Western Cape Government

Department of Environmental Affairs and Development Planning

Western Cape Sustainable Water Protection Plan

2024 – 2029

Investing in Ecological Infrastructure for Water Security, Resilience, and Sustainability

Final

15/03/2024

Project team

Project Managers	*Natasha Davis –Wolmarans, Catherine Bill and Russell Mehl.* *Department of Environmental Affairs and Development Planning*
Primary Authors	*Anya Eilers* *James Cullis* *Amanda Gcanga*
Contributing Authors	*Phil McLean – WC DEA&DP* *John Wilson – WC DEA&DP* *Gottlieb Arendse – WC DEA&DP* *Karen Shippey – WC DEA&DP* *Andrew Turner – CapeNature* *Peter Keuck – WC Department of Agriculture* *Elkerine Rossouw – BGCMA* *Rudolph Roscher – WC Department of Agriculture*

Acknowledgements

The review and update of the Western Cape Sustainable Water Management Plan (WCSWMP), rebranded as the Western Cape Sustainable Water Protection Plan (WCSWPP), would not have been possible without the hard work and dedication of the SWMP Steering Committee and the broader stakeholder group. Significant contributions have been made by the Department of Water and Sanitation, Department of Environmental Affairs and Development Planning, CapeNature, Department of Local Government, Western Cape Department of Agriculture, Department of Forestry, Fisheries and the Environment, WRC, Berg Olifants Catchment Management Agency and others.

Foreword

It is common knowledge that the Western Cape is a water scarce province, and the protection of this resource is of paramount importance for development and growth of the economy and its people. In a challenging economic environment, it is important to use smart and integrated planning mechanisms that focus on a holistic approach when dealing with water which is considered to be the one of the most important natural resources. Thus, the Western Cape Sustainable Water Protection Plan (WCSWPP) has looked holistically at other provincial initiatives, such as the Growth for Jobs Plan and the One Health System, where linkages between human health, the economy and the environment receive a special focus.

The plan has been divided into 3 Strategic Focus Areas with 6 Strategic Enablers with a focus on the mandate of the Department of Environmental Affairs and Development Planning, however the delivery on these commitments and deliverables would require the input and cooperation of all government departments. The 3 Strategic Focus Areas are:

- *Ecological Infrastructure*
- *Water Quality and Pollution Management*
- *Water Sensitive Design*

This plan also places special emphasis on gender and human rights aspects to be more inclusive and to bring more diversity into decision-making in the water sector. Furthermore, ecological restoration and improvement of ecological infrastructure is a very important component of improving the water quality and quantity and various departments including my own have a critical role to play in ensuring that the proper investments in this area are secured and projects implemented.

The plan also details my Department's commitment to pollution prevention, especially of our water resources and we continue to engage and assist local municipalities, to take appropriate preventative action to deal with pollution ending up in our water courses. In addition, my Department will continue with water quality monitoring to expand our understanding of the impacts affecting our rivers and estuaries.

We are confident that proper implementation of the WCSWPP will provide the next steps in improving water resilience in our province and that all role-players will provide the necessary commitment to achieve the objectives of the plan.

Anton Bredell: Western Cape MEC: Local Government, Environmental Affairs and Development Planning.

Executive Summary

Climate change and extreme weather events (e.g. fire, floods and droughts) are key drivers of increasing water insecurity on a national and international scale. However, several other factors are also driving the local and international water security crises. These include environmental degradation, inadequate infrastructure, insufficient financing, water pollution, and growing demand due to population growth and increased consumption.

In South Africa, Cape Town highlighted the importance of sustainable water management on a global scale. The city has faced water scarcity issues and gained significant attention as the first major city to almost run out of water. Between 2015 and 2018, Cape Town endured a one-in-400-year drought which took the city of around 4.6 million residents to the brink of "day zero" when Cape Town would run out of water. The situation was ultimately averted, but it served as a warning for other cities around the world that could face similar challenges. Nelson Mandela Bay Municipality and the City of Johannesburg have also recently faced water security challenges, and several smaller towns in South Africa face water security and sanitation challenges on an almost daily basis.

In response to the Western Cape Government's constitutional and legislative mandate to support sustainable water management in the province, the first **Western Cape Sustainable Water Management Plan (2012-2017)** was developed with the intention of five-year implementation and review cycles to ensure sufficient monitoring and relevancy. Its development was undertaken collaboratively by the Western Cape Government and the National Department of Water Affairs, with the provincial Department of Environmental Affairs and Development Planning (DEA&DP) being the custodian. A comprehensive review was undertaken in 2017, informing the updated **Western Cape Sustainable Water Management Plan (2017-2022)**.

Since the last update to the Western Cape Sustainable Water Management Plan (WCSWMP) in 2017, significant developments have occurred in the water sector. As part of this project, these developments were reviewed and informed the update to the WCSWMP. They included among others:

- Reflection on the progress made during the 2017-2022 WCSWMP.
- Review of the legislative responsibilities and mandates of local, provincial and national governments in relation to sustainable water management.
- Review of to the 4 Goals, 16 Strategic Objectives, 12 Focus Areas and 61 Prioritised activites of the 2017-2022 WCSWMP.
- Engagement with critical stakeholders, particularly civil society, to inform the update to the Plan.
- Consideration of how the progressive realisation of human rights and gender equity can be advanced.
- Incorporation of lessons learnt from the Cape Town water crises.
- Alignment with the 15-year Western Cape Integrated Drought and Water Response Plan (WCIDWRP), launched in 2022, and the provincial Water Resilience Committee established in 2023.
- Alignment with new/updated provincial and national strategies, policies and plans.
- Consideration of the impacts of the COVID-19 pandemic.
- Review of relevant conceptual frameworks that can guide an improved WCSWMP.

The review process showed that 2017-2022 WCSWMP provided a wholistic framework for achieving sustainable water management in the province. However, other provincial departments are responsible for their own components of water resilience. By leveraging the existing structures of the provincial water resilience committee, the DEA&DP (and by extension the WCSWMP) should focus its attention on interventions that improve **environmental water resilience on a catchment scale**. This will ultimately increase resilience across all other sectors and enable the DEA&DP to focus constrained budgets on areas of maximum impact that align with their core mandate. It will also address the gaps in the 15-year WCIDWRP (which focuses on **water quantity** and **municipal water resilience**) and the SmartAgri plan (which focuses on **agricultural water resilience**).

As such, the updated plan has been rebranded as the **Western Cape Sustainable Water Protection Plan (WCSWPP) (2024 – 2029)**.

OVERALL OBJECTIVE OF THE 2024 - 2029 WESTERN CAPE SUSTAINABLE WATER PROTECTION PLAN

To support healthy catchments and ecosystem services by investing in and collaborating on Ecological Infrastructure, for the overall benefit of water management and quality in the Province.

To achieve this objective, the 2024-2029 WCSWPP prioritises **three (3) Strategic Focus Areas** and **six (6) Strategic Enablers** (Figure E-1). Where possible, each Strategic Focus Area has Objective/s supporting DEA&DP's primary focus and mandate for each of the Strategic Enablers. These include:

- Supporting municipalities with integrating the principles of ecological infrastructure, pollution management and water sensitive design into municipal planning.
- Driving the co-ordination of provincial activities related to environmental water quality and ecological infrastructure, in partnership with other relevant institutions.
- Improving monitoring and information management across all Focus Areas.
- Communicating and advocating for ecological infrastructure, water quality and sustainable design, particularly DEA&DP flagship programmes.
- Creating an enabling environment for increased investments in ecological infrastructure and pollution management.
- Proactively and inclusively planning for ecological infrastructure, water pollution and water resilience and design, considering all stakeholders and marginalised communities.

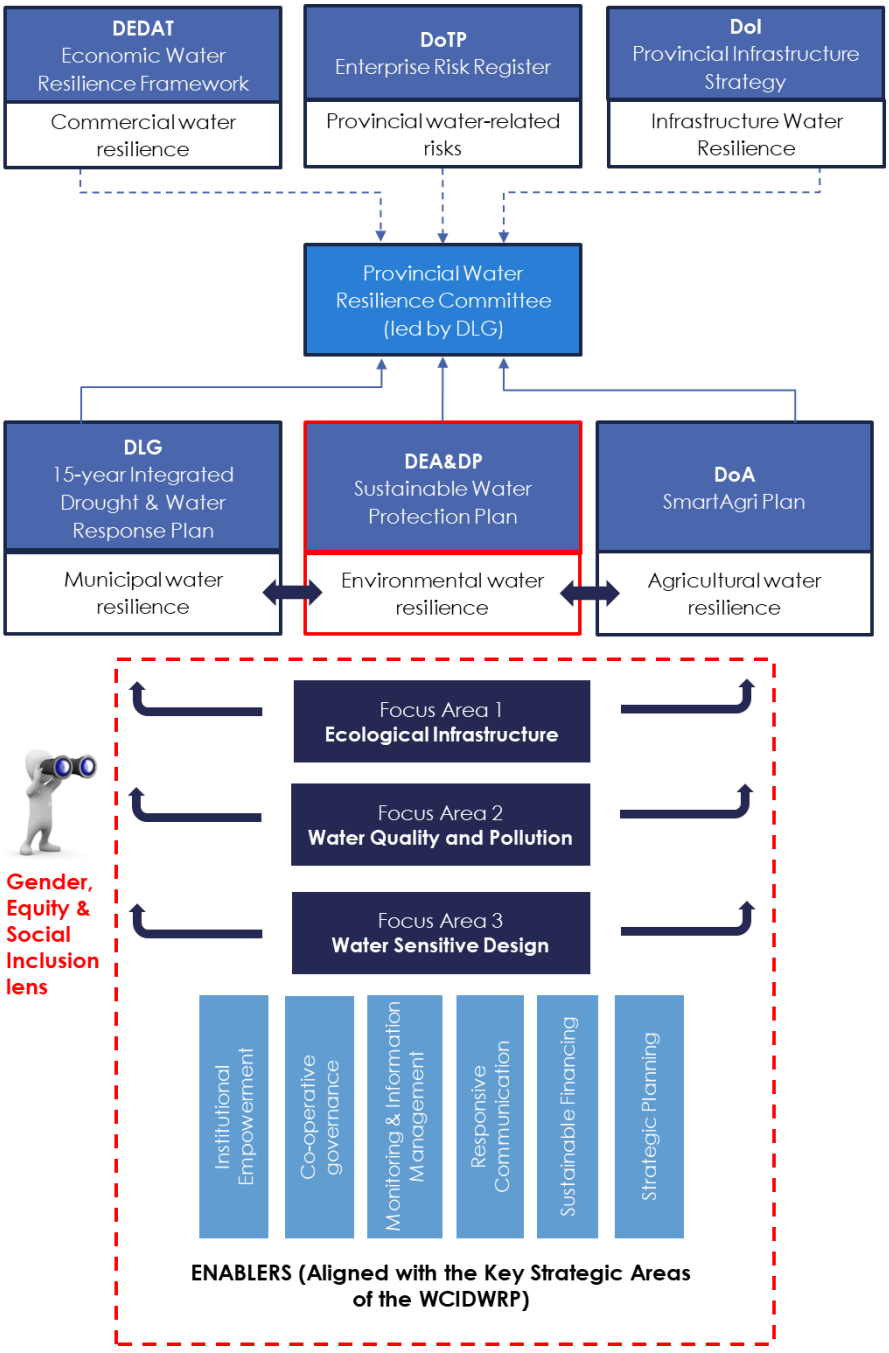


Figure E-1: Provincial departments reporting to the Provincial Water Resilience Committee and the updated Strategic Focus Areas and cross-cutting enablers of the 2024-2029 WCSWPP.

Under the updated WCSWPP, **twelve (12) Strategic Objectives** have been identified (Figure E-2). Each Strategic Objective has several activities to be implemented over the 5 year planning horizon. Details on these activities, their relevant indicators, timeframes and responsible departments can be found in **Appendix A**. It is important to note that the updated WCSWPP will remain a transversal plan, but the activities will be more focused on DEA&DP's mandate for environmental water resilience.

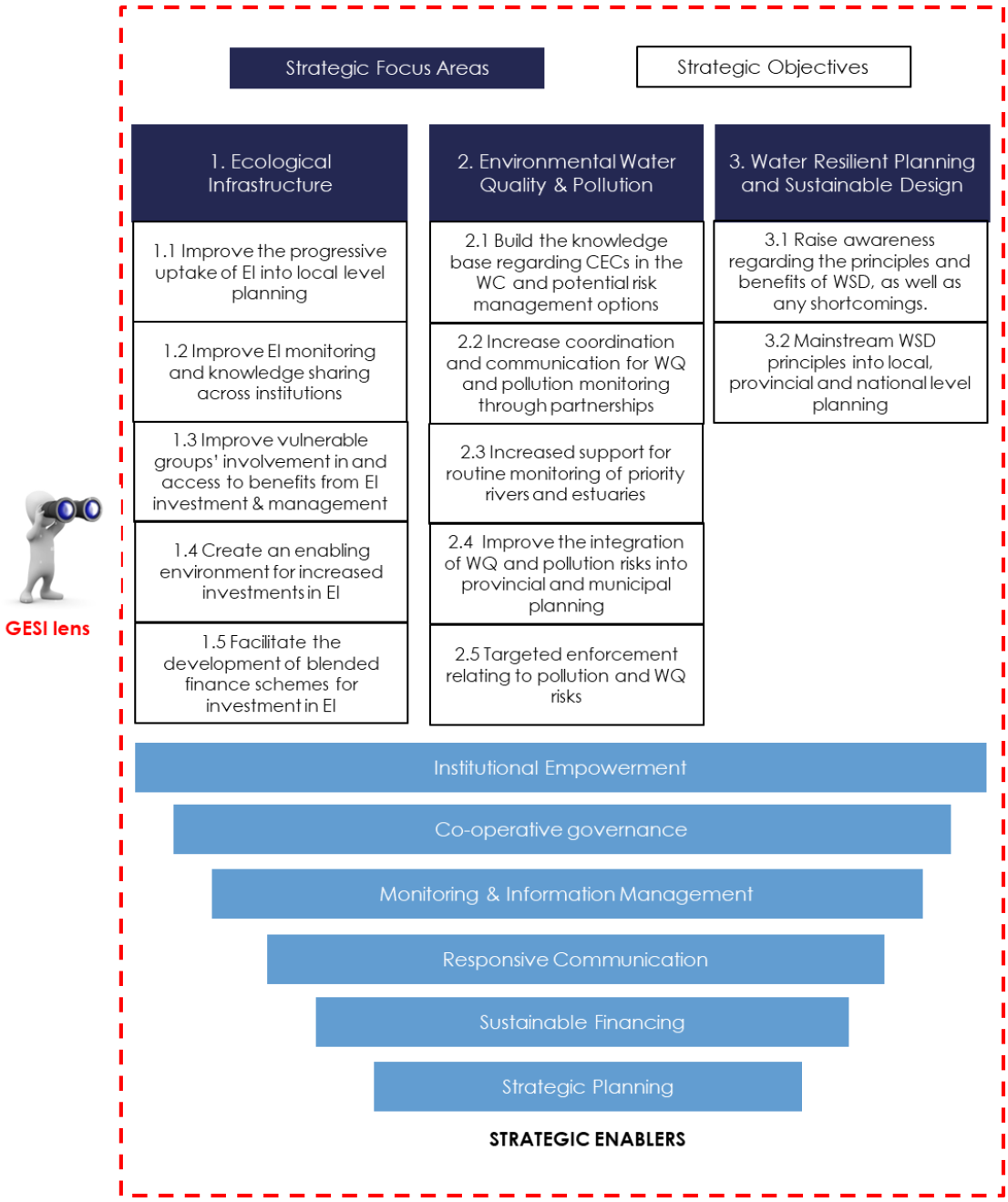
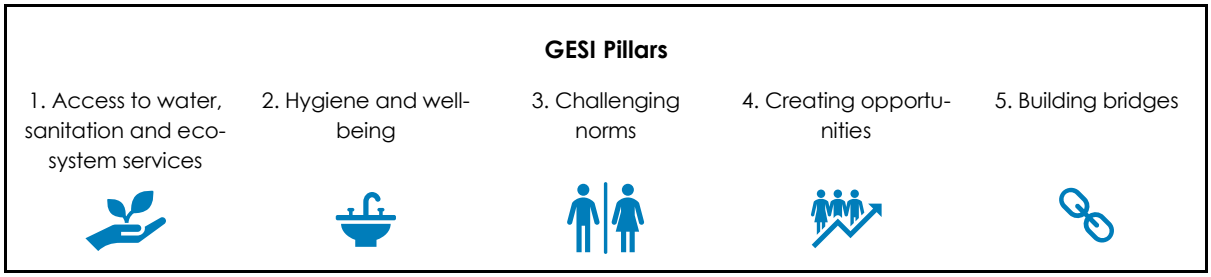


Figure E-2: Summary of the strategic framework of the 2024 – 2029 WCSWPP

The WCSWPP also embeds a **Gender, Equity and Social Inclusion (GESI) lens** for identifying priority activities and evaluating the key strategic objectives in addressing key GESI pillars. The aim is to ensure that the plan follows a GESI sensitive approach that does not directly or indirectly discriminate against any people of the Western Cape Province. The GESI-responsive approach intentionally seeks to engage with and respond to gender and social inequities by promoting equitable benefits, challenging unequal power relations and harmful gender norms, and empowering women, youth, and other marginalised groups to participate in sustainable water management implementation and decision-making. In the absence of a GESI approach, the WCSWPP might unintentionally discriminate base on gender, sexual orientation, settlement classification, race, age, cultural beliefs, religion, and language. The GESI approach is a multifaceted process of change that identifies and addresses the root

causes of inequality and exclusion, and existing barriers to gender and social equality for sustainable water management and protection.

In addressing these barriers, the WCSWPP is guided by **five GESI pillars** to ensure that women, children, and other marginalised groups meaningfully engage in and benefit from sustainable water management decision-making and implementation.



In conclusion, the WCSWPP is a 5-year plan to support the WCG with achieving the progressive realisation of enhanced **ecological infrastructure**, improved **water quality and pollution management**, and implementation of **water sensitive design** best-practices. To achieve this, the proposed activities under the twelve strategic objectives offer a phased approach to achieving sustainable water protection in the province (Figure E-3). It is imperative that these activities are implemented under or aligned with existing programmes (such as the DEA&DP Ecological Infrastructure Investment Framework and Implementation Plan) for maximum impact.

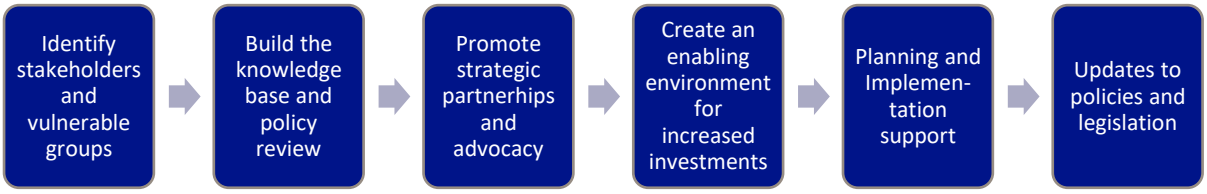


Figure E-3: Phased approach to achieving sustainable water protection.

List of Abbreviations

BOCMA	Breede-Olifants Catchment Management Agency
BRERPP	Breede River Environmental Rehabilitation and Protection Plan
BRIP	Berg River Improvement Programme
CoCT	City of Cape Town
CEC	Contaminants of Emerging Concern
CMA	Catchment Management Agencies
CMIP	Coupled Model Intercomparison Project
CSIR	Council for Scientific and Industrial Research
CWRF	City Water Resilience Framework
DoA	(Provincial) Department of Agriculture
DCOG	(National) Department of Cooperative Governance
DEA&DP	(Provincial) Department of Environmental Affairs and Development Planning
DEDAT	(Provincial) Department of Economic Development and Tourism
DFFE	(National) Department of Forestry, Fisheries and the Environment
DoHW	(Provincial) Department of Health and Wellness
DoI	(Provincial) Department of Infrastructure
DLG	(Provincial) Department of Local Government
DBSA	Development Bank of Southern Africa
DMC	(Provincial) Disaster Management Centre
DoTP	(Provincial) Department of the Premier
DWS	(National) Department of Water and Sanitation
EAF	Estuary Advisory Forum
EDP	Economic Development Partnership
EIA	Environmental Impact Assessment
EI	Ecological Infrastructure
EIIF	Ecological Infrastructure Investment Framework
FAO	Food and Agriculture Organisation
G4J	Growth for Jobs
GCTWF	Greater Cape Town Water Fund
GESI	Gender, Equity and Social Inclusion
IAP	Invasive Alien Plant
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IWQM	Integrated Water Quality Management Policy and Strategy
IWRM	Integrated Water Resources Management
LGBTQI+	Lesbian, Gay, Bisexual, Transgender, Queer, and Intersex
MAR	Mean Annual Runoff
MIG	Municipal Infrastructure Grant

MSDF	Municipal Spatial Development Framework
NbS	Nature-based Solution
NEMA	National Environmental Management Act
NGO	Non-Governmental Organisation
NSIP	National Sanitation Integrated Plan
NT	National Treasury
NWA	National Water Act
NWRS	National Water Resources Strategy
PAAC	Protected Areas Advisory Committee
PT	Provincial Treasury
RQO	Resource Quality Objective
SAEON	South African Environmental Observation Network
SALGA	South African Local Government Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SDG	Sustainable Development Goal
SMME	Small, Medium and Micro Enterprise
SPLUMA	Spatial Planning and Land Use Management Act
SSP	Shared Socio-economic Pathway
SWSA	Strategic Water Source Area
TNC	The Nature Conservancy
USDG	Urban Settlements Development Grant
WCG	Western Cape Government
WCIDWRP	Western Cape Integrated Drought and Water Response Plan
WCSWMP	Western Cape Sustainable Water Management Plan (2012 – 2017; 2017 -2022)
WCSWPP	Western Cape Sustainable Water Protection Plan (2024 – 2029)
WCWRP	Western Cape Water Resilience Plan
WCWSS	Western Cape Water Supply System
WMA	Water Management Area
WRC	Water Research Commission
WRP	Water Resilience Plan
WSA	Water Service Authority
WSC	Water Sensitive Cities
WSD	Water Sensitive Design
WSDP	Water Services Development Plans
WQ	Water Quality
WSP	Water Service Provider
WUA	Water User Association
WWF	World-Wide Fund for Nature

Glossary

Contaminants of Emerging Concern: Emerging contaminants are classes of natural and synthetic chemicals that were previously not analysed for or detected in the environment. These contaminants include pharmaceuticals, pesticides, personal care products, disinfection by-products, and industrial chemicals.

Ecological Infrastructure: Ecological infrastructure refers to the natural or semi-natural structural elements of ecosystems and landscapes that are crucial in delivering ecosystem services. These services include water and climate regulation, soil formation, and disaster risk reduction. Ecological infrastructure is the nature-based equivalent of built or hard infrastructure and has multiple co-benefits, including improved biodiversity, socio-economic development and climate change adaptation among others.

Green Infrastructure: Green infrastructure primarily focuses on replicating natural processes at different scales, such as storing or infiltrating water at the neighbourhood scale with features like rain gardens and green roofs. At a larger scale, it encompasses natural areas like wetlands and forests that provide various ecosystem services like flood protection, water filtration, and habitat provision. Green infrastructure aims to address environmental challenges and offer benefits such as stormwater management, community revitalization, improved air quality, and wildlife habitats.

Nature-based Solutions: Nature-based solutions (NBS) are activities inspired by natural processes and ecosystems, aiming to address challenges related to climate change, ecosystem resilience, and human well-being. NBS integrate nature into urban, rural, and natural environments to provide multiple benefits and support sustainable development. These solutions focus on conservation, restoration, or land management practices that leverage nature's attributes efficiently across different spatial scales. NBS offer a holistic approach to societal and environmental issues, enhancing ecosystem health, biodiversity conservation, and sustainable development.

Vulnerable Groups: The FAO definition of vulnerable groups has been used for the purpose of this plan: "*A vulnerable group is identified by the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards*".

Water Sensitive Design: Water Sensitive Design (WSD) incorporates green infrastructure and systems thinking with engineered urban water systems through innovative design of the built environment and urban landscape. Water Sensitive Design principles are key to improving climate change resilience, from the impacts of both flooding and drought.

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CASE STUDY 5: PARTICIPATION OF VULNERABLE GROUPS IN CATCHMENT MANAGEMENT

1. Introduction

1.1. A global water crisis

Water is vital for life, but also for the economy. For the second consecutive year, the top four long-term risks in the World Economic Forum's Global Risks Report are all related to water and the environment (Figure 1). This follows the year of 2023 where wildfires, heatwaves and tropical storms swept the world. On Friday, 17 November 2023, the Earth appeared to have crossed a threshold into new climatic territory. That day was the first that the average air temperature near the surface of the Earth was 2 degrees Celsius warmer than preindustrial levels (Copernicus, 2023). Many scientists now agree it's inevitable that the world will overshoot 1.5 degrees Celsius of warming.

Source: WEF (2024)

Figure 1: Global risks ranked by severity over the short and long term

Climate change and extreme weather events (e.g. fire, floods and droughts) are key drivers of increasing water insecurity on a national and international scale. However, several other factors are also driving the local and international water security crises. These include environmental degradation, inadequate infrastructure, insufficient financing, water pollution, and growing demand due to population growth and increased consumption. Water pollution threatens existing resources and is responsible for over 1 million deaths each year. Growing populations mean more water is needed to produce food and energy, and to run cities. At present, 4 billion people live in water-scarce areas, and one in four cities face water insecurity (UN, 2023).

According to the World Bank, the water sector currently attracts less than 2% of public spending, with a similar level of private investment in low- and middle-income countries. Meeting the global financing needs for water security is a significant challenge, with global water infrastructure estimated to require a staggering $6.7 trillion by 2030 (OECD, 2022). In South Africa, a recent study estimated the investment requirements to close the gap on the sustainable development goals for water (i.e. SDG 6) to be around R 261bn per annum, increasing to around R 300bn under a low mitigation/dry climate scenario (DBSA & WB, 2023).

"Water and climate change are inextricably linked. Climate change affects the world's water in complex ways. From unpredictable rainfall patterns to shrinking ice sheets, rising sea levels, floods and droughts – most impacts of climate change come down to water."
– UN Water

In South Africa, Cape Town highlighted the importance of sustainable water management on a global scale. The city has faced water scarcity issues and gained significant attention as the first major city to almost run out of water. Between 2015 and 2018, Cape Town endured a one-in-400-year drought which took the city of around 4.6 million residents to the brink of "day zero" when Cape Town would run out of water. The situation was ultimately averted, but it served as a warning for other cities around the world that could face similar challenges. Some of the lessons learned from the Cape Town crisis include the importance of water conservation, demand management, and investing in sustainable water infrastructure (Ziervogel, 2019).

Figure 2: Trial demonstration of one of the water supply Points of Distribution that would need to be established across the city for all residences to receive their water allocations if Day Zero was reached.

Nelson Mandela Bay Municipality and the City of Johannesburg have also recently faced water security challenges, and several smaller towns in South Africa face water security and sanitation challenges on an almost daily basis. In Nelson Mandela Bay, water shortages and infrastructure challenges led to restrictions and rationing of water supplies. Local dams were functionally empty between 2017 and 2023 due to below average rainfall, and bulk infrastructure limitations in the city did not allow for the distribution of water from inter-basin transfer schemes that were not affected by local drought conditions. The water crisis in Johannesburg intensified in 2022 when the city's two main water treatment works were damaged by floods, leading to a significant decrease in water supply. The situation has been exacerbated by climate change, increased migration and expansion of settlements, poor management and overall lack of water and sanitation delivery and services, poor planning and management of growing water demands, infrastructure challenges, and continuous high consumption by consumers.

The key water security issues in South Africa are summarised on the next page.

KEY WATER SECURITY ISSUES IN SOUTH AFRICA

Very low surface water availability and variability.

South Africa is naturally a water stressed country, with very high spatial and temporal variability, and most available dam sites have already been developed. Alternative sources of water will be required to meet the growing demand.

Climate change

Climate change is expected to have a significant impact on water resources, leading to increased drying or flooding in most parts of the country by 2050. The regional impact is uneven and increased drying is highly probable in the west, particularly in the Western Cape where the mean decline in average annual run-off is around 13% (UNU-WIDER, 2016).

Population growth and rapid urbanisation

South Africa's population is projected to reach 65 million by 2030, with a water supply deficit of 17% (DWS, 2018). Much of this growth is expected to occur in urban areas that will likely face water insecurity and challenges for urban planning.

High non-revenue water and losses.

Nearly half the water piped through South Africa's infrastructure is being lost through leaks, theft, or nonpayment. According to the latest 'No Drop' Watch Report, non-revenue water increased from the 35% recorded in 2015 to 46.4% in June 2022, well above the international average of below 30%, while water losses stood at 40.7%.

Failing Infrastructure and financial instability

Existing water infrastructure is aging, and refurbishment and improved maintenance is urgently required. The expected water infrastructure funding gap is R330 billion per annum (DBSA & WB, 2023). At least a third of the municipalities delivering water services are dysfunctional. Many water institutions are not credit-worthy and accumulated municipal water debt is now over R13 billion (DWS, 2018).

Catchment degradation

Catchment degradation from urbanisation, deforestation, damming of rivers, wetlands destruction, industry, mining, agriculture, and energy use are all contributing to the deterioration of water quality and quantity in South Africa. The spread of invasive alien plants has a significant impact on water availability and soil erosion is reducing dam storage.

Pollution

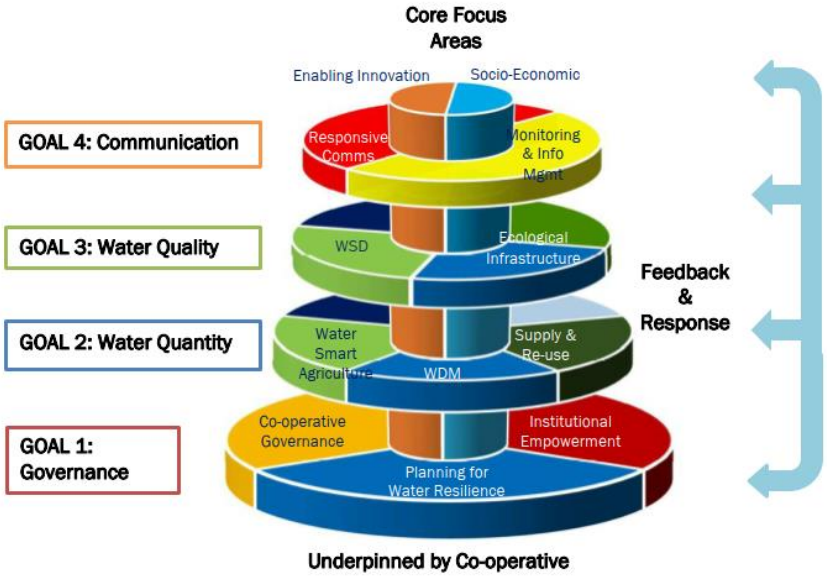
Pollution from a variety of sources is a major problem in South Africa. This includes both point and non-point pollution. The 2022 Green Drop report, released by the Department of Water and Sanitation, reflects the poor state of wastewater treatment systems across the country. The report indicates that a total of 334 systems are in a critical state, highlighting the significant challenges in wastewater management.

1.2. The Western Cape Sustainable Water Management Plan

The Western Cape Government (WCG) has a Constitutional legislative mandate, concurrent with national government, on the environmental, nature conservation, pollution control and regional planning and development; The Constitution give powers to the Province to "supervise", "monitor, and "support" local government in also achieving its mandates.

In answer to this mandate and as requested by the then National Minister of Water Affairs and Forestry, the first **Western Cape Sustainable Water Management Plan (2012 – 2017)** was developed with the intention of five-year implementation and review cycles to ensure sufficient monitoring and relevancy. Its development was undertaken collaboratively by the Western Cape Government and the National Department of Water Affairs, with the provincial Department of Environmental Affairs and Development Planning (DEA&DP) being the custodian. Activities were prioritised, to move towards achieving integrated and sustainable management of water in the Western Cape with the overall aim to guide sustainable water management towards meeting the growth and development needs of the region.

A comprehensive review of the Western Cape Sustainable Water Management Plan (WCSWMP) was undertaken in 2017. The purpose of this review was to evaluate the impact of the Plan and update it to ensure alignment with the local, provincial, and national policies. Key physical factors considered during the update of the plan included the impacts of urbanisation and climate change. The update of the **Western Cape Sustainable Water Management Plan (2017-2022)** followed an incremental approach to water management by aligning the goals and objectives. This incremental approach considered the natural water cycle from catchment to coast and considers the institutional structure that must be in place for effective governance of our water resources (DEA&DP, 2018). The 2017-2022 WCSWMP is underpinned by the same four Goals as the 2012-2017 WCSWMP (Figure 3). These goals provide the platform to enable effective collaboration for improved water security as a fundamental first step to enable effective co-operative governance for the water resources of the Western Cape Province.



Source: DEA&DP (2018)

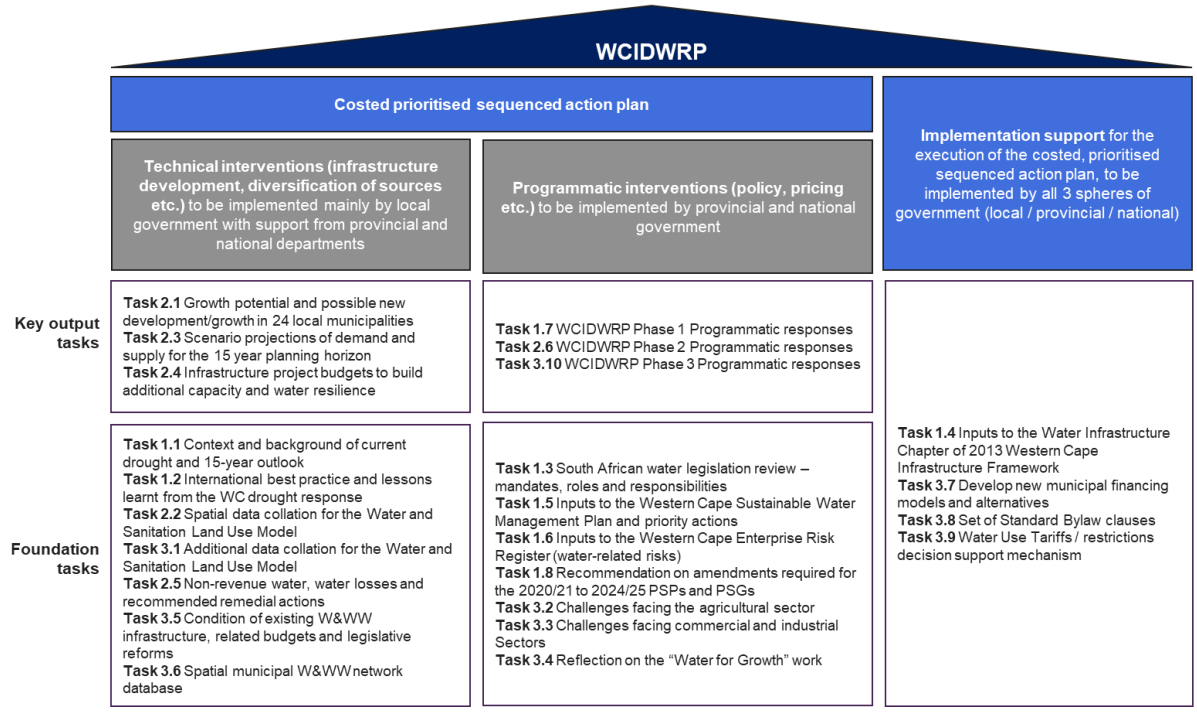
Figure 3: 4 Goals and 12 Focus Areas of the 2017-2022 WCSWMP

1.3. The Western Cape Integrated Drought and Water Response Plan

In 2022, the Western Cape Department of Local Government (DLG) launched the 15-year Western Cape Integrated Drought and Water Response Plan (WCIDWRP). The WCIDWRP aims to support integrated and coordinated provincial drought response and planning and align short- and medium-term interventions with a long-term planning horizon of 15 years (DLG, 2022a). The plan consists of **24 standalone deliverables** under three pillars (Figure 4), of which the first is the primary focus of the WCIDWRP.

1. *Technical interventions* (infrastructure development, diversification of water sources, water conservation demand management etc.) to be implemented mainly by local government with support from provincial and national departments. These interventions are costed, prioritised and sequenced over the 15-year planning horizon and supported by several water security tools developed as part of the plan.
2. *Programmatic interventions* (policy, pricing etc.), considering previous provincial planning, to be implemented by provincial and national government.
3. *Implementation support tasks* for the execution of the costed, prioritised sequenced action plan, to be implemented by all 3 spheres of government (local / provincial / national).

The WCIDWRP was initially envisaged to be the implementation arm of the WCSWMP, but upon review it became clear that they had different purposes and that the WCIDWRP should be regarded as an extension of the WCSWMP. For example, the WCIDWRP does not cover removal of IAPs at a catchment scale; coordination with CMAs is not emphasised; and it is focused on water quantity and not quality. These key issues will become the focus of the updated WCSWMP and will complement the recommendations from the WCIDWRP.



Source: DLG (2022a)

Figure 4: The '3 pillars' of the WCIDWRP, and their relevant foundation and key output tasks.

1.4. The Western Cape Water Resilience Plan

The WCIDWRP is currently being reviewed as the basis for the development of the Western Cape **Water Resilience Plan** (WRP). The final WRP should include recommendations and priority actions from both the WCIDWRP and the updated WCSWMP.

This process is being led by the provincial **Water Resilience Committee**, which was established in 2023 to monitor the development and implementation of the WRP. It also aims to provide inputs into the transversal reporting structures, including the G4J strategy, provincial water risk, etc. The Water Resilience Committee is led by the DLG, with representation from the DEA&DP, Department of Economic Development and Tourism (DEDAT), Department of the Premier (DoTP), Department of Agriculture (DoA) and Department of Infrastructure (DoI)

1.5. Purpose of this report

The objective of this report is to present an updated WCSWMP and strategic approach for enabling sustainable water management throughout the Western Cape Province. Significant developments in the water sector have occurred since the last update (Figure 7), and these have informed the plan. The need to update the plan is discussed below:

1. Incorporate lessons learnt during the past five years

The Western Cape drought, Cape Town water crises, COVID-19 pandemic, and energy crises have all significantly altered the approach to sustainable water management and protection on a local, national and global scale. It is therefore necessary to realign our thinking with changes in the understanding of what it means to be resilient. In response to the drought crisis, the City of Cape Town (CoCT) has developed a new Water Strategy that will provide a roadmap for a transition to water resilience planning and sustainable water management (CoCT, 2019a). Similarly, several other municipalities have implemented additional water supply augmentation schemes.

The lessons learnt from other significant events, like the COVID-19 pandemic and recent extreme flood events, have paved the way for several new programmes in the province focusing on water-related risks to human health. The One Health approach is filtering through the National Department of Health and being adapted by the provincial department. It arose after the COVID 19 pandemic and makes a key link to environmental health. It's *Action track 6 - Integrating the environment into One Health* has direct relevance to the WCSWMP.

2. Update plan to align with other provincial and national strategies and policies

On a national level, the publication of the Blue, Green and No Drop reports in 2022 after a 10-year hiatus have exposed the critical state of much of South Africa's water and wastewater treatment works. Dysfunctional sanitation infrastructure poses a severe water quality, pollution and human health risk and the recent reports have assisted with highlighting this on a national scale.

Other key national plans from the Department of Water and Sanitation (DWS) include the third revision to the National Water Resource Management Strategy (2023), National Water Master Pan (2018) and 2nd Integrated Water Quality Management Policy and Strategy (2017). The DWS is also currently undertaking a review of the reconciliation studies for the bulk water supply systems and stand along schemes in the southern region which includes most of the Western

Cape and including the Western Cape Water Supply System (WCWSS). The DWS is also currently developing the National Sanitation Implementation Plan (NSIP) and is updating the climate change status quo assessment and response plan for water and sanitation.

On a provincial level, the Vision Inspired Priorities (VIPs) of the 2019-2024 Provincial Strategic Plan have transitioned into the Strategic Priorities of the Growth for Jobs Plan, of which water security and resilience is one of six key priorities (Figure 5). The economic downturn following the Covid-19 pandemic highlighted the importance of stimulating economic growth for jobs and the critical role that natural resources like water play in supporting the growth for jobs vision.

Source: WCG (2023a)

Figure 5: Priority Focus Areas of the Growth for Jobs Strategy.

Of critical importance to the updating of the WCSWMP is the 15-year WCIDWRP developed by the DLG and finalised in 2022. This plan built several of the recommended activities in the 2017-2022 WCSWMP, but they do have different priorities. The WCIDWRP focuses on municipal water security and supply, and the key stakeholders are Local Municipalities. The 2012-2017 WCSWMP meanwhile had a greater focus on catchment level interventions, water quality, and environmental sustainability, engaging Catchment Management Agencies (CMAs) and other provincial and national departments. To avoid duplication, these two plans should be aligned, with the updated WCSWMP aiming to fill the gaps in the 15-year WCIDWRP for overall water resilience.

Awareness and responding to climate change risks in the Western Cape and South Africa is constantly evolving, and several plans are currently being finalised. The DWS is updating the national Climate Change Response Plan for Water and Sanitation. This was a response to the pending Climate Change Bill introduced in Parliament in 2022; the first piece of legislation in South Africa specifically aimed at mitigating and addressing the effects of climate change. An updated Climate Change Response Strategy is also currently being developed by the DEA&DP and has informed the updating of the WCSWMP. Other important provincial and national plans and events are shown in Figure 7 and discussed in Section 4.

3. Rethink strategic goals, objectives, focus areas and activities

The WCSWMP is a transversal plan to be implemented by all relevant provincial and national departments. It therefore needs to align with the **strategic objective** of sustainable water management for the Western Cape Province and the **legislative mandate** of the Western Cape Government departments, especially DEA&DP as the custodian of the plan.

Since 2017, policy changes for these departments, as well as national, provincial, and local level budget cuts and financial restraints from the economic recession have necessitated a revision of the 2017-2022 WCSWMP. In line with updated mandates and activities developed under other plans, not all goals, objectives and focus areas are still relevant to the updated Plan. There is also a need to reduce the scope of activities and only focus on the most critical actions in response to limited financial and human resources at national, local, and provincial level.

The strategic frameworks for the 2012 and 2017 versions of the WCSWMP are compared in Figure 6. Based on discussion with DEA&DP it was noted that previous versions of the WCSWMP had over 50 prioritised interventions and the updated Plan needs to be more targeted.

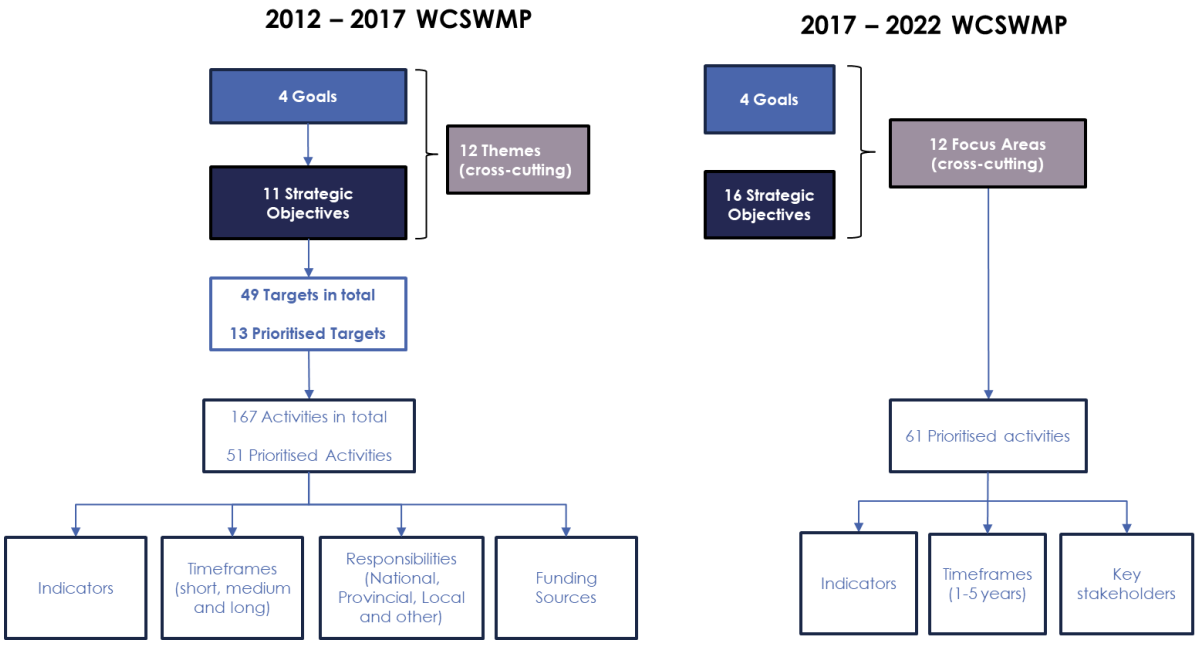


Figure 6: Strategic framework for the 2012 and 2017 WCSWMPs.

4. Engage critical stakeholders

The WCSWMP steering committee is comprehensive and includes representatives from provincial and national government and their associated agencies (such as the CMAs, WRC, SALGA etc.). The steering committee meets on a quarterly basis, and it is necessary to directly engage these key relevant stakeholders for the updated plan. Civil society is not represented in the Steering Committee, and consideration needs to be given as to how best to engage them as part of the review process. Various civil society organisations, however, are actively engaged in related forums such as the Ecological Infrastructure (EI) communities of practice.

5. Include Gender, Equity and Social Inclusion

Consideration of how progressive realisation of human rights and gender equity can be advanced in the review and update of the WCSWMP is a critical component of the updated Plan. This is in alignment with the DEA&DP's 2020-2025 five-year plan that aims to embed and mainstream gender equality in its inward and outward facing practices. Women and marginalised groups play a critical role in ecological protection, and the lessons learnt from programmes addressing this (such as the Greater Cape Town Water Fund) will be considered.

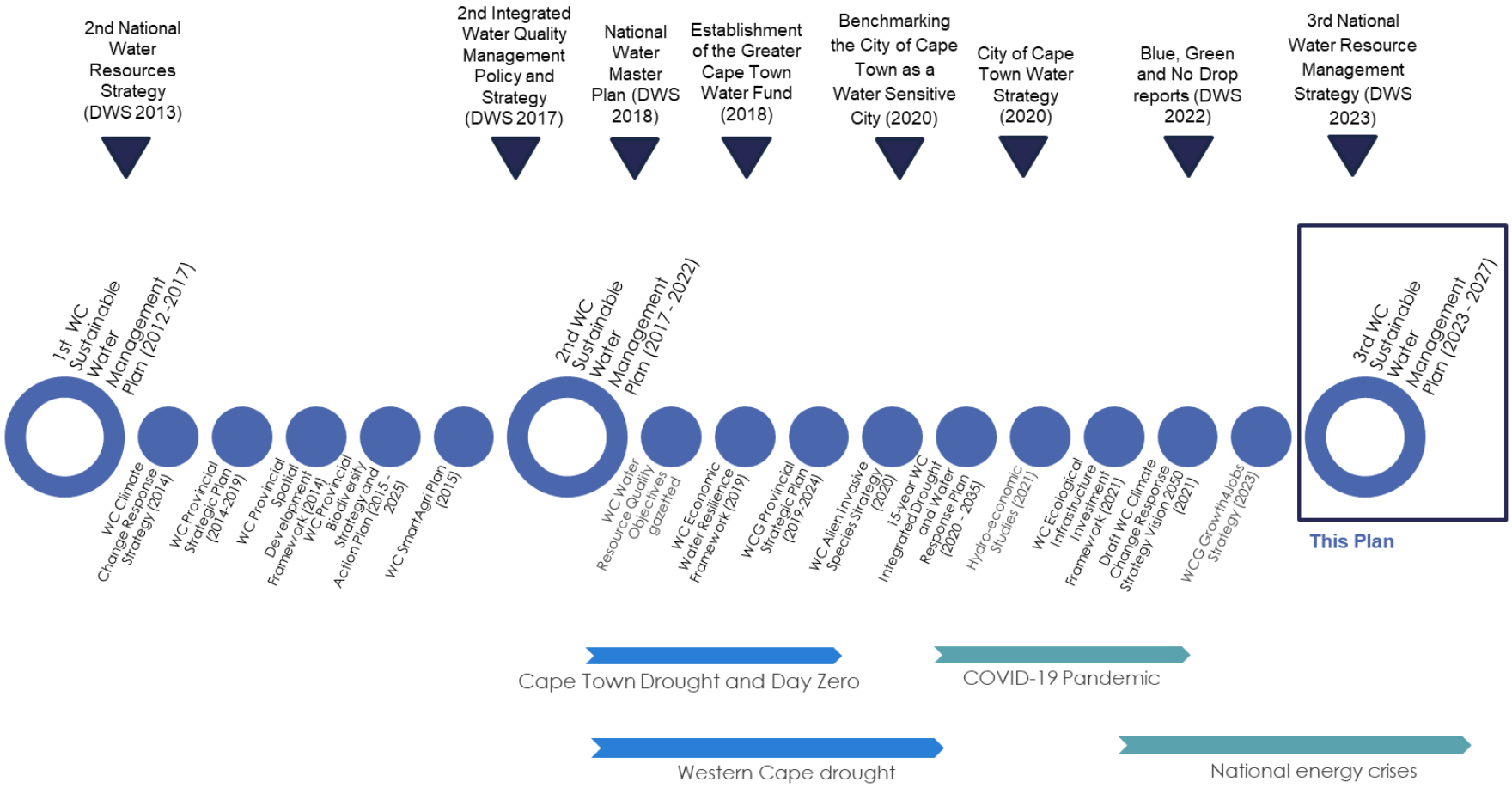


Figure 7: Evolution of the WCSWMP since 2012, and the plans and events that informed its update.

2. Western Cape Context

2.1. Local and District Municipalities

The Western Cape Province is situated on the southwestern coast of South Africa, extending north and east from the Cape of Good Hope. It is the fourth largest of the nine provinces in the country, covering about 10.6% of the country's total land area. The province is bordered by the Northern Cape and Eastern Cape. The province's capital and largest city is Cape Town, which is also the legislative capital of South Africa. The Western Cape was created in 1994 from part of the former Cape Province. The Western Cape is governed by four district municipalities and 24 local municipalities (Figure 8). The Western Cape Province covers two main Water Management Areas (WMAs), the Breede-Gouritz and the Berg-Olifants as well as small portions of the Orange and Mzimvubu to Tsitiskamma WMA.

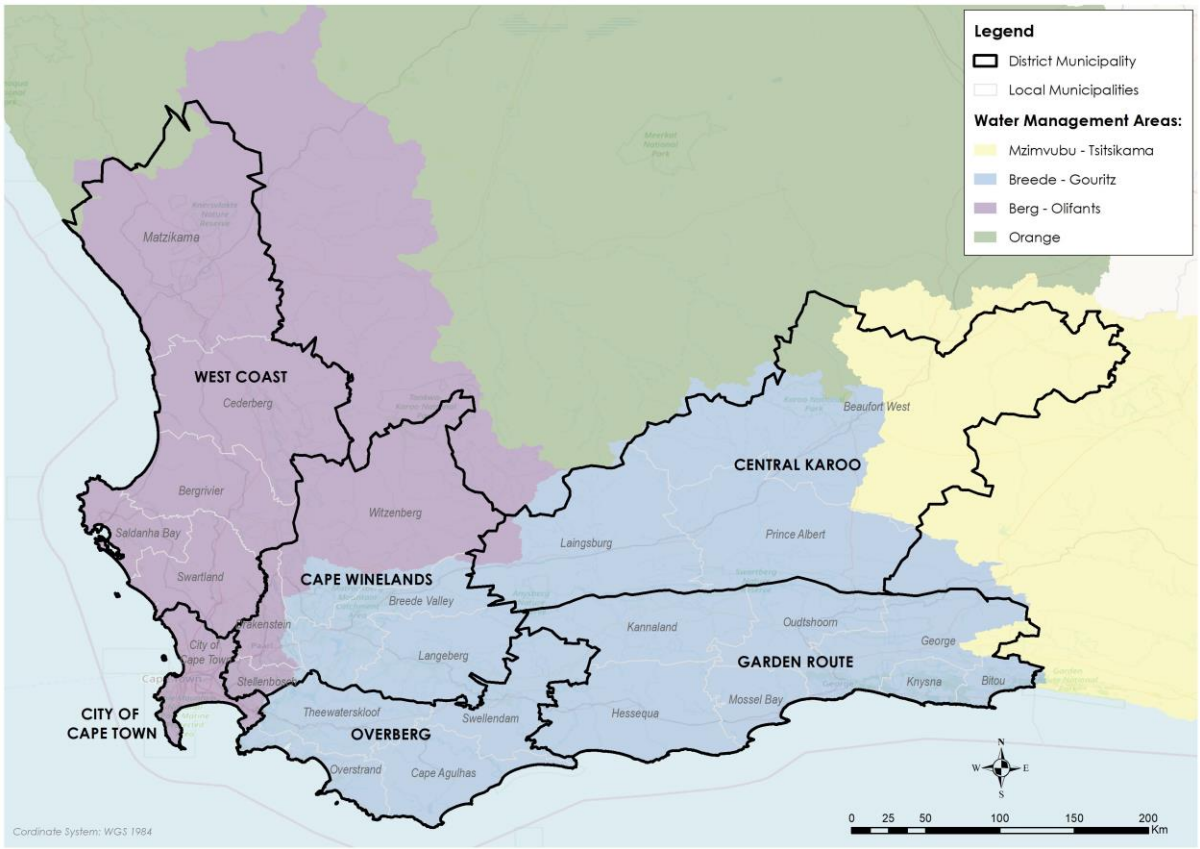


Figure 8: Districts, Municipalities and Water Management Areas of the Western Cape.

For administrative reasons the DWS has now combined the Breede-Gouritz and the Berg-Olifants WMAs to form the Breede-Olifants WMA. As a result, a single CMA now covers most of the Western Cape province. This does not reduce the water challenges faced in each WMA.

The Breede-Olifants Catchment Management Agency (BOCMA) is the lead agent for water resources management within the now combined Breede-Olifants WMA along with the provincial office of DWS and is one of only two fully operational CMAs in South Africa.

2.2. Socio-economic overview

The Western Cape is the third largest economy in South Africa, contributing 14.2 % to the national GDP in 2023 (WESGRO, 2023). The province's economy is diverse, with significant contributions from various sectors such as finance, manufacturing, agriculture, and tourism. The financial and business services sector is the largest contributor to the region's economy, followed by manufacturing. Over the past decade, the economy of the Western Cape has cumulatively expanded by 11.1%, with an average annual growth rate of 1.1%. The agriculture sector, which grew at the fastest pace (37.1%), has been a significant driver of this growth, followed by the finance (27.5%) and government sectors (21.9%) (Provincial Treasury, 2023).

Much of South Africa's wool, wheat, alfalfa hay, and fruit come from the Western Cape, as well as almost all of its wine. The interior is a sheep-raising region, and ostrich raising is prominent in the province. The CoCT also acts as a processing, trade, and retail hub for a wide range of export-quality produce due to its expansive agricultural surroundings. The agriculture sector employs a significant share of the Western Cape population (22%), and many of the most vulnerable members of society. Of the workforce, around 41% and 45% are women and youth respectively (DoA, 2021). Socio-economic impacts in the agricultural sector, such as reduced exports during the 2020 Covid-19 crises, primarily impact previously disadvantaged groups employed in the sector.

The Western Cape has a high level of service provision, with 95% of the population living in urban areas. The province also has a low level of unemployment compared to the national average. However, employment in the real economy declined by 6% from Q1 2020 to Q1 2022. The province faces several other economic challenges such as inflation, which has become a central global and national concern.

Inequality is a significant issue in the Western Cape, with high levels of social polarisation and socio-economic segregation (Figure 9). This inequality is further exacerbated by the province's housing crisis, with a significant portion of the population living in informal settlements without adequate shelter or infrastructure. Education is another area of concern, with issues affecting equal access to education, particularly for girls, and the provision of special needs education. The province also faces challenges related to HIV/AIDS, with socio-economic factors such as high levels of poverty, alcohol abuse, and illiteracy contributing to the spread of the disease.

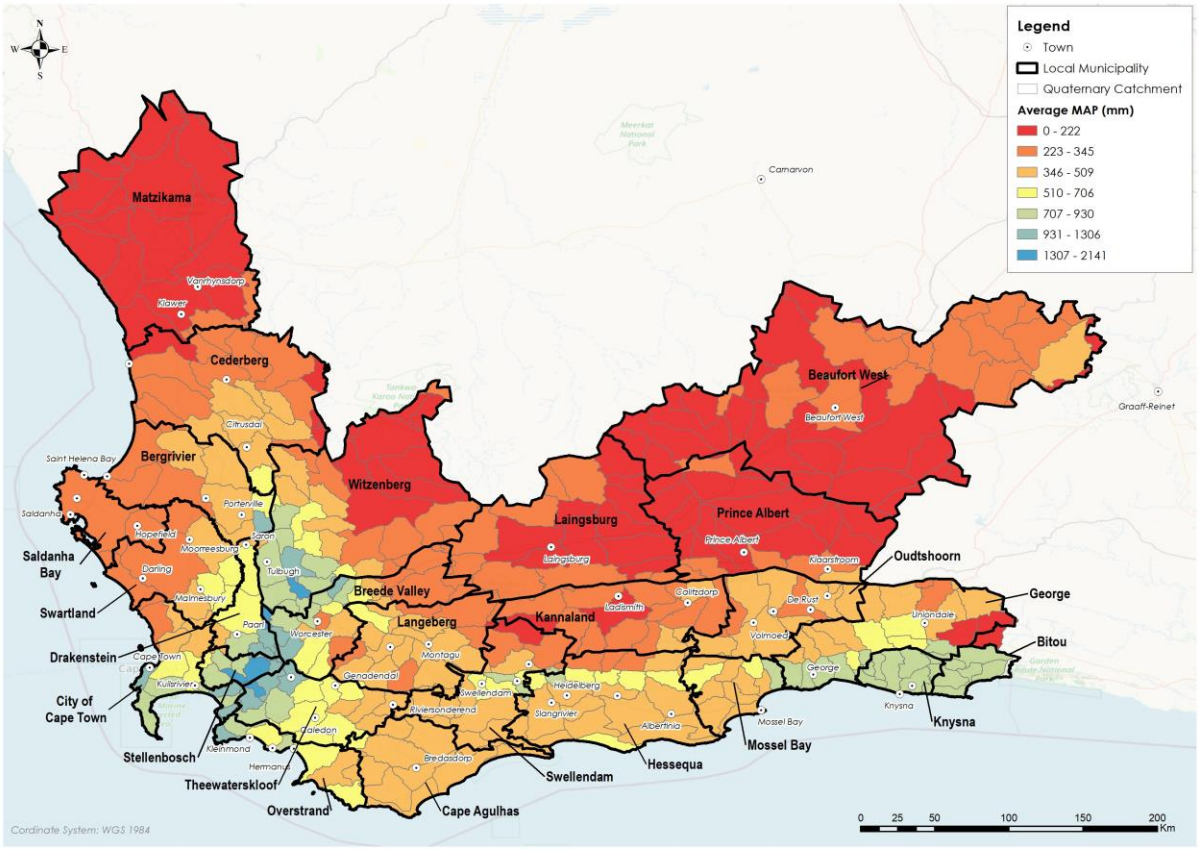
Source: Johnny Miller, Unequal Scenes

Figure 9: The stark division between the affluent suburb of Hout Bay and informal settlement of Imizamo Yethu in Cape Town.

2.3. Water management

2.3.1. Water resources

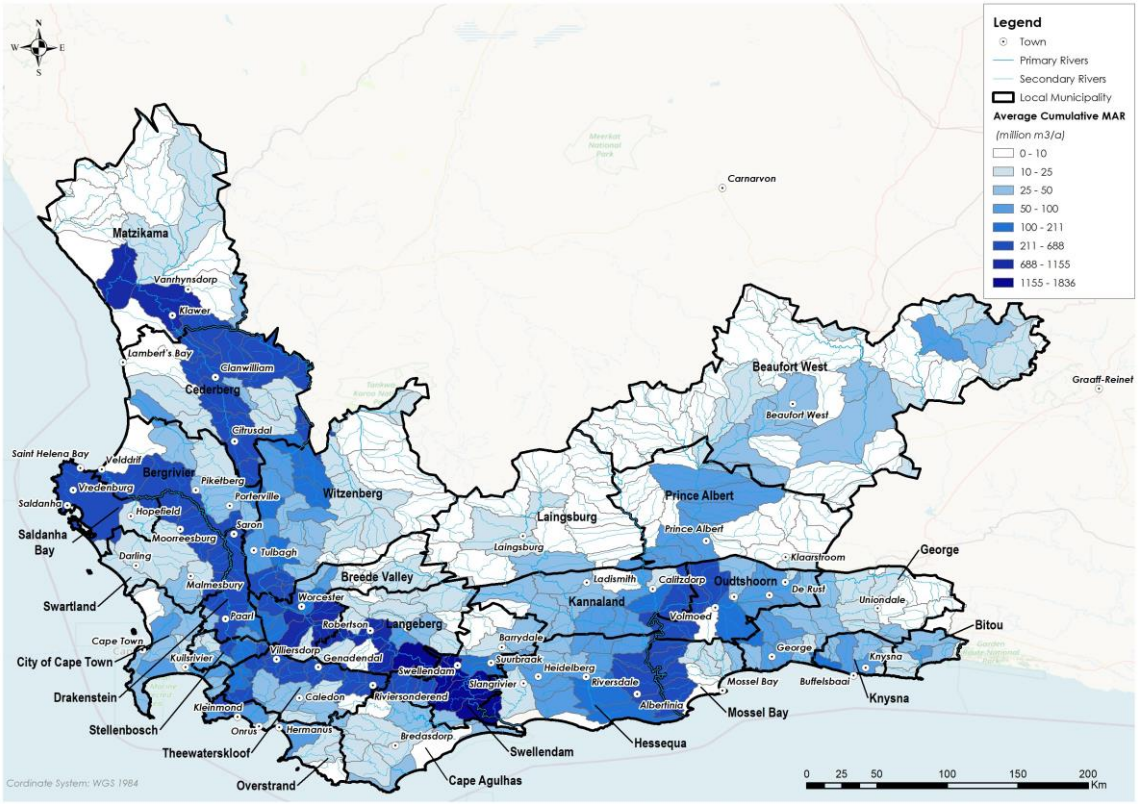
The Western Cape Province is characterised by its diverse geography, unique climate patterns, and a complex relationship with water resources. It is mostly located in the winter-rainfall region of South Africa. Rainfall, and hence water availability, varies significantly across the province, with some areas in the mountains receiving over 2,000 mm of rain a year (the highest in South Africa), while other parts of the province receive less than 100 mm of rain a year. There is also significant seasonal and inter-annual variability in rainfall across the Province (Figure 10).



Source: CSIR GreenBook (2019)

Figure 10: Mean annual precipitation for quaternary catchments across the Western Cape province.

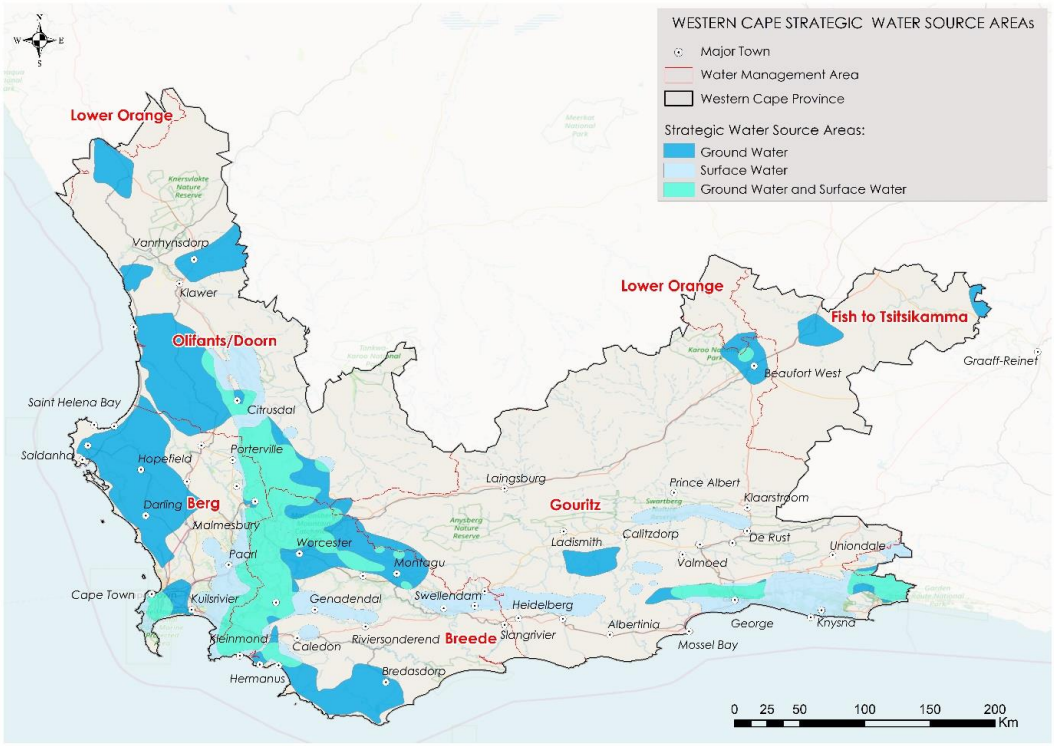
Surface water availability, like rainfall, is highly variable across the province (Figure 11) with the majority of rainfall being generated from the high mountain areas including several Strategic Water Source Areas (SWSAs). Under natural conditions this streamflow would accumulate downstream along the major rivers such as the Berg, Breede and Olifants rivers. However, under current conditions a large proportion of the runoff is used to fill dams and is diverted for municipal and agricultural purposes with some water returned via wastewater treatment plants or agricultural and urban runoff, which is often polluted. As with rainfall, surface water availability is highly variable both seasonally and inter-annually. Water security, however, is secured through many large and small dams for municipal and agricultural purposes, including the large integrated Western Cape Water Supply System (WCWSS) (see Section 2.3.2). Several towns, farms and industries are also dependent on groundwater as the main water supply.



Source: CSIR GreenBook (2019)

Figure 11: Natural cumulative Mean Annual Runoff in the Western Cape.

The SWSAs cover just 8% of the country's land surface area and contribute 50% of its mean annual runoff (WWF SA, 2013). The Western Cape contains 7 of the 22 defined SWSAs in the country, namely Boland, Groot Winterhoek, Langeberg, Outeniqua, Swartberg, Table Mountain and Tsitsikamma (Le Maitre, et al., 2018). The Western Cape also includes several Strategic groundwater resources. Groundwater is an important resource for meeting agriculture, industry, and domestic demands (Figure 12).

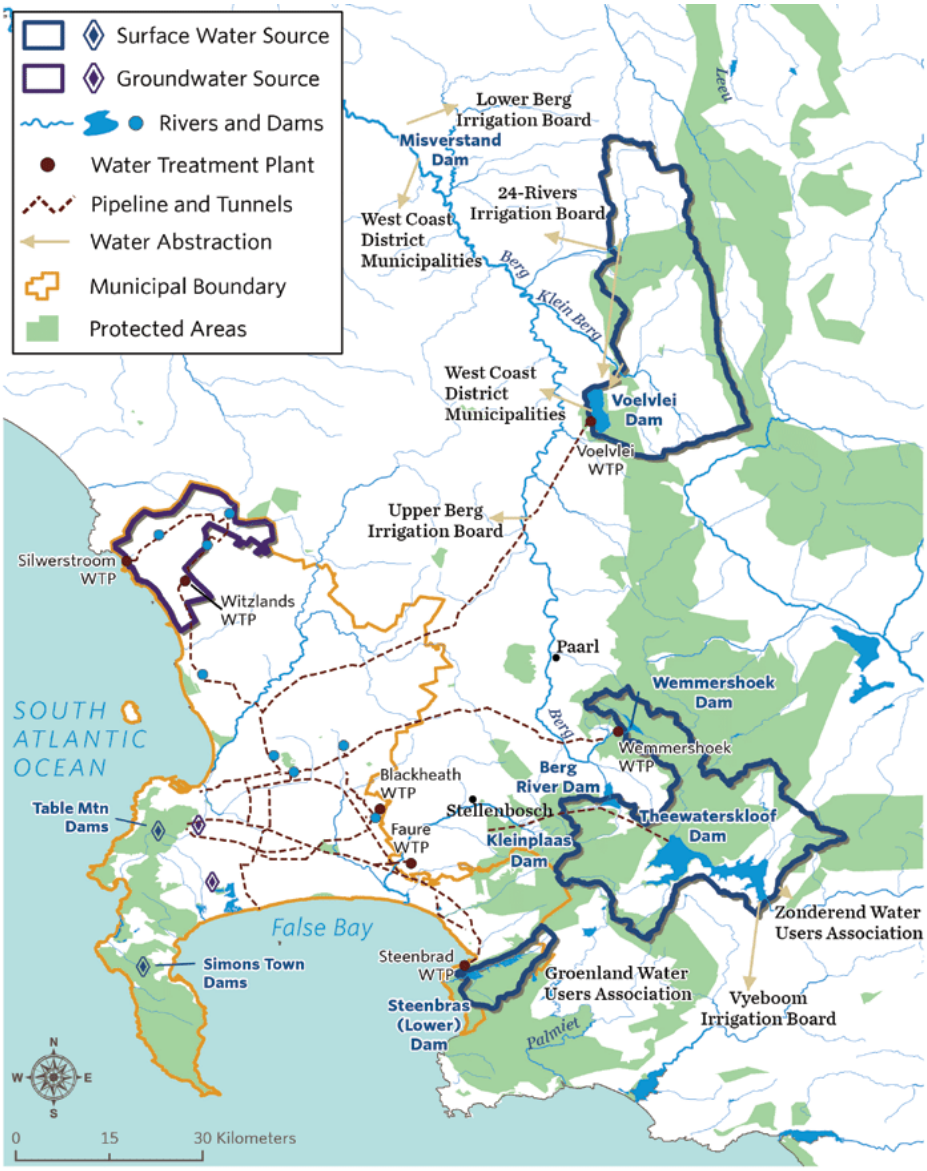


Source: Le Maitre, et al. (2018)

Figure 12: Strategic Water Source Areas (SWSAs) for groundwater and surface water and both.

2.3.2. Water demand and supply

The CoCT, surrounding municipalities and several agricultural irrigation areas are largely reliant on water from the WCWSS. It comprises an inter-linked system of six main dams, pipelines, tunnels, and distribution networks, and a number of minor dams (Figure 13). Some of these components are owned and operated by the DWS, while others are managed by the CoCT. The WCWSS also serves the agricultural and municipal demands in the local municipalities of Drakenstein, Stellenbosch, Bergrivier, Saldanha Bay and Swartland. The CoCT and other municipalities, however, also have several of their own smaller dams and other water sources, including groundwater, which gives them the ability to pro-actively manage their systems. This will increase as alternative water sources such as desalination and direct potable re-use come online.

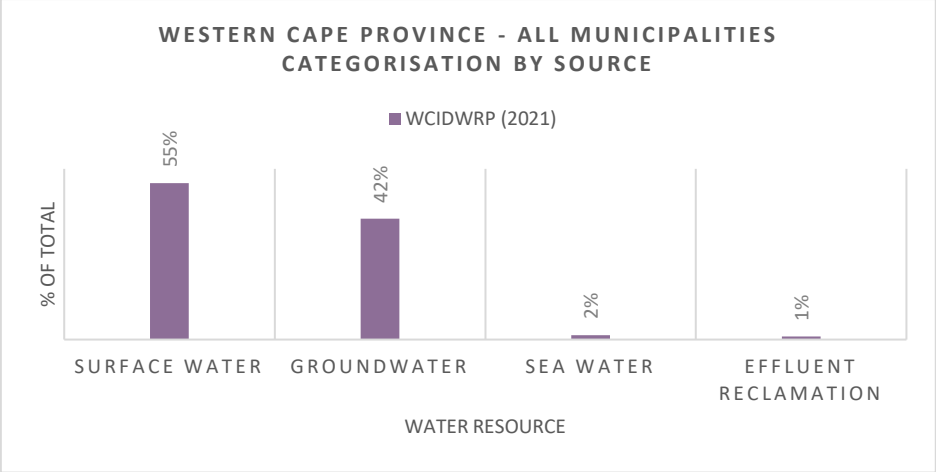


Source: Stafford, et al. (2019)

Figure 13: Overview of the Western Cape Water Supply System.

Outside of the WCWSS there are several other smaller water supply schemes with several towns dependent on only one dam, run of river schemes from local streams or groundwater. In the Central Karoo, groundwater meets much of the municipal water demand. During the 2015-2019 drought in the Western Cape Province, many boreholes were drilled across the province as emergency measures, and groundwater is increasingly being utilised to meet the demand. Groundwater for agriculture is also developing rapidly as an alternative water resource as most surface water sources have been over-allocated.

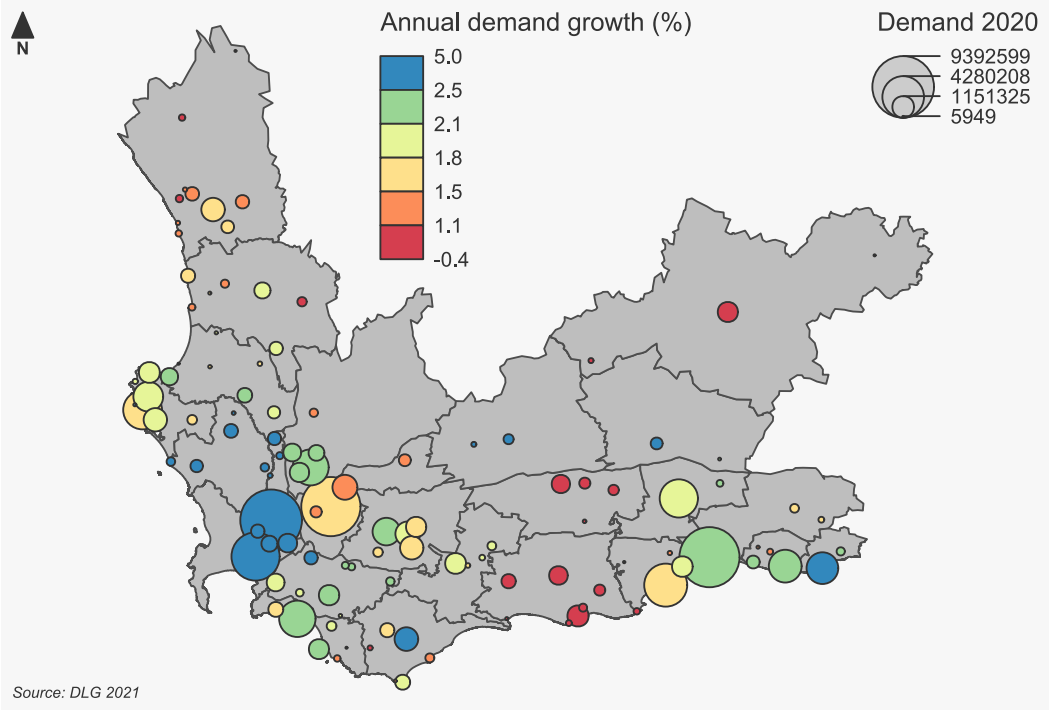
The current known groundwater abstraction by Western Cape municipalities is in the region of 20 million m3/a (DLG, 2022f). The true value is anticipated to be much greater than this, as information for some water supply systems is lacking and cannot be taken into account. The overall percentage contribution from surface and groundwater sources to municipal water supply in the Western Cape province is shown Figure 14, along with small contributions from alternative sources.



Source: DLG (2022g)

Figure 14: Municipal water sources in the Western Cape.

Long-term water demand projections under respective scenarios for the Western Cape show a growth in domestic and industrial demand across most municipalities (Figure 15). Municipalities adjacent to the CoCT (i.e. Stellenbosch, Drakenstein and Swartland) exhibit the highest rate of anticipated growth in demand over the period in question, topping out at nearly 4.5 % per year for Stellenbosch under base scenario assumptions, while the low growth scenario, with behavioural change, for Stellenbosch is 2.7 % per year (DLG, 2022d). On the other end of the spectrum, Beaufort West, Hessequa and Kannaland municipalities share very low expected rates of water demand growth over the long term.

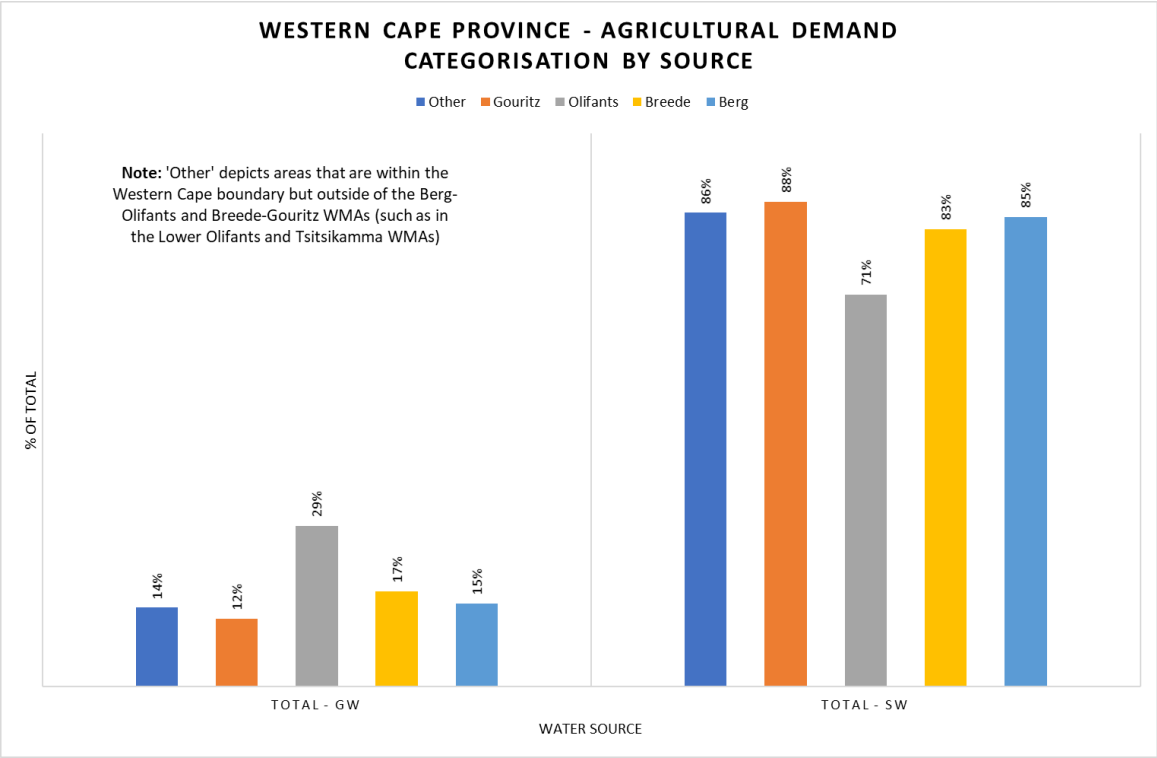


Source: DLG (2022d)

Circle diameters represent the 2020 municipal water demand per settlement in kilolitres per annum. Average annual water demand growth for domestic and non-domestic customers per settlement is presented as percentages.

Figure 15: Water demand outlook for Western Cape settlements (2020-2035).

Agriculture is a significant water user, and the sector plays a large role in sustainable water management in the province. Agriculture is the single largest water user in the Western Cape Province and comprise approximately 85 % of the overall water use in the province. All surface water for agriculture has been fully allocated in the province and it is anticipated that no "new" surface water to satisfy agricultural demand in the Western Cape would be approved in future by the DWS. Farming practices must therefore shift towards water saving technologies or groundwater development, where groundwater resources are not over-abstracted.



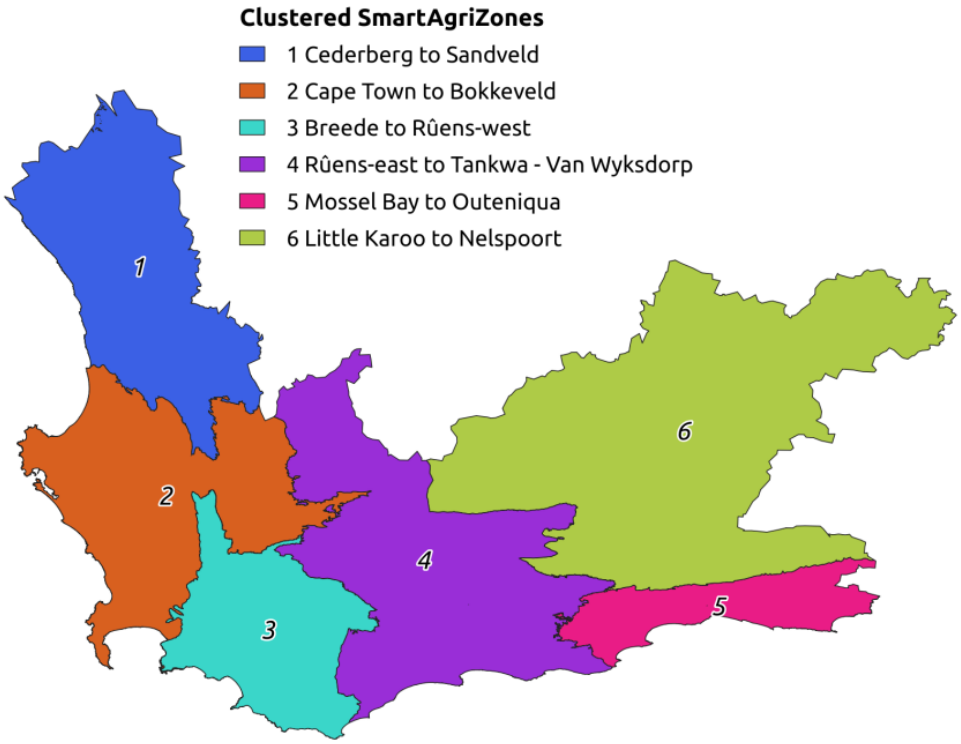
Source: DLG (2022e)

Figure 16: Agricultural demand per source: surface water vs. groundwater (current).

2.3.3. Climate change

The recent examination of past and anticipated climate trends in the Western Cape SmartAgri zones, as outlined by the DoA (2022), strongly indicates a notable shift in the region's climate that is expected to persist. This area is distinguished by pronounced climate variations and diverse average temperature and precipitation levels influenced by the intricate topography and proximity to the ocean. Overall, there has been a substantial rise in temperatures throughout all zones and seasons in the region over the last century, with a more accelerated warming trend observed in the past three decades.

Although the evidence from DoA (2022) strongly supports the reality of climate change, it is important to recognise that there are lingering uncertainties and complexities, particularly concerning shifts in rainfall patterns. The Western Cape area comprises several relatively distinct climate zones (Figure 17). These variations are evident in the climate trends and supported by referenced literature (DoA, 2022).

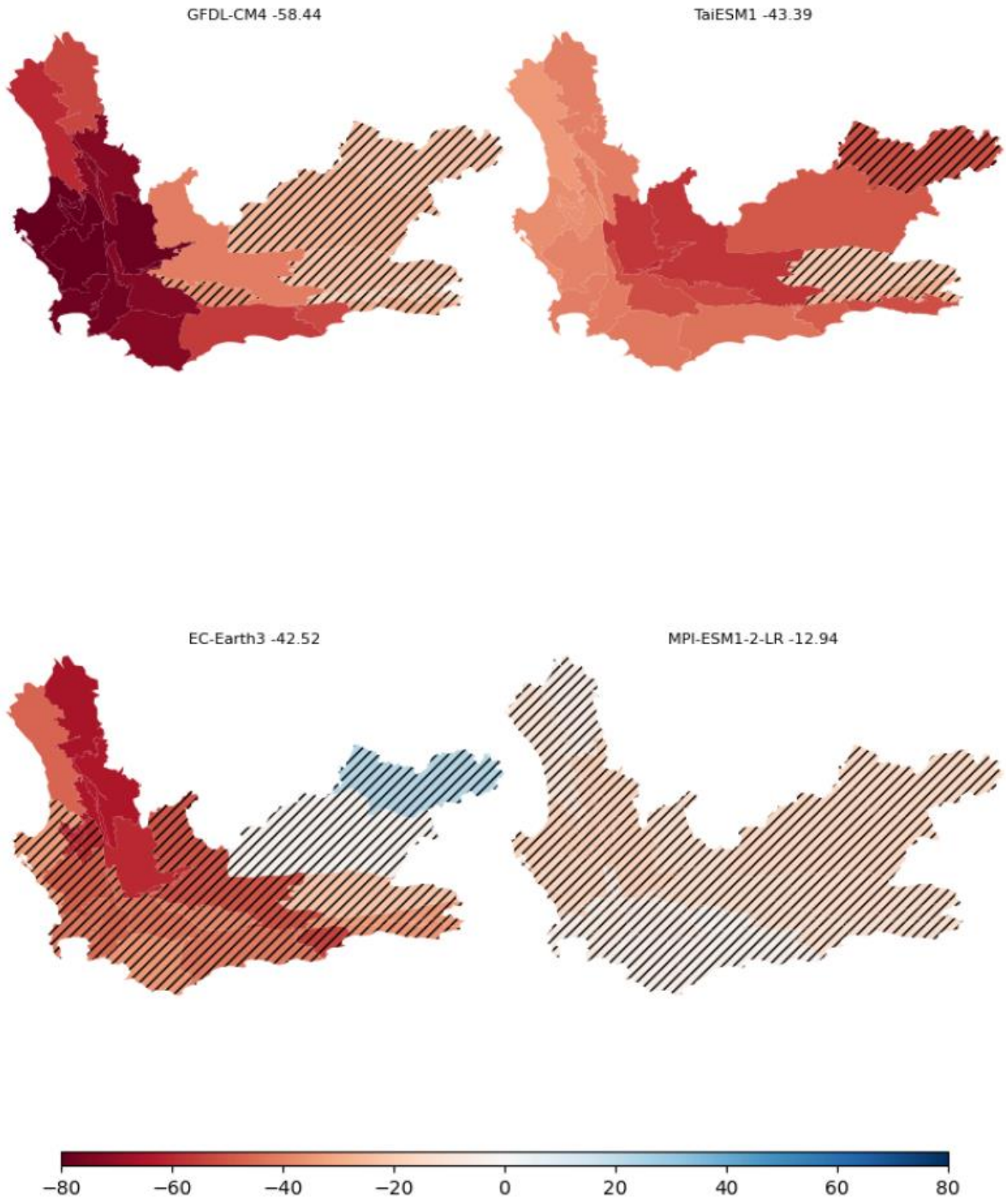


Source: DoA (2022)

Figure 17: Clustered SmartAgri zones based on similarity of inter-annual total rainfall variability.

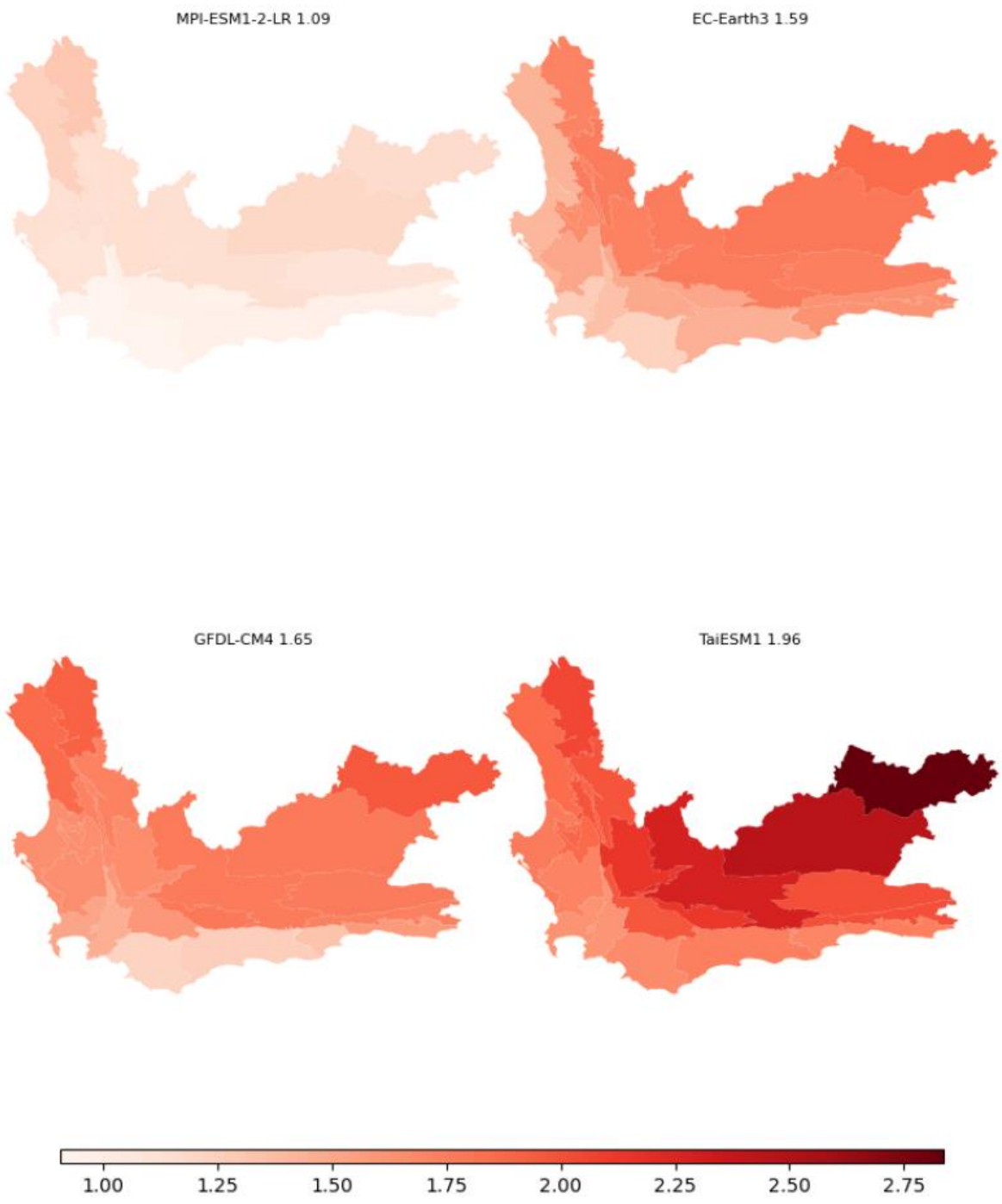
Future projected changes in rainfall patterns exhibit varying trends across the province, with a predominant decrease in rainfall expected, although diverse patterns of change may emerge (Figure 18). The mechanisms driving changes in summer rainfall differ between the northern/eastern areas and the southern and western regions. While an overall reduction in rainfall is foreseen across the region, certain subregions might experience more pronounced decreases than others. Most parts of the province show projections of decreasing rainfall in summer (December to February) though in many cases these changes are small enough that they do not pass the statistical significance test. However, rainfall changes in some parts of the province and for some seasons are statistically significant and could be as large as a 40% reduction (CSIR, 2019).

Despite some uncertainty surrounding projected rainfall changes, the analysis of water balance and Potential Evapotranspiration underscores that temperatures will increase with minimal uncertainty (Figure 19). This significantly overshadows any uncertainties related to rainfall changes (DoA, 2022). The primary message emphasises a heightened frequency of water deficits and more frequent and severe drought conditions, particularly impacting agriculture throughout the province.



Source: DoA (2022)

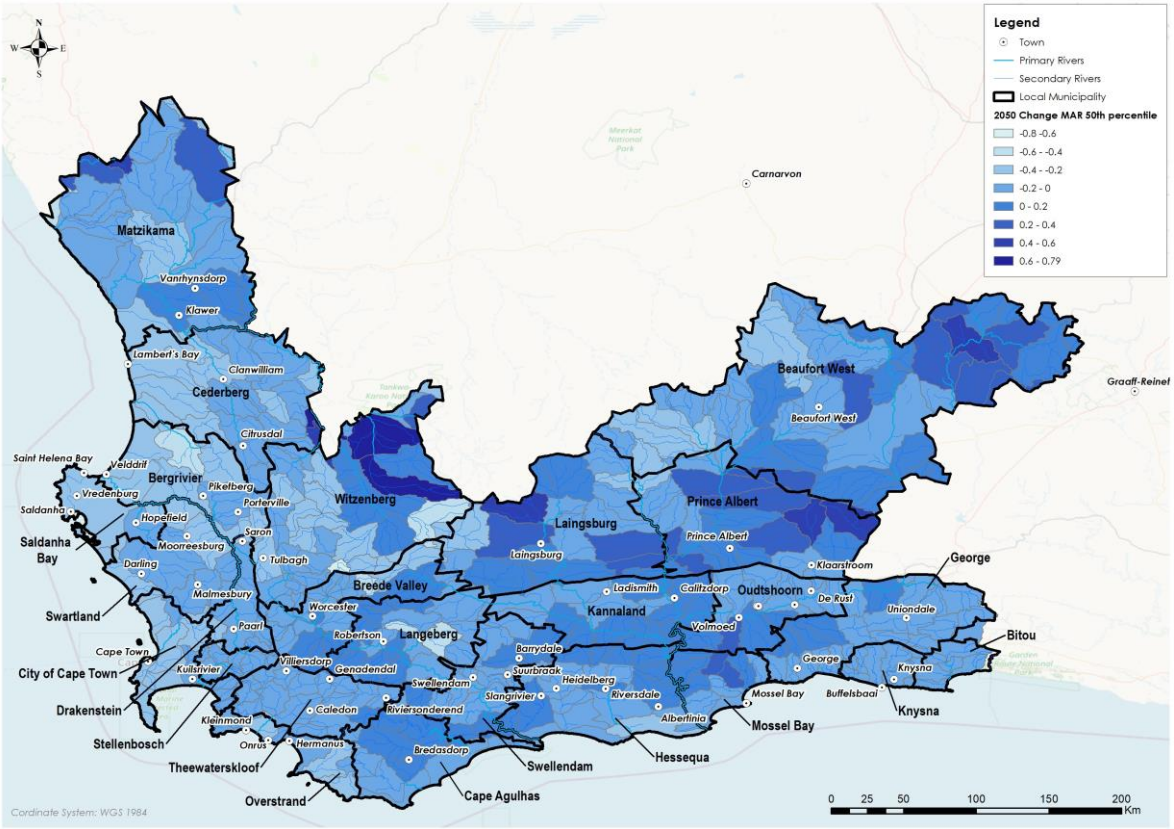
Figure 18: Projected changes in annual total rainfall (mm) across the SmartAgri zones derived from the CMIP6 model ensemble SSP5 8.5 pathway experiment for the period 2030-2060 for the 4 archetype models. Figure titles are the name of the model and the area average change in rainfall (mm). Diagonal hashing indicates trends that are not statistically significant with a p-value threshold of 0.05.



Source: DoA (2022)

Figure 19: Projected changes in annual mean temperature (°C) across the SmartAgri zones derived from the CMIP6 model ensemble SSP5 8.5 pathway experiment for the period 2030-2060 for the 4 archetype models. Figure titles are the name of the model and the area average change in temperature (°C). Diagonal hashing indicates trends that are not statistically significant with a p-value threshold of 0.05.

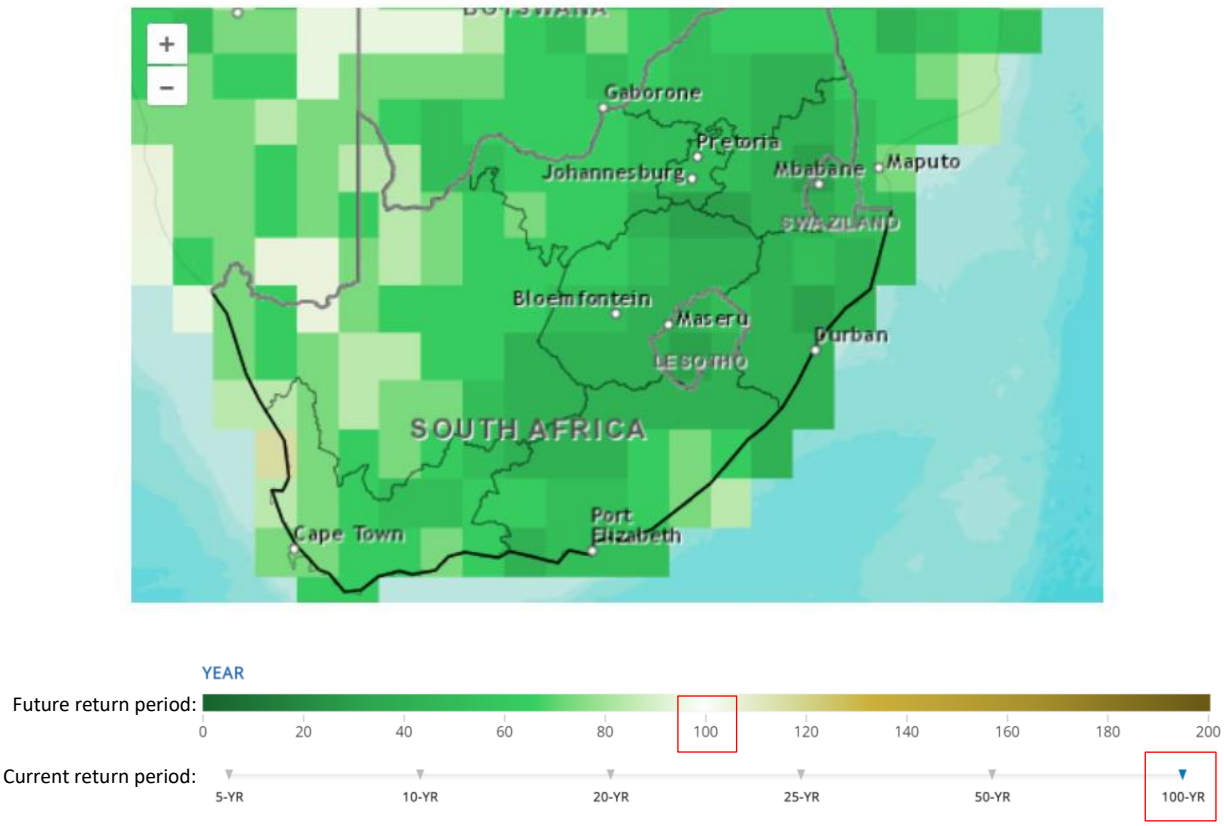
Climate change will also impact surface water availability with most catchments expected to see an overall reduction in mean annual runoff (MAR), based on data from the GreenBook Study (CSIR, 2019) (Figure 20). However, some catchments could experience a slight increase in MAR, including the inland catchments and in the western half of the province which are in a slightly different climate zone. It is important to note that while there could be an increase in the MAR in some areas, this will likely be due to increased variability in runoff, increasing the risk potential of both droughts and floods.



Source: CSIR GreenBook (2019)

Figure 20: Expected change in mean annual runoff by 2050 (50th percentile).

While the most recent global climate change models from the Inter-governmental Panel on Climate Change (IPCC) show a trend of increasing temperature and reducing annual rainfall, they also show an expected increase in the maximum one-day rainfall. This could result in a significant increase in the risk of flooding and is reflected in an expected increase in the return period for current flood frequencies. For example, what is currently the 1 in 100-year maximum daily rainfall, is expected to become the 1 in 86-year maximum daily rainfall by 2050 over much of South Africa (World Bank, 2022). This holds true for most of the Western Cape, except for part of the west coast where the frequency of maximum daily rainfall (and thus risk of flooding) is predicted to decrease (Figure 21).



Source: World Bank (2020)

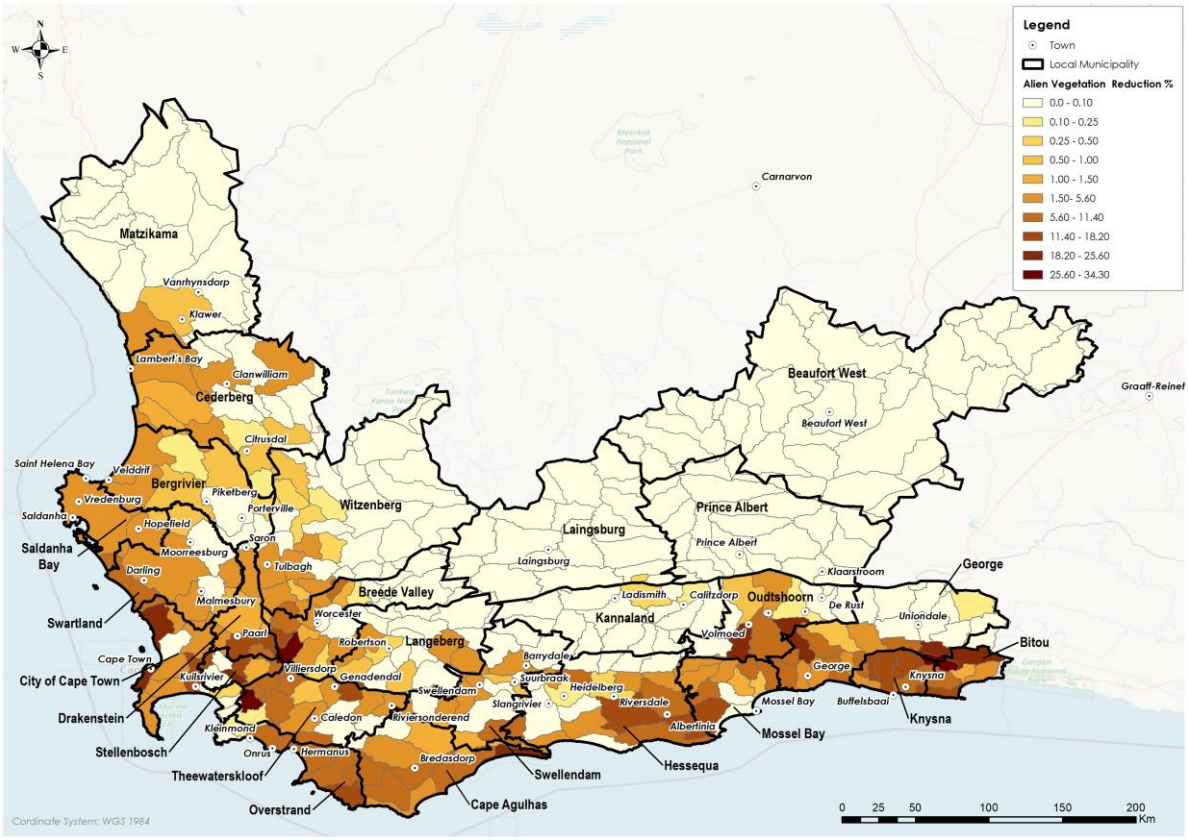
Figure 21: Future return period of largest 1-day precipitation, 100-year event. SSP3-7.0, 2035-2064 (centre 2050).

2.3.4. Invasive Alien Plants

Invasive Alien Plants (IAPs), mainly pine, eucalyptus and wattle trees are known to have a significant impact on water availability in South Africa and particularly in the Fynbos biome of the Western Cape. The potential impact of current levels of IAPs in terms of the reduction in surface water runoff from each of the catchments in the Western Cape is shown in Figure 22.

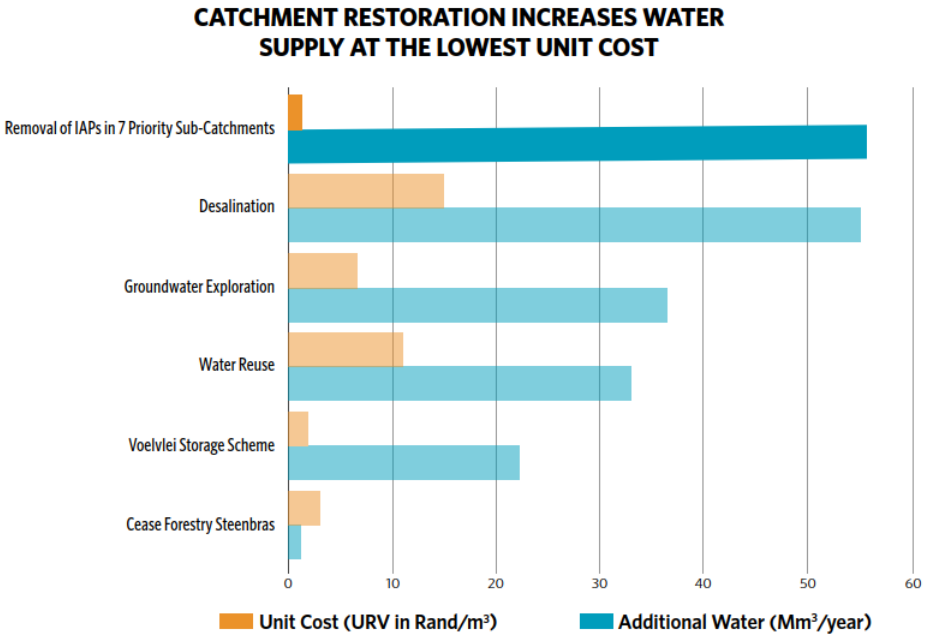
In some catchments, IAPs are estimated to contribute to up to 35 % reduction in the MAR. This impact will increase significantly if there is no clearing and the IAPs continue to spread across the catchment. As a result, there are several programmes looking to clear IAPs from the catchment areas. Recently the Greater Cape Town Water Fund (GCTWF) was established to increase funding for the clearing of IAPs in the priority catchments of the Western Cape Water Supply System. The initial business case for the GCTWF showed that the clearing of IAPs was the most cost-effective option for improving water security for the CoCT as well as highlighting the risk of further reductions in water availability to Cape Town and other municipalities if the IAPs continued to spread further (Figure 23). IAPs currently account for around 2.6 % and 5.3 % of registered water use in the Berg and Breede WMAs, but this could increase to around 9.2 % and 20.7 % respectively if not managed (Cullis, et al., 2007).

The clearing of IAPs has been shown to be one of the most cost-effective measures for adapting to increasing water security threats and climate change in the WCWSS as shown in Figure 23.



Source: DLG (2022g)

Figure 22: Reduction in runoff (MAR) due to the current extent of IAPs in the Western Cape.



Source: Stafford, et al. (2019)

Figure 23: Water yields and costs in terms of the unit reference value for the clearing of IAPs as compared to other water supply options for the CoCT.

2.3.5. Environmental water requirements (EWRs) and Resource Quality Objectives (RQOs)

In 2016 the DWS undertook a study to determine water resources classifications and resource quality objectives (RQOs) for the Berg River catchment and the Breede-Gouritz WMA in accordance with the requirements of the National Water Act. RQOs are numerical and/or descriptive statements about the biological, chemical and physical attributes that characterise a resource for the level of protection defined by its Class. These Classes reflect a gradual shift from resources that are minimally used to resources that are heavily used, while taking into consideration the social and economic needs of all who rely on the water resource.

The RQO study included engagements with stakeholders, an assessment of the current status of the water resource, and consideration of alternative future scenarios. RQOs were determined at key nodes. This included the requirements for both water quantity and water quality to meet a specified targeted ecological condition. The final water resource classes and RQOs were published in the Government Gazettes for each catchment in 2018. Previously the DWS determined similar resource classes and RQOs for the former Olifants-Doorn WMA and recently a similar RQO study was completed for the Verlorenvlei catchment.

Adherence to EWRs and RQOs (for both quality and quantity) remains a critical issue in the Western Cape, as well as for all South Africa. Over-abstraction of surface water and discharge of poor water quality into environmentally sensitive areas occurs across the region. Regular monitoring is needed to adequately manage this, as well as legal enforcement, particularly with regards to the management of the impacts of municipalities and failing treatment plants.

3. Conceptual Frameworks for Sustainable Water Management

3.1. Sustainable Development Goals

Sustainable water management and protection is a critical component of the Sustainable Development Goals (SDGs), as it underpins many of the goals and targets set out in the 2030 Agenda for Sustainable Development (Figure 24). Water is explicitly addressed in SDG 6, which aims to "Ensure availability and sustainable management of water and sanitation for all."

Achieving this goal is essential for the realisation of other SDGs, including those related to health (SDG 3), food security (SDG 2), energy (SDG 7), sustainable cities (SDG 11), and life below water (SDG 14), among others. Sustainable water management contributes to reducing poverty and inequality, enhancing health and well-being, and supporting economic growth, while also protecting ecosystems and building resilience to climate change and other global challenges. The interconnectedness of water with various aspects of sustainable development highlights the importance of adopting integrated approaches to water resource management, ensuring that water-related actions support the broader objectives of the SDGs.

Source: United Nations

Figure 24: 2030 Sustainable Development Goals.

3.2. Integrated Water Resources Management

The Integrated Water Resources Management (IWRM) policy framework is a comprehensive approach designed to improve the management of water resources. It promotes the coordinated development and management of water, land, and related resources to maximise economic and social welfare equitably without compromising the sustainability of vital ecosystems. The IWRM framework is based on the four key Dublin principles (Figure 25).

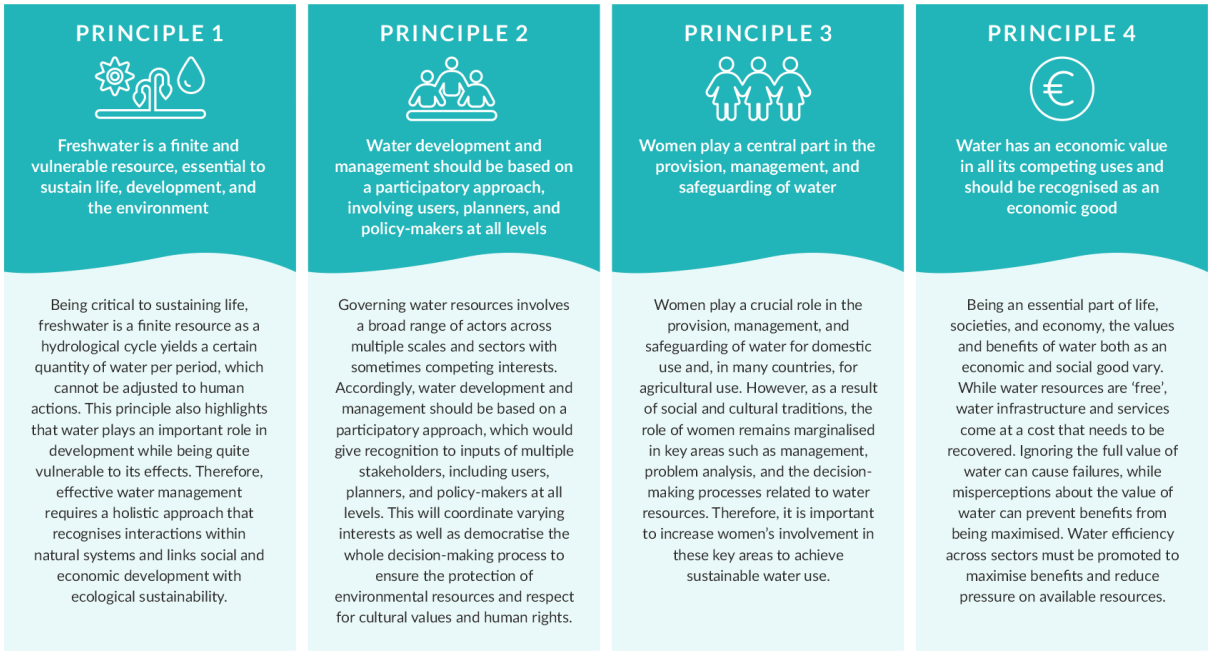
1. Water is a finite and vulnerable resource, essential to sustain life, development and the environment.

2. Water development and management should be based on a participatory approach, involving users, planners and policymakers, at all levels.

3. Women play a central part in the provision, management and safeguarding of water.

4. Water has an economic value in all its competing uses and should be recognised as an economic good

The IWRM framework recognises that water resources are an integral component of the ecosystem, and a natural resource for social and economic good. It aims to replace the traditional, fragmented sectoral approach to water resources and management that has led to poor services and unsustainable resource use. The implementation of IWRM may take place on a step-by-step basis, in terms of geographical scope and the sequence and timing of reforms. The framework is flexible, allowing for the selection, adjustment, and application of the right mix of tools for a given situation. The IWRM policy framework is globally recognised and has been linked with the Sustainable Development Goals and adaptation to climate change. It is also being used to guide the integration of water and marine-focused programmes, and to address water-related issues through pollution control programmes.



Source: GWP (2023)

Figure 25: Integrated Water Resource Management principles.

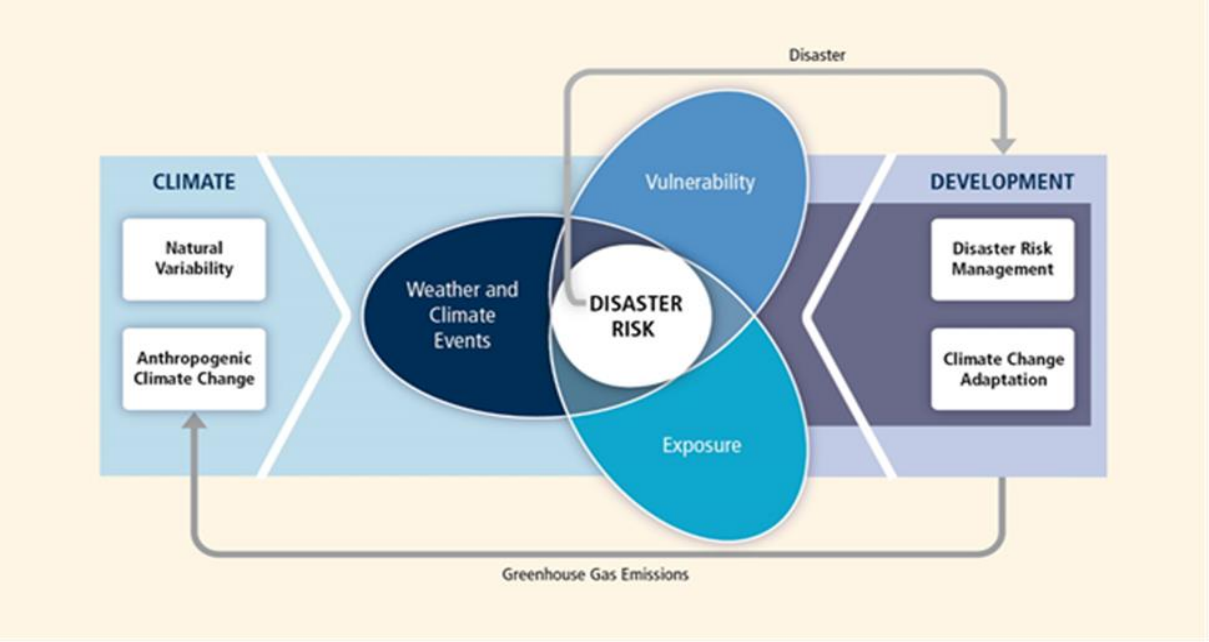
3.3. Climate Change Risk and Vulnerability

The IPCC Fifth Assessment Report (AR5) defines climate change risk as "the propensity or predisposition to be adversely affected" (IPCC, 2014). A system is most vulnerable to climate change if it has high sensitivity and exposure to the effects of climate change and if it has an inadequate capacity to adapt in this context. While there is no single conceptual framework that fits all assessment contexts, these three key dimensions, as described below, are often considered as being the main determinants of vulnerability in climate change research (IPCC, 2007). To determine climate change risk, it is necessary to consider all three aspects (Figure 5).

Climate vulnerability is defined as the propensity to be adversely affected by climate change (IPCC, 2014). It encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and capacity to cope with and adapt to future changes (IPCC, 2014). There are three elements of vulnerability: (i) exposure (ii) sensitivity (iii) adaptive capacity.

Exposure is the nature and degree to which a system is exposed to climatic variations. Exposure in a climate context is defined as "the nature and degree to which a system is exposed to significant climatic variations" (McCarthy, et al., 2001) or the degree of climate stress upon a particular unit of analysis (Smit, et al., 2000). Exposure refers to 'the amount of external stress or change a community is likely to be affected by. Exposure is most often used to measure the biophysical forces of nature or "disturbances" that impact a system. Exposure is most often used to measure the biophysical forces of nature or "disturbances" that impact a system.

Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct or indirect (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise), (McCarthy, et al., 2001).These are the attributes that affect the degree to which the system may be affected as a result of being directly or indirectly exposed to the changes in the climate system (McCarthy, et al., 2001). The sensitivities to these exposures include for instance, areas of high population density or people living in low lying areas may be differentially exposed to the effects of flooding or the elderly will be further exposed to extreme heat waves. Also, considering assets in exposed areas, proximity to neighbours, population by age and gender, dependency structures, and factors including number of people in a property.



Source: IPCC (2012)

Figure 26: Summary of climate change exposure, risk & vulnerability.

3.4. Nature-based Solutions

Nature-based Solutions (NbS) is a framework to address societal challenges by harnessing the power of nature to boost natural ecosystems, biodiversity, and human well-being. NbS encompass a wide range of actions, including the protection, restoration, or sustainable management of landscapes, seascapes, watersheds, and urban areas to tackle issues such as climate change, food and water security, disaster risks, and human health. Recognised by the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity, NbS are defined as actions that protect, conserve, restore, sustainably use, and manage natural or modified terrestrial, freshwater, coastal, and marine ecosystems, effectively addressing social, economic, and environmental challenges while simultaneously providing human well-being, ecosystem services, resilience, and biodiversity benefits.

The International Union for Conservation of Nature (IUCN) has led and promoted the IUCN Global Standard for Nature-based Solutions. This standard provides a user-friendly framework for the verification, design, and scaling up of NbS, aiming to guide users through NbS applications and set benchmarks for their progress. The IUCN has been instrumental in mainstreaming nature conservation into key economic sectors and has played a leading role in the development and promotion of established practices related to NbS, such as forest landscape restoration, integrated water resource management, ecosystem-based adaptation and mitigation, and ecosystem-based disaster risk reduction. This international framework emphasises the importance of integrating NbS into local, national, and international policies to achieve sustainable development and address the interconnected challenges of climate change, biodiversity loss, and human well-being (Figure 27).

Source: IUCN

Figure 27: Conceptualising Nature-Based Solutions.

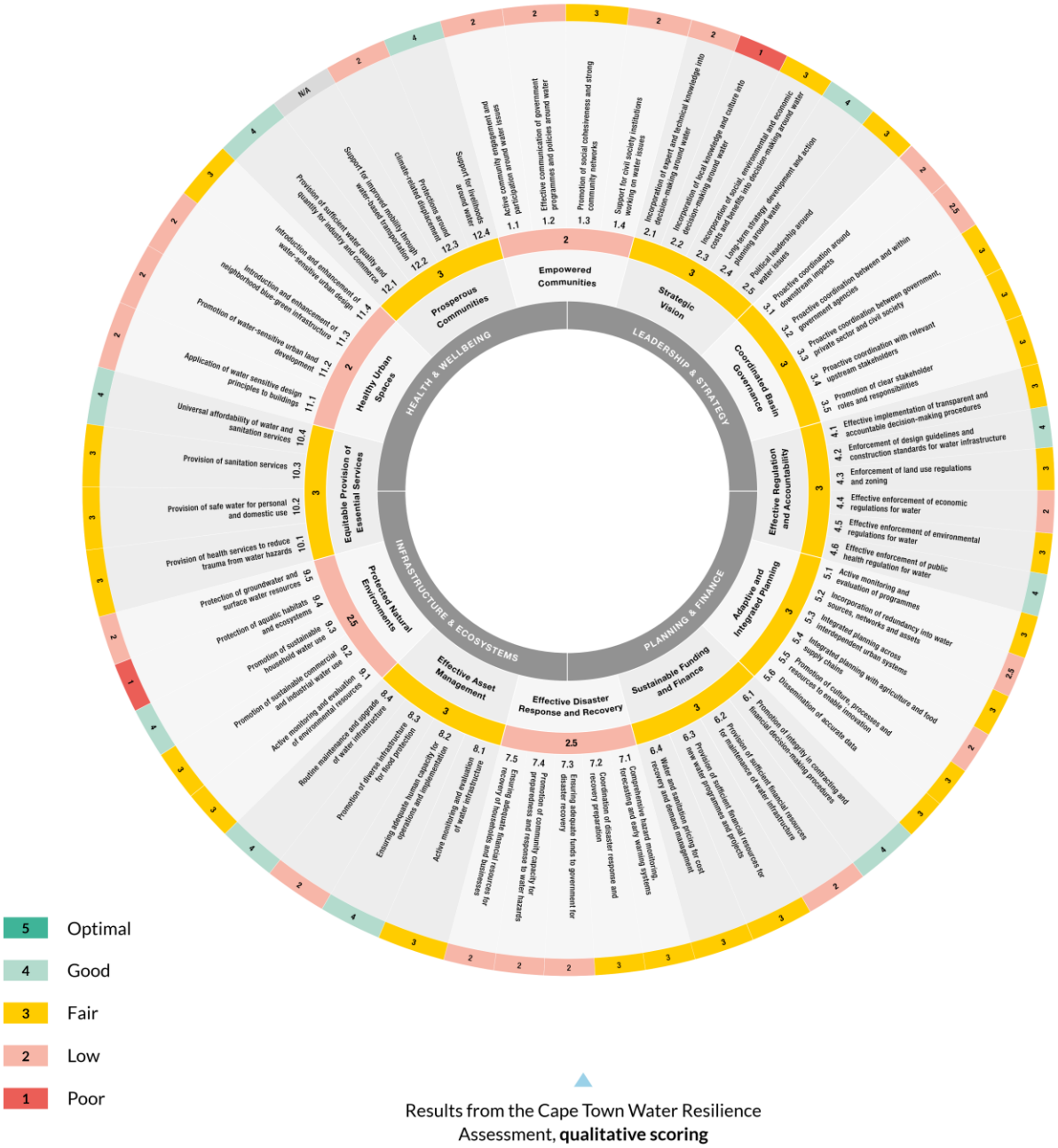
3.5. Global Framework on Chemicals and Waste

The international framework for pollution is the Global Framework on Chemicals and Waste, which was adopted at the fifth International Conference on Chemicals Management in Bonn, Germany. This framework is a successor of the Strategic Approach to International Chemicals Management and is dedicated to protecting people and the planet from harmful chemicals and waste, including by phasing out hazardous pesticides and providing adequate and sustainable funding for a toxic-free future. The Global Framework on Chemicals and Waste sets concrete targets and guidelines across the lifecycle of chemicals, aiming to improve the responsible management of chemicals and waste and establish stronger connections with other important global agendas, including climate change, biodiversity, human rights, and health. This framework is a significant step towards addressing chemical pollution at the international level and is designed to contribute to a safe, healthy, and sustainable future by preventing exposure to harmful chemicals and waste.

3.6. City Water Resilience Framework

The City Water Resilience Framework (CWRF) is a global framework for assessing and planning urban water resilience. It enables comprehensive assessments of urban water resilience across sectors, stakeholders, and city boundaries. The framework focuses on four dimensions, namely: leadership and strategy, planning and finance, infrastructure and ecosystems, and health and well-being. Each dimension is broken down into eight goals and 53 sub-goals, with indicators for measuring performance and overall resilience.

The CWRF has been designed to guide cities in building water resilience and has been applied in various cities globally, including the CoCT, Johannesburg and Nelson Mandela Bay, scalable from towns to megacities, and can be utilised by a wide range of stakeholders, including government entities, water utilities, river basin authorities, the private sector, and civil society groups. The resilience score for the CoCT are shown in Figure 28.

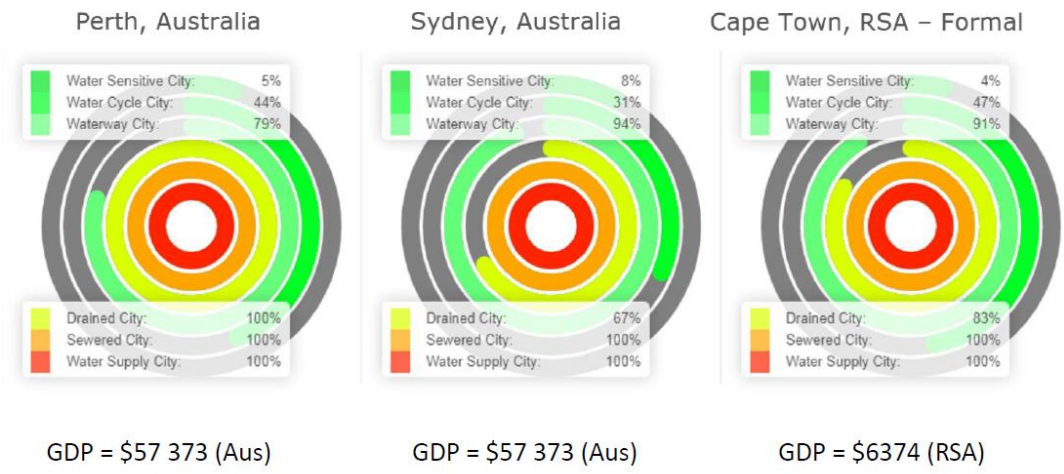


Source: CoCT (2019b)

Figure 28: City Water Resilience Framework assessment results for Cape Town.

3.7. Water Sensitive Cities Index

The Water Sensitive Cities (WSC) Index is a tool for benchmarking the current state of a city along the transition to becoming a water sensitive city. The WSC Index evaluates various aspects of water management, including water supply, stormwater management, wastewater treatment, and water conservation, to gauge the overall water sensitivity and resilience of urban areas. The WSC Index is designed to assist cities in identifying areas for improvement and tracking progress towards more water-sensitive and resilient urban water management practices. The WSCI has been applied to the CoCT with recommendations for its application for other towns and settlements in the Western Cape Figure 29.



Source: Zutari (2021)

Figure 29: Provisional Results for Benchmarking Cape Town as a Water Sensitive City, in comparison to Perth and Sydney.

4. Overview of South African Water Governance

Governance of the water sector involves all three spheres of government as well as a wide range of non-state role-players. While the Constitution (Act 108 of 1996) defines the respective mandates of the three spheres, these mandates and responsibilities are further refined for the water sector through the National Water Act (NWA) (Act 36 of 1998), dealing with water resources, and the Water Services Act (Act 108 of 1997), dealing with water services. There are a range of other pieces of legislation that impact on water security and water resilience. An overview of the governance and regulatory environment are shown in Figure 30 and Figure 31 with the primary mandate of each sphere of government summarised as follows:

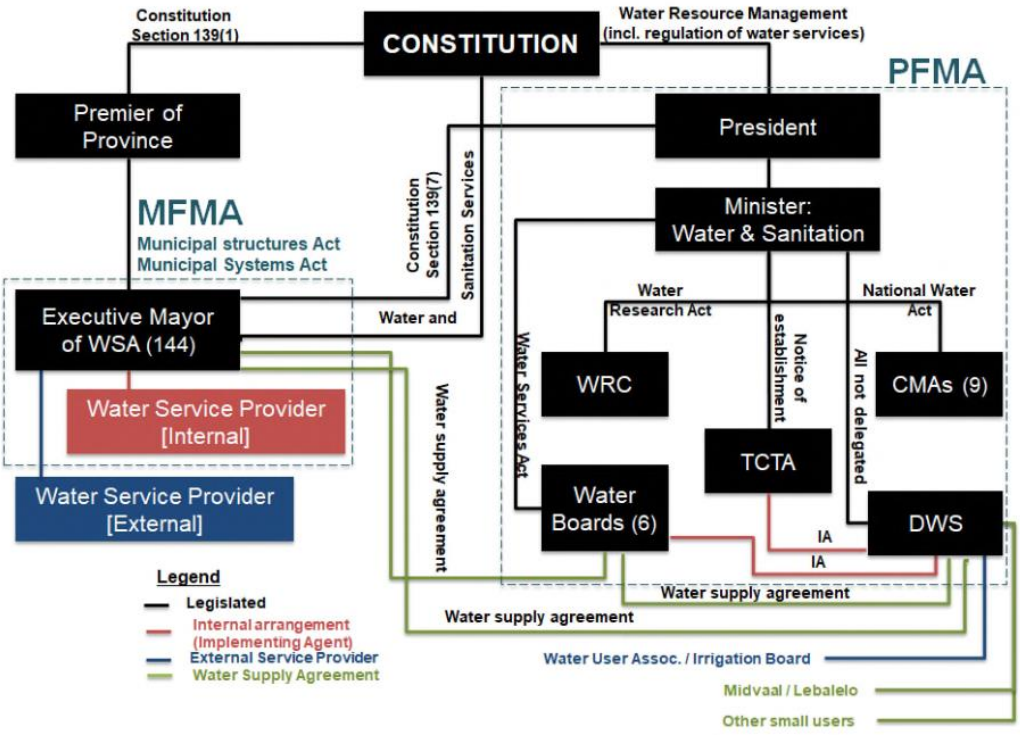
- National government has ultimate responsibility for, and authority over, water resources management, the equitable allocation and usage of water and the transfer of water between catchments and international water matters.
- Provincial government has no exclusive provincial legislative powers relating to water but has a number of concurrent constitutional functions with national government that impact on water security and water resilience, including agriculture, disaster management, environment, and pollution control.
- Local government has exclusive legislative competence for water and sanitation services, limited to potable water supply systems and domestic wastewater and sewage disposal system.

In terms of water security and water resilience in the Western Cape, the areas of interface in responsibility between spheres of government include the following (DLG, 2022b):

- Responsibility for water resource development and the provision of bulk water, e.g. municipal dams and boreholes.
- Water security through water resources management, i.e. DWS, CMA and local government interface.
- Water security through water conservation and demand management, including reducing unaccounted for water, correct water pricing and encouraging efficiency.
- Resilience through adaptive systems and equitable service provision, e.g. Provincial vs local disaster management function or longer term resilience planning.
- Resilience through equitable access to resources, specifically water allocation reform.
- Integrated catchment management, alien vegetation clearing and ecosystems services.
- Agricultural water distribution and efficiencies.

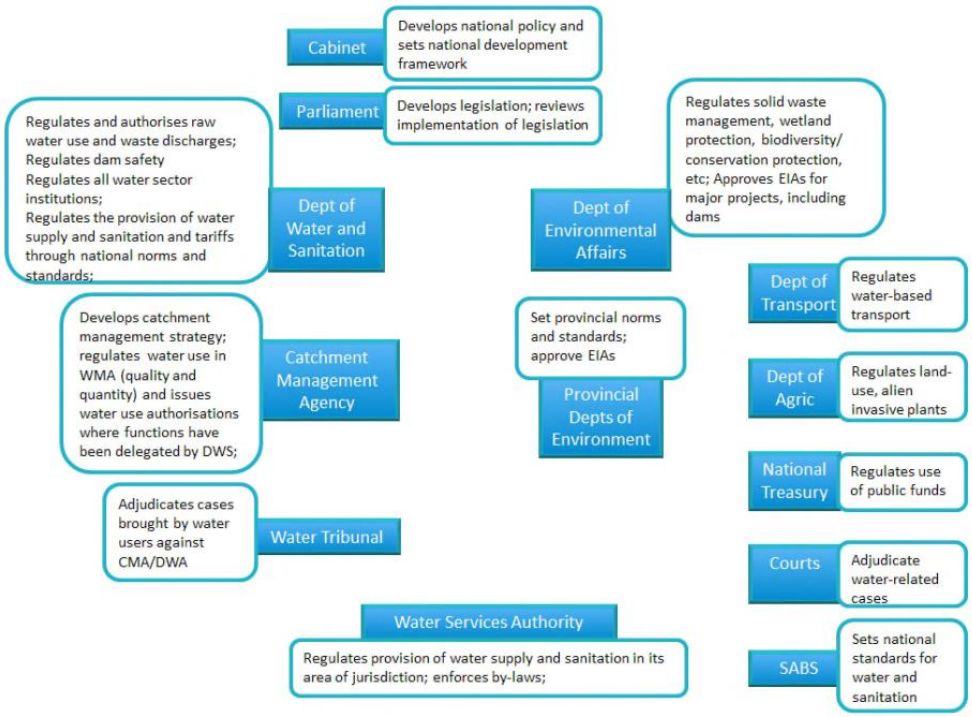
Overlapping mandates can create risks to water security and resilience including in the following areas (DLG, 2022b):

- Responsibility for bulk raw water provision to municipalities.
- Lack of consistent local level water resources management.
- Gaps in water services planning.
- Gaps in enforcement for water services providers (to provide for the issuance of operating license, content of the licence and Regulations for licence procedure; to provide for monitoring, enforcement and intervention on poor performance and non-performance of WSPs etc.).
- Responsibility for alternative water resources – specifically desalination and wastewater re-use.
- Legislative and regulatory flux at a national and regional level impacting water security.



Source: DWS (2018)

Figure 30: Governance of the South African water sector.



Source: DWS (2018)

Figure 31: Regulatory environment in the South African water sector.

4.1. National Government

4.1.1. National Government responsibilities

Principle 12 of the National Water Policy for South Africa White Paper (1997), which informed the drafting of the NWA and the Water Services Act, states that the national government is the custodian of the nation's water resources. Guided by its duty to promote the public's trust, the national government has ultimate responsibility for, and authority over, water resources management, the equitable allocation and usage of water and the transfer of water between catchments and international water matters.

The **Department of Water and Sanitation** (DWS) is the custodian of the nation's water resources and is responsible to ensure the availability and supply of water at a national level, and to ensure efficient supply of water services at local level. The legislative mandate for the DWS is to ensure that the country's water resources are protected, managed, used, developed, conserved, and controlled in a manner that is sustainable, equitable and efficient according to the policy requirements outlined in the NWA and the Water Services Act. The Department's main functions are policy formulation, water resources management, infrastructure development, capacity building, inter-governmental and intra-sectoral coordination, and water regulation (DWS, 2011). DWS manages national water resources infrastructure through its Water Trading Entity while the Trans-Caledon Tunnel Authority (TCTA) is an agent of the department mandated to raise finance to develop bulk raw water infrastructure.

The DWS's regulatory responsibilities includes setting and regulating raw water tariffs and regulating water services tariffs in line with norms and standards set by the department.

The NWA provides for water management institutions including catchment management agencies (CMAs and Water User Associations (WUAs) which are accountable to the Minister.

The Water Services Act (WSA) provides for water services institutions, namely Water Boards, Water Services Committees and Water Services Intermediaries.

The **Department of Forestry, Fisheries and Environment** (DFFE) obtains a wide range of water-related mandates from the National Environmental Management Act (NEMA) and the Specific Environmental Management Acts[1]. DFFE plays a significant role in the protection of water resources through environmental authorisations and water licensing and the monitoring and enforcement thereof, although these may be delegated to the provincial Department.

Together with DWS, DFFE must provide specific permits or a general authorisation for brine effluent discharge to the sea or to estuaries. While the DFFE Minister is the primary competent authority for the regulation of alien and invasive vegetation, the responsibility for the control of invasive species is given to all organs of state through the Biodiversity Act.

[1] The Waste Act, the Biodiversity Act and the Integrated Catchment Management Act.

National Treasury (NT) is responsible for financial policy development and legislation, financial management (budgeting and expenditure) at a national level, and financial oversight of national, provincial and local government institutions. NT's regulatory role includes the monitoring and evaluation of budgeting, expenditure and accounting of all organs of state involved in water resources and water services provision. While National Treasury is the custodian of the fiscus and allocates funds to DWS, funding for water services is overseen by a range of national departments. The equitable share, Urban Settlements Development Grant (USDG) and Municipal Infrastructure Grant (MIG) are consolidated grants, meaning that they may be used to fund or finance a range of services and are administered by a non-sector department (NT in the case of equitable share, Department of Human Settlements in the case of USDG, and The Department of Cooperative Governance (DCOG) in the case of MIG); while the Water Services Improvement Grant and Regional Bulk Infrastructure Grant are sector grants, administered by the DWS. DCOG is responsible for general oversight of and support to municipalities as well as the management of the overall Inter-governmental Relations system.

There are other national government departments whose mandate relate to a lesser extent to water management, namely the Departments of Mineral Resources, Agriculture, Human Settlements, Health, National Treasury, Trade and Industry, Land Reform and Rural Development and Public Works and Infrastructure.

Catchment Management Agencies may be delegated many of the water resources management functions of DWS, including issuing of water licenses and general authorisations, managing, monitoring, conserving and protecting water.

Water User Associations were intended to replace Irrigation Boards and operate at a restricted, localised level, and are in effect co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit. WUAs may develop their own additional water resources. There is an intention to replace WUAs and Irrigation Boards with Local Water Resources Management Institutions (DWS, 2018).

Water Boards are water services institutions whose primary activity is to provide water services to other water services institutions within their service area, but may undertake secondary activities under certain conditions, including supply of non-potable water, catchment management services, providing water services directly to customers, and water conservation functions.

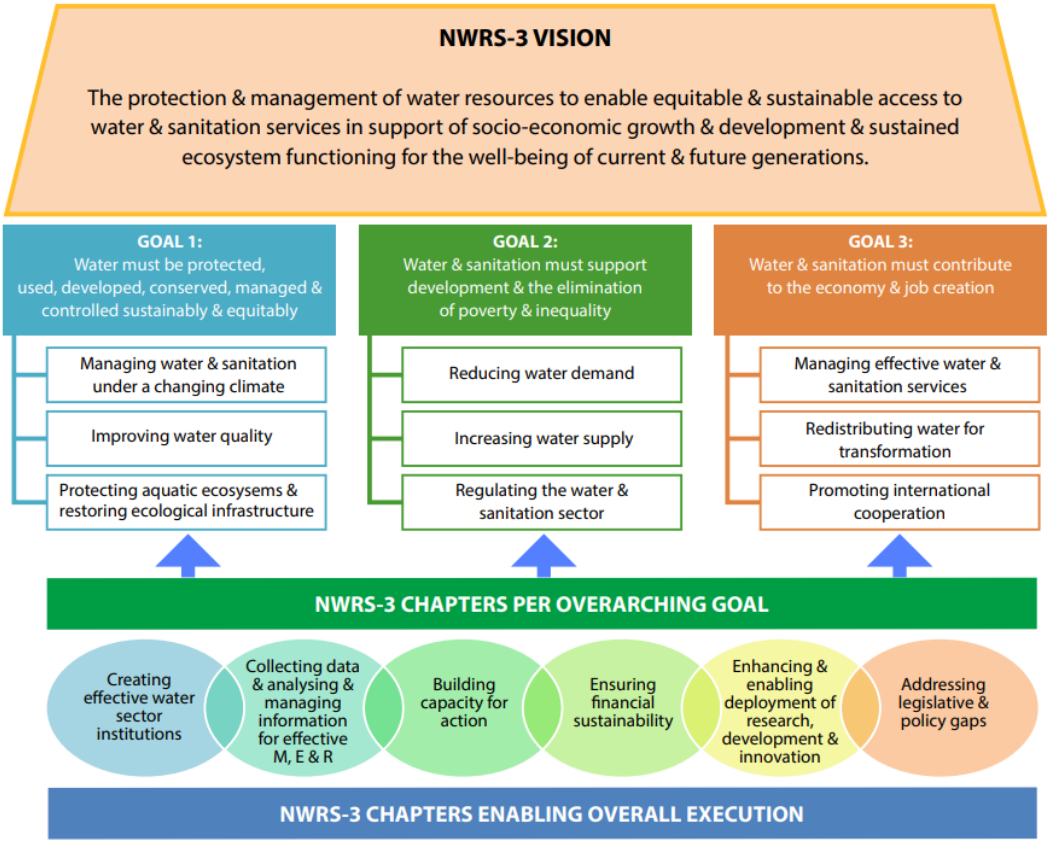
Water Services Committees are intended as private organisations to provide the water services function where WSAs are unable to do so.

Water Services Intermediaries are governed by municipal bylaws and provide water services directly to customers by agreement with the municipality as the WSAs.

4.1.2. Key national strategies and plans related to sustainable water management

The **Third National Water Resources Strategy (NWRS-3)** is the legal instrument for implementing and operationalising the National Water Act (NWA) (Act 36 of 1998). Published in March 2023, it is a comprehensive and forward-looking framework that aims to guide the sustainable management and use of the country's water resources. The strategy is built on the principles of equity, sustainability, and efficiency, with a focus on ensuring access to water and sanitation

services to support socio-economic growth and development. It emphasises the protection and management of water resources to enable equitable and sustainable access to water and sanitation services for the well-being of current and future generations. The NWRS-3 is designed to inform future water resource planning, management, and investment, taking into account the constraints and demands on the water resources in South Africa. It provides a strategic and integrated approach to water resource management, addressing various aspects such as governance, infrastructure, technology, and economics to ensure the sustainable and equitable use of water resources in the country (Figure 32).



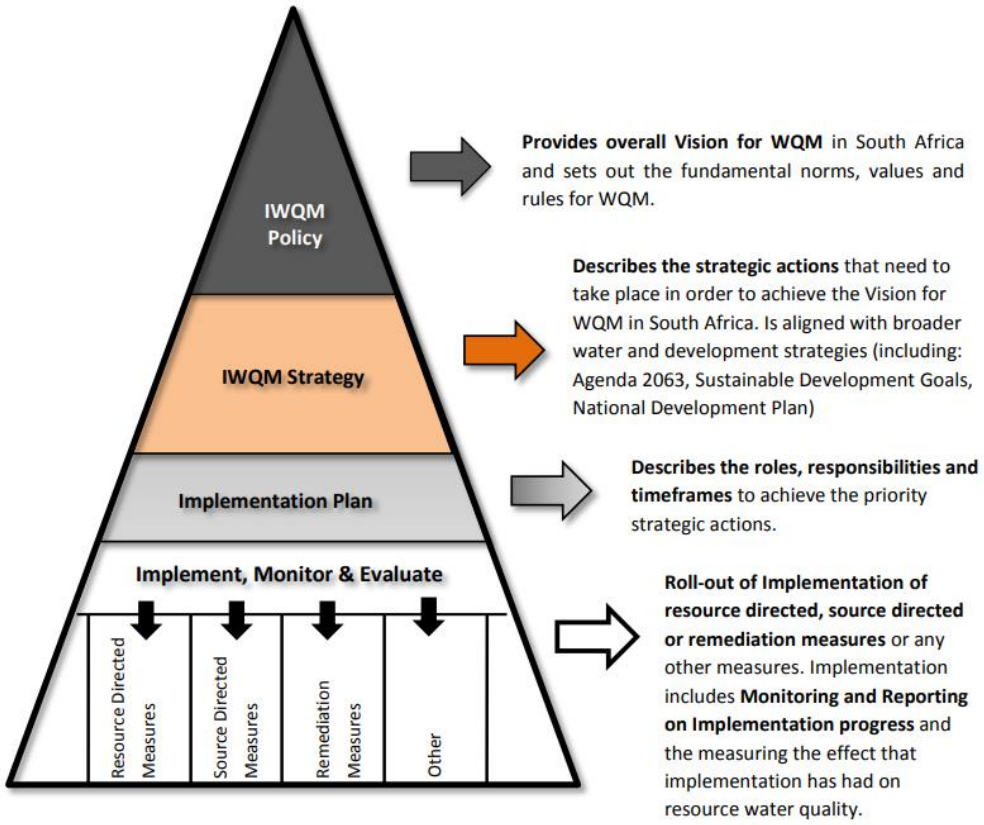
Source: DWS (2023)

Figure 32: Overview of the NWRS-3 Vision, Goals & Chapters.

The **Second Integrated Water Quality Management (IWQM) Policy and Strategy** (DWS, 2017) represents a significant step towards addressing the country's water quality challenges. The strategy aims to provide a comprehensive framework for managing water quality in South Africa. It emphasises the importance of improving water quality through an inclusive and integrated approach, recognising that deteriorating water quality in rivers, streams, dams, wetlands, estuaries, and aquifers has far-reaching impacts on the economy, human health, and aquatic ecosystems.

The IWQM Policy is underpinned by seventeen principles, ensuring that the approach to water quality management is structured, transparent, and predictable. These principles encompass government-wide integrated water quality management, people-centric approaches, subsidiarity and accountability, transboundary cooperation, partnerships, and integrated and adaptive management, among others. The policy reflects a commitment to addressing water quality challenges in a holistic and collaborative manner, aligning with the National Water Act

and the White Paper on National Water Policy to promote sustainable and integrated water resources management in South Africa.



Source: DWS (2017)

Figure 33: Relationship between Policy, Strategy, and Implementation of the 2nd IMQM.

The 2018 **National Water and Sanitation Master Plan** is a comprehensive guide developed by the Department of Water and Sanitation to steer the water sector's investment planning for the development of water resources and the delivery of water and sanitation services until 2030 and beyond. The Master Plan identifies key actions in the water sector and assigns roles and responsibilities to all stakeholders in the water sector, including various tiers of government, the private sector, and other stakeholders. The plan composes of three volumes: Volume 1: Call to Action, Volume 2: Plan to Action, and Volume 3: Schedule of Actions.

The Water and Sanitation Master Plan addresses the country's water security, future water sources, operation and maintenance of water and sanitation infrastructure, water quality management, resilience to climate change impacts, and water conservation and demand management. The plan aims to ensure that South Africa can avoid the projected 17% water deficit by 2030 by tackling both the supply and demand side of water management. On the demand side, the plan calls for households to consume less water and municipalities to waste less water. On the supply side, it calls for the construction of new dams and transfer schemes.

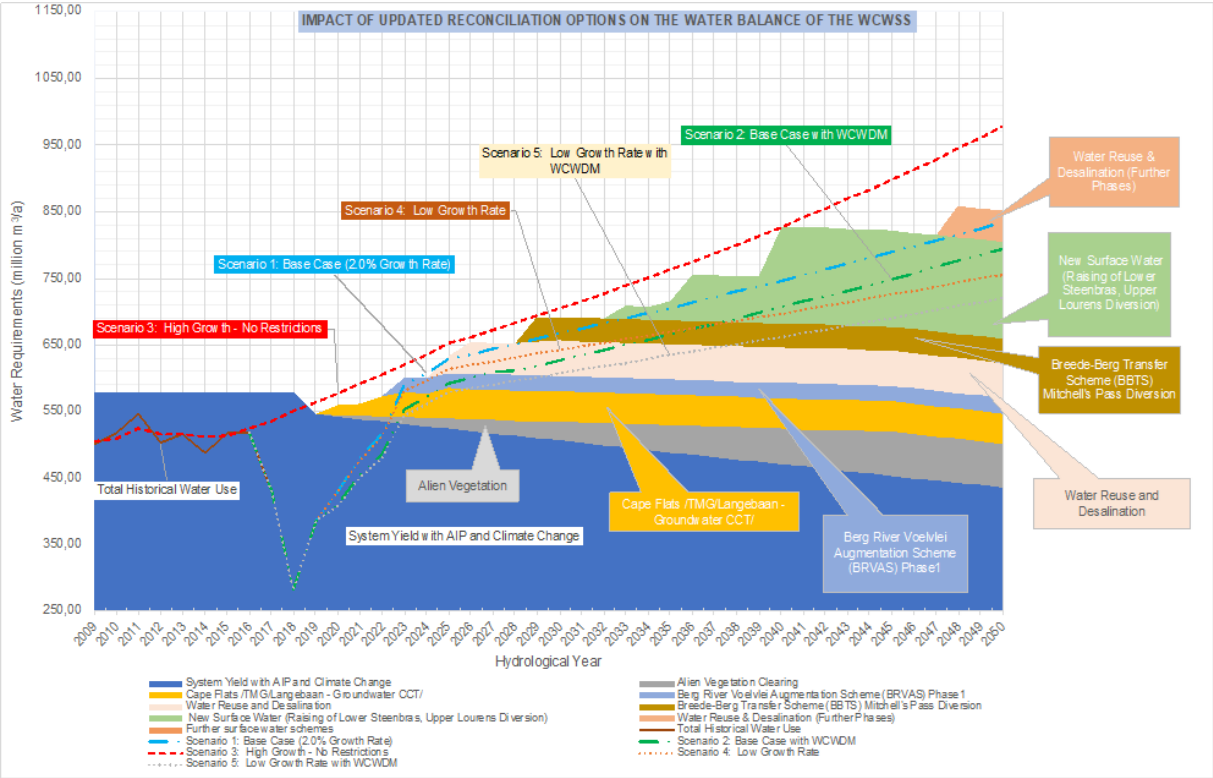
The **Blue, Green, and No Drop Certification programmes** are regulatory mechanisms of the Department of Water and Sanitation in South Africa, aimed at improving municipal drinking water quality, wastewater management, and water loss control. The Blue Drop report is a comprehensive assessment of all drinking water systems in the country, including water treatment works. It evaluates the condition of the infrastructure, maintenance, operation,

treatment processes, and monitoring and controls. The Green Drop report, on the other hand, assesses the state of all wastewater treatment systems in South Africa, including municipal, Department of Public Works, and private wastewater treatment systems. The No Drop report focuses on water loss and non-revenue water across municipalities nationwide, highlighting the need for efficient water use and conservation. The certification programmes were relaunched in 2022 after a 10-year hiatus and shows significant declines across the country.

In view of the latest information and emerging issues regarding climate change, the **Water and Sanitation Sector Policy on Climate Change** is being reviewed and updated the DWS. The Strategy will, among other things: Review all recent and current water-related climate change frameworks, protocols, modelling systems, scenarios, and response strategies; Identify gaps in the information and knowledge needed for mainstreaming climate change in water and sanitation management and planning; Investigate innovative water-saving solutions to sanitation needs/challenges; Investigate the potential impacts on the environment of maladaptation to climate change; and Develop proposals for the more effective utilisation of climate change research outcomes and understanding of climate risks in support of water-related decision-making. This will include relevant information from the IPCC AR6 outputs.

The **National Sanitation Integrated Plan (NSIP)** and it's monitoring mechanism are currently being developed to guide the sanitation sector in the implementation and monitoring of sanitation services in South Africa. The NSIP is a coordinated plan that considers South Africa's scarcity of resources (water, energy, financial and technical) and promotes delivery of equitable, efficient, and sustainable sanitation services to all and contributes to public health and clean environment. The main goal of the NSIP is to assist the sanitation sector in providing adequate and innovative sanitation services and solutions to enable long-term sustainable management of sanitation services in South Africa. The NSIP provides a 10-year roadmap for service delivery in the sanitation sector to guide the eradication of sanitation backlogs (inclusive of bucket systems and open defaecation per province), ensure the provision of appropriate alternative sanitation, foster and grow use of innovative sanitation solutions, and create a pathway to generate economic opportunities in the sector.

The national DWS is currently updating the **Reconciliation Strategy for the Southern Region and All Town Studies** across South Africa. This includes an update to the WCWSS Reconciliation Strategy which was first compiled in 2007. The 2021/22 WCWSS Reconciliation Strategy Status Report (1 October 2021 to 30 September 2022) included projected future water requirements, the proposed interventions and the potential timeline for implementation to avoid any delay. The updated 2022/23 WCWSS Reconciliation Strategy Status Report (1 October 2022 to 30 September 2023) is currently underway. An 'Evaluation of Schemes' is also currently being undertaken and forms part of the ongoing WCWSS Reconciliation Strategy. This includes the revision and updating of the potential future bulk water interventions for the WCWSS that were initially screened in a workshop held in 2005. The results of these studies will be available soon and will provide an update on the hydrology and the yields from the major water supply systems such as the WCWSS (Figure 34). These studies are also updating the future water demands for each system as well as small towns and reviewing the potential water supply augmentation options and will make recommendations for the way forward.



Source: DWS (2021)

Figure 34: Future demand projection scenarios and recommended sequencing of water supply augmentation options for the WCWSS including the impacts of climate change and IAPs.

4.2. Provincial Government - Western Cape

While there are no exclusive provincial legislative powers relating to water in Schedule 5 of the Constitution, there are several concurrent constitutional functions with national government that impact on water security and water resilience, including agriculture, disaster management, environment, and pollution control. Provincial government has no direct mandate for water resources through the NWA and the only mandate through the Water Services Act is the monitoring of performance of water services institutions. The key roles of the Province relate to the support, monitoring and capacity building of local government in general (in terms of S154(1) of the Constitution and the MFMA), coordination of planning (through NEMA and the Spatial Planning and Land Use Management Act), and the protection of the environment (through NEMA and the SEMAs). Provincial government also plays a role as a water user in its own right, and a significant user in some sectors (e.g. health and education). Table 1 provides a summary on the mandates of specific provincial departments and is discussed in more detail in the next sections.

Table 1: Legislative mandates of specific provincial departments regarding water security and water resilience.

Source: DLG (2022b)

Department	Legislation	Mandate regarding water security and water resilience
Department of Local Government	Constitution	Support and monitoring of local government
	Municipal Systems Act	Support and monitoring of local government
	Municipal Structures Act	Adjustment of water services function
	Water Services Act	Monitor performance of water services institutions
	Municipal Financial Management Act	Intervene in a municipality in the event of financial crisis
Provincial Treasury	Constitution	Support and monitoring of local government
	Municipal Systems Act	Regulation and oversight of municipal finances, including tariffs
Department of Environmental Affairs and Development Planning	Constitution	Environment, nature conservation, pollution control, development planning
	National Environmental Management Act	Coordinate environmental planning through environmental implementation plan Exercise functions to protect the environment Environmental authorisations
	Integrated Coastal Management Act	Prepare, coordinate and monitor coastal management programme
	Waste Act	Consult DWS in issuing of waste disposal licenses
	Biodiversity Act	Control invasive species, monitor and report progress
	Spatial Planning and Land Use Management Act	Planning alignment Support and monitor municipal planning performance Enable regional and provincial development
Department of Economic Development and Tourism	Constitution	Consumer protection, industrial promotion, tourism, trade
Department of Agriculture	Constitution	Promote and support agriculture
Department of the Premier	Inter-governmental Relations Framework Act	Coordination with national government and municipalities; dispute resolution
	Disaster Management Act	Declare a Provincial Disaster Issue regulations and directives to manage disaster
Department of Transport and Public Works		General obligations as a significant user + custodian of provincial infrastructure
Department of Health		General obligations as a significant user
Western Cape Education Department		General obligations as a significant user
Department of Human Settlements		General obligations as a significant user
Department of Community Safety		General obligations as a user
Department of Cultural Affairs and Sport		General obligations as a user
Department of Social Development		General obligations as a user

The Western Cape Government, in its **Provincial Growth for Jobs (G4J) Strategic Framework 2023-2035**, appreciates the importance of improved water resilience for long term socio-economic growth and stability. The G4J aims to supports economic growth for job creation in response to the post-Covid economic downturn and requires support from all government departments. At its heart, G4J is premised on a recognition that the private sector creates jobs, and that the State needs to stimulate market growth and create an enabling environment in which people and businesses are enabled to create and exploit opportunities.

Under its fourth priority focus area of *Water security and resilience* (see Figure 5 in Section 1.5), the plan outlines the province's objective to have: "optimised and increased its water supply, integrated the management of water resources, and enhanced the adaptive capacity of business and citizens with respect to water usage to improve resilience, competitiveness, and quality of life for all its people, so that it has a sufficient water supply to achieve its economic growth aspirations." – Western Cape Growth for Jobs Strategy 2035, pg. 119.

The province aims to achieve this by "Doubling the amount of water available for secondary and tertiary economic sectors (primarily from non-productive use) by 2035 and honouring existing allocations to agriculture" – Western Cape Growth for Jobs Strategy 2035, pg. 119.

The transversal G4J underpins all other provincial strategies and plans. As such, all related water resilience strategies, and plans (including the Sustainable Water Management Plan) should be viewed through the G4J lens (Figure 35).

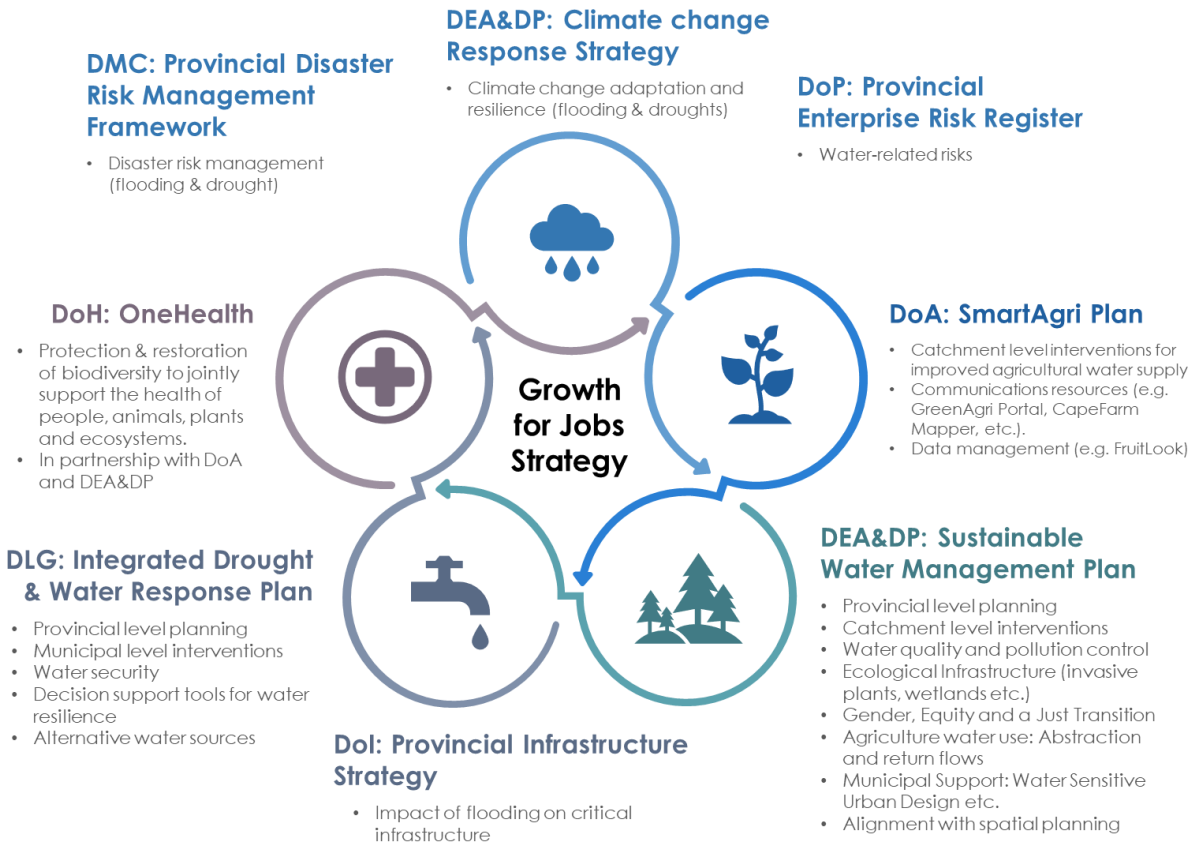


Figure 35: Summary of key provincial plans and strategies related to sustainable water management in the Western Cape.

4.2.1. Department of Local Government (DLG)

The DLG's involvement in water security is driven primarily by the mandate to support and build capacity in local governance, as well as to monitor the performance of Water Service Authorities as provided for in the Water Services Act. In 2022, the DLG launched the **15-year Western Cape and Integrated Drought and Water Response Plan (WCIDWRP)** (see Section 1.3 for further information). The DLG oversees the **Provincial Water Resilience Committee**, as discussed throughout this report.

The DLG's Disaster Management Centre (DMC) also oversees the **Provincial Disaster Risk Management Framework** that aims to prevent or reduce the risk of disasters through mitigation and adaptation. The DMC has a critical role to play in flood and drought risk management in the Western Cape and played a key role during the 2015-2019 drought. It also maintains a dedicated provincial drought risk register that should also be aligned with the updated WCSWMP.

4.2.2. Provincial Treasury (PT)

The PT has a similar role to DLG to support, monitor and build capacity with respect to municipal finances across the province. In relation to water security and resilience, the PT is concerned with the financial sustainability of the water services function and the degree to which this is threatened by tariff levels or unaccounted for water.

4.2.3. Department of Environmental Affairs and Development Planning (DEA&DP)

Although the right to the protection of the environment and the right to access to water are separated in the Bill of Rights, aspects of water resources management are a sub-set of environmental management. Thus, environmental mandates of the DEA&DP overlap significantly with water resource, water security and water resilience, particularly water quality.

Section 24 of the Constitution of the Republic of South Africa, 1996 (the Constitution) provides that everyone has the right to an environment that is not harmful to their health or well-being; and 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;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development.

The DEA&DP is responsible for Environmental Management and Provincial Development Planning, which emanate from the Constitution. The Provincial Government has a direct responsibility and a mandate for environmental management, which falls within the ambit of "Environment", "Nature Conservation" and "Pollution Control" (Schedule 4: Part A).

Planning falls within the ambit of "Regional Development"; "Urban Rural Development" (Schedule 4: Part A) and "Provincial Planning" (Schedule 5: Part A).

The Functional Areas of Schedule 4: Part A of the Constitution refer to those areas of Concurrent National and Provincial Legislative Competence, whilst the Functional Areas of Schedule 5: Part A of the Constitution refer to those areas of Exclusive Provincial Legislative

Competence. The Department's powers of "supervision", "monitoring" and "support" of local government are derived from section 41, 139, 154 and 155 of the Constitution.

To support this mandate, the DEA&DP and its directorates have developed several strategies and plans to guide them. The climate change risk provincial mandate of the DEA&DP is addressed through the **Western Cape Climate Change Response Strategy and Implementation Plan: Vision 2050** (Figure 36). This is envisaged as a transversal strategy providing policy direction in response to climate-related risks and potential opportunities, through either creating or leveraging systemic innovative response programmes that tackle the region's vulnerability to droughts, heat and floods and take advantage of opportunities that will enable climate resilient development which fosters economic growth that is low-carbon and further creates an advanced Green Economy (DEA&DP, 2023).

The climate change risk lens as taken up in the **2017-2022 WCSWMP**, reflects on the water-related risks identified in the 2014-19 Provincial Strategic Goals (ultimately replaced by the Provincial Strategic Plan 2019-2024). The key factors contributing to this risk include increased urbanisation, climate change, failing infrastructure and irresponsible consumer behaviour. Insufficient water quantity and poor water quality will have a negative impact on individual livelihoods and the broader economy and poses a direct threat to growth and development, agriculture (and food security), health and ecological infrastructure (DEA&DP, 2018).

Source: DEA&DP (2023)

Figure 36: Structure of the Western Cape Climate Change Response Strategy: Vision, Guiding Objectives, Climate Action Pathways and Implementation Plan.

The 2017-2022 WCSWMP also considered how biodiversity and nature conservation initiatives can contribute to water security and resilience, specifically through IAP and ecological infrastructure (EI) management – taken up in the **Biodiversity Strategy and Action Plan** (DEA&DP, 2016) and the **Ecological Infrastructure Investment Framework and Implementation Plan** (DEA&DP, 2021a). The strategy and framework are driven by the mandates for environment, nature conservation, pollution control and development planning to address threats to water resources from unsustainable use (over abstraction), transformation (loss of watershed priority areas through inappropriately sited and illegal agriculture) and urban development and infrastructure and land degradation as well as IAPs.

The 2017-2022 WCSWMP, whilst recognising the overall water management function of the DWS and the CMAs, considered the mandate of all Western Cape Government departments, as well as municipalities, in achieving overall water resilience.

4.2.4. Department of Economic Development and Tourism (DEDAT)

The DEDAT has a mandate to promote industry, tourism and trade. Given that water is a key economic input, water security is of critical importance to the provincial economy. The DEDAT had established a Green Economy Team with a dedicated Water Unit to ensure water availability that supports the economy, to undertake development facilitation and to act as an intermediary between the private sector and national and local government. This was developed in response to the anticipated Day Zero scenario to reduce business risk and the subsequent goal to build the water sector to support water resilience in the Western Cape economy. However, this unit has since been seconded to the Department of Infrastructure and is now 100% focused on energy.

The **Western Cape Economic Water Resilience Strategic Framework** defines DEDAT's future approach to and role in improving water-use efficiencies and reducing water consumption in businesses, supporting businesses in securing their own water supply augmentation as well as growing the water sector in the Province (DEDAT, 2019).

4.2.5. Department of Agriculture (DoA)

The DoA has as constitutional mandate to promote agriculture. Agriculture is the largest consumer of water in Western Cape Province and the second largest user of water in the WCWSS. Water security and water quality is essential for agricultural productivity and thus food security and economic growth.

The department has also implemented the **LandCare programme**, which aims to achieve sustainable natural resource management among farmers, landowners, and land users within the agricultural sector in the Western Cape. The programme derives its mandate from the Constitution, the Conservation of Agricultural Resources Act (No. 43 of 1983), NEMA and NWA. The programme includes a range of projects and activities inclusive of area-wide planning; awareness raising and project implementation (e.g. alien vegetation clearing, erosion protection, fencing installation, etc). The relevant strategic objectives and actions are included in the DoA's **SmartAgri Plan**, that was initially developed in 2015 and builds on the 2014 Climate Change Response Strategy. The SmartAgri Plan is reviewed and updated on an annual basis and helps guide the DoA's strategy with regards to climate and water resilience.

4.2.6. Department of the Premier (DoTP)

The Premier of the Western Cape has powers in terms of the Intergovernmental Relations Framework Act to coordinate water-related actions of multiple state stakeholders, as well as to resolve potential intergovernmental disputes. The power to declare a provincial disaster in terms of the Disaster Management Act means that the Premier can issue regulations and directives relating to water resources and water services, despite not having the mandate to do so outside of the disaster context.

The DoTP is the custodian of the provincial **Enterprise Risk Register** which incorporates water and other environmental related risks.

4.2.7. Department of Infrastructure (DoI)

The DoI is the custodian of much of the provincial infrastructure, primarily schools and health facilities. In this role it is responsible for the design, construction and maintenance of these facilities, which can have a significant demand on water resources, both in terms of location and design standards. The department also coordinates all Expanded Public Works Programme activities in the province, which includes alien vegetation clearing.

The increasing risk of flooding and the recognition of the benefits of catchment management activities in reducing this risk, particularly in the face of climate change make sustainable water management of relevant interest to the DoI, as highlighted in its **Strategic Infrastructure Plan** for the fiscal years 2023/24 – 2027/28.

4.2.8. Department of Health and Wellness (DoHW)

Following the COVID-19 pandemic, the **OneHealth Approach** is filtering through the National Department of Health and being adapted by the Provincial DoHW, in collaboration with the DoA and DEA&DP. It makes a key link between human, animal and environmental health and the management of water-borne diseases. The Western Cape OneHealth approach follows six tracks (Figure 37). Track 6, *Integrating the environment into One Health*, is of particular relevance to sustainable water and environmental management. This action aims to protect and restore biodiversity, prevent the degradation of ecosystems and the wider environment to jointly support the health of people, animals, plants and ecosystems.

Source: WCG (2023b)

Figure 37: Six tracks in the WCG OneHealth Approach.

4.3. Municipalities and Local Government

Local government (24 local municipalities and 5 district municipalities in the Western Cape) are responsible for the provision of services to communities in a sustainable manner, to promote social and economic development and to promote a safe and healthy environment. Local government has exclusive legislative competence for water and sanitation services,

limited to potable water supply systems and domestic wastewater and sewage disposal system, i.e. water services, as well as stormwater management systems in built-up areas.

The Water Services Act designates municipalities as water service authorities (WSAs), which may choose to undertake the water service provider (WSP) function themselves or delegate the function through a contract with a third party. The Act creates a right for all citizens to access to a basic water supply, and an obligation on the part of municipalities to ensure that this right is realised. WSAs are responsible for regulating water and sanitation provision and use through by-laws. The Water Services Act requires municipalities to produce **Water Services Development Plans** (WSDPs) which need to include projections of population growth, future water demand, proposed water resources, infrastructure requirements and timing, and the costs thereof. This water services planning responsibility is closely linked to the municipal mandate for municipal planning provided for in the Constitution and in Spatial Planning and Land Use Management Act (SPLUMA). While the NWA and NEMA create a general obligation for water conservation and demand management, the responsibility in this regard of municipalities as WSAs is reinforced in the Water Services Act.

4.4. City of Cape Town

Following the drought crisis, the CoCT developed a new water strategy. One of the five goals of the **City of Cape Town Water Strategy** (CoCT, 2019a) is to transition to a "water sensitive city by 2040 that optimises and integrates the management of water resources to improve resilience, competitiveness and liveability for the prosperity of the people of Cape Town". The City aims for a water sensitive city to be realised through a collaborative approach involving all stakeholders within the CoCT, including the community. This is defined in the new water strategy: "Collaborative relationships are based on trust, and trust is built where there is transparency and mutual accountability, and where stated intentions of all partners are consistently translated into actions" (CoCT, 2019a).

Source: CoCT (2019a)

Figure 38: Five Commitments from the CoCT's Water Strategy.

A critical component of the new strategy is the development of new water supply augmentation options. Several of these options had already been identified and were undergoing feasibility studies when the strategy was developed. Several of these, including several groundwater schemes, were fast-tracked during the drought and are currently in operation. The next major developments include direct-potable reuse and seawater desalination. The Faure New Water Scheme, a direct reclamation scheme, is currently being designed.

5. Progress with Implementing the 2017-2022 WCSWMP

Significant progress has been made during the past five years under the 2017-2022 WCSWMP and building on the implementation of the initial 2012-2017 WCSWMP. Details of this performance is documented in the WCSWMP annual progress reports. The sections below provide a summary of this progress since 2017.

5.1. Berg and Breede River Rehabilitation Programmes

The Berg River Improvement Programme (BRIP) is one of the flagship programmes of the **DEA&DP** and has been responsible for the clearing, rehabilitation, and maintenance of several kilometres of the Berg River. The BRIP has several additional co-benefits including employment and support for Small, Medium and Micro Enterprises (SMMEs). The Berg and Breede Riparian Rehabilitation Programme (est. 2013) is one of the largest active riparian rehabilitation projects in South Africa. Initiated by the Department of Environmental Affairs and Development Planning, the primary aims of this project is to improve ecological functioning of the river, to create jobs (through EPWP) and to buffer the effects of climate change (flooding). As of June 2023, the Riparian Rehabilitation projects on the Berg and Breede rivers had rehabilitated 32 sites totalling nearly 30ha and introduced 685,170 plants. The new projects added 51 209 plants to this number making the total number of plants introduced 736,379, comprising 63 species.

The DEA&DP led Riparian Rehabilitation Projects are also key initiatives for embedding gender sensitive planning and implementation. There is an acknowledgement by service providers and DEA&DP that ecological restoration works cannot be successful without a collaborative approach with communities. Through local contractors, community members are employed. For IAP removal, men tend to be the most appropriate group given the labour-intensive nature required. Where labour is less intensive, such as nursery management, women from local communities are engaged. In some nurseries in the Western Cape, the entire staff is made up of women from surrounding local communities. The inclusion of local communities in ecological restoration provides economic opportunities and increases knowledge of natural resources conservation within the local communities, ultimately developing environment champions (Figure 39).

Source: Society for Ecological Restoration (2021)

Figure 39: Men and women from a local community working on the Berg and Breede River Rehabilitation Project.

THE DEA&DP WAY OF WORKING: THE BERG RIVER IMPROVEMENT PLAN (BRIP)

The vision of the BRIP is to enhance and entrench a water stewardship initiative to ensure the ecological integrity of the Berg River catchment, in order to sustain economic growth and contribute to the Green Economy. The implementation of this Plan is a demonstration of the multi-dimensional, holistic and systemic way the Department tackles a challenge which is environmental, social and economic.

PIONEERING PRACTICES

The riparian rehabilitation programme has to date seen the production of more than half a million-plant species for use in the active rehabilitation of riparian areas of approximately 40 hectares, cleared of alien invasive plant species. This is the first and only project of its kind within South Africa, actively placing indigenous riparian plant species, improving biodiversity, mitigating secondary invasions of invasive alien plants and improving ecosystem services related to buffering land-use activities and river bank stabilisation. The programme also places a focus on empowering and offering work opportunities to rural communities.

WORKING IN PARTNERSHIP

The implementation of the Water Sensitive Cities Benchmarking and Implementation strategy for the transition towards a Water Sensitive City with the City of Cape Town (CoCT) intends to reduce municipal reliance on surface water from the Berg River Catchment in order to preserve this resource for agricultural economic production; address water security from a medium to longer term perspective, as part of a climate change adaptation response.

OPPORTUNITIES FOR INNOVATION

The support for the development of the Water Hub in Franschhoek is set to continue, with further development of a financially feasible and sustainable business plan. The need for such a facility has been driven by an increased awareness around the opportunity and gap for innovation within the water sector, with links to innovation in other sectors such as housing, agriculture and spatial planning. The development of the facility will seek to better position itself within the context of growing the Green Economy by providing the opportunity to realise a new market in water innovation manufacturing and technology development for the Western Cape.

PRO-POOR COMMUNITY PARTNERSHIP

Further opportunities to replicate the approach undertaken within the Genius of SPACE (Systems for Peoples Access to a Clean Environment) project in Langrug, Franschhoek, are to be realized through implementing bioremediation interventions that reduce the pollution of environmental resources and improve the socio-economic environment of locally, historically disadvantaged communities through a community stewardship initiative. This will further empower and develop capacity amongst local, informal communities to support uptake of such interventions and drive support for entrepreneurial development from both the public and private sector.

EVIDENCE-LED PRACTICE

The project on the valuation of the Berg Estuary sets out to provide a better understanding of the functioning and value of the Estuary in the Berg catchment in terms of the goods and services it provides and its importance in terms of driving economic development in different sectors, including the environment. The principal goal of the study is to provide a better understanding of the Berg River estuary in terms of economic, natural science, cultural heritage, and intrinsic value as part of the role of water management within the broader hydrological systems, taking the flows of the systems and rainfall of the region into account.

The monitoring of water quality variables across the Berg and Breede Catchments is crucial to understand the dynamics of both catchments in terms of water quality and pollution and to address areas of concern. Furthermore, the monitoring programme will continue to provide a basis upon which to measure the efficacy of the implementation of interventions to reduce pollution and improve ecological integrity. This will continue to manage sampling, data collection and analysis of identified sites across the two catchments, while supporting decision- making in terms of pollution risks, as well as enforcement and regulatory monitoring requirements as and when required.

5.2. Ecological Infrastructure Investment Framework

The Ecological Infrastructure Investment Framework (EIIF) is a flagship project of the **DEA&DP** that aims to coordinate and prioritise investment from multiple stakeholders into ecological infrastructure (EI). Broadly speaking, EI is the ecological basis upon which all life depends, and investing in its proper functioning ensures continued delivery of life-supporting services, while possibly improving these services. For example, investment in the eradication of IAPs will:

- Increase and regularise the provisioning of water in our catchments for human use
- Increase the productivity of agriculturally important lands assisting in food security
- Reduce the frequency of high intensity, life threatening, wildfires (as witnessed in Knysna in 2017 for example)

In 2021/22 - 2022/23, the EIIF project team from DEA&DP worked with the **Keurbooms Ecological Infrastructure Investment Working Group** (KEIIWG) to arrive at two group farm concept plans and two group farm project plans, specifically focused on the control, management and eradication of IAPs on the two group farms. The project also supported the KEIIWG, in terms of coordination of partners to leverage further investment and the development of awareness materials. Key findings from this project included alignment between landscape-level ecological infrastructure priorities and the EIIF which served as a ground-up partial confirmation of prioritisation, and an eagerness from land users to participate in and contribute towards ecological infrastructure investment.

During a similar period, the EIIF team evaluated the job creation potential arising from Ecological Investment in the Holsloot, Keurbooms and Karatara catchments. It focused on augmenting investor confidence by estimating the direct socio-economic return from investments in the three catchments. The purpose of the project was the extrapolation of job creation potential associated with ecological investments in these catchments, an understanding of the capacity of teams operating in these catchments to absorb investment and undertake clearing, and the need for jobs at a community-level within all three catchments. Key findings from this project included the identification of the Keurbooms Catchment as the highest priority catchment in need of ecological infrastructure investment from a socio-economic perspective, and a lack of capacity in recent years of IAP clearing teams on the ground in the three catchments. Valuable insights into the pitfalls of sustaining capacity in terms of IAP clearing teams were also elucidated.

5.3. Alien Vegetation clearing in priority areas

The clearing of IAPs was a priority focus of the 2017-2022 WCSWMP and was supported by the DEA&DP and several other key stakeholders in the Western Cape and nationally. Between 2019 and 2021, **CapeNature** cleared approximately 37 910 hectares of IAPs, in partnership with the **DFFE** Natural Resource Management Programme in the Western Cape. Funding constraints have diminished the areas of land cleared. During the same period, the **DoA** cleared 10 500 hectares of IAPs in agricultural areas. The above-mentioned hectares include initial clearing, and first or second follow-up clearing. **BOCMA** funds alien clearing on private land where agreements are signed between landowners and the water user associations and has done clearing in priority areas in the Breede River Catchment. **SANBI** undertook IAP clearing in the Upper Riviersonderend and Upper Berg River.

5.4. Natural Resource Economic and Benefit Studies

The **DEA&DP** has undertaken several studies on demonstrating the economic significance of sustainable water management. These include studies showing the economic impacts of poor water quality and the associated economic risk posed by failing wastewater treatments, poor sanitation management, an increase in informal settlements (particularly along the Berg and Breede Rivers), the economic impact of the drought on the Berg River Estuary, and the social and economic threats and benefits to several critical wetlands in the Western Cape including the Papenkuils wetland. These studies have been valuable in demonstrating the economic importance of protecting environmental systems and should be used to help motivate for action and additional funding for protection of the resource.

5.5. Water Quality Monitoring and Enforcement

The **DEA&DP** undertake water quality monitoring at several locations within the Western Cape as part of the Berg River Improvement Programme (Figure 40) and the Breede River Monitoring Programme (Figure 41). This data is critical for monitoring the condition of the resource and is used for compliance monitoring and to support studies demonstrating the risk of declining water quality. This monitoring is co-ordinated with other agencies such as **DWS**, **BOCMA**, and **CapeNature**. Water quality data collected by the DEA&DP is currently not publicly available but is made available on request. Improved management and access to water quality data is considered in this update of the 2017-2022 WCSWMP.

Source: DEA&DP

Figure 40: Location of water quality monitoring sites in the Berg River catchment.

Source: DEA&DP

Figure 41: Location of water quality monitoring sites in the Breede River catchment.

5.6. Estuary Management

Most estuaries in the Western Cape are receiving reduced water flows from the catchment. The 2018 National Biodiversity Assessment notes that a third of freshwater no longer reaches the coast (SANBI, 2018). This pressure is anticipated to increase with growing demand for water. The 2018 National Biodiversity Assessment called for determination of ecological water requirements for all estuaries within 5 years and implementation of flow requirements within 2 years of their classification. Furthermore, pollution has increase with 33 % of estuaries countrywide under severe pollution pressure with concomitant impacts on biota and human health. The Estuary Management Framework and Implementation Strategy Project led by the **DEA&DP** has supported the development of 17 new Estuary Management Plans (EMPs) and updated 16 EMPs, over the past few years, totalling 33 estuaries across the Western Cape (DEA&DP, 2021b). However, there are a total of 54 "significant" estuaries in the Western Cape.

The National Estuarine Management Protocol (NEMP) requires that all estuaries are managed according to an EMP and thus there is a need to develop EMPs, or an approach to enabling grouping of similar smaller systems, for the rest of the Western Cape estuaries.

There are several additional organisations and spheres of government that are currently involved with estuary management and that are drafting or have drafted EMPs and/or Mouth Management Plans, including **CapeNature, SANParks, DFFE** and **CoCT**. Table 2 indicates the status of EMPs for all Western Cape estuaries.

Table 2: Status of Estuary Management Plans for Western Cape estuaries (January 2024).

Source: DEA&DP

Estuary Name	Responsible Management Authority	Draft EMP	EMP approved
West Coast District			
Sout (Noord)	DEA&DP	Y	Y
Olifants River	CapeNature	Y	Y
Jakkalsvlei	CapeNature	Y	Y
Wadrift/Langdrift	DEA&DP	Y	Y
Verlorenvlei	CapeNature	Y	Y
Berg river	DFFE	Y	N
Langebaan	SANParks	N	N
City of Cape Town (CoCT)			
Rietvlei/Diep	CoCT	Y	Y
Sout(Wes)	DEA&DP / CoCT	N	N
Disa / Hout Bay	DEA&DP / CoCT	Y	N
Wildevoelvlei	SANParks	N	N
Schuster	SANParks	N	N
Krom	SANParks	N	N
Silvermine	DEA&DP / CoCT	Y	N
Zandvlei	CoCT	Y	N
Zeekoei	CoCT	Y	N
Eerste	DEA&DP / CoCT	Y	N
Lourens	DEA&DP / CoCT	Y	N
Sir Lowry's Pass	CoCT	Y	N
Steenbras	CoCT	N	N
Overberg District			
Bot/Kleinmond	CapeNature	Y	Y
Buffels (Oos)	DEA&DP	Y	N
Klein	CapeNature	Y	Y
Onrus	DEA&DP	Y	N
Palmiet	CapeNature	Y	Y
Rooiels	CapeNature	Y	Y
Uilkraals	CapeNature	Y	Y

Estuary Name	Responsible Management Authority	Draft EMP	EMP approved
Heuningnes	CapeNature	Y	Y
Klipdrifsfontein	CapeNature	Y	Y
Ratel	SANParks	Y	N
Garden Route District			
Duiwenhoks	DEA&DP	Y	N
Goukou	CapeNature	Y	Y
Breede	DEA&DP	Y	Y
Blinde	DEA&DP	Y	Y
Tweekuilen	DEA&DP	N	N
Gericke	DEA&DP	N	N
Groot Brak	DEA&DP	Y	N
Hartenbos	DEA&DP	Y	N
Klein Brak	DEA&DP	Y	N
Gouritz	DEA&DP	Y	N
Gwaing	DEA&DP	Y	N
Kaaimans	DEA&DP	Y	N
Maalgate	DEA&DP	Y	N
Goukamma	CapeNature	Y	Y
Knysna	SANParks	Y	N
Noetsie	SANParks	N	N
Wilderness/Touw	SANParks	N	N
Swartvlei	SANParks	Y	N
Keurbooms	CapeNature	Y	Y
Bloukrans	SANParks	N	N
Groot	SANParks	Y	N
Matjies	DEA&DP	Y	Y
Piesang	DEA&DP	Y	Y
Sout (Oos)	SANParks	Y	N

5.7. Water Resource Quality Objectives

The Water Resource Classes and associated Resource Quality Objectives (RQOs) for the Berg catchment were gazetted on 6 November 2020, in terms of the National Water Act (Act No. 36 of 1998), a correction notice gazetted on 4 December 2020. The RQOs for the Olifants-Doorn were Gazetted on 22 April 2016 (GG No 39943) Similarly, the Water Resource Classes and associated RQOs for the Breede-Gouritz Water Management Area were gazetted on 26 August 2022. **BOCMA** and **DWS** are working towards including RQO monitoring in the water quality monitoring that they both conduct. The monitoring programmes that are conducted within DWS (e.g. surface water flow, river eco-status monitoring, surface and ground water quality monitoring, national microbial monitoring) will include the RQO sites. These monitoring programmes are broader than the RQO sites but due to resource constraints, RQO points will be prioritised. During 2021/22, DWS and BGCMA monitored all the RQO river sites that were prioritised. Five of the six river health indices under the River Eco-Status Monitoring Programme were monitored, namely macro-invertebrates, water quality, vegetation, geomorphology, and habitat integrity. The fish index was not monitored. **DEA&DP** was a key stakeholder involved in the development of the water resource classes and RQOs.

5.8. Water Sensitive Design and Water Sensitive Cities in the Western Cape

The **DEA&DP** in partnership with the **CoCT** undertook as study to benchmark the CoCT as a Water Sensitive City and develop guidelines for supporting the transition to water sensitive settlements for the Western Cape. The benchmarking study was based on the WSC Index developed by the Commonwealth Research Centre for Water Sensitive Cities in Melbourne Australia, but as adapted for application in Africa Cities (see Section 3.7).

A critical aspect of the application of the WSC to Cape Town, is the recognition of the different challenges faced in formal and informal areas of the city that influence not only the current state, but also the potential interventions to improved overall water sensitivity design. Therefore, the main adaptations included the separation of benchmarking formal and informal areas of the city (Figure 42) as well as developing notes on incorporating indigenous knowledge into decision making and recommending a change in one of the stages of development from a water ways city to a water conscious city. The study also considered the necessary requirements for supporting the transition to a WSC based on the Transition Dynamics Framework and identified several interventions that should be applied in the CoCT to support the transition to a more water sensitive city. Several of these have been incorporated into the updated Water Strategy for the CoCT and are being implemented.

Source: Zutari (2021)

Figure 42: Average goal ratings for informal and formal areas in the CoCT, part of the WSC Index benchmarking study.

5.9. Water Hub

The Water Hub, located near Franschhoek, was established in 2013 as a living laboratory to explore ways to help solve some of the most pressing and urgent issues facing society in South Africa. These include the safe, effective, and low-cost options for using nature-based solutions (Nbs) to treat polluted effluent from urban areas, in particular from informal settlements.

The aim of the Water Hub is to show how nature-based solutions can be used to address increasing water quality risks in a practical, resilient, equitable, sustainable, and cost-effective manner (Figure 43). Lessons learned here are applicable in a wide range of settings throughout the rest of Southern Africa and the world, potentially making the Western Cape a world-leader in the development of this kind of innovative technology and solutions to water security and sustainability challenges across the world. Polluted effluent discharge is severely impacting our already constrained water resources, damaging agricultural export opportunities (and hence negatively impacting economic development and employment opportunities) and impacting the dignity and health of affected residents. These innovations and solutions are being trialled at the Water Hub using largely existing infrastructure and supported by academic staff to provide real-world, workable and demonstrable solutions to the food-energy-water nexus and polluted urban runoff crisis faced by this and other countries.

Source: Future Water Institute, University of Cape Town

Figure 43: Large scale bio-filtration cells at the Water Hub, Franschhoek are part of on-going research on using nature-based solutions to clean polluted water.

The Water Hub is located close to a residential area where 64% of the population live in informal housing. A key component of the research being conducted is how to better collaborate with vulnerable communities, such as residents living in Langrug and other informal settlements in Franschhoek. According to the Stellenbosch Municipality, about 1,800 households in the area shared 150 toilets in 2018. River restoration initiatives are ongoing in the Stiebeuels River where employment of local communities is encouraged Figure 44. Lastly, the Cool Shack Project at the Water Hub focuses on the improvement of housing for vulnerable communities by lowering the temperature in housing structures.

Source: Trevor Bohatch, GroundUp (2017)

Figure 44: The Stiebeuels River has high levels of water pollution (left) and drains the Langrug Informal settlement in Franschhoek (right). The Water Hub aims to demonstrate how natural water systems can clean storm water runoff.

Ongoing research at the Water Hub is managed by the Future Water Institute of the **University of Cape Town** with support also expressed by **Stellenbosch University**, the **University of the Western Cape** and the **Cape Peninsula University of Technology**. The **DEA&DP** has an interest in supporting the development of the Water Hub as it aligns very strongly not only with the mandate for improved water security and resilience but is also directly linked to reducing risks for human health and protecting the local economy through reducing water quality risks.

5.10. WCSWMP Steering Committee

The WCSWMP Steering Committee consists of representatives from **DEA&DP, DLG, DoA, DoTP, DoI** and **PT**, as well as the national **DWS** and **DFFE** in the Western Cape. Other steering committee members include **BOCMA, GreenCape, CapeNature, WRC** and **SALGA**. The steering committee meets on a quarterly basis and reports on progress made on the priority focus areas of the 2017-2022 WCSWMP. This forum is a useful form of collaborative governance and is helpful in recording progress and to promote co-ordination between the different agencies responsible for implementing the goals of the 2017-2022 WCSWMP and its sub-programmes (such as the EIIF Implementation and Monitoring Plan). The minutes from the WCSWMP steering committee are then reported up to the Water Resilience Planning Committee.

5.11. Forums/Collectives relevant to sustainable water management

Several community-based water resilience and sustainability collectives have been established in the Western Cape Province to address the need for co-ordination and collective action in addressing increasing water security risks and challenges. These included, amongst others the **Boland & Groot Winterhoek SWSA Collective** (shown in Figure 45), the **Outeniqua to Tsitsikamma Water Working Group**, facilitated by the **Garden Route Biosphere Reserve** and the **Grootvadersbosch Conservancy**. The five biosphere reserves (Cape West Coast, Kogelberg, Cape Winelands, Garden Route and Gouritz Cluster) also serve to varying extents as community based collectives that implement ecological infrastructure investment.

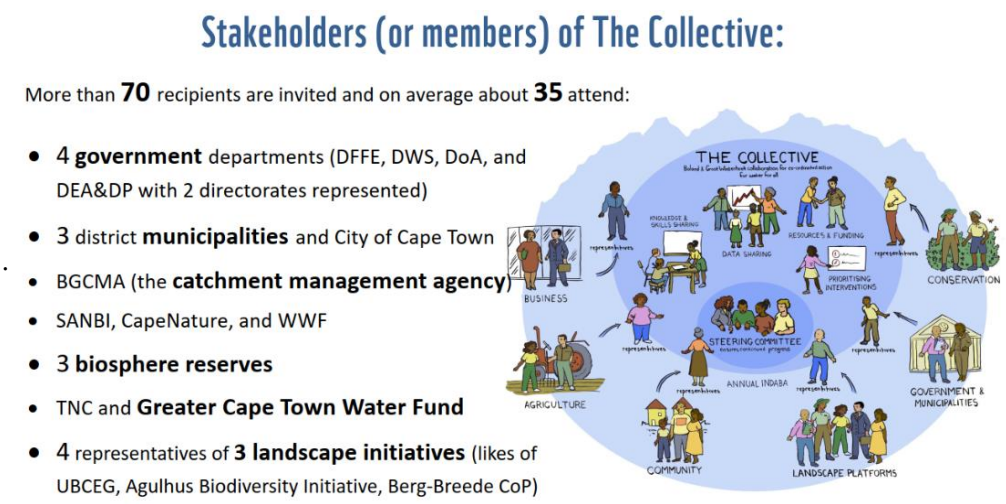


Figure 45: Summary of the stakeholders/members of the Boland & Groot Winterhoek Collective.

While local and community organisations prove to be effective in enabling women to participate in decision making (see **Case Studies 1, 2 and 5**), regional stakeholder platforms such as **Upper Breede Collaborative Extension Group** and the **Fresh Water Forum** remain platforms of greater influence. It is therefore important for regional multistakeholder platforms to consider limiting participation barriers faced by community organisations. Community-centred organisations are interested to benefit from the support of government and other stakeholders through capacity building, access to information, skills development, and access to resources. Should local community groups from vulnerable areas be engaged in regional decision-making forums, facilitation skills through intermediaries are required to enable inclusive participation.

In addition to these, there are several other forums, committees, collective, steering committees, platforms etc. that contribute to sustainable water management in the Province. A summary of these have been included in Table 3, and the various role players in Table 4.

Table 3: Forums, committees, and collectives for sustainable water management in the Western Cape.

Collectives and collaboratives	**Boland Groot-Winterhoek Collective:** Aimed at protecting the Boland Groot-Winterhoek Strategic Water Source Areas.
	Table Mountain Water Source Partnership: Aimed at protecting the Table Mountain Strategic Water-source Area.
	Upper Breede Collaborative Extension Group: Focused on coordinating and sharing resources and lessons around alien clearing in the upper Breede catchment.
	Breede-Zonderend Catchment Collaborative: Focused on coordinating and sharing resources and lessons around alien clearing in the lower Breede catchment.
	Upper Berg River Environmental Network: Focused on coordinating and sharing resources and lessons around alien clearing in the upper Breede catchment.
	Ecological Infrastructure for Water Security (EI4WS) project: Focused on integrating ecological infrastructure into planning, finance and development in the water sector to improve water security, with application demonstrated in two water catchments.
Provincial steering committees and task teams	**EIIF Steering Committee:** Oversight for the implementation of the EIIF
	BRIP Steering Committee: Oversight for the implementation of Berg River Improvement Programme
	WCSWMP Steering Committee: Oversight for the implementation of the Sustainable Water Management Plan and other activities
	OneHealth Steering Committee: Coordinate an integrated multi-disciplinary approach to optimize a healthy balance between humans, animals and ecosystems.
	Smart Agri Steering Committee: The SC is tasked with keeping track of SmartAgri, its implementation and actions, to ensure that momentum in reaching its objectives is maintained.
	Water Response Operational or Water Resilience Committee: Was created as a committee to monitor the implementation of the Water Resilience Plan, which is a key action of the provincial Water risk. It also aims to provide inputs into the transversal reporting structures, including the G4J strategy, provincial water risk, etc.
	Western Cape Drought Task Team: To assess the province's drought preparedness and seasonal outlook

	Integrated Regional Water Monitoring Committee: To coordinate water monitoring in the province, standardise data collection and analysis methods and develop platforms to share data.
Western Cape Water Supply System	**WCWSS Steering Committee:** The WCWSS Strategy Steering Committee replaced the original Study Steering Committee on completion of the strategy in 2007. The Committee is chaired by national DWS and oversees water supply planning for the area served by the WCWSS.
	Water Users Platform for the WCWSS: Currently being established by the Economic Development Partnership (EDP). This came as a recommendation from the Hydro-economic Study to strengthen stakeholder engagement. It is intended to be an informal accountable space where water users can discuss areas of concern and possible actions. CoCT is the funder, so the focus is on water resources for the city and water quality is not a priority.
	Municipal Infrastructure Forum: Quarterly forum platform formed to review, discuss and document barriers, opportunities and challenges related to infrastructure procurement and implementation. Discussions include nature-based infrastructure, wastewater infrastructure etc.
Estuary specific forums	**Western Cape Estuaries Task Team:** The relevant Responsible Management Authorities lead the EAFs/PAACs (in some instances chairs/vice-chairs are local stakeholders).
	Estuary Advisory Forums (PAACs as well): Active across the province; Olifants, Verlorenvlei, Berg, Diep, Zandvlei, Bot, Klein, Onrus, Uilkraals, Heuningnes, Breede, Goukou, Gouritz, Hartenbos, Klein Brak, Groot Brak, Touw/Swartvlei, Knysna, Goukamma, Keurbooms/Piesang. EAFs include all relevant government departments and community representatives.
	National WG7 Estuaries task team: Led by DFFE, the working group discusses all national policy matters related to integrated environmental management e.g. amendment of NEMA, EIA regulations, environmental instrument regulations.
Municipal forums	**Municipal Infrastructure Forum:** Quarterly forum platform formed to review, discuss and document barriers, opportunities and challenges related to infrastructure procurement and implementation. Discussions include nature-based infrastructure, wastewater infrastructure etc.
Communities of Practice	**Agri Sector Unity Forum:** (ASUF), an inclusive, voluntary association of representative agricultural associations, was established to primarily develop consensus policy positions on strategic issues in agriculture,

	as well as to advocate consensus positions to national government, regional institutions, and with the international community.
	Pathways to water resilient South African cities: The Pathways to water resilient South African Cities project is a collaboration between the Future Water Institute at the University of Cape Town and the University of Copenhagen, funded through DANIDA.
Civil Society	**Western Cape Water Caucus:** Led by EMG, a network of organisations and civil society advocating for equitable and just use, provision and protection of water sources.

Table 4: Public and private sector involvement in the various forums. Blue denotes a member, red denotes the lead.

	DEA&DP	DLG	DoHW	DoI	DoA	DEDAT	DoTP	EDP	CoCT	DWS	DFFE	BOCMA	SANBI	CapeNature	SANParks	GreenCape	WWF	TNC	SALGA	WRC	DBSA	Universities	SAEON	Municipalities	Communities	Irrigation boards	NGOs	Industries	Biosphere Reserves
Agri Sector Forum																													
Boland Groot-Winterhoek Collective																													
Breede-Zonderend Catchment Collaborative																													
EIIF Steering Committee																													
Estuary Advisory Forums																													
Municipal Infrastructure Forum																													
National WG7 Estuaries task team																													
OneHealth Steering Committee																													
Pathways to water resilient South African cities Community of Practice (PaWS)																													
SANBI project Steering Committee (EI4WS)																													
Smart Agri Steering Committee																													
Table Mountain Water Source Partnership																													
Upper Berg River Environmental Network																													
Upper Breede Collaborative Extension Group																													
Integrated Regional Water Monitoring Committee																													
Water Response Operational Committee																													
Water Users Platform for the WCWSS																													

	DEA&DP	DLG	DoHW	DoI	DoA	DEDAT	DoTP	EDP	CoCT	DWS	DFFE	BOCMA	SANBI	CapeNature	SANParks	GreenCape	WWF	TNC	SALGA	WRC	DBSA	Universities	SAEON	Municipalities	Communities	Irrigation boards	NGOs	Industries	Biosphere Reserves
WCSWMP Steercom																													
WCWSS Steering Committee																													
WC Drought Task Team																													
WC Estuaries Task Team																													
WC Water Caucus																													

6. Policy alignment and strategic overview of the 2024-2029 Western Cape Sustainable Water Protection Plan

6.1. Provincial Roles and Responsibilities

Several provincial departments have developed plans and strategies that support water resilience initiatives aligned with the principles of the 2017-2022 WCSWMP, as outlined in Figure 35 and Section 4.2. A review of these strategies through the lens of the updating of the WCSWMP was done and the full review is included in a separate report.

An important consideration for the updated WCSWMP is to distinguish the DEA&DP's legislative mandate that defines the specific actions the department should prioritise and promote in terms of achieving the overall objective. This may differ to the specific actions that other national, provincial, and local government agencies should take to achieve these objectives. For the latter, the role of the DEA&DP is to identify and make recommendations on potential actions as part of the recommendations of the WCSWMP rather than specific actions to be undertaken by the DEA&DP and incorporated into the annual budgets and business plan. In this regard it is particularly important that the updated WCSWMP aligns with the new Western Cape Provincial strategy including the objectives of the Growth for Jobs (G4J) Strategy.

> *"Our (DEA&DP's) mandate is to enable a resilient, sustainable, quality and inclusive living environment for all. We're committed to improving urban and rural areas through enhanced management of land, an enhanced climate change plan, and better living conditions for all.*
>
> *Our departments include* ***Environmental Governance, Policy Coordination & Enforcement, Environmental Quality, Environmental Sustainability*** *and* ***Development Planning****".*
>
> DEA&DP Provincial Website

Another important element that has been considered in updating the WCSWMP is the **Provincial Water Resilience Committee** that was established in early 2023, following the publication of the 15-year WCIDWRP. The DLG Directorate Municipal Performance Monitoring and Support has been delegated the responsibility of managing the Water Resilience Committee. The DEA&DP, DLG, DoTP, DEDAT and DoI are represented on the committee, with each department playing a strategic role in achieving water resilience. The members of Water Resilience Committee are show in Figure 46.

6.2. Updated Strategic Focus Areas for the 2024-2029 WCSWPP

Given the need to align the updated WCSWMP with DEA&DP's core mandate, it was agreed that the updated WCSWMP's focus should shift from **water management** to **water protection**. As such, the updated plan has been rebranded as the **Western Cape Sustainable Water Protection Plan (WCSWPP) (2024 – 2029).**

OVERALL OBJECTIVE OF THE 2024 - 2029 WESTERN CAPE SUSTAINABLE WATER PROTECTION PLAN

To support healthy catchments and ecosystem services by investing in and collaborating on Ecological Infrastructure, for the overall benefit of water management and quality in the Province.

Many of the interventions in the 2017-2022 WCSWMP were absorbed into the WCIDWRP, but there are several gaps in the WCIDWRP and other provincial plans that should be addressed in the updated 2024-2029 WCSWPP.

- The WCIDWRP largely deals with municipal water security and supply issues, but a comprehensive approach to water resilience extends beyond these confines. The WCIDWRP highlights the need for both municipal and **catchment level planning**. For example, the removal of IAPs will improve water security for local municipalities, but multiple municipalities may share the same catchment and the IAPs could be locaed on private or state owned land. It is therefore an unlikely intervention to be implemented on a municipal level. Many stakeholders will benefit from IAP clearing and such an intervention would be better coordinated at a catchment level. DEA&DP and partners have a critical co-ordination role to play regarding catchment management interventions.
- The WCIDWRP does not specifically address **water quality and pollution** concerns. In the context of sustainable water protection, interventions for improved water quality are equally important to those for improved water security. This is a key mandate for the DEA&DP. Population growth and urban and agriculture expansion will necessitate the need for adequate water quality management.
- Some **Water Sensitive Design (WSD)** principles such as stormwater and rainwater harvesting were included at a settlement level in the 15-year WCIDWRP, but not holistically across the province. However, WSD principles and the necessary policy reforms still need to be integrated into provincial planning. The legal mandate of DEA&DP includes the Spatial Planning and Land Use Management Act. They therefore have a critical role to play in integrating the principles of WSD into Urban Development Planning requirements (EIA, Urban, land-use planning) and promoting the uptake of these with local municipalities.

The four strategic goals and 16 strategic objectives of the 2017-2022 WCSWMP provided a wholistic framework for achieving sustainable water management in the province. However, other provincial departments are responsible for their own components of water resilience (Figure 46). By leveraging the existing structures of the provincial water resilience committee and their associated mandates, the DEA&DP (and by extension the WCSWPP) should focus its attention on interventions that improve **environmental water resilience on a catchment scale**. This will ultimately increase resilience across all other sectors and enable the DEA&DP to focus constrained budgets on areas of maximum impact that align with their core mandate.

It will also address the gaps in the 15-year WCIDWRP (which focuses on **water quantity** and **municipal water resilience**) and the SmartAgri plan (which focuses on **agricultural water resilience**). Based on the review of existing plans, the updated WCSWPP framework prioritises **three (3) Strategic Focus Areas** and **six (6) Strategic Enablers** (Figure 46). Under the Strategic

Focus Areas **twelve (12) Strategic Objectives** have been identified and described in Section 9 with potential activities and proposed indicators for monitoring implementation objectives.

These **Strategic Focus Areas, Strategic Enablers, Strategic Objectives** and **Priority Actions** are presented in Sections 8 and 9 respectively. All activities under the plan will be approached through a Gender, Equity and Social Inclusion (GESI) lens, as discussed in Section 7.

The updated WCSWPP will remain a transversal plan, but the activities will be more focused on DEA&DP's mandate for environmental water resilience.

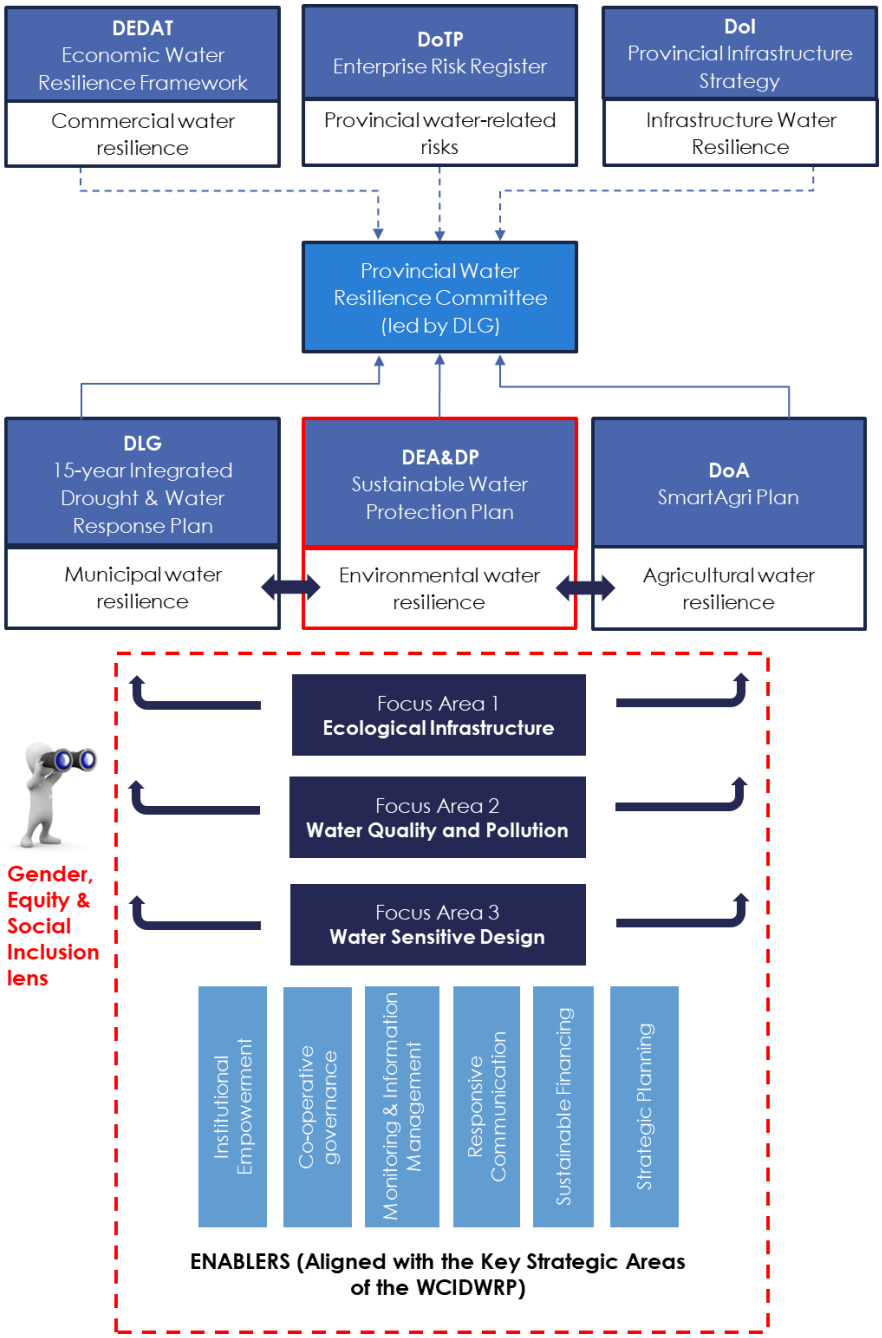


Figure 46: Provincial departments reporting to the Provincial Water Resilience Committee and the updated Strategic Focus Areas and cross-cutting enablers of the 2024-2029 WCSWPP.

7. Gender, Equity and Social Inclusion

To realise the Western Cape's Strategic Plan of achieving 'A safe Western Cape where everyone prospers', the Western Cape Government developed a **Human Rights Policy Framework** which gives effect to the WCG's commitments to ensure that human rights barriers are removed, particularly those experienced by the following priority groups: woman, children, people with disabilities, foreign nationals, older persons and the Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex and many other terms (LGBTQI+) community (DEA&DP, 2022a). In line with this provincial level objective, the DEA&DP plans to increase incorporation of GESI principles into policy and planning at the local and provincial level, as per their **Gender and Human Rights Gap analysis** which also informed this update of the WCSWPP.

It is commonly recognised in gender literature that "intersectionality" - which refers to how groups may be disadvantaged by multiple cumulative factors - plays a role. This therefore means that sex and gender identity, disability, location, age, culture, religion, race, socio-economic status and type of employment all play key cumulative roles in how access and opportunity is distributed even within vulnerable groups. For this reason, the FAO definition of **vulnerable groups**, described below, has been used for the purpose of the 2024-2029 WCSWPP.

FAO Definition of Vulnerable Groups

"The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards".

The WCSWPP embeds a **GESI lens** for identifying priority activities and evaluating the key strategic objectives in addressing key GESI pillars. The aim is to ensure that the plan follows a GESI sensitive approach that does not directly or indirectly discriminate against any people of the Western Cape Province. The GESI-responsive approach intentionally seeks to engage with and respond to gender and social inequities by promoting equitable benefits, challenging unequal power relations and harmful gender norms, and empowering women, youth, and other marginalised groups to participate in sustainable water management implementation and decision-making. In the absence of a GESI approach, the WCSWPP might unintentionally discriminate base on gender, sexual orientation, settlement classification, race, age, cultural beliefs, religion, and language. The GESI approach is a multifaceted process of change that identifies and addresses the root causes of inequality and exclusion. It aims to:

- promote equitable and inclusive access, decision-making, and participation for all,
- transform systems, social norms, and relations to enable equitable benefits,
- build individual and collective agency, resilience, and action, and
- promote the empowerment and well-being of people experiencing vulnerability.

In the context of the WCSWPP, gender does not mean women. The concept of gender refers to social construct which may or may not depend upon biological traits, attributes and opportunities associated with expressing as male and female and the relationships between and among them in conjunction with other characteristics such as age, race, class, and/or other expressions of identity. **Gender equity** means being fair to all genders.

To ensure fairness, measures are often needed to compensate for historical and social disadvantages that prevent women and men from otherwise operating as equals. Equity leads to equality. Gender equality, therefore, is the equal valuing by society of both the similarities and the differences between women and men, and the varying roles they play.

Another important component of a GESI framework is **social inclusion** which is a process for creating conditions that enable full and active participation of every member of the society.

The GESI approach provides opportunities for addressing existing barriers to gender and social equality for sustainable water management and protection. Existing barriers include the prevalence of **social and gender norms** that restrict women's access to resources and participation in water management activities; **exclusion of women and other marginalised groups** from decision-making and implementation; **gaps in policies** and **under-representation** of women and other marginalised groups in local governance mechanisms. In the broader sense, under-represented and marginalised groups include women, children, youth (especially the unemployed), residents of informal settlements, farm workers, etc.

In addressing these barriers, the WCSWPP is guided by **five strategic GESI pillars** to ensure that women, children, and other marginalised groups meaningfully engage in and benefit from sustainable water management decision-making and implementation. These strategic pillars are described below with additional details under each strategic focus area in Section 9.

7.1. Pillar 1: Access to water, sanitation and ecosystem services

Adequate and acceptable provision of water and sanitation services.

South Africa's historical inequalities have resulted in unequal access to water, sanitation, and the use of natural environments to benefit from ecosystem services. The most vulnerable and marginalised communities and groups, mainly women, children, farm workers and informal settlement residents, tend to have limited access to water and sanitation services. At the same time, the most marginalised communities depend more on natural resources to sustain their livelihoods, increasing their vulnerability to deteriorating ecosystems (DEA&DP, 2022a). In addition, the benefits and burdens of natural resources management are unequally distributed between the vulnerable and privileged, with the latter benefitting the most while experiencing minimal burdens (DEA&DP, 2022a).

Multiple studies show that access to water and natural resources disproportionately affects women and girls as they are primarily responsible for water acquisition and water-related tasks (Kayser, et al., 2021). Walking long distances to access water further exposes women and children to multiple vulnerabilities, such as sexual harassment, limited time at work, robberies, mental stress, and missing school (Harris, et al., 2021). In the case of rural areas of South Africa, young girls fetching water from isolated water sources face threats of abduction for child marriage and rape (Meyiwa, et al., 2014). In urban areas, particularly informal settlements, similar vulnerabilities are experienced. Gender-based violence studies also show that women and girls face partner and parent violence; a consequence of their inability to perform household responsibilities due to water access related dynamics (Tallman, et al., 2022). These

gender-based acts of violence are worsened by competition over increasingly scarce and degraded resources.

The WCSWPP aims to strengthen opportunities for enhanced water and ecosystems access to vulnerable communities while addressing key concerns such as safety, which particularly effects women and children.

7.2. Pillar 2: Hygiene and well-being

Water and sanitation interventions that enable a healthy environment for women, children, disabled people and other vulnerable groups. Enable use of water and nature for recreational, well-being, and cultural purposes.

Water, sanitation, and environmental factors have an impact on the well-being of vulnerable communities. Globally, vulnerable communities with limited access to water and sanitation have reported loss of dignity and low self-esteem, affecting their overall well-being.

Health hazards stem from poor water, waste, and sanitation services. In South Africa, informal settlement dwellers make up 8.1% of the 62 million population (StatsSA, 2023). In the western Cape (excluding the CoCT), over 40% of the informal settlements had been in existence for over 15 years by 2016 (WCG, 2016) indicating that informal settlements are becoming a permanent feature of the South African dwelling system.

Due to resource and infrastructure limitations, informal settlement dwellers tend to have limited access to adequate water and sanitation services. In addition, informal dwellers face increased vulnerabilities to flooding, crime, pollution incidents, and fires (WCG, 2016). These affect opportunities for recreational activities and well-being.

Most of the informal settlements in Cape Town (including Khayelitsha, Phillippi, Strand, Klipfontein, Gugulethu, and Mfuleni) are built in low-lying areas which become flooded during the rainy seasons causing home destructions and loss of lives (Figure 47). In addition, residents in informal settlements are exposed to greater health risks (Weimann & Oni, 2019). A similar pattern is seen other settlements in the Western Cape.

The WCSWPP aims to promote and strengthen sustainable management practices that enhances the health, hygiene, and well-being of vulnerable communities (see **Case Study 1**).

Source: Brenton Geach, Daily Maverick (2023)

Figure 47: Impacts of flooding in an informal settlement in Citrusdal, Cederberg Municipality.

CASE STUDY 1: ENGAGING LOCAL COMMUNITIES FOR IMPROVED HYGIENE AND WELL-BEING

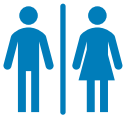
Water Hustlers located in Enkanini informal settlement, Stellenbosch Municipality, focus on the immediate concerns of the community members impacted by water, waste, sanitation, and safety challenges. Water Hustlers' work includes ecological protection and water conservation. Partnering with the Stellenbosch River Collaboration, the organisation has been working with community members in river rehabilitation and catchment restoration initiatives. While sections of the informal settlement have access to water and sanitation services, the newer sections are without basic services (Figure 48). As a result, women and children often walk longer distances to fetch water from the serviced side of the informal settlements. Due to the high crime rate in Enkanini, women and children fetching water are exposed to greater crime risks. Similarly, to access sanitation services, women and children walk longer distances to relieve themselves. Men on the other hand tend to use open fields which are closer to the recently established section of the informal settlement. While the Water Hustlers was established to address pollution and waste challenges, they have had to evolve their agenda and work with community members to ensure the safety of women and children. By doing so, the participation of women is greater as well as the role that women volunteers play in decision-making.

Negative perceptions of government institutions do affect the desire for local and grassroots groups to engage meaningfully on water resources and natural systems. In Enkanini, community members still vividly remember the water restrictions by the local municipality when communal taps were disconnected for limited hours during the 2015-2017 drought period. This affected the livelihoods and safety of women that work during the day and often fetch water after work. Most of the small businesses, such as salons and cafeterias run by women were also severely affected. The community was of the view that a collaborative approach with the residents could have been developed and the municipality could have designed a water management programme that still enabled residents to sustain their livelihoods. Despite some negative attitudes around the role of government, local and grassroots organisations remain open to collaborate, receive support from the government, and exchange knowledge on similar initiatives.

Source: Alex Duval Smith, The Guardian (2012)

Figure 48: Enkanini is a collection of about 2,000 shacks on a hill next to Plankenbrug industrial estate, in the town of Stellenbosch.

7.3. Pillar 3: Challenging norms



Promoting positive social and gender norms that advance the rights of women and other under-represented groups.

Globally, socially constructed gender norms are recognised as a key barrier to women's advancement and participation in the economy. Poverty associated with women's domestic and care work, combined with harmful gender norms that limit women's voice, agency, mobility and earning potential, often sideline women from engaging in paid, productive work as well local leadership and community governance structures. Even when women's earnings are present within the household, evidence suggests that women's control over household spending and saving patterns are limited and that the risk of gender-based violence increases if women are perceived (real or not) to earn more than their male counterparts.

South Africa has one of the highest levels of gender-based violence, with StatsSA revealing that in a period of 3 months in 2023 the country recorded 10,561 rapes, 1,514 cases of attempted murder, and 12,401 assaults towards women (StatsSA, 2023). The province of the Western Cape faces additional challenge such as gang violence. In the Western Cape alone, 7,310 sexual offences were reported in the 2022/2023 financial year (WCG, 2023c). Gender and human rights analyses on the Western Cape Province indicate that increasing scarcity of natural resources and economic hardship is linked to escalating violence in communities, particularly gender-based violence (DEA&DP, 2022a). Townships and informal settlements generally have higher crime rates, particularly murder, sexual violence, robberies, and theft (WCG, 2016).

The WCSWPP focuses on enhancing the protection and promotion of the human rights of women, and other under-represented groups by challenging harmful and discriminatory social beliefs, norms, and practices that currently restrict women's access to resources and meaningful participation in water management activities.

7.4. Pillar 4: Creating opportunities

Enabling the engagement of women and other under-represented groups in sustainable water management implementation and decision-making.

As a result of prevalent norms, women, youth, and other under-represented groups often lack access to key resources that would enable their participation in water management activities. Traditional gender norms status translate to women's and marginalised group's limited access to land, information, finances, and other resources, leaving them at higher risk of the impacts of climate change. Barriers to mobility, lack of confidence, and burden of responsibilities, can also prevent women and other under-represented groups from pursuing economic opportunities and occupying spaces they are often excluded from.

Azad & Pritchard (2023) argue that the inclusion of women in natural resource management and resilience planning confronts standard gender norms and benefits from women's bonding and social capital as principal adaptive characteristic for building resilience. Decision-making and governance structures remain significant contributors to the marginalisation of women

and other vulnerable groups in the management, governance, and use of water resources and ecological infrastructure (Sinyolo, et al., 2018).

As such, this pillar focuses on supporting women's leadership and increasing their participation in decision making and governance, specifically water management planning, implementation and monitoring. This will be achieved by reducing barriers to their participation, while simultaneously building the capacity and agency of women's organisations and other under-represented groups to claim their rightful seat at the decision-making table when it comes to gaining economic, social, and environmental benefits from water programming (see **Case Study 2**).

In reducing barriers to women's participation in planning, implementation and monitoring, the WCSWPP will take measures to ensure women's equitable involvement and participation – from the individual level, such as ensuring events are hosted at appropriate times of day, to the organisational level, such as providing opportunities to women's and marginalised organisations to be engaged.

CASE STUDY 2: GENDER MAINSTREAMING IN NATURE-BASED SOLUTIONS

The TNC team working in the Western Cape has been championing women-led ecological restoration programmes (Figure 49). Their service providers are encouraged and incentivised to employ women across different workstreams. The implementation of programmes in designed in a manner that allows women to participate. For example, some programmes require teams working in high altitude areas to camp overnight. For these programmes, the implementation is structured in a way that the team spend two weeks camping and the third week with their families. Over the years, TNC has observed a growing number of women working in IAP removal to such an extent that some of their service providers have greater numbers of female workers, including female managers. This alternative approach to ecological restoration has shown that women can benefit through employment opportunities, technical training and business and leadership skills development therefore becoming empowered citizens.

Source: Amanda Gcanga

Figure 49: The number of women involved in IAP clearing is growing through the GCTWF.

7.5. Pillar 5: Building bridges

Strengthening the capacity of women's organisations and other under-represented groups to meaningfully engage and participate in local water management governance processes and strengthening the capacity of local government to practice more gender-responsive decision-making.

Water management initiatives are often misunderstood as inherently equitable with the expectation that trickle-down effects will equally benefit everyone. However, when water management policies and programming do not explicitly include the needs and interests of women and other under-represented groups, they often fail to address their unique needs or benefit them equitably. In the Western Cape Province, there exists a gap in the extent to which GESI principles are integrated and applied in decision making. Furthermore, groups advocating for the rights of women and other under-represented groups are often excluded from formal water management governance mechanisms.

Studies suggest that women are eager and willing to engage and participate in decision-making platforms. Jooste & Mathibela (2020) reported that female residents in South African informal settlements are significantly more likely to participate in issues that are close to their heart, such as water, sanitation, pollution and safety.

Challenges around travel costs, language, cultural differences within the community of practice, and time for travel to regional stakeholder engagements tend to limit the participation of community organisations. In regional multi-stakeholder forums, there is also a risk that the discussions might be too technical and less meaningful for local community groups. Without adequate facilitation processes, the nature of regional multi-stakeholder groups tends to be less effective for community and grassroots organisations that represent vulnerable communities.

To address these constraints, this pillar focuses on bridging capacity gaps and ensuring that water governance mechanisms integrate a strong GESI lens. In one direction, the WCSWPP supports building the capacity of women's and marginalised organisations, networks and movements, to engage and participate in water management action in the province from a position of knowledge and power. In the other direction, the WCSWPP builds capacity of local government and other decision-makers to design and implement more GESI-responsive policies, programmes and plans. By strengthening awareness, knowledge, and understanding of GESI-responsive water management, the WCSWPP equips women and under-represented groups with the skills and know-how to feel confident in demanding their rightful seat at the decision-making table, engaging and advocating from a position of knowledge and power.

8. Strategic Enablers

The six Strategic Enablers are the building blocks of the WCSPP. They represent the strategic elements that underlie the effective implementation of the Plan, and its ability to provide meaningful impact across the three Strategic Focus Areas. Their cross-cutting nature also highlights the need for inter-disciplinary collaboration and the importance of building adaptive capacity. The six Strategic Enabler of the WCSWPP are aligned with the Key Strategic Areas of the WCIDWRP, supporting the continued alignment and integration of the two plans.

Most actions and activities in the WCSWPP are built on several of the Strategic Enablers.

An overview of the six **Strategic Enablers** is presented below.

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1. Institutional Empowerment

Goal 16 of the SDGs emphasises the importance of promoting peaceful and inclusive societies, providing access to justice for all, and building effective, accountable, and inclusive institutions at all levels. Strong institutions can help prevent conflicts related to natural resources, promote the rule of law, ensure equal access to justice, and develop effective, accountable, and transparent institutions at all levels.

Strong institutions are the building blocks of a successful water and environmental management programme. Therefore, empowering government and other institutions is of paramount importance. In the Western Cape context, specific focus must be given to capacity building in local government. Human and financial resource constraints in local government limits their abilities to implement actions on the ground, and many actions under the WCSWPP require the involvement of Local Municipalities.

DEA&DP's focus for Institutional Empowerment:

Support for local municipalities with integrating the principles of ecological infrastructure, pollution management and water sensitive design into municipal planning.

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2. Co-operative Governance

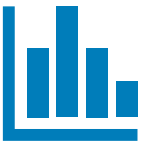
The NWRS in South Africa emphasises the importance of cooperative governance in water resource management. Cooperative governance is seen as essential for IWRM and is aimed at bringing together diverse stakeholders to cooperatively produce knowledge and solutions, promote social learning, and build enduring institutional capacity. The NWRS recognises the need for cooperative governance to ensure the effective and sustainable management of water resources, a process that involves multiple stakeholders with different perspectives, capacities, and goals. The focus of cooperative governance in the NWRS is on accountability, democracy, communication, and education, which are all crucial for the successful and sustainable management of water resources (DWS, 2023).

Similarly, the successful implementation of the WCSWPP, WCIDWRP and other water resilience plans relies on strong co-operation between the various departments and role-players. The DEA&DP has a responsibility to co-ordinate planning across the Province and support other spheres of government so that they too can effectively perform their mandates.

DEA&DP's focus for Co-operative Governance:

Drive the co-ordination of provincial activities related to environmental water quality and ecological infrastructure, in partnership with other relevant institutions.

3. Monitoring and information management



Monitoring and information management is core to the success of any plan or project. For activities under the WCSWPP, regular monitoring is needed to assess their effectiveness and adapt the approach if necessary. A monitoring and evaluation framework can assist with this. In addition to collating data. Monitoring data will be ineffective without proper information management systems, which allow the DEA&DP and other organisations manage, preserve, store, and deliver information effectively. Overall, it will help the DEA&DP and other organisations make better decisions, achieve their goals, and enhance their efficiency. It is crucial that appropriate budgets are set for monitoring and information management from the early stages of a project.

DEA&DPs focus for Monitoring and Information Management:

Improved monitoring and information management across all Focus Area.

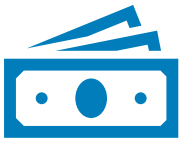
4. Responsive Communication

Responsive communication is needed for the implementation of the WCSWPP, as a mechanism for aligning roles and responsibilities. Within government institutions, effective communication will help align initiatives and instil a mechanism of learning, where all partners can adapt and learn from failures and successes. Responsive communication within the Western Cape Government is imperative, as multiple different departments are involved with sustainable water management. Likewise, responsive communication with the public is also necessary. This will allow citizens and communities to make responsible decisions about water management. Many interventions in the WCSWPP rely on community participation, and communication will be essential for fostering trust, respect, and understanding, leading to active involvement in these interventions. Two-way communication will allow implementing agencies to incorporate indigenous and local knowledge for maximum impact. This is particularly important for NbS, where effective communication helps raise awareness about the benefits of NbS, promotes knowledge sharing and conflict resolution, and ensures that NbS initiatives are equitable and responsive to the needs of diverse communities and marginalised groups.

DEA&DPs focus for Responsive Communication:

Communication and advocacy for ecological infrastructure, water quality and sustainable design, particularly DEA&DPs flagship programmes.

5. Sustainable Financing



A limiting factor for many interventions promoting sustainable water management and protection is financing. This is particularly relevant for government departments, where limited funds must cover both operational and infrastructure costs. Many municipalities in the Western Cape have insufficient funds to deliver adequate water, sanitation and environmental services. With limited funding, sustainable water and environmental protection is not always a priority. Many government agencies are also wholly dependent on funding from National Treasury, putting them at risk to fluctuations in national funding.

However, the integrated nature of water also opens an opportunity to mobilise different funding sources, promoting a more sustainable financial system. As many sustainable water protection interventions have multiple co-benefits, multiple funders may be interested in investing. The GCTWF is a good example of a financial mechanism that aims to mobilise resources from public and private sectors to support the conservation and restoration of watersheds and other natural areas. Water tariffs could also be used to fund water management activities.

DEA&DPs focus for Sustainable Financing:

Creating an enabling environment for increased investments in ecological infrastructure and pollution management.

6. Strategic Planning

The Cape Town drought highlighted the critical importance of planning for water management. Long-term planning, particularly around water sensitive design and catchment protection/restoration, was emphasised as critical for mitigating and adapting to the impacts of climate change, population growth and urban development.

The WCSWPP, WCIDWRP, SmartAgri Plan and others are themselves strategic plans for long-term resilience. All actions in the WCSWPP require a level of planning that is aligned to the overarching objective, and the ultimate WRP that is currently being finalised. Strategic planning (through the lens of the WCSWPP and its principles) is therefore a pivotal pillar in for the WRP.

DEA&DPs focus for Strategic Planning:

Proactive and inclusive planning for ecological infrastructure, water pollution and water resilience and design, considering all stakeholders and marginalised communities.

9. Strategic Focus Areas

Through the review of the 2017-2022 WCSWMP and engagement with stakeholders, three Strategic Focus Areas were identified and are presented in the following sections. This section an overview of each of the Strategic Focus Areas and includes the Strategic Objectives of the WCSWPP, supported by the Strategic Enablers discussed in the previous chapter (Figure 50). For each Strategic Focus Area, several Objectives and associated Activities have been identified and are discussed in the following sections. Details on the proposed Outcome, Indicators, Lead institutions, other stakeholders and Timeframes have been included in **Appendix A**.

Where possible, each Strategic Focus Area has Objective/s supporting DEA&DP's primary focus and mandate for each of the Strategic Enablers (see Section 8). These include:

- Supporting municipalities with integrating the principles of ecological infrastructure, pollution management and water sensitive design into municipal planning.
- Driving the co-ordination of provincial activities related to environmental water quality and ecological infrastructure, in partnership with other relevant institutions.
- Improving monitoring and information management across all Focus Areas.
- Communicating and advocating for ecological infrastructure, water quality and sustainable design, particularly DEA&DP flagship programmes.
- Creating an enabling environment for increased investments in ecological infrastructure and pollution management.
- Proactively and inclusively planning for ecological infrastructure, water pollution and water resilience and design, considering all stakeholders and marginalised communities.

GESI lens

Strategic Focus Areas	Strategic Objectives	
1. Ecological Infrastructure	2. Environmental Water Quality & Pollution	3. Water Resilient Planning and Sustainable Design
1.1 Improve the progressive uptake of EI into local level planning	2.1 Build the knowledge base regarding CECs in the WC and potential risk management options	3.1 Raise awareness regarding the principles and benefits of WSD, as well as any shortcomings.
1.2 Improve EI monitoring and knowledge sharing across institutions	2.2 Increase coordination and communication for WQ and pollution monitoring through partnerships	3.2 Mainstream WSD principles into local, provincial and national level planning
1.3 Improve vulnerable groups' involvement in and access to benefits from EI investment & management	2.3 Increased support for routine monitoring of priority rivers and estuaries	
1.4 Create an enabling environment for increased investments in EI	2.4 Improve the integration of WQ and pollution risks into provincial and municipal planning	
1.5 Facilitate the development of blended finance schemes for investment in EI	2.5 Targeted enforcement relating to pollution and WQ risks	

Institutional Empowerment

Co-operative governance

Monitoring & Information Management

Responsive Communication

Sustainable Financing

Strategic Planning

STRATEGIC ENABLERS

Figure 50: Summary of the strategic framework of the 2024 – 2029 WCSWPP.

9.1. Strategic Focus Area 1: Ecological Infrastructure

9.1.1. Overview

The concept of ecological infrastructure is of strategic importance to the Western Cape Government. Ecological infrastructure refers to the natural or semi-natural structural elements of ecosystems and landscapes that are crucial in delivering ecosystem services. These services include water and climate regulation, soil formation, and disaster risk reduction. Ecological infrastructure is the nature-based equivalent of built or hard infrastructure and has multiple co-benefits, including improved biodiversity, socio-economic development and climate change adaptation among others.

The concept of ecological infrastructure emphasises the importance of nature as a long-term service provider. It was first used in 1984 with a focus on ecological networks and conservation corridors for landscape-level protection. More recently, the concept has been expanded to emphasise the importance of ecological networks in safeguarding ecosystem services. Ecological infrastructure plays a significant role in rural development. Key elements of ecological infrastructure, including mountain catchments and corridors of natural vegetation, are located in rural areas. Rehabilitating and maintaining ecological infrastructure contributes to diversifying rural economies through direct job creation and by strengthening economic sectors such as sustainable farming and ecotourism.

Preserving and restoring ecological Infrastructure is a key mandate for the DEA&DP, as identified in the 2020-2025 Strategic Plan. In line with this, the DEA&DP and partners are implementing several programmes that use nature-based solutions and community based adaptation techniques to restore and protect ecological infrastructure (e.g. BRIP, BREPP and EIIF). These programmes are included in Section 5.

> *"With the drought conditions that continue to persist in the Western Cape (and in the country as a whole) and the ongoing impact of climate change, which predicts a drying climate for the Western Cape, there is a strong focus on the importance of protecting and restoring ecological infrastructure. This includes diversifying water supply options, developing sustainable alternative financing mechanisms for water services, and providing stronger integration of development and water supply planning.* ***The DEA&DP's Ecological Infrastructure Investment Framework (EIIF) supports the catchment restoration goals, whilst furthering economic resource resilience****. Protecting and restoring ecological infrastructure requires a strong* ***transversal, transdisciplinary and "whole-of-society" approach****. It also requires the various spheres of government and other sectoral role-players to put greater emphasis on cooperative governance, as required in terms of the Constitution.* ***Ecological Infrastructure is a key mandate for the DEA&DP****"* – DEA&DP Strategic Plan 2020-2025

The **spread of IAPs** has been shown to have a negative impact on water resource availability as IAPs consume more water than indigenous plants like fynbos. On average, IAPs consume between 20 and 100 litres of water per tree, resulting in a loss of 500 kilolitres per hectare per day. The Western Cape loses approximately 38 million cubic meters of water per year due to the presence of IAPs (Le Maitre, et al., 2019). This loss is significant as it is equivalent to nearly 60 days of water supply for Cape Town, assuming a daily water consumption of 550 million litres (Le Maitre, et al., 2020).

Clearing IAPs is therefore critical in environmentally sensitive areas, such as headwater catchments, wetlands, and riparian areas, and their removal can reclaim billions of litres of water and protect the region's biodiversity. IAPs in the Western Cape catchments (mainly Pine, Port Jackson, Blue Gum, Rooikrans, Hakia and Black Wattle) can be controlled through mechanical methods (such as uprooting or ring barking), chemical methods (such as the spraying of herbicides) and/or biological methods (through the use of natural enemies). These methods are labour intensive and require follow-up maintenance for effective management of the catchment. It is estimated that IAPs could supply 11.3 Tg of solid biomass annually in South Africa (Vera, et al., 2022). This is largely underutilised as most of the biomass is left on-site after IAP clearing. The use of IAPs for bioenergy could result in carbon savings and, at the same time, deliver additional environmental and socio-economic advantages (see **Case Study 3**). Energy generation from alien vegetation is an intervention in the G4J Strategy. Clearing IAPs is a critical element of EIIF and Implementation Plan in the Western Cape.

Wetlands provide numerous ecological services to humans such as water supply and purification; climate regulation; flood regulation; erosion control, carbon sequestration and recreational activities to name but a few. Wetlands are experiencing the most rapid degradation compared to other ecosystems due to population growth and economic developments. Damming, river diversion, in-stream abstraction, groundwater abstraction, internal draining, grazing, agriculture and invasion by alien flora all contribute to the degradation. It is necessary for adequate considerations to take place when comparing increased water access to the harmful trade-offs it may have on wetlands. Incorporating the value received from wetlands into economic systems would significantly aid in their protection.

Protecting wetlands allows for long-term rehabilitation and ecosystem functioning. The DWS has a policy on wetlands, which recognises the need for strategies that include a focus on wetland conservation. This policy is reflected in initiatives such as the "Working for Wetlands" programme, which supports small businesses and transfers relevant skills to participants.

Riparian zones have benefits that impact rural and urban areas through ecosystem infrastructure that adds to economic benefits such as aesthetics, wildlife, water purification and protection of landscapes from flood damage. These important natural corridors act as spaces for soil retention and formation, nutrient regulation and disturbance prevention etc. Population pressures have resulted in an upsurge in densification and unplanned urbanisation, particularly in riparian areas and floodplains. These vulnerable communities are at high risk of flood damage. Agricultural expansion is also threatening riparian areas.

Preserving ecological infrastructure (EI) has several environmental and socio-economic co-benefits, making it a worthwhile candidate for pooled financing, such as **Water Funds** (e.g. the Greater Cape Town Water Fund) and **Payment for Ecosystem Services** (PES).

Co-benefits from investing in EI, including IAPs, wetlands and riparian areas among others, could include the following:

- **Health Benefits:** Enhanced EI can significantly improve water quality. For instance, green infrastructure can reduce the load of sediment, unwanted minerals, and other contaminants that are carried with runoff from impermeable surfaces. In informal settlements, where sanitation services are often inadequate, green infrastructure can play a crucial role in managing wastewater and improving overall sanitation.

- **Economic Benefits:** EI can lead to job creation, particularly in rural areas, by strengthening economic sectors such as sustainable farming and ecotourism. Clearing IAPs require a large labour force and can create many job opportunities, especially for unskilled labourers. In marginalised communities, infrastructure investments can improve access to essential services such as transportation, healthcare, and education, reducing inequalities in access to opportunities.
- **Infrastructure Benefits**: EI and green infrastructure can complement and extend the lifespan of grey infrastructure such as catch basins and drainage pipes. It can also reduce the pressure on drainage systems and lower maintenance costs.
- **Community benefits:** EI can enhance community identity and a sense of well-being. It can also provide recreational spaces, thereby improving the quality of life for residents. Community benefits agreements can address historical injustice by engaging communities in a meaningful way. Upgrading initiatives can partner closely with communities and address multiple health risks.
- **Environmental Benefits:** EI helps maintain biodiversity by providing habitats for various species and facilitating wildlife movement.
- **Climate adaptation benefits:** EI can help reduce the imapcts of flooding, a common issue in many informal settlements that is expected to increase due to climate change. By facilitating the absorption and slow release of rainwater, EI and green infrastructure can reduce the risk and impact of flooding. EI can also play a key role in ensuring water security by supporting water replenishment and drainage.

9.1.2. Gender Equity and Social Inclusion

Ecological infrastructure provides ecosystem good and services such as food, clean water, clean air, aesthetics, spiritual connection, mental well-being opportunities, and recreational pleasures. Women, and other vulnerable groups play a vital role in managing ecological infrastructure. Studies looking into water and environmental attitudes between men and women continue to show significant differences between the two genders where women are found to show more sustainable and environmentally friendly attitudes (Echavarren, 2023). Environmental concern, which Dunlap and Jones (2002) describe as "the degree to which people are aware of problems regarding the environment and supports efforts to solve them and/or indicate a willingness to contribute personally to their solution" (Dunlap & Jones, 2002) is key for developing sustainable management and use approaches to water and ecological infrastructure.

While this might be the case, women are often marginalised from water management and adaptive capacity decision-making despite growing evidence of women playing critical roles in strengthening community resilience (Krishnan, 2022). A study on the role of women in community resilience to climate change showed the contribution of women in building community, social, economic, and ecological resilience is significant (Singh, et al., 2022). Women have experience in sustainable management of natural resources such as land and water, and a greater grasp of the nuances that affect vulnerabilities within the communities and at household level. As such, engaging women on their extensive expertise in decision-making related to resilience planning should be a priority (Dilling, et al., 2019).

Simultaneously, men do tend to hold more knowledge of water use and management in areas where they dominate in access and participation, such as irrigation, institutional processes, and engineering (Barnes, 2013). The masculine codifying of water use and management ultimately leads to men having greater influence on access, management and governance

practices, leaving blind-spots on critical issues concerning women, children, and disabled people (Zwarteveen & Liebrand, 2015).

Women and children are disproportionally negatively affected by destruction of ecological infrastructure such as the loss of biodiversity, access to clean water, health impacts, and ecosystem services. Multiple studies and cases have highlighted how women and children are disproportionally subjected to mental stress, health risks, and greater exposure to gender-based violence due to the destruction of ecological systems and climate change impacts. Therefore, planning, implementation, and monitoring of ecological infrastructure activities should aim to protect discrimination of access and limit unintended consequences to vulnerable and marginalised groups.

With climate change projections, access to water and ecological infrastructure is anticipated to reduce and existing vulnerabilities to deepen. Women and children are likely to endure the burden of climate shocks and stresses (Bradshaw, 2015). The United National Human Rights Council has long recognised that ecological degradation and climate shocks such as droughts and flooding are increasingly leading to deepened gender vulnerabilities, particularly in rural areas (UNHCR, 2021). Gender perspectives become even more critical for mitigation and adaptation. Resilience and water sensitive planning are some of the approaches adopted by governments to adapt to, reduce or eliminate potential threats and shocks and enable quick and effective recovery. A gender lens, which takes into consideration gender-related issues and decisions, is important to achieve resilient and sustainable planning and plays an important role in disaster risk management.

Working closely with service providers in ecological infrastructure, better incentive can be provided by government and service providers to increase the participation of women. In addition, considerations for safety and domestic demands remain a priority in designing ecological infrastructure initiatives aimed at increasing the involvement of women.

9.1.3. Strategic Objectives

The Ecological Infrastructure Focus Area (Strategic Focus Area 1) consists of **FIVE STRATEGIC OBJECTIVES**.

Table 5 presents a summary of these, and their detailed activities can be found **Appendix A.**

Table 5: Ecological Infrastructure Strategic Focus Area – Strategic Objectives, Outcomes and High-level Indicators.

Strategic Focus Area 1: ECOLOGICAL INFRASTRUCTURE			
No.	**Strategic Objective**	**Outcome**	**High-level Indicator**
1.1	Improve the progressive uptake of EI into local level planning.	Municipalities and other local organisations will have a better understanding of the importance and benefits of EI for water resilience that will translate into local planning.	Municipalities and local organisations that have enhanced their knowledge and implementation of EI principles and practices.
1.2	Improve EI monitoring and knowledge sharing across institutions.	Local, provincial and national government institutions will be well informed on the status of EI in the Province, allowing them to partner effectively and implement programmes that complement one another.	Diversity and number of local, provincial and national organisations communicating on EI, supported by good monitoring and data
1.3	Improve vulnerable groups' involvement in and access to sustained benefits that flow from EI investment and management.	By engaging in EI interventions, vulnerable groups will have increased and sustained access to the benefits of EI investment and management, leading to improved livelihoods, reduced poverty, and enhanced resilience to climate-related risks	Number of vulnerable communities engaging in EI interventions.
1.4	Create an enabling environment for increased investments in EI.	A strong enabling environment will lower the investment risks and encourage EI investment from public and private sector partners.	Number of public and private sector partners interested in investing in EI.
1.5	Facilitate the development of blended finance schemes for investment in EI.	Blended finance opportunities will facilitate increased investments in EI interventions, supporting a shift away from solely government-dependent opportunities.	Diversified and increased investments in EI.

Objective 1.1: Improve the progressive uptake of EI into local level planning

GESI Pillars				
1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges

Through the EIIF Implementation and Monitoring Plan and other programmes, information, data, and tools are available to support the implementation of EI interventions in the Western Cape. This information needs to cascade down to a local level to ensure that implementation occurs effectively. As such, local municipalities require support with integrating ecological infrastructure into municipal planning documents, and other relevant municipal tools, such as by-laws and overlay zones. This action supports DEA&DP's 5-year plan to have *"98 % of municipalities integrating biodiversity ecological infrastructure priorities into IDPs"* (DEA&DP, 2020), as well as the EIIF's Key Strategic Action to *"Enhance the knowledge and capacity of land use planners, engineers and other technical experts to integrate the protection and rehabilitation of WSAs into land use planning at various scales"* (DEA&DP, 2021a).

The EI Strategic Objective and its associated activities under the WCSWPP and EIIF Implementation and Monitoring Plan should also link with DEA&DP's programme to Mainstream Climate Change into Local Municipalities, as well as the DLG's ongoing water security interventions for municipalities.

The proposed activities under Objective 1.1 are shown below and present a progressive and whole-of-society approach to supporting the uptake of EI into local-level planning[2]. All interventions should be implanted in with the EIIF Implementation and Monitoring Plan to avoid duplication:

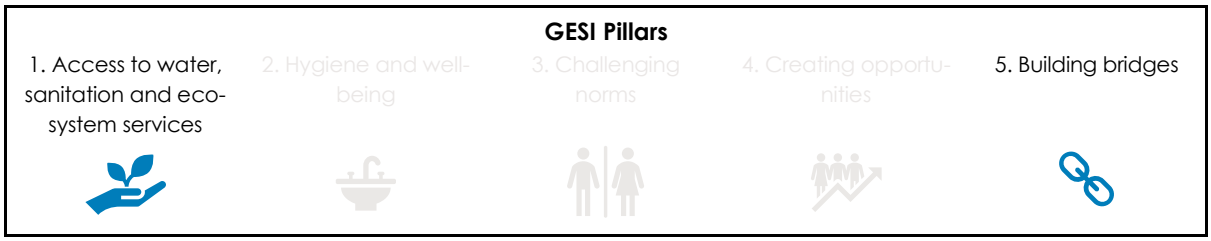
- ❖ Identify local level forums/committee to raise awareness regarding EI and NBS principles and practices. Vulnerable groups (such as farm workers and informal settlement dwellers) should be represented.
- ☐ Use local level forums/committees to raise awareness among local government officials and other local partners and communities on the value of nature-based solutions and ecological infrastructure.

Identify priority EI interventions linked to critical water resources, water supply infrastructure and vulnerable communities.

- ❖ Provide capacity building and support to municipalities on the use of existing EI information and tools (such as resource protection plans and IAP prioritisation plans) to update their MSDFs, IDPs, WSDPs and other municipal guidelines and plans. Areas with critical water resources, water supply infrastructure and vulnerable communities should be prioritised.
- ☐ Develop a set of generic by-laws on the incorporation of EI and NBS services into local municipal by-laws. This will contribute to the generic by-laws on alternative water use developed as part of the WRP.
- ☐ Provide capacity building and support to municipalities on adopting legislative tools (such as by-laws) to support the enforcement of EI and NBS.

[2] ❖ denotes a GESI specific activity

Objective 1.2: Improve EI monitoring and knowledge sharing across institutions.

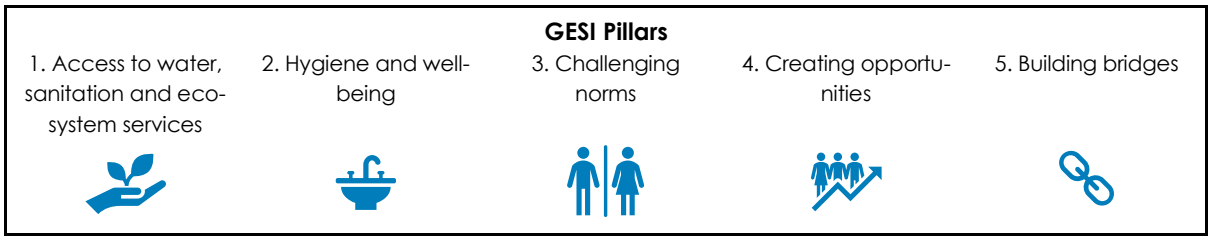


CapeNature, BOCMA, CoCT, DEA&DP, DoA, DLG, TNC (though the GCTWF), DFFE (through the Working on Fire Programme) and various NGOs have been or are actively implementing EI projects in the WC and CoCT, particularly regarding IAP clearing. With such a diverse number of partners at various levels of government, proactive monitoring and shared learning is critical to supporting the success of all programmes and avoid the duplication of efforts. The EIIF also highlights the importance of robust partnerships, and the partnerships already mobilised under this programme can pave the way for further collaboration and development opportunities.

The proposed activities for this strategic objective are shown below:

- ☐ Use the EIIF platform to continue promoting strong communication between the WCG departments, DWS, DFFE, CN, BOCMA and other relevant partners.
- ☐ Advocate for the proactive monitoring of the physical, economic and social impacts of EI management.
- ☐ Integrate the outcomes of the Berg Olifants CMS (currently under development) into the Water Resilience Plan and SWMP among others.
- ☐ Integrate IAP and other EI spatial information into the PSDF.
- ☐ Support the development of a provincial tracking tool to monitor the physical, economic and social impacts of EI management (such as IAP clearing efforts).

Objective 1.3: Improve vulnerable groups' involvement in and access to sustained benefits that flow from EI investment and management.



Vulnerable populations in the Western Cape, particularly in rural areas, are more directly reliant on the natural environment to meet their energy, food, shelter and water needs. As such, they are disproportionately exposed to the impacts of climate change and poor water resource management. Vulnerable populations and local communities should therefore be at the forefront of EI management programmes; as custodians responsible for the management of the natural resources, as well as users benefitting from the ecosystem services. EI programmes can also provide opportunities for social and economic development, such as job creation, skills development, and food security (Anderson, et al., 2021). By engaging vulnerable groups in the planning and implementation of ecological infrastructure, it is possible to ensure that these communities receive the benefits they need to thrive in a changing environment.

In the case where vulnerable communities might become dependent on external funding as they move away from ecosystem-based livelihoods, it is important to involve local NGOs to

makes these programmes sustainable. Community-based natural resource management is a people-centred approach that integrates conservation and development to overcome poverty, hunger, and disease. By engaging local NGOs, such as gender-focused organisations, in inclusive natural resource management, vulnerable groups can access, manage, and benefit equitably from natural resources, thus reducing their dependency on external funding.

Additionally, involving local NGOs can help ensure that the needs, capacities, and knowledge of the communities are central to the planning and implementation of natural resource management, leading to more sustainable and effective outcomes. Furthermore, local NGOs can play a key role in building climate resilience among vulnerable communities by strengthening social and institutional capacities, as demonstrated in the study on the role of community-based conservation and natural resource management in building climate resilience among vulnerable mountain societies.

Natural resource management programmes that foster the growth of SMMEs and local entrepreneurs are crucial for creating sustainable livelihoods and reducing dependence on external funding. For example, the by-product of IAP clearing can be utilised by local enterprises to produce charcoal that can treat water (this research is being undertaken at the water hub as well as piloted through the Khayelitsha Canoe Club selling charcoal for urban farming, see **Case Study 3**). Government and local NGOs play a vital role in supporting these SMMEs and entrepreneurs, as they can help overcome challenges such as limited access to business and financial services, regulatory constraints, and market access.

The proposed activities for this strategic objective are shown below[3]:

- ❖ Partner with local NGOs to drive EI programmes that are financially resilient and do no harm on local communities.
- ❖ Advocate for EI implementing partners to engage vulnerable communities in IAP management (training in removal, monitoring, and maintenance), and riparian bank and wetland rehabilitation
- ❖ Support learning events between women, emerging farmers, and other vulnerable groups working on IAP control for catchment conservation, water security, and biodiversity protection.
- ❖ Provide training to EI implementing partners on incorporating gender and social equity considerations into planning, implementation, and monitoring activities.
- ❖ Build entrepreneurial capacity through SMME incubation for practitioners operating in the EI space (e.g. transforming the by-products of IAP clearing into fuel sources).

Facilitate and connect local NGOs to EI investment opportunities within government and with external funders

[3] ❖ denotes a GESI specific activity

CASE STUDY 3: SOCIO-ECONOMIC OPPORTUNITIES FROM A COMMUNITY-LED ECOLOGICAL INFRASTRUCTURE PROGRAMME

The Khayelitsha Canoe Club works on river and wetland restoration through IAP removal as well as debris management. In addition, they teach the youth water activities like swimming and canoeing as well as provide guided river tour as part of tourism. The NGO was formed by a group of young males who were interested to develop an environmentally safe and liveable neighbourhood.

The success of ecological restoration activities gave rise to green economic opportunities. The founders of the Club developed a recycling arm of the NGO where they turn environmental waste from invasive water plants into fertilisers for food production gardens (Figure 51). They particularly supply community garden in schools, where local women from Khayelitsha work in school feeding schemes. The Club has approximately 45 volunteers, mainly male youth. There is an interest to grow the Club and have female youth take interest and participate.

Source: Amanda Gcanga

Figure 51: At the Khayelitsha Canoe Cub, dried water hyacinth (left) is carbonised and converted to biochar (right). This is used as a fertiliser for community gardens in schools.

Objective 1.4: Create an enabling environment for increased investments in EI.

GESI Pillars				
1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges

Significant investment is needed for EI in the Western Cape, and fiscal budget constraints necessitate the need to engage other partners such as the private sector. An enabling environment is important for private sector investment in EI because it provides the necessary conditions for businesses to thrive, ultimately leading to sustained economic growth, increased employment, and poverty reduction. The WCSWPP and EIIF Implementation and Monitoring Plan recognise the importance of creating an enabling environment for increased investments in EI by fostering a supportive environment that offers opportunities for research, collaboration, and economic growth.

The WCSWPP aims to support the EIIF Implementation and Monitoring Plan by promoting EI as a critical component of the region's development strategy by supporting research, identifying opportunities for collaboration, documenting success stories, amending regulations, and developing a high-level dashboard for monitoring. By leveraging the successes of local communities, supporting research, and advocating for policy changes, this objective will help to attract investment and foster a more inclusive and equitable approach to water management.

The proposed activities are shown below[4]:

- ☐ Support and promote research that demonstrates the social and economic benefits of investing in ecological infrastructure, including the Water Hub.
- ☐ Look for applications of some of the technologies being tested at the Water Hub and other initiatives applied in municipalities (such as George Municipality).
- ☐ Identify opportunities for demonstrating how investing in EI is critical to supporting the objectives of other provincial and municipal strategies and policies, especially related to health, infrastructure, and disaster risk reduction.
- ❖ Documenting success stories of women, youth and marginalised groups involved in EI restoration activities. Can be leveraged to advocate for a blended finance approach.
- ☐ Amend the EIIF to better reflect the potential benefits of investing in EI, e.g. the link with agricultural needs, human health, socio-economic growth.
- ☐ Support the development of a high-level dashboard to communicate water supply risk from IAPs, benefits from clearing, and EI interventions to decision makers and funders.

[4] ❖ denotes a GESI specific activity

Objective 1.5: Facilitate the development of blended finance schemes for investment in EI

GESI Pillars

1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges
				

Blended financing is important for investments EI because it combines public and private funding to attract investment in developing countries, where private investment is often constrained by investors' perceptions of high risks and low returns. Blended finance refers to the strategic use of public sources of capital, such as Official Development Assistance or funding by development financiers, with private capital. Public funds are usually offered on concessional terms, which are more attractive than the prevailing market conditions, and are used to de-risk investment projects to mobilise additional private capital.

The success of blended finance rests critically on the ability to maximise additionality, both in terms of the financial resources mobilised and the developmental impact created, while minimising concessionally, i.e., providing public capital at as close to market conditions as possible. The Greater Cape Town Water Fund (GCTWF) is an example of a blended finance approach that applies a public and private funding model to achieve water security for the Greater Cape Town region by restoring ecological infrastructure through the clearing of IAPs.

In order to facilitate the development of a blended finance approach for EI management in the Western Cape, the following activities are proposed[5]:

- ☐ Identify potential funders and funding mechanisms for EI in the Western Cape.
- ☐ Raise awareness about water funds and other opportunities for public and private sector investments in EI including lessons learnt from the GCTWF.
- ☐ Continue supporting partnership building with the private sector for improved EI, resilience and sustainability, e.g. Biodiversity Collectives, SMMEs, for EI
- ☐ Leverage information from previous studies (such as the DEA&DP economic valuation studies, and water quality & IAP monitoring data) to develop business cases for new funding opportunities.
- ❖ Advocate for water resources management and conservation organisations to build internal capacity on incorporation of GESI into roll-out and scaling-up of nature-based solutions through water funds and other mechanisms.

[5] ❖ denotes a GESI specific activity

9.2. Strategic Focus Area 2: Water Quality and Pollution Management

9.2.1. Overview

Water pollution can have significant impacts on the environment, human health, and the economy (see **Case Study 4**). Rapid urbanisation, particularly informal development, has negative impacts on the quality of rivers and groundwater due to poor solid waste and wastewater management. This in turn can affect livelihoods, especially for those who depend on natural water sources for their daily needs and economic activities. Contaminated water can lead to the loss of income from fisheries and agriculture due to the death of aquatic life and reduced crop productivity. It can also increase the costs associated with treating water and healthcare expenses due to water-related illnesses. Marginalised communities often bear the brunt of water pollution due to their limited access to clean water and sanitation facilities. These communities, including informal settlements, may face challenges such as inadequate waste management and sanitation services, leading to environmental justice issues. The lack of access to safe, clean water can exacerbate social injustices and negatively impact the well-being of these communities.

Women in the Western Cape are disproportionately affected by poor water quality and pollution. A study focusing on water service provisions and women in a rural area of South Africa highlighted the emotional distress and civic action related to water insecurity (Bulled, 2017). Another study concluded that there are dynamic relationships in water insecurity and pollution for female-headed households in South Africa (Ngarava, et al., 2019).

Water pollution poses a significant threat to biodiversity in the Western Cape, affecting both terrestrial and aquatic ecosystems. Agricultural activities often lead to the contamination of water bodies with pesticides and other harmful substances. For instance, rural surface and ground water in farming areas of the Western Cape were found to be contaminated by endosulfan, a restricted-use pesticide (Dalvie, et al., 2003). This contamination can affect many biological systems and lead to bioaccumulation, posing a long-term threat to the environment and biodiversity. In many cases, the chronic effects of long-term exposure to pesticides is unknown, although on-going research is slowly building the knowledge base.

Pesticides are only one type of Contaminants of Emerging Concern (CECs) which also include pharmaceuticals, personal care products, disinfection by-products, and industrial chemicals. Sources of CECs include industrial and domestic wastewater, airborne contaminants, and runoff from land surfaces. Many CECs are recalcitrant, and traditional wastewater treatment methods tend to be inefficient at eliminating CECs or reducing their concentrations.

One of the clearest examples of biodiversity risks posed by water pollution is eutrophication, the process whereby high levels of nutrients, often from agricultural runoff, lead to excessive growth of algae and other aquatic plants. This can deplete oxygen levels, leading to the death of fish and other aquatic organisms and a decrease in biodiversity. Wetlands in the Western Cape are also threatened by pollution and invasive plants. These threats can lead to habitat degradation and loss of biodiversity.

Preventing pollution and ecological degradation is a legal mandate of the DEA&DP, and therefore validates its inclusion as a key focus area. In addition, the WCIDWRP currently does not consider water quality concerns, other than the state of wastewater treatment works.

CASE STUDY 4: THE SOCIO-ECONOMIC CASE FOR POLLUTION MANAGEMENT IN THE BREEDE RIVER CATCHMENT (Cullis, et al., 2018)

Intensive agriculture and urban development has resulted in an array of water quality problems in the Breede River including increased salinity, nutrient enrichment, microbiological water quality, agrochemicals, and impacts on dissolved oxygen. Water quality becomes progressively poorer downstream due to water abstractions and irrigation return flows entering the rivers. The recent rapid growth in urban and peri-urban areas is of especial concern for water quality impacts.

Agriculture is the dominant economic driver and largest water use sector in the catchment, accounting for approximately 87% of the average annual water demand. A recent study of the Breede River catchment estimated the direct value added and total value added, to be around ZAR4 billion and 7 billion, respectively, and impacting around 57 000 jobs. There are therefore several economic risks in the Breede catchment associated with poor water quality.

Declining yields due to increased salinity: The estimated contribution by irrigated fruit in the Breede catchment is around ZAR 6 billion. A 10% drop in yields of grapes and stone fruit, which are the dominant produce, if salinity levels exceed their critical thresholds will reduce economic output by ZAR 600 million per year.

Increasing maintenance costs due to increasing filamentous algae: A concern with increasing nutrient levels is the potential for eutrophication and increased growth in filamentous algae. It could result in significant economic costs due to the need to clean filters and other components of irrigation systems that get blocked. These costs have been estimated to be at about ZAR 1 887 per hectare per year, or around ZAR132 million per year for the total irrigated area of the Breede River Catchment.

Risks to international markets due to water quality concerns: The Western Cape agriculture sector significantly contributes to international exports. Declining water quality is a risk as export agriculture may not meet the high standards set for irrigation water by these international markets.

Increasing human health risks: Poor water quality impacts human health leading to declining living standards and social well-being. Various studies have highlighted high public health costs associated with decreased water quality, either as public health cost to mitigate spread of water quality related diseases, or individual costs in terms of visits to a doctor and time lost at work.

Impacts on tourism, recreation and property values: The value of tourism in the Breede River catchment to be around ZAR1 640 million per year, of which approximately 54% or ZAR883 million could be attributed to the proximity to rivers, estuaries and wetlands. Declining reduced water quality could potentially have a significant financial and economic impact.

9.2.2. Gender Equity and Social Inclusion

Municipalities in the Western Cape province, face challenges of deteriorating water quality and increasing incidents of water pollution. Sources of pollution include poorly functioning and over-capacitated wastewater treatments, poor and limited solid waste infrastructure in informal settlements, waste from the agriculture sector including herbicide, waste from industries, and solid waste. Deteriorating and poor water quality, along with pollution, disappropriately impacts marginalised and vulnerable groups most. Various studies have highlighted the impact of pollution and poor water quality to residents of informal settlements with severe consequences of health and overall well-being especially for women and children.

A better coordinated water quality and pollution approach that considers the impacts to vulnerable and marginalised groups is needed. More importantly, their role in planning and monitoring has shown benefits for sustainable water quality and pollution management. Joint monitoring programmes and citizen science have potential for greater social inclusion.

9.2.3. Strategic Objectives

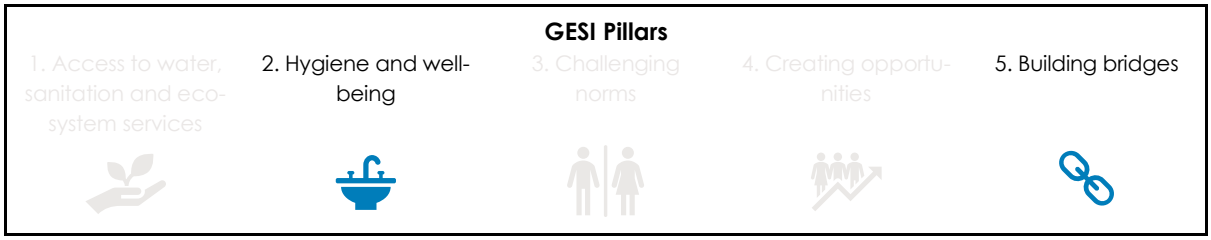
The Water Quality and Pollution Focus Area (Strategic Focus Area 2) consists of **FIVE STRATEGIC OBJECTIVES**.

Table 6 presents a summary of these, and their detailed activities can be found **Appendix A.**

Table 6: Water Quality and Pollution Strategic Focus Area – Strategic Objectives, Outcomes and High-level Indicators.

Strategic Focus Area 2: WATER QUALITY AND POLLUTION			
No.	**Strategic Objective**	**Outcome**	**High-level Indicator**
2.1	Build the knowledge base regarding emerging contaminants and pesticides in the WC and potential risk management options.	A better understanding of critical hotspots and emerging WQ and pesticide risks, and potential tools for risk management.	Incremental risk-based approach to monitoring emerging contaminants and pesticides in the Province.
2.2	Increase coordination and communication for water quality and pollution monitoring in the Western Cape through strategic partnerships.	Strategic partnerships are mobilised for improved coordination and communication in the Province, thus creating an enabling environment for increased investments in WQ monitoring.	Variety and number of stakeholders engaged in dialogue or activities relating to WQ and pollution monitoring and restoration activities in the WC.
2.3	Increased support for routine monitoring of priority rivers and estuaries.	By advocating for the importance of WQ monitoring, provincial support will increase and WQ monitoring will clearly be linked to provincial level objectives.	Number of monitoring sites increased and linked to provincial level objectives (health, economy etc.).
2.4	Improve the integration of water quality and pollution risks into provincial and municipal planning.	Increased uptake of WQ and pollution risks into various levels of planning.	Number of plans incorporating WQ risk.
2.5	Targeted enforcement relating to pollution and water quality risks.	The risks of poor water quality and pollution will be reduced by ensuring that action is taken against polluters.	Number of successful pollution and WQ enforcements.

Objective 2.1: Build the knowledge base regarding emerging contaminants and pesticides in the WC and potential risk management options.



The persistence and toxicity of CECs continue to be investigated by scientists, and the full range of their potential human health and environmental risks remain unknown. In the Western Cape, CECs have been detected in various water sources, with the potential for long-term environmental and health effects (Mokhethi, 2022). The presence of CECs in water resources has raised concerns about the potential development of drug resistance due to sustained, low-level exposure to pharmaceutical drugs in drinking water, including Antiretrovirals, which are ubiquitous in South Africa due to the ongoing HIV/AIDS epidemic in the country .

Limited environmental monitoring of pesticides and the lack of understanding of pesticide use on farms in the region have been highlighted as areas of concern. The detection of pesticide residues in water resources has underscored the need for extended monitoring and analytical techniques to assess the chronic health and environmental effects of long-term pesticide exposure. The presence of pesticide mixtures in water and their potential impact on aquatic systems has also been a subject of study, emphasising the need for a comprehensive understanding of pesticide pollution in the region.

To address the global threat presented by emerging contaminants, South Africa has taken measures, including ratification of the Basel, Stockholm and Rotterdam conventions, as well as key measures like banning liquid waste from being dumped in landfills (UNEP, 2020). These actions are beginning to have a measurable impact, but more work is needed to truly resolve the issue and safeguard the health of its citizens and environment. There is now a need to downscale research and testing of CECs to a local and provincial level. Opportunities remain to adopt pesticide risk assessment and management tools (such as PRIMET) for the Western Cape context. Ethekweni Municipality, Nelson Mandela Bay Municipality and CoCT are all using PRIMET to determine the risks of spraying, and lessons can be learnt from these applications.

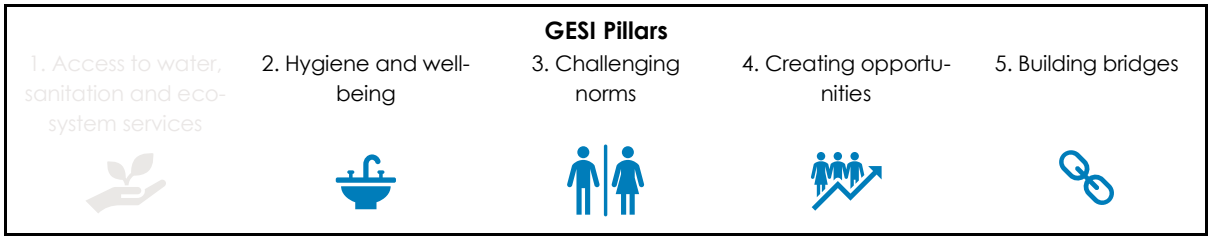
Farm labourers, immunocompromised individuals, and women, the elderly and young are particularly at risk to the acute and chronic health effects of CECs. Research has shown that women in agriculture are more vulnerable to pesticide exposure due to their roles in agricultural work and household management (Asmare, et al., 2022). Furthermore, a study found that neurotoxic symptoms were significantly higher among women living and working on farms compared to those living in neighbouring towns, some of which may to attributed to pesticide exposure (Motsoeneng & Dalvie, 2015).

Given that CEC monitoring and management is still in its infancy in South Africa, a progressive risk management approach is needed in the Western Cape. The impacted stakeholders and communities need to be mapped before targeted pesticide and CEC monitoring can be

executed, eventually leading to policy changes. Given the need for this progressive risk management approach, the following activities are proposed[6]:

- ☐ Identify stakeholders involved in the monitoring of emerging contaminants and pesticide in the Province and initiate discussions for improved co-ordination.
- ☐ Initial mapping of potential hotspots for pesticides and emerging contaminants based on existing data, e.g. Contaminants of Emerging Concern Knowledge Hub and spatial mapping of high risk activities (e.g. landfill sites, WWTWs)
- ❖ Identify and map vulnerable communities (such as farm workers) that are at high risk of exposure to pesticides and emerging contaminants. This will form the basis for a targeted pesticide monitoring programme for the Province.
- ☐ Review global and national standards and potential regulatory tools (e.g. NEMA, RQOs) that could be used for managing and reducing the risk of pesticides and emerging contaminants in the Western Cape.
- ☐ Develop a targeted pesticide and WQ monitoring plan for the Province, in collaboration with key stakeholders and potential implementing partners.
- ❖ Provide training to vulnerable communities on the risk of pesticides and emerging contaminants, their rights and responsibilities for lowering their risk.
- ☐ Start implementing the targeted pesticide and WQ monitoring plan, and continuously monitor and manage the data and information.
- ☐ Update hotspot map for pesticides and emerging contaminants based on data from targeted pesticide monitoring combined with possible modelling.
- ☐ Adopt pesticide risk assessment and management tools (such as PRIMET) for the Western Cape context. Lessons learnt from other areas in South Africa.
- ☐ Capacity building for local municipalities/provincial government on emerging contaminants and pollution, as well as relevant management tools.
- ☐ Develop and adopt relevant policies and regulatory tools for improved management of emerging contaminants and pesticides in the Western Cape.

Objective 2.2 Increase coordination and communication for water quality and pollution monitoring in the Western Cape through strategic partnerships



Multiple government and non-government partners conduct water quality and pollution monitoring in the Western Cape. This is largely led by the DWS, and targeted effort needs to be made to ensure clear communication and coordination among all actors.

Vulnerable groups are a critical part of this, as they are often the most adversely effected by pollution incidents (such as failing sanitation infrastructure polluting local groundwater sources). The risks of pollution should be clearly communicated to these groups, with channels for residents to report to report pollution risks. Involving local communities in water quality monitoring through a citizen science approach can also create a sense of ownership and

[6] ❖ denotes a GESI specific activity

challenges norms regarding women's roles in natural resource management. Citizen science approaches can open doors for local opportunities (see **Case Study 5**).

Given the critical link between water quality and economic development in the Western Cape, it is also important to communicate water quality risks to key economic players. Various platforms, forums and working groups can be leveraged for enhanced communication and collaboration (see Section 5.11).

The proposed activities are shown below[7]:

- ☐ Improve collaboration with DWS, CapeNature, SANBI, SAEON, Citizen Science Association and other agencies interested in WQ monitoring.
- ❖ Identify and map communities that may be vulnerable to increasing water quality risks (including women, children, disabled, informal dwellers, farmworkers). Can be combined with pesticide risk mapping.
- ❖ Provide support to local organisations from vulnerable communities to conduct water quality and well-being awareness campaigns in affected communities.
- ☐ Communication of the economic risks from poor WQ to key economic players and use this to get additional support for increased monitoring of WQ.
- ☐ Review and contribute data to the Freshwater Biodiversity Information System or other shared water quality data portals
- ☐ Support DWS in developing an integrated monitoring strategy at national and provincial/CMA level to co-ordinate monitoring programmes and ensure standardisation of methods and quality of data (including the development of a centralised WQ information management system).
- ☐ Produce an internal, annual WQ (i.e. state of ~~he~~ rivers) report for WCG monitored river and estuary sites (in partnership with BOCMA).
- ☐ Include or elevate WQ risks in the provincial Risk and Vulnerability reporting (~ every 3 years), and highlight the importance of improved WQ monitoring.
- ❖ Co-develop, advocate for and implement (in collaboration with local organisations including schools) a citizen science approach to WQ monitoring that transcends cultural, social, economic and gender boundaries.

[7] ❖ denotes a GESI specific activity

CASE STUDY 5: PARTICIPATION OF VULNERABLE GROUPS IN CATCHMENT MANAGEMENT

The Kuilsriver Catchment Management Forum in Khayelitsha is an example of a local initiative born out of local needs and located within the community. The Forum was established to address a wider range of ecological system topics of concern to women and the broader community of Khayelitsha. The Kuilsriver Catchment Management Forum initially provided wetlands educational programmes, addressing flooding issues experienced by residents, and worked closely with community members and partners to address issues related to wetlands that affect the community as well as the conservation of wetlands.

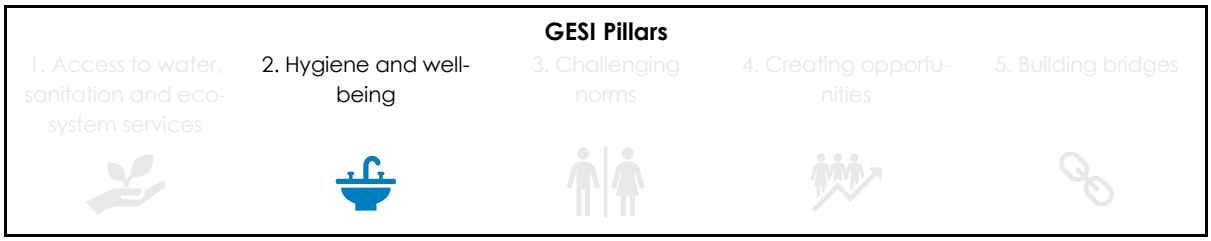
As interest grew from community members, especially women with children, a green park was developed. The park provides multiple benefits to the community and mostly benefits children who have limited space for recreational activities. Overtime, the Forum enabled women to participate in decision making. It was crucial for the Forum to hold engagements around the availability of women, taking into consideration their domestic, employment and cultural responsibilities and activities. When needed, meetings could be held after a Sunday church ceremony while addressing other community needs and interests.

The use of a commonly spoken language, IsiXhosa, limited language barriers and empowered women to communicate effectively. The Forum also worked closely with schools to engage learners on citizen science, particularly on river health. With the schools, the Forum established health clubs where leaners from the communities could be engaged in river cleanup s and environmental awareness programmes. While the Forum is no longer active, there is greater interest from the community to revive it. Organisations such as the Environmental Monitoring Group continue to keep community members engaged while seeking support opportunities for reviving the local forum.

Source: Alex Duval Smith, The Guardian (2012)

Figure 52: Manzomthombo High School students help clean the Kuilsriver, with support from the Environmental Monitoring Group.

Objective 2.3: Continue and improve routine water quality monitoring of rivers and estuaries



The DEA&DP and DWS undertake regular water quality monitoring of rivers and estuaries in the Western Cape. However, insufficient budgets restrict the number of sites that can be monitored regularly. To support improved water quality monitoring in the Province, a clear link between the risks of water quality and human health must be made, which can be supported by the OneHealth and G4J programmes.

Priority estuaries and rivers for additional monitoring need to be confirmed, with emphasis put on high risk areas, such as downstream of wastewater treatment works or adjacent to informal settlements.

DWS is busy updating all guidelines for estuary management and monitoring, and these guidelines should inform an update to the activities under this strategic objective.

The proposed activities are shown below[8]:

- ❖ Develop a paper on WQ risks to human health, livelihoods and the economy (i.e. demonstrate the value of monitoring through pollution reduction). Make a clear link with the objectives of the G4J, OneHealth, and DRR strategies.
- ☐ Advocate for improved flow (and water quality) monitoring in highly stressed water catchments, e.g. Berg River estuary Verlorenvlei, to support compliance monitoring of RQOs etc. (to be led by DWS)
- ☐ Through the WRP steering committee, advocate for support from other WCG departments for WQ monitoring. Make a clear link with the Enterprise Risk Register.
- ☐ Confirm priority estuaries and rivers for additional monitoring
- ❖ For key programmes (such as OneHealth and Infrastructure Plan), identify and integrate water quality risks from industry, agriculture, and sanitation affecting vulnerable groups (including women, children, disabled, informal dwellers, farmworkers)
- ☐ Establish new water quality monitoring sites for priority estuaries and rivers (including nutrient analysis) across the Western Cape.
- ❖ Building on the One Health Plan, conduct an assessment on the related cost incurred by the health sector as a result of vulnerable groups being exposed to sanitation infrastructure related risks.

[8] ❖ denotes a GESI specific activity

Objective 2.4: Improve the integration of water quality and pollution risks into provincial and municipal planning

GESI Pillars				
1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges

Many smaller municipalities in the Western Cape are under capacitated and overwhelmed with the range of interventions required to address pollution risks. Many sanitation systems in the province are aged, and regular leaks and pipe bursts are common, while some wastewater treatment works have insufficient capacity. Sewage pump station failures, effluent from wastewater treatment works, and polluted stormwater from industrial areas and informal settlements contribute to the pollution of estuaries and coastal waters. Load shedding has placed an added pressure of sewage pump stations that are not able to operate during power cuts, with smaller municipalities being unable to afford costly generators and the necessary security to protect these from vandalism. Local municipalities therefore require assistance with integrating pollution risk management into their Municipal Spatial Development Forums (MSDFs), adopting the relevant policies, proactively managing pollution incidents instead of reacting etc.

The proposed activities are shown below:

- ☐ Provide information and examples of applications that could support municipalities with managing wastewater pollution spills during load shedding.
- ☐ Continued support for municipalities with obtaining and integrating spatial data of pollution and environmentally sensitive areas into their MSDFs, WSDPs
- ☐ Develop a pollution response strategy for addressing industrial and agricultural pollution hotspots and emergencies in the Province.
- ☐ Develop an annual implementation plan to mitigate pollution (through enforcement and policy review)

Objective 2.5: Targeted enforcement relating to pollution and water quality risks

GESI Pillars				
1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges

The Western Cape government and local municipalities struggle to enforce pollution control due to various reasons. One of the reasons is the lack of resources and capacity to monitor and enforce regulations. Another reason is the lack of compliance from industries and individuals who do not adhere to regulations and standards. Additionally, the vastness of the Western Cape province and the complexity of the pollution sources make it difficult to monitor and enforce regulations.

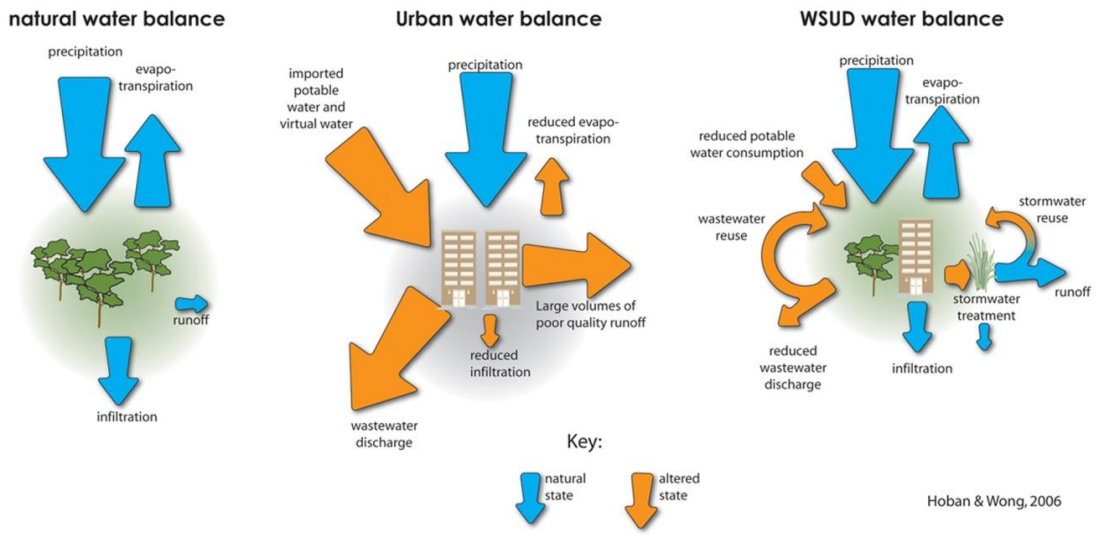
To support local municipalities with enforcing pollution standards in the Province, the following activities are proposed:

- ☐ Continue collaboration with DWS to support enforcement of the RQOs through routine monitoring and pollution blitzes and other methods.
- ☐ In collaboration with DWS and CMAs, identify sectors for targeted enforcements on an annual basis.
- ☐ Investigate approaches to improve efficiency and resources in responding to pollution events/notices and enforcement, particularly at municipal level
- ☐ Engage local communities, schools, and NGOs to report pollution incidents, including improved communication channels to report pollution from WWTW and other infrastructure, including the use of social media, hotlines etc.

9.3. Strategic Focus Area 3: Water Sensitive Design

9.3.1. Overview

Water Sensitive Design (WSD) is a Nature-based Solution (NbS) to urban water problems. It incorporates green infrastructure with engineered urban water systems through innovative design of the built environment and urban landscape (Figure 53). WSD principles are key to improving climate change resilience, from the impacts of both flooding and drought.



Source: Hoban & Wong (2006)

Figure 53: The urban water cycle and role of Water Sensitive (Urban) Design.

WSD offers several benefits, including:

- **Reduced Flood Risks:** WSD helps reduce stormwater flood risks in urban areas, minimising the area and people affected by flooding.
- **Stress on Water Resources:** It decreases stress on water resources by reducing the likelihood of overexploitation of water and managing the risk of stormwater and flooding.
- **Multiple Environmental Benefits:** WSD provides multiple environmental benefits, such as improved stormwater quality, reduced reliance on drinking water for irrigation, flood mitigation, improved biodiversity, and decreased urban heat island effect.
- **Social Benefits:** WSD also offers social benefits, including healthier local waterways, cooler summer temperatures, and the use of visible green technologies.

- **Cost Savings:** While investments in WSD may increase total construction costs, they can reduce negative impacts on citizens, buildings, and the city, and decrease unexpected costs to repair damages caused by extreme weather conditions such as flooding or stormwater run-off.

The CoCT is a prime example of the incorporation of WSD into planning and supporting the transition to a Water Sensitive City. Following 2015-2017 drought crisis, the CoCT developed a new water strategy (Figure 38). One of the five goals of the Water Strategy (CoCT, 2019a) is to transition to a "water sensitive city by 2040 that optimises and integrates the management of water resources to improve resilience, competitiveness and liveability for the prosperity of the people of Cape Town". The City aims for a water sensitive city to be realised through a collaborative approach involving all stakeholders within the CoCT, including the community. This is defined in the new water strategy: "Collaborative relationships are based on trust, and trust is built where there is transparency and mutual accountability, and where stated intentions of all partners are consistently translated into actions" (CoCT, 2019a).

On reflection, the CoCT has several components that are applicable to WSD and the governance required for this transition to a more water sensitive city. In fact, much of South Africa has had a long history of successful water resources planning and effective implementation that has been critical to the success of the economy in the past, despite having an average per capita water availability well below the global average. With the implementation of the Cape Town Water Strategy (CoCT, 2019a), these fundamental principles have been reinforced and a range of interventions are being considered.

Some WSD principles such as stormwater and rainwater harvesting were included on a settlement level in the WCIDWRP. However, WSD principles and the necessary policy reforms still need to be integrated into provincial planning. The legal mandate of DEA&DP includes the Spatial Planning and Land Use Management Act. They therefore have a critical role to play in integrating the principles of WSD into Urban Development Planning requirements (EIA, Urban, land-use planning) and promoting the uptake of these with local municipalities. Once the framework has been established, the DLG should be responsible for supporting local municipalities with the technical implementation of WSD engineering interventions.

9.3.2. Gender Equity and Social Inclusion

Addressing complex water challenges, such as building resilience in water planning and promoting sustainable design, is particularly hard in the South Africa context due to the vulnerabilities as a result of past and persisting inequalities. Building resilience requires holistic long-term planning, political will, a greater level of coordination with concerned actors, and inclusion of marginalised and vulnerable groups into all types of municipal planning and to integrate spare capacity to be better prepared for times of disruption and climate change.

In addition, conventional engineering solutions dominate decision-making for water supply in South Africa. Conventional traditional engineering approaches tend to lack sensitivities toward issues of gender and social equity if not appropriately addressed in the conceptual and planning phase. While there are elements of the "traditional approaches" that should be maintained and strengthened, there is a need for consideration of resilience thinking that takes on a GESI lens to introduce alternative options with the potential for multiple co-benefits for vulnerable and marginalised groups. Opportunities exist particularly in the introduction,

planning and monitoring of green infrastructure that directly and indirectly affects vulnerable and marginalised groups.

Water resilience planning and sustainable design approaches recognise the centrality of water and ecological infrastructure and calls for more holistic planning and implementation. A whole-of-society approach and collective management is key to effective water resilience planning, particularly in rapidly growing urban areas (Baker, et al., 2018). These emerging approaches dismiss traditional planning practices, including patriarchal norms and the exclusion of women, as these are viewed to be unstainable (Kumar, et al., 2023).

Underpinning water resilience planning and sustainable design is co-creation with stakeholders, requiring extensive and inclusive stakeholder engagement to safeguard the current and future use of water and environment commons. While governments traditionally engage in stakeholder participatory process, there has been criticism on the true impact of the engagement and the impact towards resilience planning and implementation. More increasingly, government-led stakeholder processes with vulnerable groups are perceived to be merely tick box exercises (SACN, 2022).

Effective government-led engagement and communication with vulnerable groups is often restricted by human and financial resources, state bureaucratic processes, and negative perceptions from community members (EDP, 2020).

9.3.3. Strategic Objectives

The Water Sensitive Design Focus Area (Strategic Focus Area 3) consists of **TWO STRATEGIC OBJECTIVES**.

Table 7 presents a summary of these, and their detailed activities can be found **Appendix A.**

Table 7: Water Sensitive Design Strategic Focus Area – Strategic Objectives, Outcomes and High-level Indicators.

Strategic Focus Area 3: WATER SENSITIVE DESIGN			
No.	**Strategic Objective**	**Outcome**	**High-level Indicator**
3.1	Raise awareness regarding the principles and benefits of WSD, as well as any shortcomings.	Increased recognition of the need for WSD design principles.	Number of government departments sensitised on the importance of implementing WSD.
3.2	Mainstream WSD principles into local, provincial and national level planning.	Increased uptake of WSD principles into government planning.	Number of government departments incorporating or strengthening WSD components in their planning.

Objective 3.1: Raise awareness regarding the principles and benefits of WSD, as well as any shortcomings

GESI Pillars				
1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges
				

The CoCT WSC benchmarking study (Section 3.7) highlighted the critical role that WSD plays in promoting adaptive infrastructure, ensuring quality urban spaces, improving ecological health, improving human capital and achieving equity of essential services in an urban environment (Zutari, 2021). It also highlighted the stark contrast between the uptake of WSD and urban water resilience principles in the formal and informal areas of Cape Town (Figure 42). This spatial equity gap is echoed in other towns and settlements across the Western Cape.

There are several opportunities and challenges for equity-based improvements in the mainstream implementation of WSD and green infrastructure in Western Cape towns and settlements, where the spatial equity gap is evident. WSD interventions (such as retention ponds, swales, wetlands, pollutant traps etc.) require open space (Figure 54). Population pressures and limited access to land in the Western Cape results in regular issues with land invasion, challenging the principles of WSD. It is therefore imperative to work with communities to ensure a participatory process where all users reap the rewards. WSD interventions are also particularly important in informal settlements, where homes are often built on steep slopes and in flood prone areas and are at a high risk of flooding.

The proposed activities for this objective are shown below[9]:

- ☐ Advocate for WSD to be included in relevant provincial plans and strategies, e.g. OneHealth approach, Infrastructure framework (flooding, energy savings), Disaster Risk Reduction, Climate change Response Strategy (carbon mitigation).
- ❖ Provide support for the inclusion of vulnerable groups in the decision-making processes for WSD benchmarking and implementation. Care must be taken to ensure a two cities (formal and informal) approach is followed.
- ☐ Advocate for alterative and sustainable sanitation for informal settlements to reduce environmental risk. Incorporate research/pilot sites by WRC and UCT.
- ❖ Design communication and awareness plan to ensure that all members of the community receive appropriate information regarding planning and implementation of Water Sensitive City interventions (in appropriate language, and multiple platforms for communication).

[9] ❖ denotes a GESI specific activity

Source: Hoban (2019)

Figure 54: Examples of WSD principles applied in Australia: swales (top), bioretention systems (middle) and constructed stormwater wetlands (bottom).

Objective 3.2: Mainstream WSD principles into local, provincial and national level planning

GESI Pillars				
1. Access to water, sanitation and eco-system services	2. Hygiene and well-being	3. Challenging norms	4. Creating opportu-nities	5. Building bridges

To raise awareness among communities, it is necessary to support local, provincial and national planning authorities with mainstreaming WSD principles into their designs. Many Western Cape Municipalities signed the **Rawsonville Declaration** at the 2017 Water Indaba, where implementing WSD was one of the items. However, most municipalities have not been yet implemented WSD due to changes in management and leadership, and insufficient technical knowledge. It is necessary to provide the technical support to local government

officials on implementing WSD principles. Likewise, a clear link must be made between provincial, local and national departments on the incorporation of WSD into urban planning, and the relevant communication and cooperation.

The proposed activities under this objective are shown below:

- ☐ Provide support to provincial departments & local municipalities to incorporate WSD into regional strategic planning and urban/municipal planning. Highlight critical links to climate change adaptation and disaster risk reduction.
- ☐ Engage with DWS on reconciliation study for the WCWSS and all towns study.
- ☐ Support literacy of engineers and technical staff in local government on WSD.
- ☐ Support municipalities with benchmarking their urban water resilience and identified opportunities to implement WSD, building on the work done for CoCT.

10. Way forward

10.1. A stepwise approach to sustainable water protection

The WCSWPP is a 5-year plan to support the WCG with achieving the progressive realisation of enhanced ecological infrastructure, improved water quality and implementation of water sensitive design best-practices. To achieve this, the proposed activities under the twelve strategic objectives offer a phased approach to achieving the high-level outcomes, shown in Figure 55. The progress of some Strategic Objectives may be more advanced than others, and these activities will need to be regularly reviewed to align planning with overall progress.

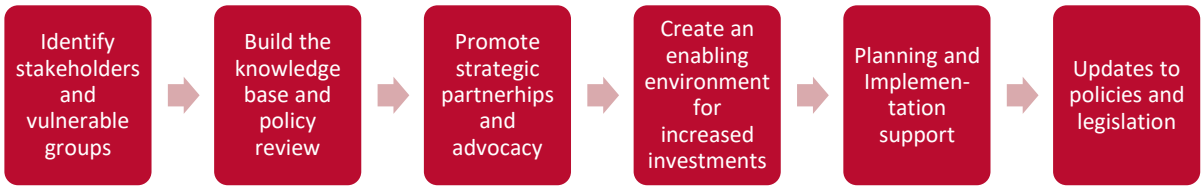
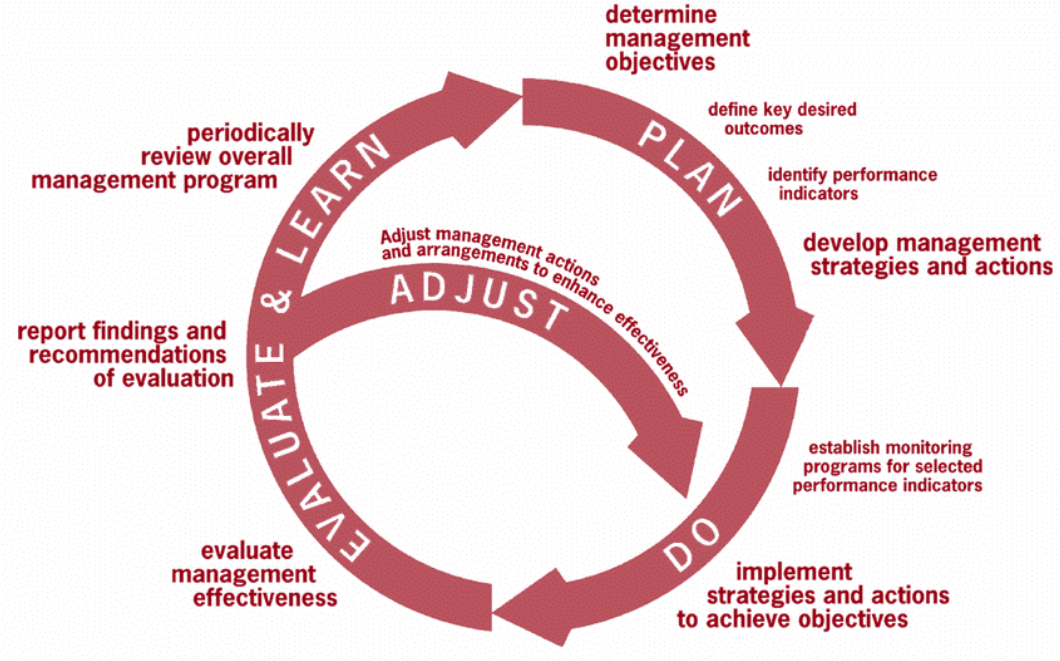


Figure 55: Phased approach to achieving sustainable water management.

In this regard, it is proposed that an adaptive management approach is followed by the DEA&DP and other implementing partners. This approach is used in environmental management, including water resources management, to deal with uncertainty and complexity. It involves making decisions based on the best available information, monitoring the outcomes of those decisions, and adjusting management actions as new information becomes available (Figure 56).

The key principles and components of adaptive management in this context include:

- Clear Objectives that are science-based and reflect societal values.
- Regular Monitoring and Data Collection on relevant indicators to track changes over time.
- Feedback Loops that allow for continuous learning and adjustment.
- Stakeholder Engagement involving a diverse group of stakeholders, including local communities, government agencies, environmental organisations, and industry, in the decision-making process .
- Flexibility to adapt management strategies based on new information, changing conditions, or unexpected events. This may involve changing regulations, infrastructure, or management practices.
- Transparent Communication with stakeholders to keep them informed about the status of the water management programme, the results of monitoring, and any planned adjustments.



Source: TNC (n.d.)

Figure 56: Adaptive management cycle.

10.2. Embedding GESI Pillars and a focus on vulnerable groups

The 2024-2029 WCSWPP is a gender and social inclusion sensitive plan which incorporates a GESI lens for the prioritised strategic focus areas, namely Ecological infrastructure, Water Quality and Pollution, and Water Sensitive Design. Specific GESI activities have been included in the WCSWPP and reinforce measures responsive to factors affecting vulnerable and marginalised groups, particularly:

- discrimination related to access to water resources and associated benefits;
- barriers that exclude or minimise the participation of vulnerable and marginalised groups in water resources management; and
- the unintended consequences of planning, implementation, and monitoring of water resources management initiatives on marginalised and vulnerable groups.

Sustainable water protection programmes require institutional capacity in terms of staff competency to implement and monitor GESI-specific activities, as well as a dedicated budget for these departments. It will be key for the institutions leading the implementation of specific actions to build capacity for incorporating GESI. It will be recommended to pursue diversity among staff, and intentionally recruit and train staff from vulnerable and marginalised groups.

Monitoring and evaluation is key to the success of integrating GESI into sustainable water protection. Prior to implementation of activities, a GESI baseline analysis will need to be conducted to accurately measure the impact on inclusion and social equity. Monitoring and evaluation exercises will also need be carried out during the design and implementation phase which will include engaging implementers and identified vulnerable communities.

A checklist can be used to ensure all recommended GESI actions and considerations are in place. This should be reviewed regularly and collaboratively and updated as required. Each activity is colour-coded against the GESI assessment scale (see Table 8 as an example).

Table 8: Example GESI-Assessment Scale.

Source: THET (n.d.)

GESI-Assessment Scale
GESI Unequal: perpetuates gender and other forms of inequality by reinforcing unbalanced norms, roles and relations.
GESI Blind: Does not consider gender and other forms of inequality.
GESI Sensitive: Considers gender and other forms of inequality but takes no remedial action to address it.
GESI Specific: Considers gender and other forms of inequality and takes remedial action to address it but does not change underlying power relations.
GESI Transformative: Addresses the causes of gender-based and other forms of inequality by transforming harmful norms, roles and relations through the inclusion of strategies to foster progressive changes in power relationships.

10.3. Alignment with the Water Resilience Plan

The WRP (still under development) stems from the WCIDWRP and will be the key water resilience plan for the Western Cape Province, and thus all activities in the WCSWPP will need to feed into this plan (Figure 57). The WRP priority actions for the next 5-years are due to be finalised in 2024, and it is recommended that the WCSWPP be reviewed following this prioritisation exercise. Since the nature of the work being implemented by the DoA, DLG and DEA&DP are very similar, regular engagement between these 3 departments is recommended, under the auspices of the Water Resilience Committee.

Figure 57: Interconnectivity of the DoA, DLG and DoA plans, under the umbrella of the WRP, chaired by the Water Resilience Committee.

In addition to the key stakeholders of the Water Resilience Committee (as shown in Figure 50 in Section 6.2), multiple other partners need to be engaged for the successful implementation of the WCSWPP. The existing steering committee/forums/platforms, as summarised in Table 3 and Table 4, can be leveraged for alignment on the key objectives of the WCSWPP. The key role players and their involvement in the 12 Strategic Objectives is summarised in Table 9

Table 9: Key stakeholders and the Strategic Objectives of the WCSWPP.

Strategic Focus Areas:	1: Ecological Infrastructure					2: Water quality & pollution					3: WSD	
Strategic objectives:	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	3.1	3.2
NATIONAL GOVERNMENT												
DWS												
DFFE												
BOCMA												
SANBI												
SALGA												
DBSA												
PROVINCIAL GOVERNMENT												
DEA&DP												
DLG												
DoA												
DEDAT												
DoI												
DoTP												
DoHW												
EDP												
CapeNature												
LOCAL GOVERNMENT												
Local Municipalities												
CoCT												
RESEARCH INSTITUTIONS												
Universities & Technikons												
WRC												
Green Cape												
OTHER												
NGOs												
Collectives and Collaboratives												
WWF												
TNC												
WesGro												
Citizen Science Association of SA												

10.4. Critical risks

The top ten critical risks identified for successful implementation of the WCSWPP are included in Table 10. The strategic objectives, enablers and activities developed under the updated WCSWMP will all contribute to mitigating these risks. The key mitigating factors to be considered are included in the table.

Table 10: Critical risks and possible mitigation for the successful implementation of the WCSWPP.

NO.	CRITICAL RISKS	MITIGATION
1	Increase in water scarcity due to multiple compounding factors (quantity and quality).	Pollution management and sound catchment management principles should remain at the forefront of this plan and all future work to be implemented by relevant partners.
2	Insufficient investment in Ecological Infrastructure.	A strong business case can made for investment in ecological infrastructure, and many studies have shown this (as summarised in this plan). Building on previous studies, a strong business case can help leverage investments and elevate the importance of ecological infrastructure to that of traditionally preferred grey infrastructure.
3	Rapid population growth and migration to the Western Cape.	Local, provincial and national government institutions will need to work closely together to ensure adequate spatial planning and implementation of critical infrastructure projects. This rapid growth also provides a unique opportunity to embed WSD and other resilient design methods.
4	Political instability and social unrest	Using the adaptive management cycle, organisations will need to continue understanding political risk factors, assessing the political environment, developing contingency plans, engaging local partnerships, and establishing strategic partnerships to mitigate the effects of political instability and social unrest on their operations.
5	Lack of integrated and strategic planning.	The WCSWPP and WCIDWRP should be implemented together under the greater water resilience plan, to ensure that water quantity and quality concerns are addressed concurrently.
6	Lack of capacity and (permanent) personnel in local and provincial government departments.	The relevant local and provincial government departments should advocate for permanent positions where capacity gaps are evident. Redefining the organisational organogram and drafting clear responsibilities and terms of service will enable government staff to focus on priority programmes, such as the BRIP and water quality monitoring. Ensuring that staff are contracted into permanent positions will decrease the risk of losing institutional knowledge and maximise efforts.
7	Lack of operational funding for DEA&DP to implement, monitor, and maintain the WCSWPP.	Many of the strategic objectives and activities in the WCSWPP support the mandate and strategies of the DoI, DoHW and other departments. Sharing ownership of these activities encourage other departments to help fund the implementation, monitoring and maintenance.

NO.	CRITICAL RISKS	MITIGATION
		For example, the activities under Focus Area 2 align closely to the activities under the DoHW's OneHealth Programme.
8	Limited and/or disrupted project funding.	Considering alternative funding sources not reliant on government coffers (such as private sector) will be key to increasing the investment in Ecological Infrastructure.
9	Lack of collaboration between different spheres of government and different departments	Effective and meaningful collaboration across all spheres of government is central to the success of the WCSWPP. The overarching WRP and its steering committee (chaired by the DLG) will be critical for driving this collaboration.
10	Lack of public and key stakeholder support	The WCSWPP includes numerous activities aimed at engaging public stakeholders and local communities, particularly vulnerable groups. For each strategic objective, community engagement is typically one of the first short term activities to be implemented. These should be considered as a priority.

10.5. Implementation plan

To ensure that the update Plan becomes embedded across government departments, the proposed implementation timeline in Table 11 identifies the initial activities required to establish the new Plan and manage it in an adaptive way. The actual implementation of activities under the three strategic focus areas will also be impacted by resources available in the annual budget for each department and the ability to align implementation with other programmes.

The greatest threat to the success of implementing the WCSMPP is a lack of resources and expertise. These needs to a be priority along with aligning this with the water resilience plan.

Table 11: Implementation timeline for the 2024-2029 WCSWPP.

ACTIVITY	DATE
Identify champions for the 3 Strategic Focus Areas	March 2024
Update the WCSWPP based on the key actions identified in the updated WRP	April 2024
Finalise Year 1 priority activities	May 2024
Identify priority activities for the coming year.	November each year
Annual review of Strategic Focus Areas, Objectives and Activities, following an adaptive governance approach.	November each year
Incorporate activities into Annual Performance Plan, with relevant budgets captured on the Medium Term Expenditure Framework.	February each year

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Appendix A

The details of the proposed actions are included below.

				Gender, Equity and Social Inclusion (GESI) specific activities		Timeframes				
No.	Objective	Outcome	High-level indicator	Proposed Activities	Proposed Indicator	Short-term (1-2 yrs)	Medium-term (3-5 yrs)	Long-term (>5 yrs)	Overall Lead	Other stakeholders
FOCUS AREA 1: ECOLOGICAL INFRASTRUCTURE										
1.1	Improve the progressive uptake of EI into local level planning.	Municipalities and other local organisations will have a better understanding of the importance and benefits of EI for water resilience that will translate into local planning.	Municipalities and local organisations that have enhanced their knowledge and implementation of EI principles and practices.	Identify local level forums/committee to raise awareness regarding EI and NBS principles and practices. Vulnerable groups (such as farm workers and informal settlement dwellers) should be represented.	Suitable forums/committees identified.				DEA&DP	Municipalities; NGOs; relevant WCG departments
				Use local level forums/committees to raise awareness among local government officials and other local partners and communities on the value of nature-based solutions and ecological infrastructure. **Implemented under the EIIF Implementation and Monitoring Plan.*	No. Forums/committees actively engaged.				DEA&DP	Municipalities; NGOs; DFFE; relevant WCG departments
				Identify priority EI interventions linked to critical water resources, water supply infrastructure and vulnerable communities, that feed into Ecological Infrastructure Management Plans or Programmes at a local-level.	No. Ecological Infrastructure Management Plans or Programmes.				Municipalities	DEA&DP; DLG
				Provide capacity building and support to municipalities on the use of existing EI information and tools (such as resource protection plans and IAP prioritisation plans) to update their MSDFs, IDPs, WSDPs and other municipal guidelines and plans. Areas with critical water resources, water supply infrastructure and vulnerable communities should be prioritised.	No. Municipalities supported.				DLG	DEA&DP; DFFE; Municipalities
				Develop a set of generic by-laws on the incorporation of EI and NBS services into local municipal by-laws. This will contribute to the generic by-laws on alternative water use developed as part of the WRP.	Set of generic by-laws on EI and NBS.				DEA&DP	DLG; DWS; DFFE
				Provide capacity building and support to municipalities on adopting legislative tools (such as by-laws) to support the enforcement of EI and NBS.	No. Municipalities supported.	-	-		DLG	DEA&DP; DFFE; Municipalities
1.2	Improve EI monitoring and knowledge sharing across institutions.	Local, provincial and national government institutions will be well informed on the status of EI in the Province, allowing them to partner effectively and implement programmes that complement one another.	Diversity and number of local, provincial and national organisations communicating on EI, supported by good monitoring and data	Use the EIIF platform to continue promoting strong communication between the WCG departments, DWS, DFFE, CN, BOCMA and other relevant partners.	No. Partners participating in the EIFF platform.				DEA&DP	All parties involved in EI management and restoration efforts.
				Advocate for the proactive monitoring of the physical, economic and social impacts of EI management.	No. Partners tracking progress of EI management across a range of physical and socio-economic parameters.				DEA&DP	All parties involved in EI management and restoration efforts.
				Integrate the outcomes of the Berg Olifants CMS (currently under development) into the Water Resilience Plan and WCSWPP among others.	Integration of the CMS into the WRP, WCSWPP and other plans.				BOCMA	DLG; DEA&DP
				Integrate IAP and other EI spatial information into the PSDF.	Degree to which EI is integrated into the PSDF.				DEA&DP	DLG; DFFE
				Support the development of a provincial tracking tool to monitor the physical, economic and social impacts of EI management (such as IAP clearing efforts). **Implemented under the EIIF Implementation and Monitoring Plan.*	Prototype tracking tool.				DEA&DP??	All parties involved in EI management and restoration efforts.
1.3	Improve vulnerable groups' involvement in and access to sustained benefits that flow from EI investment and management.	By engaging in EI interventions, vulnerable groups will have increased and sustained access to the benefits of EI investment and management, leading to improved livelihoods, reduced poverty, and enhanced resilience to climate-related risks	Number of vulnerable communities engaging in EI interventions.	Partner with local NGOs to drive EI programmes that are financially resilient and do no harm on local communities.	No. Long-term partnerships developed.				NGOs	DEA&DP; DFFE
				Facilitate and connect local NGOs to EI investment opportunities within government and with external funders.	No. Long-term partnerships developed.				DEA&DP	NGOs; funders
				Advocate for EI implementing partners to engage vulnerable communities in IAP management (training in removal, monitoring, and maintenance), and riparian bank and wetland rehabilitation.	No. Advocacy engagements held.				DEA&DP	All parties involved in EI management and restoration efforts.
				Support learning events between women, emerging farmers, and other vulnerable groups working on IAP control for catchment conservation, water security, and biodiversity protection.	No. Learning events.				DEA&DP	All parties involved in EI management and restoration efforts.
				Provide training to EI implementing partners on incorporating gender and social equity considerations into planning, implementation, and monitoring activities.	No. Training sessions.				DEA&DP	All parties involved in EI management and restoration efforts.

				Gender, Equity and Social Inclusion (GESI) specific activities		Timeframes				
No.	Objective	Outcome	High-level indicator	Proposed Activities	Proposed Indicator	Short-term (1-2 yrs)	Medium-term (3-5 yrs)	Long-term (>5 yrs)	Overall Lead	Other stakeholders
				Build entrepreneurial capacity through SMME incubation for practitioners operating in the EI space (e.g. transforming the by-products of IAP clearing into fuel sources).	No. SMMEs developed in EI.				DEDAT	All parties involved in EI management and restoration efforts.
1.4	Create an enabling environment for increased investments in EI.	A strong enabling environment will lower the investment risks and encourage EI investment from public and private sector partners.	Number of public and private sector partners interested in investing in Ecological Infrastructure	Support and promote research that demonstrates the social and economic benefits of investing in ecological infrastructure, including the Water Hub.	No. Research projects supported.				Universities	DEA&DP; CoCT
				Look for applications of some of the technologies being tested at the Water Hub and other initiatives applied in municipalities (such as George Municipality).	Opportunities scoped in local municipalities.				DLG	Universities; Municipalities; DEA&DP
				Identify opportunities for demonstrating how investing in EI is critical to supporting the objectives of other provincial and municipal strategies and policies, especially related to health, infrastructure, and disaster risk reduction.	High-level policy alignment.				DoI and DoHW	DEA&DP; DLG; Municipalities
				Continue documenting the success stories of women, youth and marginalised groups involved in EI restoration activities. These can be leveraged to advocate for a blended finance approach.	Media publications.				DEA&DP	NGOs
				Amend the EIIF to better reflect the potential benefits of investing in EI, e.g. the link with agricultural needs, human health, socio-economic growth.	Updated EIIF.				DEA&DP	DoA; DoI, DoHW
				Support the development of a high-level dashboard to communicate water supply risk from IAPs and benefits from IAP clearing and EI interventions to decision makers and funders.	Prototype dashboard.				DWS	DEA&DP; DFFE
1.5	Facilitate the development of blended finance schemes for investment in EI.	Blended finance opportunities will facilitate increased investments in EI interventions, supporting a shift away from solely government-dependent opportunities.	Diversified and increased investments in EI	Identify potential funders and funding mechanisms for EI in the Western Cape. **Implemented under the EIIF Implementation and Monitoring Plan.*	No. Funding sources identified.				EDP	DEA&DP
				Raise awareness about water funds and other opportunities for public and private sector investments in EI including lessons learnt from the GCTWF. **Implemented under the EIIF Implementation and Monitoring Plan.*	No. Partners engaged with.				EDP	DEA&DP; DoA; CoCT; TNC
				Continue supporting partnership building with the private sector for improved EI, resilience and sustainability, e.g. Biodiversity Collectives, SMMEs, for EI. **Implemented under the EIIF Implementation and Monitoring Plan.*	No. Partners engaged with.				DEA&DP	EDP
				Leverage information from previous studies (such as the DEA&DP economic valuation studies, and water quality & IAP monitoring data) to develop business cases for new funding opportunities.	No. Business cases developed.				EDP	DEA&DP
				Advocate for water resources management and conservation organisations to build internal capacity on incorporation of GESI into roll-out and scaling-up of nature-based solutions through water funds and other mechanisms.	No. Engagements.				DEA&DP	DWS; SALGA; CapeNature; SANParks
FOCUS AREA 2: WATER QUALITY AND POLLUTION MANAGEMENT										
2.1	Build the knowledge base regarding emerging contaminants and pesticides in the WC and potential risk management options.	A better understanding of critical hotspots and emerging WQ and pesticide risks, and potential tools for risk management	Incremental risk-based approach to monitoring emerging contaminants and pesticides in the Province	Identify stakeholders involved in the monitoring of emerging contaminants and pesticide in the Province and initiate discussions for improved co-ordination.	Stakeholder register drafted.				DEA&DP	DFFE; DWS
				Initial mapping of potential hotspots for pesticides and emerging contaminants based on existing data, e.g. Contaminants of Emerging Concern Knowledge Hub and spatial mapping of high risk activities (e.g. landfill sites, WWTWs).	First order hotspot map developed.				DEA&DP	DFFE; DWS
				Identify and map vulnerable communities (such as farm workers) that are at high risk of exposure to pesticides and emerging contaminants. This will form the basis for a targeted pesticide monitoring programme for the Province.	Map or report on communities vulnerable to pesticide risks.				DoHW	DEA&DP; DFFE; DWS

				Gender, Equity and Social Inclusion (GESI) specific activities		Timeframes				
No.	Objective	Outcome	High-level indicator	Proposed Activities	Proposed Indicator	Short-term (1-2 yrs)	Medium-term (3-5 yrs)	Long-term (>5 yrs)	Overall Lead	Other stakeholders
				Review global and national standards and potential regulatory tools (e.g. NEMA, RQOs) that could be used for managing and reducing the risk of pesticides and emerging contaminants in the Western Cape.	Review recommendations drafted.				DEA&DP	DFFE; DWS
				Develop a targeted pesticide and WQ monitoring plan for the Province, in collaboration with key stakeholders and potential implementing partners.	Monitoring plan developed.				DEA&DP	DFFE; DWS
				Provide training to vulnerable communities on the risk of pesticides and emerging contaminants, their rights and responsibilities for lowering their risk.	No. Vulnerable communities trained and engaged.				NGOs	DEA&DP; DLG
				Start implementing the targeted pesticide and WQ monitoring plan, and continuously monitor and manage the data and information.	No. Sites monitored.				DEA&DP	DFFE; DWS; Municipalities
				Update hotspot map for pesticides and emerging contaminants based on data from targeted pesticide monitoring combined with possible modelling.	Hotspot map revised.				DEA&DP	DFFE; DWS
				Adopt pesticide risk assessment and management tools (such as PRIMET) for the Western Cape context. Lessons learnt from other areas in South Africa.	Pesticide risk tool adapted to the WC context.				DFFE	DEA&DP; DWS
				Capacity building for local municipalities/provincial government on emerging contaminants and pollution, as well as relevant management tools.	No. Municipalities engaged with.				DFFE	DLG; DEA&DP
				Develop and adopt relevant policies and regulatory tools for improved management of emerging contaminants and pesticides in the Western Cape.	Adoption of relevant policy/regulation.				DEA&DP	DFFE; DWS
2.2	Increase coordination and communication for water quality and pollution monitoring in the Western Cape through strategic partnerships.	Strategic partnerships are mobilised for improved coordination and communication in the Province, thus creating an enabling environment for increased investments in WQ monitoring	Variety and number of stakeholders engaged in dialogue or activities relating to WQ and pollution monitoring and restoration activities in the WC.	Improve collaboration with DWS, CapeNature, SANBI, SAEON, Citizen Science Association and other agencies interested in WQ monitoring.	No. Strategic partnerships maintained or initiated.				DEA&DP	Various
				Identify and map communities that may be vulnerable to increasing water quality risks (including women, children, disabled, informal dwellers, farmworkers). Can be combined with pesticide risk mapping.	Map or report on communities vulnerable to general and environmental WQ risks.				DoHW	DEA&DP; DFFE; DWS
				Provide support to local organisations from vulnerable communities to conduct water quality and well-being awareness campaigns in affected communities.	No. Community groups supported.				DoHW	DEA&DP; DFFE; DWS; Municipalities; NGOs
				Communication of the economic risks from poor WQ to key economic players and use this to get additional support for increased monitoring of WQ.	No. Economic partners engaged.				EDP	DEDAT; WesGro; DoA; DEA&DP
				Review and contribute data to the Freshwater Biodiversity Information System or other shared water quality data portals	Data shared.				DEA&DP	Relevant partners
				Support DWS in developing an integrated monitoring strategy at national and provincial/CMA level to co-ordinate monitoring programmes and ensure standardisation of methods and quality of data (including the development of a centralised WQ information management system).	Strategic support for DWS.				DWS	DEA&DP
				Produce an internal, annual WQ (i.e., state of the rivers) report for WCG monitored river and estuary sites (in partnership with BOCMA).	Annual report or publication.				DEA&DP	BOCMA
				Include or elevate WQ risks in the provincial Risk and Vulnerability reporting (~ every 3 years) and highlight the importance of improved WQ monitoring.	WQ risks included in the provincial Risk and Vulnerability report.				DoTP	DEA&DP
				Co-develop, advocate for and implement (in collaboration with local organisations including schools) a citizen science approach to WQ monitoring that transcends cultural, social, economic and gender boundaries.	Strategic citizen science approach developed.				DEA&DP	Citizen Science Association of South Africa

				Gender, Equity and Social Inclusion (GESI) specific activities		Timeframes				
No.	Objective	Outcome	High-level indicator	Proposed Activities	Proposed Indicator	Short-term (1-2 yrs)	Medium-term (3-5 yrs)	Long-term (>5 yrs)	Overall Lead	Other stakeholders
2.3	Increased support for routine monitoring of priority rivers and estuaries.	By advocating for the importance of WQ monitoring, provincial support will increase and WQ monitoring will clearly be linked to provincial level objectives.	Number of monitoring sites increased and linked to provincial level objectives (health, economy etc.)	Develop a paper on WQ risks to human health, livelihoods and the economy (i.e. demonstrate the value of monitoring through pollution reduction). Make a clear link with the objectives of the G4J, One-Health, and DRR strategies.	White paper or policy brief.				DEA&DP	DEDAT, DLG, DoTP, DoHW
				Advocate for improved flow (and water quality) monitoring in highly stressed water catchments, e.g. Berg River estuary Verlorenvlei, to support compliance monitoring of RQOs etc. (to be led by DWS).	No. Stressed catchments with improved flow monitoring.				DWS (through the Integrated Water Monitoring Committee)	DEA&DP, DLG
				Through the WRP steering committee, advocate for support from other WCG departments for WQ monitoring. Make a clear link with the ERR.	No. WCG departments engaged with regarding WQ.				DEA&DP	Relevant WCG departments
				Confirm priority estuaries and rivers for additional monitoring.	No. Additional monitoring sites prioritised.				DEA&DP	DWS (Note: as of Jan 2024, DWS is updating all guidelines for estuary and river management).
				For key programmes (such as OneHealth and Infrastructure Plan), identify and integrate water quality risks from industry, agriculture, and sanitation affecting vulnerable groups (including women, children, disabled, informal dwellers, farmworkers).	Sanitation risks incorporated into strategic provincial plans.				DoI; DoHW	DEA&DP; DLG
				Establish new water quality monitoring sites for priority estuaries and rivers (including nutrient analysis) across the Western Cape.	No. Samples collected.				DEA&DP	
				Building on the One Health Plan, conduct an assessment on the related cost incurred by the health sector as a result of vulnerable groups being exposed to sanitation infrastructure related risks.	Paper on costs and health indicators linked to sanitation risks.				DoHW	DEA&DP; DLG
2.4	Improve the integration of water quality and pollution risks into provincial and municipal planning	Increased uptake of WQ and pollution risks into various levels of planning.	Number of plans incorporating WQ risk.	Provide information and examples of applications that could support municipalities with managing wastewater pollution spills during load shedding.	No. Municipalities supported.				Municipalities	DLG; DEA&DP
				Continued support for municipalities with obtaining and integrating spatial data of pollution and environmentally sensitive areas into their MSDFs, WSDPs.	No. Municipal spatial plans with improved water risk information.				Municipalities	DLG; DEA&DP
				Develop a pollution response strategy for addressing industrial and agricultural pollution hot-spots and emergencies in the Province.	Sectoral pollution response plans developed.				DoA & DEDAT	DEA&DP
				Develop an annual implementation plan to mitigate pollution (through enforcement and policy review).	Implementation plan.				DEA&DP	DWS
2.5	Targeted enforcement relating to pollution and water quality risks.	The risks of poor water quality and pollution will be reduced by ensuring that action is taken against polluters.	Number of successful pollution and WQ enforcements.	Continue collaboration with DWS to support enforcement of the RQOs through routine monitoring and pollution blitzes and other methods.	No. Enforcements.				DWS	DEA&DP; BOCMA
				In collaboration with DWS and CMAs, identify sectors for targeted enforcements on an annual basis.	No. Enforcements.				DWS	DEA&DP; BOCMA; DEDAT
				Investigate approaches to improve efficiency and resources in responding to pollution events/notices and enforcement, particularly at municipal level.	Recommendations on improving pollution enforcement.				DLG	DEA&DP; DWS
				Engage local communities, schools, and NGOs to report pollution incidents, including improved communication channels to report pollution from WWTW and other infrastructure, including the use of social media, hotlines etc.	No. Communities, schools and NGOs engaged with pollution monitoring and reporting.				NGOs	DEA&DP; DLG
FOCUS AREA 3: WATER SENSITIVE DESIGN										
3.1	Raise awareness regarding the principles and benefits of Water Sensitive	Increased recognition of the need for WSD design principles	Number of government departments sensitised on the importance of implementing WSD	Advocate for WSD to be include into relevant provincial plans and strategies, e.g. OneHealth approach, Infrastructure framework (flooding, energy savings), Disaster Risk Reduction, Climate change Response Strategy (carbon mitigation).	No. New/existing strategies/plans incorporating WSD principles.				DEA&DP	DoI; DoHW; other government departments

				Gender, Equity and Social Inclusion (GESI) specific activities		Timeframes				
No.	Objective	Outcome	High-level indicator	Proposed Activities	Proposed Indicator	Short-term (1-2 yrs)	Medium-term (3-5 yrs)	Long-term (>5 yrs)	Overall Lead	Other stakeholders
	Design (WSD), as well as any shortcomings.			Provide support for the inclusion of vulnerable groups in the decision-making processes for WSD benchmarking and implementation. Care must be taken to ensure a two cities (formal and informal) approach is followed.	No Vulnerable communities involved in decision making process for WSD.				DoHW; NGOs	DEA&DP; DLG; CoCT
				Advocate for alternative and sustainable sanitation for informal settlements to reduce environmental risk. Incorporate research/pilot sites by WRC and UCT.	No. Informal settlements engaged.				SALGA; DLG; DoI	Universities; WRC; DEA&DP; DWS
				Design communication and awareness plan to ensure that all members of the community receive appropriate information regarding planning and implementation of Water Sensitive City interventions (in appropriate language, and multiple platforms for communication).	Communication and awareness plan developed.				Municipalities; DoI	DLG; DEA&DP
3.2	Mainstream WSD principles into local, provincial and national level planning.	Increased uptake of WSD principles into government planning	Number of government departments incorporating or strengthening WSD components in their planning.	Provide support to provincial departments & local municipalities to incorporate WSD into regional strategic planning and urban/municipal planning. Highlight critical links to climate change adaptation and disaster risk reduction.	No. Government departments.				DLG	Municipalities; DEA&DP; DoI
				Engage with DWS on reconciliation study for the WCWSS and all towns study.	No. Engagements with DWS.				DWS	DEA&DP; DLG
				Support literacy of engineers and technical staff in local government on WSD.	No. Municipalities receiving capacity building.				DLG	Municipalities; DEA&DP; DoI
				Support municipalities with benchmarking their urban water resilience and identified opportunities to implement WSD, building on the work done for CoCT.	No. Towns or municipalities supported with benchmarking.				Municipalities	DLG; DEA&DP; CoCT

Email: Catherine.Bill@westerncape.gov.za

Tel: +27 21 483 2760

Department of Environmental Affairs and Development Planning

Chief Directorate: Environmental Quality

Directorate: Pollution and Chemicals Management

www.westerncape.gov.za

Department of Environmental Affairs and Development Planning: General Enquiries

Email: **enquiries.eadp@westerncape.gov.za**

Tel: +27 21 483 4091 **Fax:** +27 21 483 3016

Western Cape Government