

# Circular Water Economy for Basin Resilience

Diversifying the "Water Mix" with Non-Conventional Resources in the  
Orange-Senqu River Basin

Comfort Molosiwa, Executive Secretary, ORASECOM

18<sup>th</sup> June, 2026



# Structure of the Presentation

- Background
- Water Conservation & Demand Management
- Assessment Sectors
- Key Findings
- Urban WCWDM in the basin
- Mining Sector Insights
- Irrigation Sector Insights
- Conclusion & Future Directions

# Location, Extent, Countries, Population and Water Supply

**Basin Area :** approx.  
**1 million sq km.**

## **Basin States:**

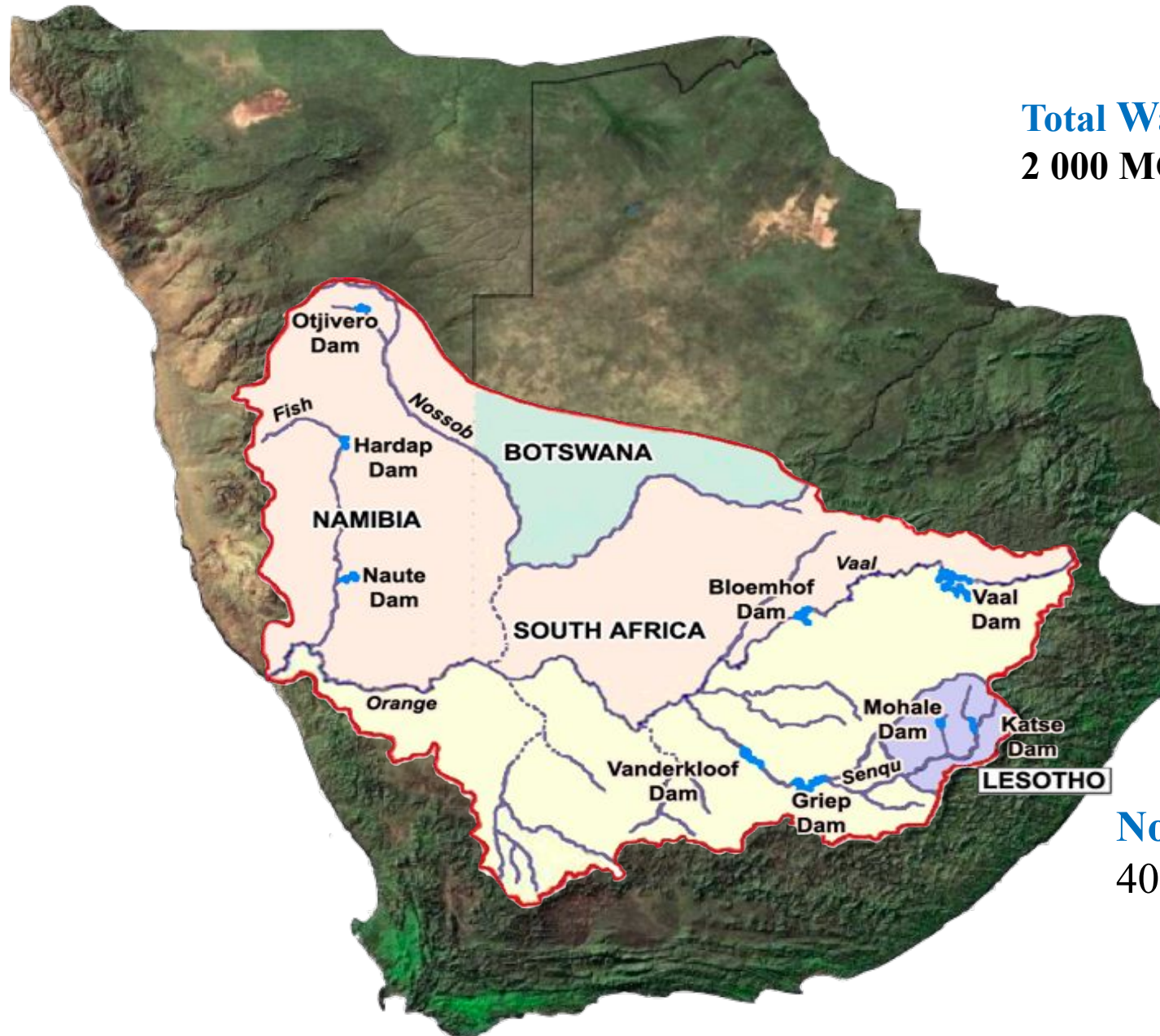
**Botswana,  
Lesotho, Namibia  
and South Africa.**

**Population  
Depending on Basin  
Water: 19 million .**

**Population Living  
Within Basin: 14,27  
million**

**Total Water Supply:  
2 000 MCM**

**Non-Revenue Water:  
40 – 50 %**



# Background and Project Overview

ORASECOM initiated the Water Conservation and Water Demand Management (WCWDM) project in 2020 under the Climate Resiliency Investment Plan (CRIP) to enhance basin resilience by exploring the reuse potential of water across critical sectors. This strategic approach aims to diversify water sources and improve sustainable water management in the Orange-Senqu River Basin.

## ORASECOM and CRIP

- The Orange-Senqu River Commission (ORASECOM) focuses on cooperative water resource management across the basin.
- CRIP launched in 2020 to integrate climate resilience into water management strategies.
- WCWDM is a key component of CRIP, targeting sustainable water use and demand reduction.
- Efforts aim to address water scarcity risks exacerbated by climate change impacts.

## Water Conservation and Demand Management (WCWDM)

- WCWDM involves optimizing water use efficiency and reducing wastage.
- The program assesses opportunities for water reuse and improved demand management.
- Focuses on both supply-side and demand-side water balance improvements.
- Seeks to promote circular water economy principles for long-term sustainability.

## Goal: Assess Water Reuse Potential

- Evaluate water reuse options across urban, industrial, mining, and irrigation sectors.
- Identify non-conventional water resources to diversify the basin's water mix.
- Support basin resilience by reducing dependency on conventional fresh water sources.
- Provide data-driven insights to guide policy and investment decisions in water management.

# Sectors Assessed for Water Reuse Potential

## Urban and Industrial Sector

- Focus on optimizing water use in cities and industrial facilities to reduce demand on conventional water sources.
- Assessment includes wastewater reuse, leak reduction, and efficient water management practices.
- Urban WCWDM strategies aim to support sustainable growth and reduce environmental impact.
- Industrial water recycling and reuse are critical to minimizing freshwater withdrawals and promoting circular water use.

## Mining Sector

- Mining operations assessed for potential to recycle process water and manage effluents sustainably.
- Water reuse helps reduce dependence on scarce freshwater in mining-intensive areas.
- Focus on innovative treatment technologies to enable safe reuse of mining wastewater.
- Improved water management in mining mitigates environmental risks and supports regulatory compliance.

## Irrigation Sector

- Irrigation water demand evaluated for opportunities to integrate treated wastewater and non-conventional sources.
- Water reuse in agriculture can improve water productivity and reduce pressure on freshwater resources.
- Adoption of efficient irrigation techniques complements reuse efforts to maximize water savings.
- Sustainable irrigation practices contribute to basin-wide water balance and long-term resilience.

- ▶ ORASECOM'S WATER REUSE POTENTIAL ASSESSMENT FOCUSED ON THREE CRITICAL SECTORS—URBAN AND INDUSTRIAL, MINING, AND IRRIGATION—EACH PRESENTING UNIQUE OPPORTUNITIES AND CHALLENGES FOR INTEGRATING NON-CONVENTIONAL WATER RESOURCES TO ENHANCE BASIN RESILIENCE.

# Key Findings: Overview

Countries	1	2	3
	Urban and Industrial Sector (m3/year)	Mining Sector (m3/year)	Irrigation Sector (m3/year)
Botswana	1 186 980	31 378 842	4 988 820
Lesotho	-	-	255 500
Namibia	8 911 246	6 210 694	561 600 000
South Africa	59 276 000	86 505 000	59 860 000

- ▶ THE ASSESSMENT REVEALED SIGNIFICANT OPPORTUNITIES FOR WATER REUSE AND CONSERVATION ACROSS THE URBAN, MINING, AND IRRIGATION SECTORS WITHIN THE ORANGE-SENQU RIVER BASIN. IMPLEMENTING THESE STRATEGIES CAN SUBSTANTIALLY IMPROVE BASIN RESILIENCE BY DIVERSIFYING WATER SOURCES BEYOND CONVENTIONAL SUPPLIES, REDUCING DEMAND, AND ENHANCING SUSTAINABILITY.

# Urban Water Conservation and Demand Management in the Basin

## Key findings and strategies from urban water conservation and demand management in the Basin

- The basin implemented targeted water-saving measures in urban areas, focusing on reducing per capita water consumption through public awareness campaigns and incentives.
- Leak detection and repair programs significantly lowered water losses in distribution networks, enhancing system efficiency and reliability.
- Promotion of water-efficient appliances and fixtures helped reduce household water demand, supported by regulatory standards and subsidies.
- Reuse of treated wastewater for non-potable urban uses such as landscaping and industrial processes was explored to diversify water sources and reduce pressure on freshwater supplies.
- Integrated urban water management approaches combined demand management with infrastructure upgrades to optimize water use and ensure supply security.
- Challenges included behavioral change resistance, infrastructure funding constraints, and the need for continuous monitoring and evaluation to sustain impacts.

- URBAN WCWDM INITIATIVES IN THE BASIN DEMONSTRATE EFFECTIVE STRATEGIES FOR REDUCING WATER DEMAND, IMPROVING EFFICIENCY, AND SUPPORTING SUSTAINABLE URBAN WATER USE, WHICH ARE CRITICAL FOR THE RESILIENCE OF THE ORANGE-SENQU RIVER BASIN.

# Water Management Insights for Mining and Irrigation



The mining and irrigation sectors present significant opportunities for enhancing basin resilience through targeted water reuse and conservation strategies. Mining can reduce freshwater demand by adopting reuse technologies, while irrigation efficiency improvements can conserve water and sustain agricultural productivity amid climate challenges.

## Mining Sector Water Management Insights

- Mining operations have high water demand but also significant potential for water reuse through treatment and recycling of process water.
- Technologies such as reverse osmosis and sedimentation ponds help recover water for reuse, reducing freshwater withdrawals.
- Implementing closed-loop water systems in mining reduces effluent discharge and environmental impact on the basin.
- Water conservation in mining also involves optimizing water use in mineral processing and dust suppression.
- Collaborative basin-wide water management plans can integrate mining water reuse with other sector needs to improve overall resilience.

## Irrigation Sector Water Management Insights

- Irrigation consumes the largest share of water in the basin, making efficiency gains critical for sustainability.
- Adopting precision irrigation technologies like drip and sprinkler systems reduces water wastage and enhances crop yield.
- Reusing treated wastewater for irrigation can supplement freshwater supply and reduce pressure on the basin.
- Soil moisture monitoring and scheduling irrigation based on crop water needs optimize water use.
- Promoting water-saving practices among farmers supported by policy incentives encourages sustainable irrigation management.

# Conclusion and Future Directions

## Key conclusions & next steps for circular water economy

- Diversify water sources by integrating non-conventional resources like treated wastewater, stormwater, and desalinated water to reduce reliance on freshwater and buffer drought impacts.
- Apply circular water economy principles to boost water efficiency, promote reuse, and support sustainability in the basin.
- Strengthen ORASECOM's institutional frameworks and cross-border cooperation to coordinate water reuse and share best practices.
- Invest in infrastructure for water treatment, recycling technologies, and monitoring to maximize reuse potential and ensure quality.
- Enhance capacity building and public awareness to engage communities and stakeholders in conservation and reuse efforts.
- Focus future research on innovative technologies, climate projections, and socio-economic impacts to guide adaptive management and policy.

- DIVERSIFYING THE WATER MIX WITH NON-CONVENTIONAL RESOURCES IS CRITICAL TO ENHANCING BASIN RESILIENCE, ENSURING SUSTAINABLE WATER AVAILABILITY, AND ADAPTING TO CLIMATE VARIABILITY. STRATEGIC IMPLEMENTATION AND CONTINUOUS INNOVATION ARE ESSENTIAL FOR LONG-TERM WATER SECURITY.