource closure, and urgent choices need to be made about its current and he future management. Faced with serious water scarcity, investing in large infrastructure is a solution that will take some time to implement. Solutions with results in the short term are needed. Two clear Water Demand Management options are available to policy makers:

WHY WATER DEMAND MANAGEMENT?

The LRB has approached water resource closure

Investing in new water infrastructure will likely take up to five years or more to complete

Meanwhile climate variability and climate change are already reducing available water

Conserve: use currently available water efficiently as an adaptation strategy to meet present and future water supply. This option includes protecting the environment at catchment level, switching from flooding irrigation to drip irrigation, retrofitting water pumps and shower heads to conserve water, and reducing water wastage through curbing non-revenue water.

Re-use: develop alternative technologies that can serve to substitute or augment the supply of water in the basin. The most obvious alternative here is use of waste and recycled water.

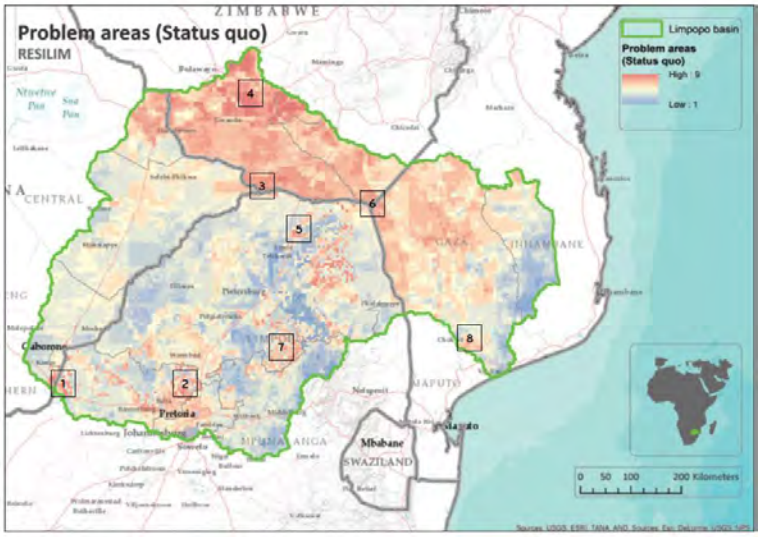
The overall objective of implementing WDM strategies is to use water more efficiently, rather than focusing on increasing water supply. Many regulatory and water-pricing options can be used to promote more efficient water use technologies, practices and behaviors aimed at improving water resources management and enhancing climate resilience of people and ecosystems.

A WDM strategy involves applying sector specific technical, economic, and social approaches and incentives that lead to efficient, equitable and beneficial use of both water and financial resources. WDM's socio-economic, biophysical and environmental benefits include:

- Improving the **availability** of water for allocation to other users or for competing users;
- Improving the **financial security** of water institutions by reducing non-revenue water;
- Increasing understanding of the **value of water** as a scarce resource and providing economic incentives to use it responsibly;
- Reducing the amount of **effluent** that must be treated due to the management of leaks;
- Positive impacts on the **environment**;
- Reducing the **uncertainty** of demand forecasts since the water intensity of each end-user is known, water usage per consumer can be calculated, and demand for new consumers can be predicted;
- Reducing impacts of **climate change** through efficiency, flexibility in water resource management.

THE STUDY

The LRB IWRM Strategic Plan 2011-2015 calls for the Limpopo Watercourse Commission (LIMCOM) to promote methods to increase the availability and the efficient use of water resources in the Basin. In 2015-16, based on this need, the Resilience in the Limpopo Basin (RESILIM) Program, funded by USAID Southern Africa, conducted a cost benefit analysis (CBA) of Water Demand Management options to build an economic argument for improving the efficiency of water use by different actors. The study conducted a survey of basin households and farmers, and analyzed data about water efficiency measures in the region.



RESILIENCE ACTION AREAS IN THE LRB

Based on the report, *Risk, Vulnerability & Resilience in the Limpopo River Basin*, which identified vulnerable hotspots - Resilience Action Areas (RAAs) - survey sites were selected in Botswana, Mozambique and Zimbabwe.

Four WDM options, relevant for most of the eight RAAs in the LRB, and in particular for RAAs 1, 3 and 6, were selected to carry out the study. WDM strategies selected were:

- Improving the quality of water to **increase the use of recycled waste water** in the RAA.1 (Botswana and South Africa) and the RAA.6 – Pafuri Triangle;
- Improving water system efficiency through **implementing drip irrigation** versus flood method irrigation in the RAA.1 (Botswana and South Africa) and the RAA.8 – (Mozambique);
- **Improving end-use efficiency of water** in the RAA.1 – (Botswana and South Africa) and the RAA.6;
- **Improving the availability of water** per capita through enforcing catchment protection and ecosystems conservation in the RAA.3 (Botswana, Zimbabwe and South Africa).

The survey and data analysis provided useful insights for water manager and policy makers.

WBM OPTIONS ANALYSED

INCREASING THE USE OF RECYCLED WASTE WATER

South African experience shows that recycled water works Reuse of treated effluent not only strengthens the sustainability of water resources; but also strategically increases the security of supply through the diversification of water resources. In the Limpopo Water Management Area North (where treated water is used in mining and industry), Olifants River Catchment and eThekwini Municipality

(Durban Water Recycling Project and Umgeni Water) in South Africa, treated wastewater is gradually being put to some economic use.

RECYCLED WATER?

Households and farmers in the Limpopo basin are willing to use recycled water for agricultural purposes, watering gardens, and flushing toilets

Investments are needed for wastewater treatment plants

Households need to separate and store recycled wastewater

Consumers want recycled water that appears to be clean Colour, price, suspended solids and salinity level of recycled water are major attributes that households care about in the LRB. Recycled wastewater that can get these attributes right will be acceptable to households.

Consumers are willing to start using recycled water for growing plants and for sanitation Households and farmers are willing to use recycled water for agricultural purposes, watering garden and flushing toilet. This is a step in the right direction with potential for reducing the pressure on current water usage if households can rely on conventional water sources for drinking and household consumption only. This by itself may require investments, including: (i) establishment and the maintenance of waste water treatment plants; and (ii) two separate tanks with one dedicated to recycled water at household level.

Consumers are willing to learn from their neighbors Awareness campaigns and exchange among countries should be encouraged to promote the use of recycled wastewater. LRB riparian countries could learn from Namibia and also South Africa on how recycled wastewater has been streamlined into major water usage patterns. Institutional capacity development and improved technologies may also be needed to improve awareness and increase the use of recycled wastewater in the LRB.

SMARTER WATER FOR AGRICULTURE?

Yields of almost four times higher than those from other types of irrigation technologies

Farmers know about it but are reluctant to go into debt to switch to drip irrigation

Subsidies to get started would help

IMPLEMENTING DRIP IRRIGATION

Farmers get better yields from drip irrigation The study showed that there are benefits obtained from using drip systems compared to other irrigation systems. Farmers who used drip irrigation technology realized yield almost four times higher than those who were using other types of irrigation technologies.

Subsidies are needed to get farmers to start replacing traditional water practices with drip irrigation Initial cost significantly affects the demand for drip irrigation. Farmers are not willing to take a loan or credit to finance the cost of drip irrigation, but would be willing to switch if there is a subsidy for initial cost of the drip irrigation. Policy makers can help by providing the enabling environment for farmers to be able to invest in this technology, such as awareness, training campaigns and subsidy for the initial cost. Funding agencies such as the Green

Climate Fund can also be approached to finance the initial cost of the drip irrigation in LRB riparian countries.

REDUCING NON-REVENUE WATER

In South Africa, national non-revenue water is estimated at 1 580 million m^3 with an estimated value of R 7.2 billion annually lost for the year 2012 (Mckenzie, Siqalaba and Wegelin, 2012). Similar detailed analysis is needed at the Basin level to support investment to reduce pressure on the basin.

More water for everyone By solving the problem of non-revenue water, in South Africa, for example, an additional 15,856,290[1] people could get access to drinking water. To solve the problem of non-revenue water, particularly water leakages, several options can be implemented: pressure management, water mains replacement, active leak detection, infrastructure upgrade, education campaigns and tariff reform.

Lower service delivery costs With increasing pressure on the basin and climate change's threat to water supply, there is a need to reduce and eliminate non-revenue water, working with municipalities, national governments, development partners and private sector, to put in place required investments. This is important, for both increasing supply of water and ensuring sustainability of the basin's environment. Costs of improved service delivery are much lower when undertaken through investments in non-revenue water reduction rather than through investments in capital projects to augment supply capacities.

CAN WE IMPROVE EFFICIENCY OF WHAT WE ALREADY HAVE?

Leaking pipes and unmetered connections cost the region USD600 million a year

Reducing non-revenue water leads to more water for everyone

We need joint investment by municipalities, national governments and key development partners

Benefits all round Reducing non-revenue water leads to following benefits:

- Increased **tariff revenue** that the water utility companies can collect from the loss;
- Increased **number of people with access** to drinking water; and
- The availability of **water for other uses i**ncluding economic activities.

The first and most important step to developing a non-revenue water reduction strategy is the ability to estimate how much water is being lost. After this, understanding the root causes of NRW can be incorporated in development of an appropriate strategy that can be sustained.

ENFORCING CATCHMENT PROTECTION

Catchment protection measures influence both water quality and quantity Minimizing water pollution can ensure that more water resources are available in the basin. Minimizing soil erosion can

[1] Based on the standard of 273 liters per person per day, as the relatively high per capita water use for South Africa in 2012

reduce sediment build-up in streams and rivers that affects stream flow. Catchment protection has positive social, economic and environmental effects:

- Satisfied **needs of water dependent forests and ecosystems**;
- Increased **groundwater aquifers** alimentation;
- Fulfilment of **economic demands** including water reservoirs, fish ponds, water intakes for irrigation or watering holes for wild animals;
- Improved **natural values** of environment and biodiversity;
- Protection of **surface water quality**.

WHAT ABOUT THE ENVIRONMENT?

Protecting the catchment environment increases the supply of clean water

Minimizing surface and ground water pollution from mining and agriculture is a priority

POLICY IMPLICATIONS FOR IMPLEMENTING WDM OPTIONS IN THE LRB

WHAT'S NEEDED TO CHANGE MINDS?

- Awareness campaigns
- Learning exchanges
- Institutional capacity ddevelopment
- Improved technologies

With increasing pressure on water resources due to population growth, increased economic growth, climate change and other factors, there is clear evidence for the need to implement WDM options in the Limpopo River Basin. Key factors influencing a successful implementation of the WDM options to ensure that water remains affordable for all, including vulnerable groups, are:

- Improving the **enabling environment** based on an adequate set of mutually supportive policies and a comprehensive legal framework, with a coherent set of incentives and regulatory measures to support these policies;
- Enhancing **capacity of institutions** and coordination mechanisms among sectors that include a variety of users and other stakeholders;
- Strengthening water **information systems** at all levels to support decision-making;
- Securing the human right for **access to water** for everybody and particularly for the poor; and
- Developing a **financing strategy** to cover the investment requirements for reducing water losses in the production-supply-utilisation systems, control user wastage, and stimulate water efficient economy.