National Climate Change Response Strategy for the Water and Sanitation Sector

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WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

WATER RESEARCH COMMISSION

South Africa 1994 - 2024 30 YEARS OF FREEDOM

Layout

1. Role of the Water and Sanitation Sector on Climate Action
2. Policy Mandating Climate Change in the Water and Sanitation Sector
3. Draft National Climate Change Response Strategy for the Water and Sanitation Sector
4. Consultation on National Climate Change Response Strategy for Water and Sanitation Sector

The role of the Water and Sanitation Sector on Climate Action

Role of the Water and Sanitation Sector on Climate Action

Application of Climate Change Act

The Act applies to the countries "internal waters, territorial waters, exclusive economic zone and continental shelf of the Republic as referred to in Sections 3, 4, 7 and 8 of the Maritime Zones Act, 1994 (Act No.15 of 1994)",

- Schedule 1 of the Act states that functions relevant to the development of Sectoral Emissions Targets and ensuring they are met
- Schedule 2 of the Act states that National Departments are required to develop a Sector Adaptation Strategy and Plan, to be reviewed and amended at a five-yearly intervals

Department Planning Horizon and International Statutes that RSA is a signatory to

- Ensure that the 2050 target towards keeping global warming to 1^{o}C and reaching net zero carbon (UNFCC Paris Agreement) as well as climate actions to mitigate impacts as a sector remains appropriate over time.

Policy Mandating Climate Change in the Water and Sanitation Sector

Policy Mandating Climate Change in the Water Sanitation

National Policy

- Section 24(b) of the Constitution provides that "everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation [and] promote conservation"
- National Water Act (NWA) - protecting water resources for sustainable future use, in the draft version managing climate change in the water and sanitation sector is explicitly (Section 2)
  - National Water Resources Strategy III – chapter 9 – managing water and sanitation under climate change
- The Water and Sanitation Sector Policy (2017) on Climate Change sets out principles that strive to strengthen the effective protection, conservation and management of water resources against the impacts of climate change.
- The National Climate Change Act, *Schedules 1 and 2 mandates sector Departments to develop Sectoral Emissions Targets and Develop a Sector Adaptation Strategy and Plan (respectively)*
- National Development Plan: Chapter 5 on Environmental Sustainability – an equitable transition to a low-carbon economy, through responding effectively to climate change by adaptation, managing a just transition, enhancing governance systems and capacity,
- Mid-Term Strategic Framework Priority 5 on Spatial Integration, Human Settlements and Local Government – targeted actions to safeguard our unique natural resource base and mitigate risks related to climate change.

Policy Mandating Climate Change in the Water and Sanitation

Regional Policy

- AU Agenda 2063 Goal 7 on Environmentally sustainable and climate resilient economies and communities – identifies climate resilience and natural disaster preparedness as priority areas,
- SADC Climate Change Strategy - The Southern African Development Community (SADC) Secretariat developed a Climate Change Adaptation (CCA) Strategy (2011) also informs appropriate regional adaptation response to climate change calls for the implementation of adaptation measures at different geographical intervention levels (local, transboundary river basins, SADC region)

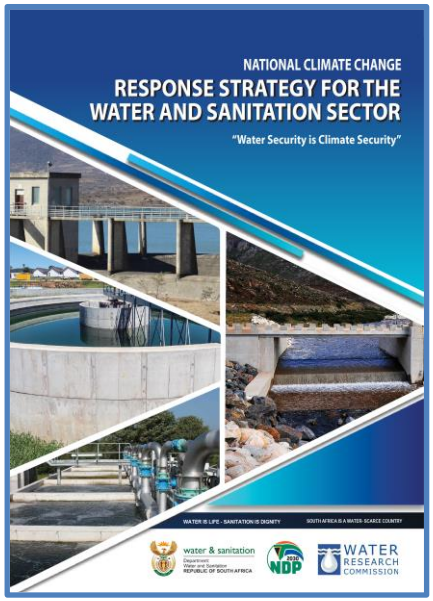
International Policy

- The United Nations Framework Convention on Climate Change (UNFCC): The Paris Agreement – mitigation efforts towards 1.5 (2.0) ^{o}C temperature cap and nations reporting on adaptation efforts,
- SDG 13 Climate Action interlinked with SDG 6 - 13.2 Integrate climate change measures into national policies, strategies and planning,

Draft National Climate Change Response Strategy for the Water and Sanitation Sector

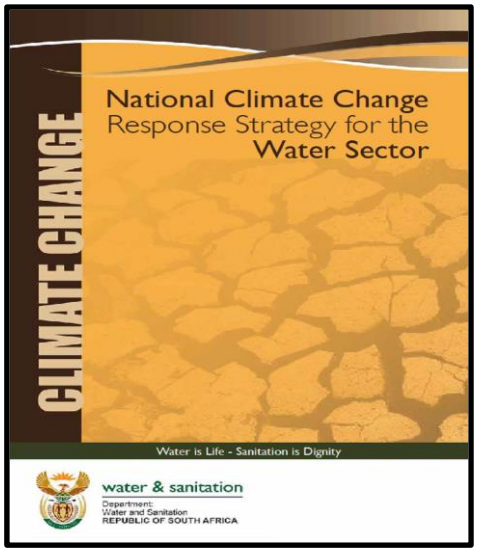
Why do we need the Climate Strategy and keep updating it?

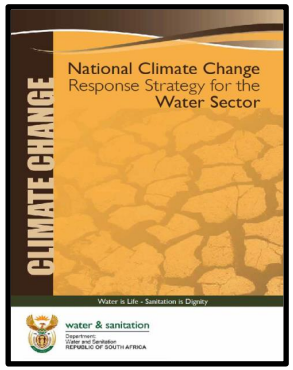
- Now it's a legislative mandate, Climate Change Act, and response to the climate emergency
- Reason for update
  - monitoring and evaluation results – changes in climate impact hence Actions;
  - technological advances (new Global Climate Models and Emission Scenario);
  - the best available science, evidence or information; or
  - the Republic's international commitments and obligations (net zero carbon).
- Updated Status Quo Analysis includes the following:
  - Updated Hydro-climatic zones for South Africa.
  - Review of the latest global climate change scenarios.
  - Update of downscaled climate scenarios for RSA.
  - Updated of the potential impact on Water Resources.
  - Climate change impacts on sanitation
  - Climate change and groundwater
  - Climate change and aquatic ecosystems
  - Climate-proofing critical infrastructure
  - Integrated Water Resources Management (IWRM)
- Updated National Water Resources Strategy…



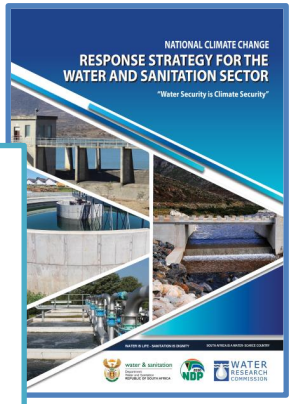
National Climate Change Response Strategy for the Water Sector (Current)

WATER GOVERNANCE	INFRASTRUCTURE DEVELOPMENT, OPERATION AND MAINTENANCE	WATER MANAGEMENT	IMPLEMENTATION
Building Adaptive Institutions	Multi-purpose water storage	Data and information	Roles and responsibilities
Intergovernmental Relations	Water supply and sanitation	Scenarios and climate modelling	Monitoring and evaluation
Awareness, communication and shared learning	Groundwater Development	Vulnerability Assessments	Financing the Strategy
Research and Development	Alternative water supply sources	Precipitation and flow Forecasting	
Stakeholder Participation	Flood Protection Measures	Planning	
Regional Engagement	Infrastructure safety	Water allocation and authorization	
Review of Strategy	Hydro-geo-meteorological monitoring system	Optimisation of dam and groundwater operation	
		Water conservation and water demand management	
		Groundwater management	
		Water quality management	
		Resource management and protection	
		KSO3.12 Disaster Management	





New or Explicitly Stated in the Updated Climate Change and Water & Sanitation Strategy:



In the Status Quo Report

- ✓Seven hydro-climatic zones
- ✓Potential Adaptation Options for Water and Sanitation
  - ✓Climate Resilient Water and Sanitation Infrastructure
  - ✓Climate Smart Agriculture (CSA)
  - ✓Ecosystem-based Adaptation (EbA)
  - ✓Water Sensitive Cities and Urban Water Resilience
  - ✓Decision Making Under Uncertainty (from data, models to analysis)
  - ✓Climate Resilient Development Pathways (CRDP)
- ✓Potential Mitigation Options for Water and Sanitation
  - ✓Water-Energy nexus
  - ✓Reducing the Carbon Footprint of the Water Sector
  - ✓Improving Energy Efficiency for Water and Sanitation
  - ✓Supporting Alternative Energy Supply Solutions
  - ✓Impacts of Energy Policy and the Just Energy Transition

In the Climate Change Response Strategy

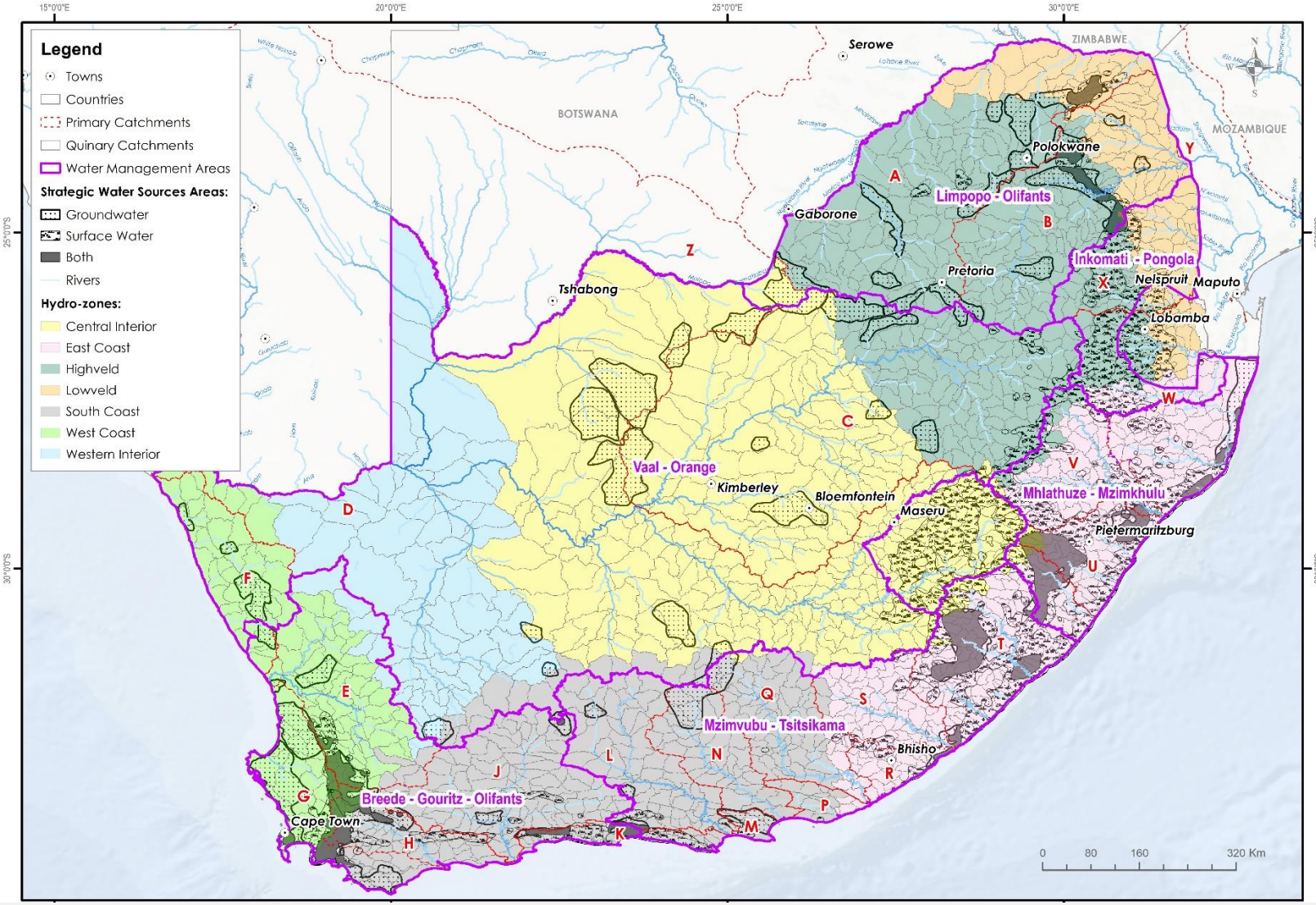
- ✓Strategic Framework and Key Strategic Objectives
  - ✓Investment in climate Resilient Infrastructure
  - ✓Water Resources and Sanitation Management
  - ✓Net Zero Carbon for Water and Sanitation

Social inequality

Gender

elderly and people with disabilities,

Children

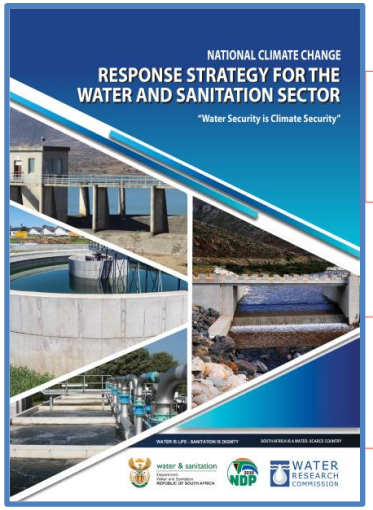


Map of homogeneous hydro-climatic zones within primary catchments (A - X) and Strategic Water Source Areas (SWSAs).

Limpopo-Olifants WMA: Climate Impacts and Response Actions

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions (i.e. mitigation and adaptation options)
Lowveld Highveld	Waterberg Soutpansberg Wolkberg	**Increased water use and future water requirements (urban, industrial agriculture, domestic, energy, forestry, etc.).**	•Implement new technologies to reduced water demand. •Implement water restrictions across all sectors, especially during periods of low water availability and based on seasonal forecasting. •Educate communities on the importance of conserving water.
		Increased uncertainty in streamflow.	•Removal of alien vegetation in catchment areas and replace with indigenous vegetation. •Implement water restrictions during dry years. •Improved regulation and compliance with licences and EWRs.
		Increased variability of groundwater recharge with up to 30% increase in parts, and up to 40% decrease in others.	•Identify areas that may become flood zones and prevent development in these areas. •Increase woody vegetation to prevent areas becoming water-logged under high rainfall •Remove non-indigenous vegetation in areas where groundwater levels will decrease •Application of NbS to improve natural storage of water
		Crop loss due to heat stress from increased temperatures and increased flooding, which results in food insecurity.	•Encourage farmers to plant drought resistant and heat tolerant crops. •Ensure adequate water storage and alternative water resources are available for use. •Ensure soils are sufficiently stabilised to prevent loss of crops from flooding.

National Climate Change Response Strategy for the Water and Sanitation Sector (updated)



VISION

A low carbon, climate resilient, equitable, efficient and sustainable water and sanitation sector by 2050.

IMPROVED COLLABORATIVE GOVERNANCE	INVESTMENT IN CLIMATE RESILIENT INFRASTRUCTURE SYSTEMS	RESEARCH, KNOWLEDGE & INFORMATION MANAGEMENT	WATER RESOURCES & SANITATION MANAGEMENT	NET ZERO CARBON FOR WATER AND SANITATION
Identify champions within DWS and with strategic partners.	Augment and strengthen existing bulk water systems.	Research, education, training and awareness raising.	Improve water use efficiency and reduce non-revenue water.	Quantify and reduce the carbon footprint of the water sector.
Develop community of practice and identify local experts.	Promote and support alternative and conjunctive use of water source options.	Update relevant CC information for water resources planning.	Promote alternative sanitation solutions.	Reduce or reuse methane emissions from wastewater treatment
Ensure alignment across all relevant policies e.g. NAP, NWRS, NDP, etc.	Protect and improve investment in EI.	Updated guidelines, design standards, and IWRM process.	Ensure coordination in integrated planning	Support the development of alternative energy.
Transboundary Climate Resilience.	Climate resilience of water infrastructure.	Improve monitoring.	Strengthen regulation, compliance and enforcement of allocations and RQOs.	Consider the Water Impacts of the Just Energy Transition.

IMPLEMENTATION PLAN

Assign Roles & Responsibility → Identify & Cost Priority Actions → Secure Funding → Indicators & Timeframes → M&E

KSO 1: Improved Collaborative Governance

Key Strategic Objective (KSO)	Priority Actions	Scale	Lead Organization (bold) and Other Potential Partners	Time Frame			Potential Indicators
				Short	Medium	Long	
KSO 1: Improved Collaboration and Co-operative Governance	Identify, train and capacitate champions within DWS and with other strategic partners.	National	**DWS (D:CC, CD:IGR),** WRC, CMAs, WSAs, PCC, DFFE, COGTA, NGOs, IDAs, etc.	X			Identified champions and MOUs with other depts.
	Develop community of practice and identify local experts	National	**DWS (D:CC), WRC**, PCC, Academia,	X	X		National and local level community of practice established.
	Ensure alignment across all relevant policies e.g. NAP, NWRS, NDP, etc.	National	**DWS (B: WRM, SU: WRPS&E**) CC, PCC, DFFE, DALRRD.	X	X		Updated NWRS, WSMP and relevant DWS policies, and aligned with National policies.
	Improve Transboundary Climate Resilience across SADC and with river basin organisations	Regional	**DWS (CD:IWC)**, LHWC, LHWC, LIMCOM, ORASECOM, OKACOM, INCOMAPUTO RIVER BASIN IDAs, etc.		X	X	Updated regional CC response strategy and agreements.

Key for time frame:
Short: < 2 years; Medium: 2– 5 years; Long : 5 years

Key Issues from Climate Change Strategy and Implementation Forward from the NCCRS

KSO 1: Improved Collaboration and Co-operative Governance

- Develop a community of practice and identify local experts
  - To be implemented through support and collaboration with PCC (and IWMI)

KSO 2: Investment in Climate-Resilient Infrastructure

- Increase investments in **Ecological Infrastructure** (EI) and Ecosystem Based Adaptation (EbA) such as EWRs, rivers, wetlands, and **strategic water source areas** (SWSAs) linked to water infrastructure.

- Improve climate resilience of existing (and new) water and sanitation infrastructure.
  - Ensure climate consideration into planning and implementation of infrastructure project – CRVAS are provided and updated

KSO 3: Research, knowledge, and information management

- Conducted Research, education, training, and awareness raising programs on climate change and responses for water and sanitation in South Africa.
  - Research priorities (Annexure Slide 45 to 47) were identified and communicated to WRC for implementation
  - Climate Risk and Vulnerability Assessment for Sector were conducted in all WMA (targeting Regions, CMA and local municipalities) and will be redone after next CRVAS update

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- **Prioritise vulnerable communities**: informal and peri-urban developments
- Improved **Monitoring**, **Seasonal Forecasts**, **Flood/Drought Early Warning**, **Decision Support Systems** (augmentation, planning, restrictions, etc), and develop **Real Time Operational Systems**
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Key Issues from Climate Change Strategy and Implementation Forward from the NCCRS

KSO 4: Water Resources and Sanitation Management

- Improved water use efficiency and reduce non-revenue water losses across all sectors including municipalities, industry, agriculture, mining, energy, transport, and forestry
  - Pilot to be implemented in uMhlathuze and George as part of the Low Carbon and Climate Resilience Water and Sanitation Management for Sector, funded by German Federal and Swiss governments (Annexure Slide 48 - 64), thereafter successful interventions to be upscaled to other Municipalities (through knowledge share and training)

- Promote alternative and sustainable sanitation solutions.
  - To be implemented as part of the LCCR Pilot

KSO 5: Net Zero Carbon for Water and Sanitation

- Quantify and reduce the carbon footprint of the entire water and sanitation sector.
  - In collaboration with DFFE the Department has Set Emission Targets based on the project and will be reporting on,
  - Additionally, To be implemented as part of the LCCR Pilot at the local scale – the tracking or quantification of GHG emission from Wastewater treatment plants and Energy Consumption through efficiency interventions

Key Issues from Climate Change Strategy and Implementation Forward from the NCCRS

KSO 5: Net Zero Carbon for Water and Sanitation

- Identify opportunities for re-use of methane emissions from wastewater treatment plants.
  - To be implemented as part of the LCCR Pilot at local scale – the reduction of GHG emission from Wastewater treatment plants and Energy Consumption through efficiency interventions
- Support the development of water-linked alternative energy sources.
  - To be implemented as part of the LCCR – study to determine the feasibility of energy sources such as floating solar or photovoltaics
- Consider the water resources impacts and WEF inter-connections of the Just Energy Transition (JET) in South Africa.
  - To be implemented in collaboration with PCC and the energy sector – through water licencing for new activities

Consultation on National Climate Change Response Strategy for the Water and Sanitation Sector

Consultation on Climate Change Response Strategy for Water and Sanitation

- Conducted between November 2023 and January 2024, the following were represented and were conducted in hybrid platforms
  - Presidential Climate Commission,
  - National Business Initiative (NBI) and Private Sector (Consultants),
  - Universities (WITS, UKZN, UP, SU, TUT, UFS, UL, UCT,) and Research Institutions (WRC, CSIR, SAEON, HSRC, etc.),
  - Civil Society Organisations or Non-Profit Organizations and the general public
  - Sector Departments (DFFE, DARLD, etc.),
  - Provincial Government Departments and DWS Offices (including CMAs)
  - River Commissions (ORASECOM)
  - International Development Agencies (IWMI, FANRPAN, IUCN, GIZ, etc.)
  - NEDLAC

Thank you!

Annexure

Study Approach and Methodology

The Project will be carried in six phases, each phase has different tasks with differing aims, objectives and timelines:

1. Project Inception
2. Water Resource Assessment
3. Status Quo Assessments
4. Stakeholder Engagement (incl. Training and Capacity Building)
5. Status Quo Assessment Report
6. Updated Climate Change Response Strategy for the Water and Sanitation Sector.

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The draft Updated Strategy developed in October 2023. This will then be taken to stakeholders for review and finalised by March 2024.

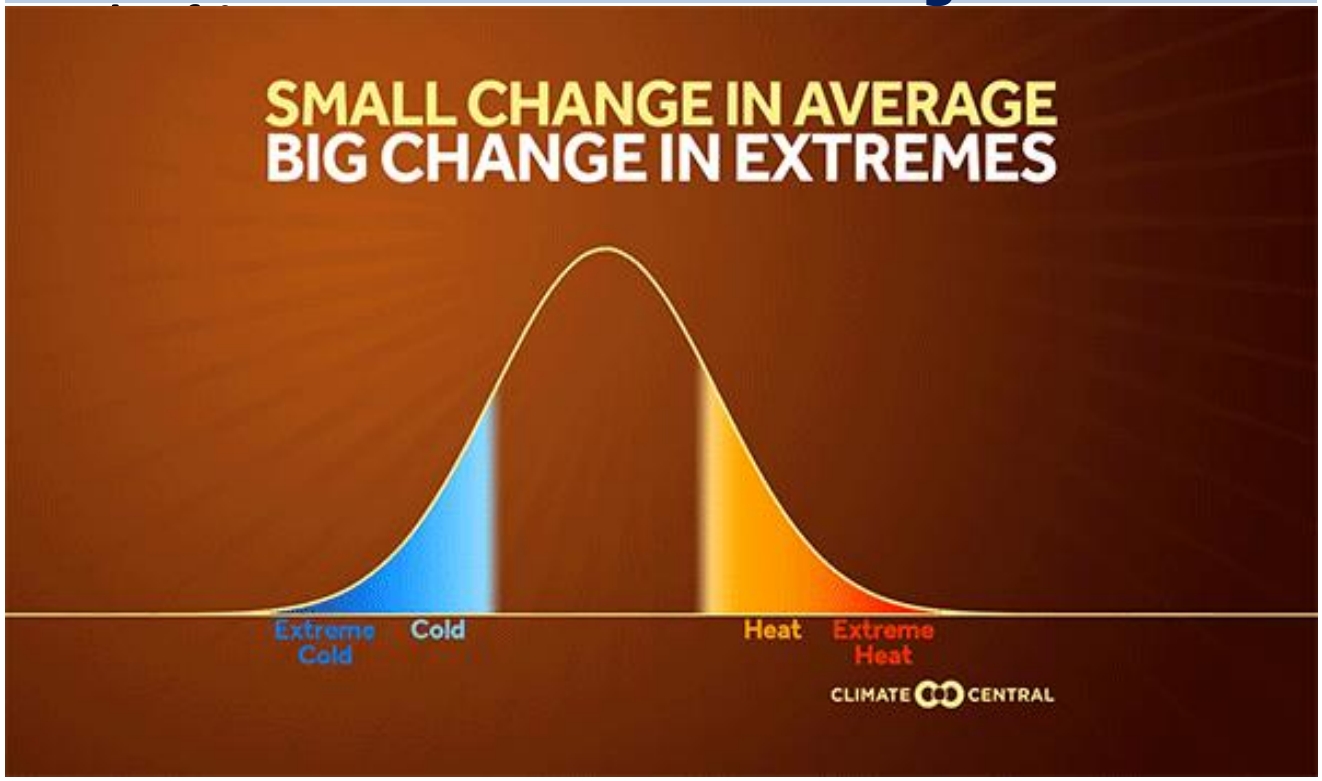
Phase 1	**Inception (3 Months)**
Task 1.1	Project Set up and Inception Meeting
1.2	Inception Report
Phase 2	**Water Resources Assessment (6 Months)**
Task 2.1	Literature Review
Task 2.2	Review of global climate change models and scenarios
Task 2.3	Review of hydro-climatic zones for South Africa
Task 2.4	Downscaled climate change scenarios for the water sector
Task 2.5	Climate change scenarios for runoff and evaporation
Task 2.6	Water resources situation assessment report
Phase 3	**Status Quo Analysis (18 Months)**
Task 3.1	Climate change impacts for Ground Water
Task 3.2	Climate change impacts for Sanitation
Task 3.3	Climate change impacts for Water Ecosystems
Task 3.4	Climate change and Water Quality
Task 3.5	Water conservation and demand management
Task 3.6	Integrated water resources management
Task 3.7	Climate change, Water Infrastructure and Climate Proofing
Phase 4	**Stakeholder Engagements (incl Training and Capacity Building)**
Task 4.1	Stakeholder Workshops (x3)
Task 4.2	Stakeholder Meetings (x5)
Task 4.3	Training and Capacity Building (x2)
Phase 5	**Status Quo Analysis Report (6 months)**
Task 5.1	Draft Status Quo Analysis Report
Task 5.2	Final Status Quo Analysis Report
Phase 6	**Climate Change Strategy for Water Sector (6 Months)**
Task 6.1	Risk and Vulnerability Assessment for Water Sector
Task 6.2	Adaptation (and Mitigation) Actions for Water and Sanitation
Task 6.3	Draft Climate Change Strategy for Water Sector
Task 6.4	Final Climate Change Strategy for Water Sector

Supporting Technical Reports

Index	DWS Report No.	Report Title and Deliverables	Link
1	P RSA 000/00/23221/1	Inception Report	N/A
2	P RSA 000/00/23221/2	Literature Review	Link
3	P RSA 000/00/23221/3	Review of Global Climate Change models and scenarios	Link
4	P RSA 000/00/23221/4	Review of Hydro-Climatic Zones	Link
5	P RSA 000/00/23221/5	Downscaled Climate Change Scenarios for the Water Sector	Link
6	P RSA 000/00/23221/6	Climate change scenarios for Runoff and Evaporation	Link
7	P RSA 000/00/23221/7	Water Resources Situation Assessment Report	Link
8	P RSA 000/00/23221/8	Climate Change impacts for Ground Water	Link
9	P RSA 000/00/23221/9	Climate Change impacts for Sanitation	Link
10	P RSA 000/00/23221/10	Climate Change impacts for Water Ecosystems	Link
11	P RSA 000/00/23221/11	Climate Change and Water Quality	Link
12	P RSA 000/00/23221/12	Water Conservation and Demand Management	Link
13	P RSA 000/00/23221/13	Integrated Water Resources Management	Link
14	P RSA 000/00/23221/14	Climate change, Water Infrastructure and Climate Proofing	Under Development
16	P RSA 000/00/23221/16	Final Status Quo Assessment Report	Link
17	P RSA 000/00/23221/17	Risk and Vulnerability Assessment for Water Sector	Link
18	P RSA 000/00/23221/18	Adaptation (and Mitigation) Actions for Water and Sanitation	Link
19	P RSA 000/00/23221/19	Draft Climate Change Strategy for Water Sector	Under Development
20	P RSA 000/00/23221/20	Final Climate Change Strategy for Water Sector	Under Development

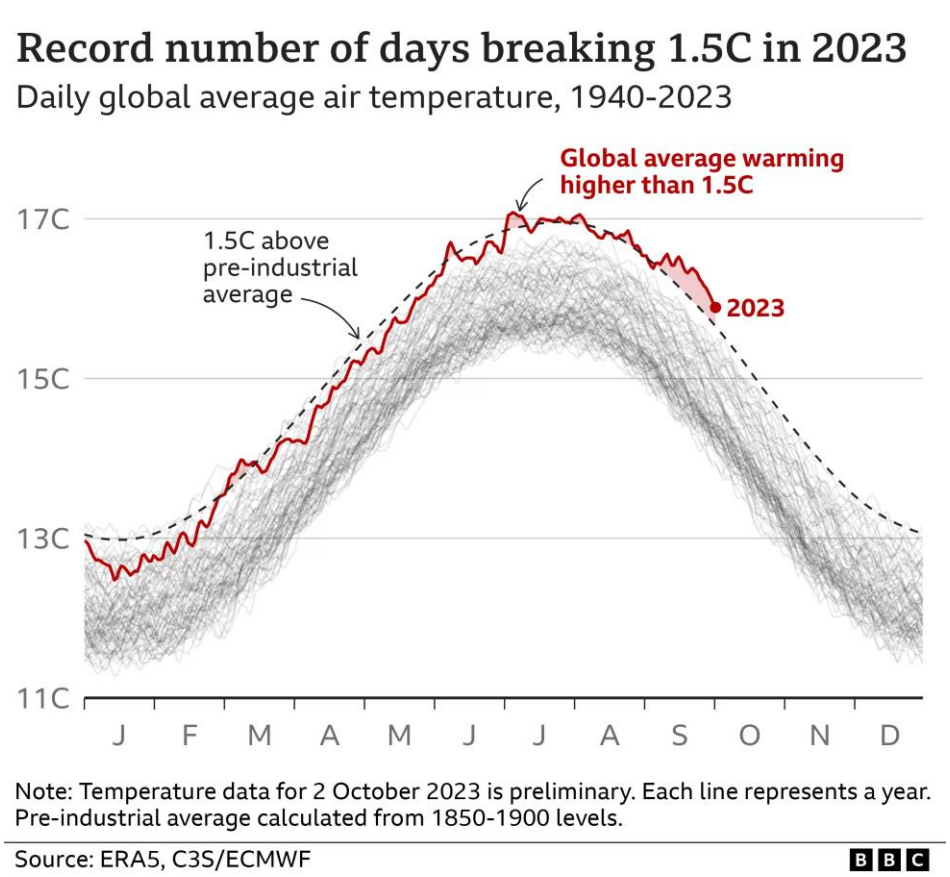
Overview of Climate Change and Water Sector in South Africa

What is Climate Change?



- Anthropogenically-induced Climate Change is attributed to greenhouse gas emissions post-industry revolution.
- Climate change in this context, refers to human-linking activities resulting in a shift in average surface temperatures (i.e., in the atmosphere).
- This leads to amplification in temperature and change in precipitation patterns, leading to a rise in evapotranspiration, reduction in runoff, soil moisture and recharge and thus, impact availability and quality of water resources.

“We are living in a new climate reality.”



Corsica

Hawaii

Libya

African countries are particularly vulnerable to the impacts and increasing risks of Climate Change:

Vulnerable communities, limited resources, and insufficient infrastructure.

(Source: Taylor et al 2014, Strengthening Climate Resilience for Africa Cities. A framework for Working with Informality). (http://www.africancentreforcities.net)

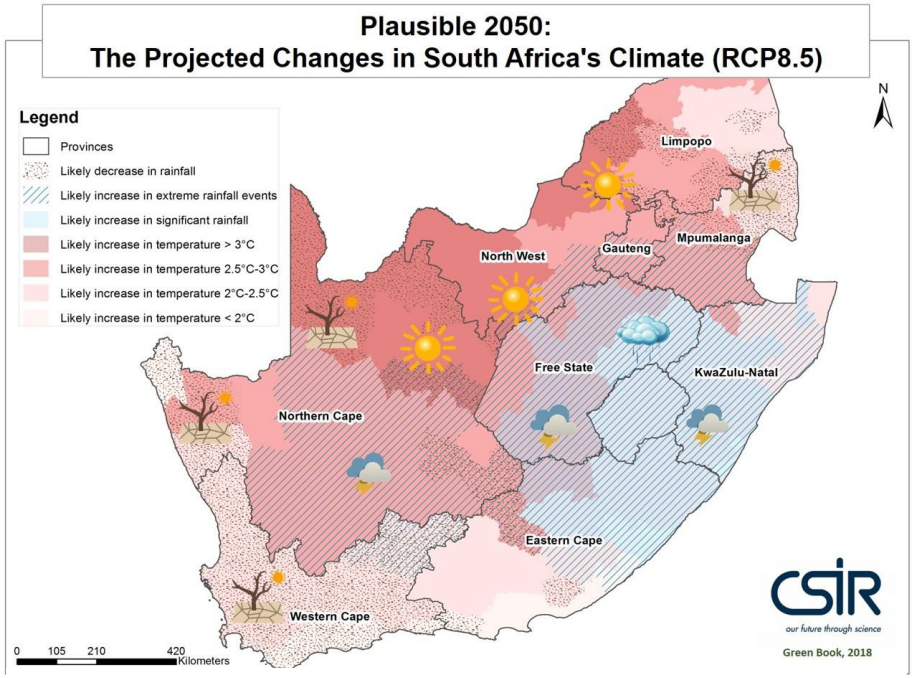
Increasing climate change related risks in RSA.

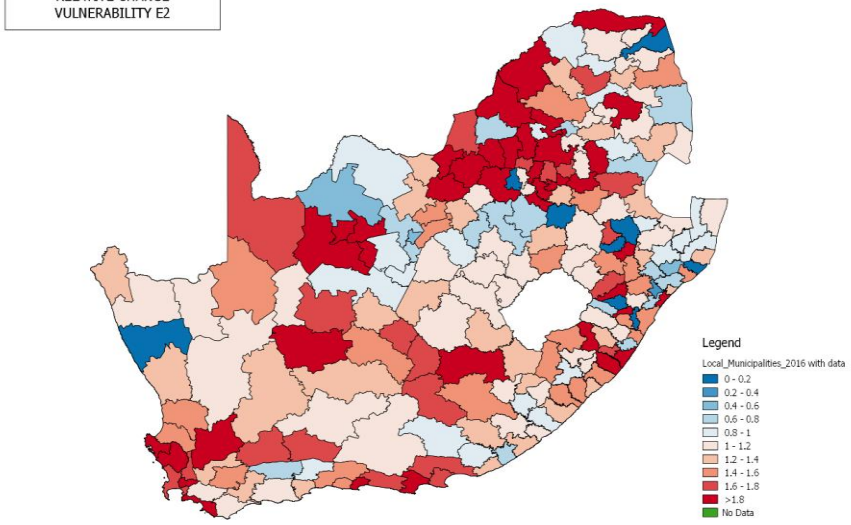
‘Day Zero”
WC and EC
(and GP?)

KZN/EC/WC
Floods (GP?)

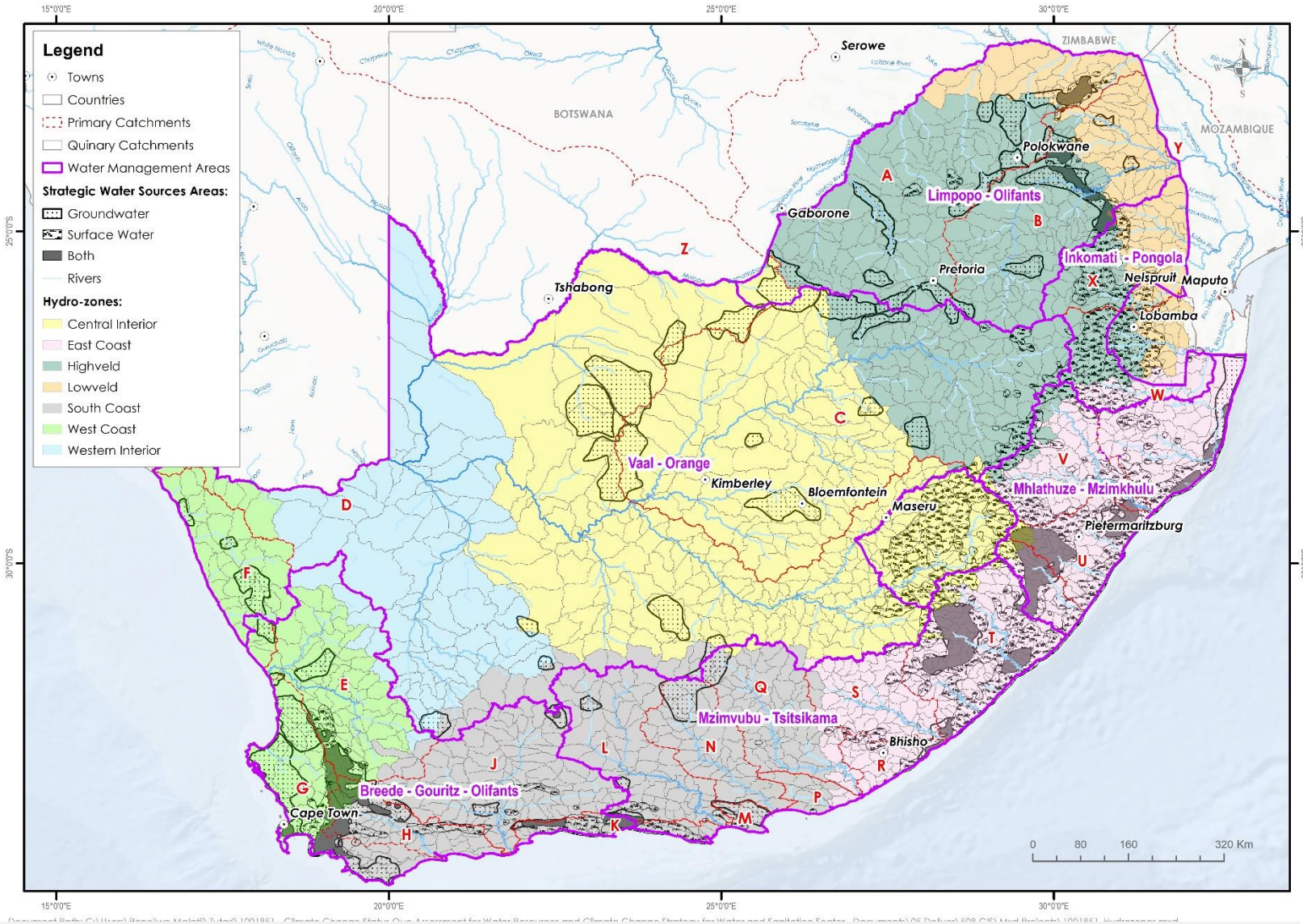
Climate Impacts on Water Resources

- Water is a medium through which climate change will be felt and determines the extent of responses,
- Projected decline in water availability and substantial seasonal variability, more pronounced in the Western Cape Region up along the western parts to the Northern region,
- Climate change will exacerbate water-related disasters, including droughts, floods, water-related health risks, pollution and ecosystem impacts.
- These disasters will impact water quality and water infrastructure and impact recovery. Mitigation plans to reduce impacts include climate adaptation projects, disaster preparedness and response capabilities.





Relative change in water supply vulnerability with 50th percentile (mean) climate change exposure (E2) scenario and high population growth.



Map of homogeneous hydro-climatic zones within primary catchments (A - X) and strategic water source areas (SWSAs).

Limpopo-Olifants WMA: Climate Impacts and Response Actions

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Lowveld Highveld	Waterberg Soutpansberg Wolkberg	**Increased water use and future water requirements (urban, industrial agriculture, domestic, energy, forestry, etc.).**	•Implement new technologies to reduced water demand. •Implement water restrictions across all sectors, especially during periods of low water availability and based on seasonal forecasting. •Educate communities on the importance of conserving water.
		Increased uncertainty in streamflow.	•Removal of alien vegetation in catchment areas and replace with indigenous vegetation. •Implement water restrictions during dry years. •Improved regulation and compliance with licences and EWRs.
		Increased variability of groundwater recharge with up to 30% increase in parts, and up to 40% decrease in others.	•Identify areas that may become flood zones and prevent development in these areas. •Increase woody vegetation to prevent areas becoming water logged under high rainfall •Remove non-indigenous vegetation in areas where groundwater levels will decrease •Application of NbS to improve natural storage of water
		Crop loss due to heat stress from increased temperatures and increased flooding, which results in food insecurity	•Encourage farmers to plant drought resistant and heat tolerant crops. •Ensure adequate water storage and alternative water resources are available for use.

Limpopo-Olifants WMA: Climate Impacts and Response Actions (contd)

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Lowveld Highveld	Waterberg Soutpansberg Wolkberg	**Decrease in precipitation in the south and north-east ranging between 2% to 6%, and in the north up to 16%.** **Increased uncertainty in rainfall projections** **Reduced summer rainfall**	•Augment existing bulk water supply systems. •Promote water storage at household level. •Explore alternative and under-developed water resources. •Use of low flow irrigation systems (e.g. drip irrigation) •Ongoing/improved monitoring: rainfall, temperature, streamflow, and groundwater.
		Increased dryness of dry years.	•Implement water restrictions during dry years. •Encourage farmers to plants drought tolerant crops
		Increase in summer temperatures ranging between ~1.4°C to ~2°C across the WMA by the mid-2030s, and, increase in winter temperatures ranging between ~1.45°C to ~1.9°C.	•Reduce GHG emissions through improved energy efficient. •Increases areas where indigenous forests can serve as carbon sinks. •Implement NbS to capture carbon and reduce heating impacts. •Implementation of alternative energy generation technologies, such as energy from methane at wastewater treatment plants and prevent release into the atmosphere.
		Increased evaporation and crop requirements due to increased temperatures ranging between 7% to 10.5%	•Irrigate during cooler times during the day to reduce evaporative loss •Use of low flow irrigation systems (e.g. drip irrigation)

Inkomati-Pongola WMA: Climate Impacts and Response Actions

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Lowveld Highveld East Coast	Mpumalanga Drakensberg Enkangala Grasslands Mbabane Hills Upper Usutu	**Rainfall uncertainty, with projections indicating either a wetting or drying especially during the summer months.**	• Ongoing rainfall monitoring to determine which areas are experiencing wetting and which are experiencing drying and combined with improved seasonal forecasting. • Use of low flow irrigation systems (e.g. drip irrigation) • Promote water storage at household level such as rainwater harvesting • Explore alternative and under-developed water resources
		Increased temperature ranging between~1.4°C to ~1.7°C. **Increase in summer temperatures between ~4°C to ~5°C.**	• Reduce GHG emissions through the use of energy efficient technologies. • Increases areas where indigenous forests can serve as carbon sinks. • Implementation of alternative energy generation technologies, such as energy from methane at wastewater treatment plants and prevent release into the atmosphere.
		Increased flooding events due to the likely increase of storm activity and more intense rainfall events.	• Identify new flood zones and prevent development at these locations. • Implement NbS (clearing of IAPs, wetlands, etc.) to reduce the impact of flooding.
		Increased temperatures, leading to increased evaporation	• Irrigate during cooler times during the day to reduce evaporative loss. • Use of low flow irrigation systems (e.g. drip irrigation). • Adapt water resources planning modes to account of higher rates of evaporation.

Inkomati-Pongola WMA: Climate Impacts and Response Actions (cont.d)

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Lowveld **Highveld** **East Coast**	Mpumalanga Drakensberg Enkangala Grasslands Mbabane Hills Upper Usutu	**Increased water use and water requirements (urban, industrial agriculture, domestic, energy, forestry, etc.).**	• Implement new technologies with reduced water demand / requirements. • Implement water restrictions across all sectors during periods of drought. • Engage and educate communities on the importance of conserving water
		Projections indicate increased water scarcity due to likelihood of increased drying, especially in coastal areas.	• Explore alternative and under-developed water resources. • Use of low flow irrigation systems (e.g. drip irrigation) • Promote water storage at household and rainwater harvesting.
		Decreased streamflow during years with low and average flow and, dry years are projected to becoming even drier	• Removal of alien vegetation in catchment areas and replace with indigenous vegetation. • Implement water restrictions during dry years. • Encourage farmers to plants drought tolerant crops.
		Variable groundwater recharge across the WMA	• Identify areas that may become flood zones and prevent development in these areas • Increase woody vegetation to prevent areas becoming water logged under high rainfall • Remove non-indigenous vegetation in areas where groundwater levels will decrease • Application of NbS to improve natural groundwater storage of water

Mhlathuze-Mzimkulu WMA: Climate Impacts and Response Actions

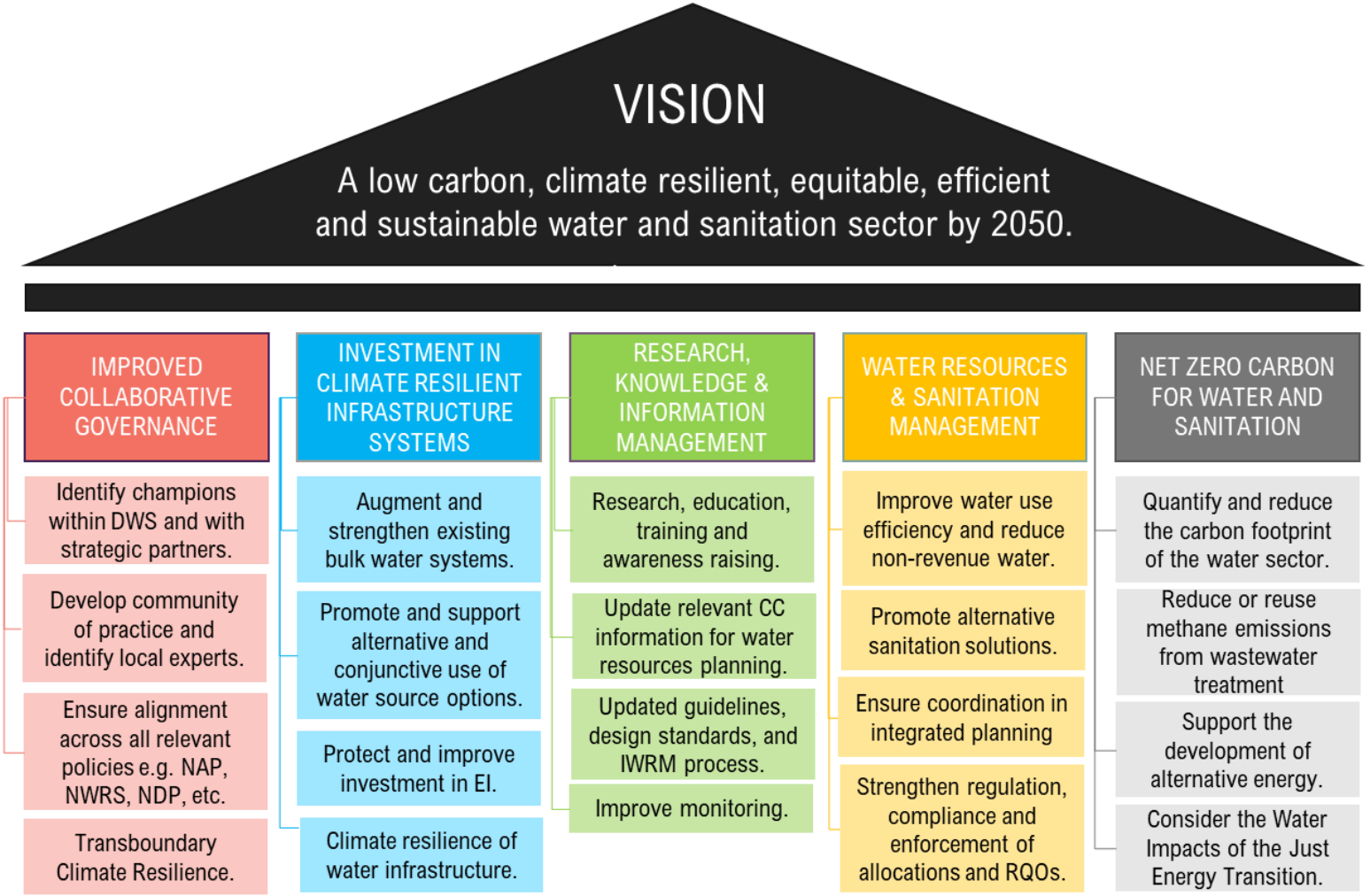
Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Highveld East Coast	Northern Drakensberg Southern Drakensberg Enkangala Grasslands Mfolozi Headwaters	**Reduced rainfall ranging between 2% and 10%.** **Projected increases in the higher lying western areas.**	• Implement critical water supply augmentation projects. • Explore alternative and under-developed water resources. • Promote water storage at household level such as rainwater harvesting. • Monitoring to determine which areas are experiencing wetting and/or drying. • Use of low flow irrigation systems (e.g. drip irrigation)
		Dry years are projected to becoming even drier	• Implement water restrictions during dry years • Encourage farmers to plants drought tolerant crops
		Wet years are projected to become even wetter in places **Projections indicate a likely increase in summer rainfall, with increased occurrence of large events such as flooding.**	• Identify new flood zones, protect and prevent development at these. • Improve urban stormwater including attenuation and water sensitive design principals. • Implement NbS to reduce impact of flooding. • Consider potential for updated operating rules for dams for flood management.
		Increased summer temperature between~1.1°C to ~1.4°C and winter temperatures ranging between 1.4°C to >1.9°C	• Reduce GHG emissions through the use of energy efficient technologies • Increases areas where indigenous forests can serve as carbon sinks

Mhlathuze-Mzimkulu WMA: Climate Impacts and Response Actions (cont.d)

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Highveld East Coast	Northern Drakensberg Southern Drakensberg Enkangala Grasslands Mfolozi Headwaters	**Increase in temperatures due to proximity to the ocean**	• Reduce GHG emissions through the use of energy efficient technologies • Increases areas where indigenous forests can serve as carbon sinks • Irrigate during cooler times during the day to reduce evaporative loss • Use of low flow irrigation systems (e.g. drip irrigation)
		Increase in streamflow up to 20% in the higher lying west.	• Modelling of new expanded flood zones • Ensure adequate soil stabilisation in expanded flood zones
		Decrease in streamflow along the coast and the interior.	• Removal of alien vegetation in catchment areas and replace with indigenous vegetation. • Implement water restrictions during dry years. • Encourage farmers to plants drought tolerant crops. • Increased regulation of licence conditions and protection of EWRs and ROQs.
		Variable groundwater recharge across the WMA	• Remove non-indigenous vegetation in areas where groundwater levels will decrease. • Application of NbS to improve natural storage of water. • Increased monitoring of groundwater levels and abstractions.
		5 to 8% increase in evaporation across the WMA	• Irrigate during cooler times during the day to reduce evaporative loss • Use of low flow irrigation systems (e.g. drip irrigation). • Incorporate increased evaporation into water resources planning models.
		Crop loss due to heat stress from increased temperatures and increased flooding, which results in food insecurity	• Encourage farmers to plant drought resistant and heat tolerant crops • Ensure adequate water storage and alternative water resources are available. • Ensure soils are sufficiently stabilised to prevent loss of crops from flooding.

Vaal-Orange WMA: Climate Impacts and Response Actions

Hydro-climatic Zones	Strategic Water Source Areas	Projected Climate Impacts	Climate Response Actions
Central interior Western interior Highveld	Upper Vaal Maloti Drakensberg Northern Drakensberg Southern Drakensberg Eastern Cape Drakensberg	**High uncertainty in future rainfall, with possible wetting or drying in the summer months. Precipitation is projected to decrease in the range of 2% to 6% in the south and north-east, with reductions of up to 16% in the northern parts.**	• Implement water supply augmentation projects and improved operation. • Promote water storage at household level such as rainwater harvesting. • Explore alternative and under-developed water resources. • Use of low flow irrigation systems (e.g. drip irrigation). • Implement catchment management activities to reduce erosion and sedimentation.
		Dry years are expected to become drier	• Removal of alien vegetation in catchment areas and replace with indigenous vegetation. • Implement water restrictions during dry years. • Encourage farmers to plants drought tolerant crops
		Increase in summer temperatures of ~1.1°C to >1.8°C. **Increase in winter temperatures of <1°C to >1.8°C.**	• Reduce GHG emissions through the use of energy efficient technologies. • Increases areas where indigenous forests can serve as carbon sinks. • Implementation of alternative energy generation technologies, such as energy from methane at wastewater treatment plants and prevent release into the atmosphere.
		Increased risk of flooding due to the likely increase of storm activity and more extreme rainfall events.	• Identify new flood zones and prevent development at these locations. • Increase woody vegetation to reduce the limit the area of impact. • Implement catchment management activities to reduce erosion and sedimentation.
		Increased water requirements (urban, agriculture, domestic, industrial, mining, energy etc.)	• Implement new technologies with reduced water demand / requirements • Implement water restrictions across all sectors during periods of


VISION
A low carbon, climate resilient, equitable, efficient and sustainable water and sanitation sector by 2050.
IMPROVED COLLABORATIVE GOVERNANCE
Identify champions within DWS and with strategic partners.
Develop community of practice and identify local experts.
Ensure alignment across all relevant policies e.g. NAP, NWRS, NDP, etc.
Transboundary Climate Resilience.
INVESTMENT IN CLIMATE RESILIENT INFRASTRUCTURE SYSTEMS
Augment and strengthen existing bulk water systems.
Promote and support alternative and conjunctive use of water source options.
Protect and improve investment in EI.
Climate resilience of water infrastructure.
RESEARCH, KNOWLEDGE & INFORMATION MANAGEMENT
Research, education, training and awareness raising.
Update relevant CC information for water resources planning.
Updated guidelines, design standards, and IWRM process.
Improve monitoring.
WATER RESOURCES & SANITATION MANAGEMENT
Improve water use efficiency and reduce non-revenue water.
Promote alternative sanitation solutions.
Ensure coordination in integrated planning
Strengthen regulation, compliance and enforcement of allocations and RQOs.
NET ZERO CARBON FOR WATER AND SANITATION
Quantify and reduce the carbon footprint of the water sector.
Reduce or reuse methane emissions from wastewater treatment
Support the development of alternative energy.
Consider the Water Impacts of the Just Energy Transition.
IMPLEMENTATION PLAN
Assign Roles & Responsibility
Identify & Cost Priority Actions
Secure Funding
Indicators & Timeframes
M&E

KSO 1: Improved Collaborative Governance

Key Strategic Objective (KSO)	Priority Actions	Scale	Lead Organization (bold) and Other Potential Partners	Time Frame			Potential Indicators
				Short	Medium	Long	
KSO 1: Improved Collaboration and Co-operative Governance	Identify, train and capacitate champions within DWS and with other strategic partners.	National	**DWS (D:CC, CD:IGR),** WRC, CMAs, WSAs, PCC, DFFE, COGTA, NGOs, IDAs, etc.	X			Identified champions and MOUs with other depts.
	Develop community of practice and identify local experts	National	**DWS (D:CC), WRC**, PCC, Academia,	X	X		National and local level community of practice established.
	Ensure alignment across all relevant policies e.g. NAP, NWRS, NDP, etc.	National	**DWS (B: WRM, SU: WRPS&E**) CC, PCC, DFFE, DALRRD.	X	X		Updated NWRS, WSMP and relevant DWS policies, and aligned with National policies.
	Improve Transboundary Climate Resilience across SADC and with river basin organisations	Regional	**DWS (CD:IWC)**, LHWC, LHWC, LIMCOM, ORASECOM, OKACOM, INCOMAPUTO RIVER BASIN IDAs, etc.		X	X	Updated regional CC response strategy and agreements.

Key for time frame:
Short: < 2 years; Medium: 2– 5 years; Long : 5 years

KSO 2: Investment in Climate Resilient Water Infrastructure

Key Strategic Objective (KSO)	Priority Actions	Scale	Lead Organization (bold) and Other Potential Partners	Time Frame			Potential Indicators
				Short	Medium	Long	
KSO 2: Investments in climate resilient infrastructure.	Augment and strengthen existing integrated bulk water supply systems including the implementation of delayed infrastructure and improved operational rules and allocations.	National and Local Level	**DWS (B:WRM and B:Infrastructure),** CMAs, TCTA, DBSA, National Treasury, Municipalities, Private Sector, IDAs, etc.	X	X	X	Updated Reconciliation and All Town strategies, and implementation of required augmentation.
	Promote and support alternative and conjunctive use of water source options at local level.	National and Local Level	**DWS (CD:IWRP),** WSPs, CMAs, TCTA, DBSA, Municipalities, Private Sector, IDAs, etc.	X	X	X	Percentage water use from alternative water sources. Number of municipalities with conjunctive water use.
	Increase investments in Ecological Infrastructure (EI) and Ecosystem Based Adaptation (EbA) recognising both the benefits, but also potential areas of concern.	National and Local Level	**DFFE**, DWS, CMAs, DALRRD, SANBI, Municipalities, NGOs, and Private Sector..	X	X	X	Hectares of IAPs removed and maintained. Number of rehabilitated wetlands.
	Improve climate resilience of existing (and new) water and sanitation infrastructure.	National and Local Level	**DWS (B:WRM and B: Infrastructure),** TCTA, WSP, Municipalities, etc.	X	X		Climate change risk and vulnerability

Key for time frame:
Short: < 2 years; Medium: 2– 5 years; Long : 5 years

KSO 3: Knowledge and Information Management

Key Strategic Objective (KSO)	Priority Actions	Scale	Lead Organization (bold) and Other Potential Partners	Time Frame			Potential Indicators
				Short	Medium	Long	
KSO 3: Research, knowledge, and information management	Research, education, training, and awareness raising programs on climate change and responses for water and sanitation in South Africa.	National	**WRC,** DWS, DFFE, CMAs, Universities, Funding Partners.	X			Number of training and awareness raising meetings and workshops conducted. Number of climate change research studies and products produced
	Update relevant climate change information such as NWIS and WR2012 used to inform water resources planning and design.	National	**DWS (B:WRM),** WRC, Accademia.	X	X		Climate change information on water knowledge portals.
	Develop updated design standards, IWRM process and guidelines that are aligned with climate resilience principals.	National	**DWS (B:WRM), DWS (B:Infrastructure),** WRC, SANRAL, SANCOLD, etc.	X	X		Updated IWRM process (Recon studies etc.) and design guidelines for infrastructure such as dams, roads, flood lines.
	Improved monitoring of water resources and water quality including for groundwater.	National, CMA and Local level.	**DWS (B:WRM),** CMAs, SAWS, DFFE, SAEON.	X	X	X	Increased number of stream gauges and availability of data. National groundwater monitoring system.

Key for time frame:
Short: < 2 years; Medium: 2– 5 years; Long : 5 years

KSO 4: Improved Water and Sanitation Management

Key Strategic Objective (KSO)	Priority Actions	Scale	Lead Organization (bold) and Other Potential Partners	Time Frame			Potential Indicators
				Short	Medium	Long	
KSO 4: Improved Water Resources and Sanitation Management	Improved water use efficiency and reduce non-revenue water losses across all sectors including municipalities, industry, agriculture, mining, energy, transport, and forestry.	Local	**DWS (CD:WUE)**, DALRRD, DFFE, DMME, and Municipalities, etc.	X	X		Reduced NRW and AUW. Improved water use efficiency for all sectors.
	Promote alternative and sustainable sanitation solutions.	Local	**DWS (B:Sanitation)**, SALGA, NT, and Municipalities	X	X		Implementation of alternative / low water use sanitation solutions.
	Improved coordination and integration into planning for more water sensitive cities.	Local	**DWS (B:WRM)**, DALRRD, and Municipalities	X	X	X	Integration of climate change and resilience into local development plans.
	Strengthen regulation, compliance, and enforcements of allocations and RQOs.	Local	**DWS (B:WRM and B: Regulation)**, CMAs, DFFE, etc.	X	X	X	Increased regulation of water use licenses and RQOs.

Key for time frame:
Short: < 2 years; Medium: 2– 5 years; Long : 5 years

KSO 5: Net Zero Carbon for Water and Sanitation

Key Strategic Objective (KSO)	Priority Actions	Scale	Lead Organization (bold) and Other Potential Partners	Time Frame			Potential Indicators
				Short	Medium	Long	
KSO 5: Net Zero Carbon for Water and Sanitation.	Quantify and reduce the carbon footprint of the entire water and sanitation sector.	National and Local.	**DWS (B:WRM and B Sanitation),** PCC, WRC, SALGA, etc.	X			Research report on the carbon footprint of water.
	Identify opportunities for re-use of methane emissions from wastewater treatment plants.	Local	**DWS (B:WRM and B Sanitation),** SALGA, WSA, Municipalities.	X	X	X	Reduced methane emissions from wastewater treatment.
	Support the development of water linked alternative energy sources.	National	**DME,** DWS, SALGA, ESKOM, Private, etc.		X	X	Number of hydropower plants and other water linked renewable energy sources supported in SA.
	Consider the water resources impacts and WEF inter-connections of the Just Energy Transition (JET) in South Africa.	National	**DWS (CD:IWRP),** DWS (Branch Sanitation), PCC, WRC, NGOs,	X	X		Report on the water-energy-food (WEF) links and recommendation for the water in the Just Energy Transition (JET).

Key for time frame:
Short: < 2 years; Medium: 2– 5 years; Long : 5 years

Consultation on Climate Change Response Strategy for Water and Sanitation

- Conducted between November 2023 and January 2024, the following were represented and were conducted in hybrid platforms
  - Presidential Climate Commission,
  - National Business Initiative (NBI) and Private Sector,
  - Universities (WITS, UKZN, UP, SU, TUT, UFS, UL, UCT,) and Research Institutions (WRC, CSIR, SAEON, HSRC, etc.),
  - Civil Society Organisations or Non-Profit Organizations and the general public
  - Sector Departments (DFFE, DARLD, etc.),
  - Provincial Government Departments and DWS Offices (including CMAs)
  - River Commissions (ORASECOM)
  - International Development Agencies (IWMI, FANRPAN, IUCN, GIZ, etc.)

Academic Expert Consultation on Climate Change Response Strategy for Water and Sanitation

- Emerging Issues from Discussions
  - Good governance, coordination and alignment in government, to enable uptake and implementation of strategies and programmes,
  - Funding to sustain initiatives and programmes – a funding model is required to attract and/or secure foreign climate financing and investment for research and implementation
  - how we communicate uncertainty in Science - to decision-makers (at all spheres) on climate impacts over the next 15 to 20 years,
  - CoP 28 outcomes and extreme events in South African highlight the urgency to address climate change issues – actions needed to accelerate information from Academic to space where it can be used,
  - Improvement in data and information collection and collation - critical factors undermining the robustness and defensibility of actions that have specific societal consequences
  - Investment in Global Climate Models downscaling and bias correction, and use application of different hydrological models

Academic Expert Consultation on Climate Change Response Strategy for Water and Sanitation

- Immediate actions from the strategy to trigger and accelerate climate change Responses in the sector, implementation within next 5 years
  - Investment in climate modelling – *Downscaling of CMIP6 and application through (multiple) hydrological models to look at a wide range of potential impacts across SA,*
  - Research or assess the potential for extreme events and disasters that have occurred – *Focus on potential "Tipping Points" of extreme climate change scenarios, the likely impacts and appropriate responses,*
  - Improve communication of science and climate uncertainty – *Better understanding of what constitutes ROBUST decision-making for water security planning in South Africa*, and *Research on communicating uncertainty of future climate (and other risk drivers) to support decision-making at local level,*
  - Improve coordination, alignment and governance of climate response efforts across sectors, specifically within government,
  - Improvement of coordination around data collection and accessibility – such as updated WR2012 and design standards etc.

Academic Expert Consultation on Climate Change Response Strategy for Water and Sanitation

- Potential research areas or knowledge gaps in climate and water sector – Facilitated by WRC.
  - Building Climate Resilient Systems for the Water and Sanitation Sector – *mainstreaming catchment and site-specific responses, adaptive management, and local scale planning to incorporate climate resilient approaches, while reducing emissions, – addressing practical adaptation options with a focus at catchment, municipal and national scale,*
  - Regional and Transboundary Climate Impacts and Cooperative Response– *research to support cooperative and multilateral actions that support resilience and continued sustenance of these transboundary river systems and better-coordinated efforts in dealing with the consequences of climate change,*
  - Resilience, Proactive Planning and National Scale Adaptation – *Research to support actions for resilience of the water sector at a practical scale which advances proactive planning so that climate-induced disasters are dealt with through a well-capacitated disaster preparedness programme which contributes to water security despite the changing climate,*
  - Resilient Infrastructure and Local Scale Adaptation – *Research to provide practical adaptive solutions to address vulnerable infrastructure to climate change in rural communities, municipalities, and peri-urban areas.*

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

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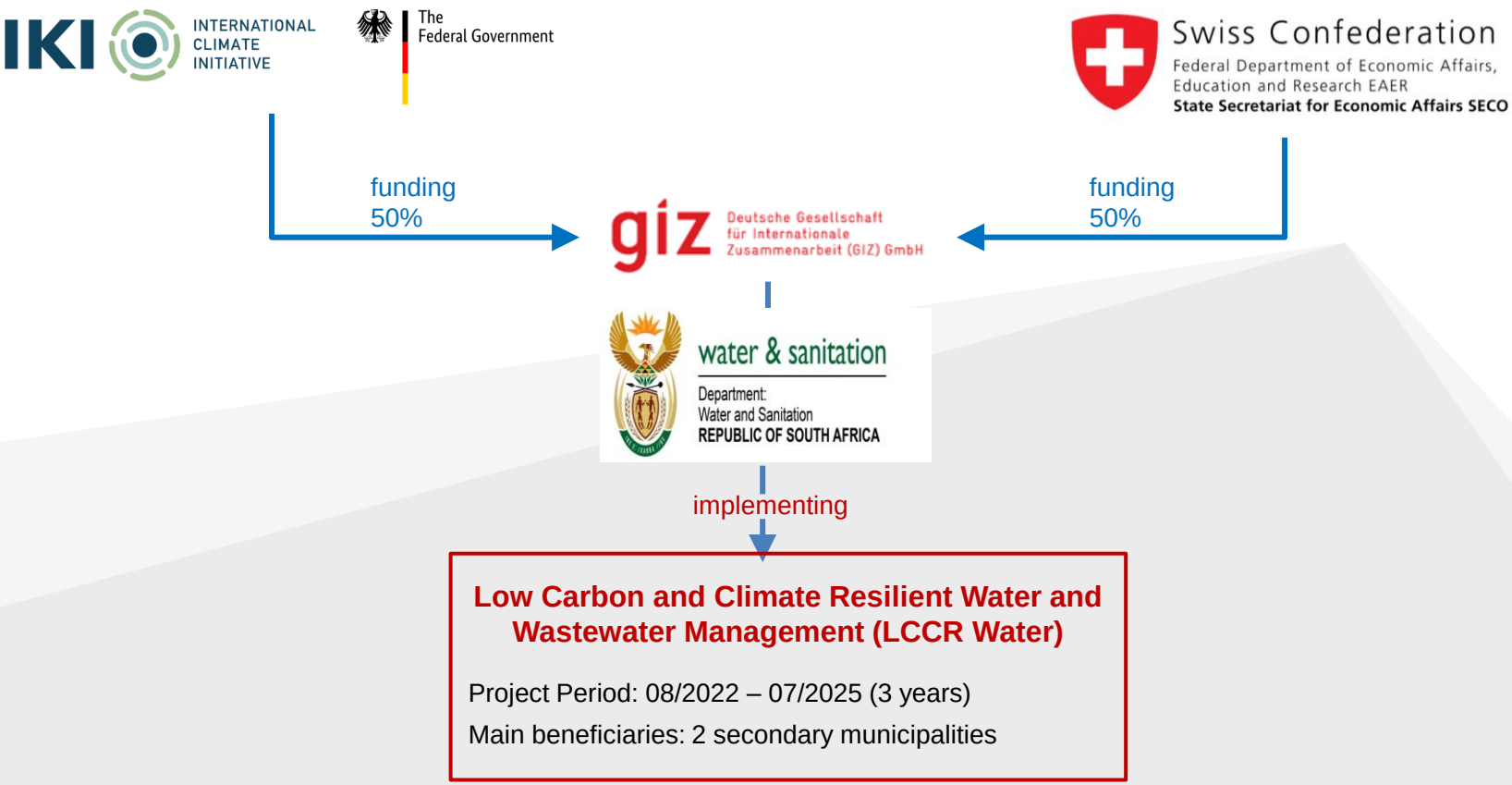
Low Carbon and Climate Resilient Water and Wastewater Management (LCCR Water)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water & sanitation
Department: Water and Sanitation
REPUBLIC OF SOUTH AFRICA
implementing
Low Carbon and Climate Resilient Water and Wastewater Management (LCCR Water)
Project Period: 08/2022 – 07/2025 (3 years)
Main beneficiaries: 2 secondary municipalities

Low Carbon and Climate Resilient Water and Wastewater Management (LCCR Water)

Impact
In the South African water and wastewater sector, secondary municipalities are better able to simultaneously improve their climate resilience, their service delivery, and their responsiveness to the needs of vulnerable groups.
Outcome
A replicable strategy for low carbon and climate resilient water and wastewater services that is responsive to vulnerable groups is implemented in secondary municipalities in South Africa

Intervention areas and indicators

Supporting **two secondary municipalities**, with **replicability** in mind

water and wastewater services

NRW reduced by 20% (e.g. from 40% to 32%)

Training of trainers on management priorities

Financial management improved

energy efficiency & renewable energy in wastewater management

Energy efficiency in wastewater treatment improved by 15%

Project concepts for low carbon or climate resilient wastewater management developed

climate resilience

Measures to improve resilience of water services (e.g. minimizing flood risks)

GHG reduction

responsiveness to vulnerable groups

Operational or financial management measures for improving services to vulnerable groups

What LCCR Water offers

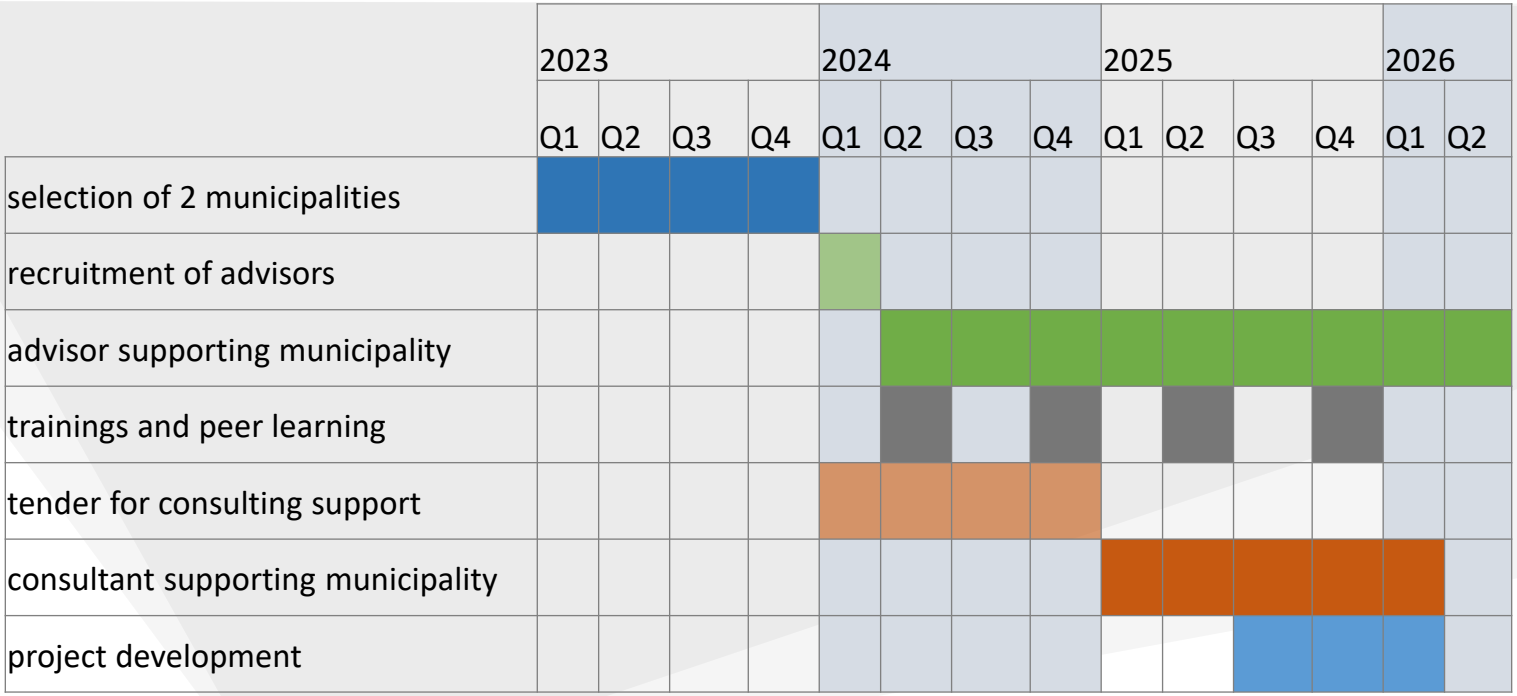
Capacity development

- **Long-term advise**, e.g. through local advisor based at municipality
- **Consulting support**, e.g. for assessments (e.g. NRW, energy audit), studies, strategies (e.g. NRW strategy), project development
- Targeted **training**, e.g. through SALGA and WRC
- **Peer learning** and access to international networks

Minor procurement (e.g. for demonstration or quick wins, identified by consultant)

Facilitating link to other projects and finance facilities

Tentative project timelines – support to municipalities



What is needed from municipalities

- Leadership and ownership
- Dedicated staff to work with from various departments
- Alignment of LCCR Water support with own priorities, plans (e.g. WSDP, IDP) and resources
- Curiosity and trust in benefit of Capacity Development
- Openness to apply for external funding, nationally or internationally

Implementing partners

- **SALGA**: Project advisor, capacity development, support in future up-scaling
- **WRC**: Project advisor, capacity development, identification of up-scaling opportunities,

Other partners, e.g. for trainings, according to needs of partner municipalities

Process for selecting secondary municipalities

- **Step 1**: shortlisting municipalities, applying criteria agreed upon during December workshop, using information from DWS and Auditor General
  - **Step 2**: gauging interest of shortlisted municipalities
  - **Step 3**: in-depth appraisal in 3 to 6 municipalities
  - **Step 4:** final selection of 2 most suitable municipalities

Result step 1 – 6 shortlisted municipalities

No.	Secondary Municipalities	Population 200 000 - 750 000	Green Drop %	Blue Drop %	Audit findings 2020/2021
1	Drakenstein	280 000	**89**	**33,60**	**Unqualified with no findings**
2	Steve Tshwete	279 000	**88**	**33,40**	**Unqualified with no findings**
3	George	208 000	**74**	**40,10**	**Unqualified with no findings**
4	Newcastle	389 000	**59**	**25,90**	**Unqualified with findings**
5	uMhlathuze	410 000	**58**	**32,40**	**Unqualified with no findings**
6	JB Marks[1]	243 000	**84**	**14,40**	***Qualified with findings***
7	Mogale City[2]	383 000	**65**	**37,00**	**Unqualified with findings**
8	Stellenbosch	*135 000*	**84**	**26,10**	**Unqualified with no findings**
9	Emalahleni	455 000	***45***	**52,60**	***Qualified with findings***
10	Madibeng	536 000	***44***	**34,20**	***Disclaimed with findings***
11	Matlosana	417 000	***44***	**41,40**	**Unqualified with findings**
12	Govan Mbeki	340 000	***39***	**40,80**	***Qualified with findings***
13	Emfuleni	733 000	***37***	***86,90***	**Unqualified with findings**
14	Sol Plaatjie	255 000	***36***	**58,80**	***Qualified with findings***
15	Polokwane	797 000	***31***	**40,80**	***Qualified with findings***
16	Matjhabeng	429 000	***26***	**29,90**	***Qualified with findings***
17	City of Mbombela	695 000	**74**	***95,20***	**Unqualified with findings**
18	Msunduzi	679 000	**78**	***100,00***	**Unqualified with findings**
19	Rustenburg	626 000	**69**	**55,70**	***Qualified with findings***

Green/bold: performance criteria met *Red/italic:* performance criteria not met

[1] JB Marks did not meet the requirement "unqualified accounts". Whether the audit findings are relevant for LCCR will be assessed in the next steps and will inform if the municipality is suitable for LCCR or not.
[2] Mogale City met the initial selection criteria, but according to the Blue Drop Progress Report, the municipality's WSP is Rand Water. LCCR's objectives are not compatible with an external service provider.

Way forward

- **Step 1**: shortlisting municipalities, applying criteria agreed upon during December workshop, using information from DWS and Auditor General
  - **Step 2**: gauging interest of shortlisted municipalities
  - **Step 3**: in-depth appraisal in 3 to 5 municipalities
  - **Step 4:** final selection of 2 most suitable municipalities