

NATIONAL WATER AND SANITATION MASTER PLAN

VOLUME 1: **CALL TO ACTION** Version 10.1

**Ready for the Future
and Ahead of the Curve**

31 October 2018

WATER IS LIFE - SANITATION IS DIGNITY



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



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List of Acronyms

AMD	Acid Mine Drainage
COGTA	Department of Cooperative Governance and Traditional Affairs
CMAs	Catchment Management Agencies
DPME	Department of Planning, Monitoring and Evaluation
DWS	Department of Water and Sanitation
DAFF	Department of Agriculture, Forestry and Fisheries
DoE	Department of Energy
DIRCO	Department of International Relations and Cooperation
DM	District Municipality
DMR	Department of Mineral Resources
DST	Department of Science and Technology
DTI	Department of Trade and Industry
DRDLR	Department of Rural Development and Land Reform
ELU	Existing Lawful Use
EWSETA	Energy and Water Sector Education and Training Authority
GWS	Government Water Scheme
IB	Irrigation Board
IUCMA	Inkomati-Usuthu Catchment Management Agency
LHWP	Lesotho Highlands Water Project
LWRMI	Local Water Resource Management Institution
MFMA	Municipal Finance Management Act
MISA	Municipal Infrastructure Support Agent
MuSSA	Municipal Services Self-Assessment
NDP	National Development Plan
NGO	Non-Governmental Organisation
NMIU	National Monitoring & Implementation Unit
NT	National Treasury
NWA	National Water Act
NW&SMP	National Water and Sanitation Master Plan
NWRS	National Water Resource Strategy
NWRSA	National Water Resources and Services Authority
NWRSR	National Water Resources and Services Regulator
NWSRSS	National Water and Sanitation Resources and Services Strategy
PFMA	Public Finance Management Act
RDI	Research, Development and Innovation

RDP	Reconstruction and Development Programme
SAAWU	South African Association of Water Utilities
SABS	South African Bureau of Standards
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute
SAWS	South African Weather Service
SOE	State Owned Enterprise
TCTA	Trans Caledon Tunnel Authority
WRC	Water Research Commission
WRMI	Water Resource Management Institution
WSA	Water Services Authority
WSP	Water Services Provider
WUA	Water User Association
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works

CALL TO ACTION

The Constitution of South Africa contains several provisions that give direction to the water and sanitation sector.

Firstly, the values of the Constitution include those of human dignity, the achievement of equality and the advancement of human rights and freedoms.

Secondly, the Constitution states 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

- i) prevent pollution and ecological degradation*
- ii) promote conservation; and*
- iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

Thirdly, the Constitution states that everyone has the right to have access to sufficient food and water.

Fourthly, the Constitution states that the property clause may not impede the state from taking measures to achieve land, water and related reform, to redress the results of past racial discrimination.

These constitutional imperatives, combined with the national water and sanitation policy papers, the National Water Act and the Water Services Act, give the mandate to the water sector to:

- *Provide universal and equitable access to reliable water supply and sanitation services*
- *Protect, manage and develop the nation's water resources in a manner that supports justifiable and ecologically sustainable economic and social development*
- *Transform access to water to redress the racial imbalances created by apartheid.*

Despite these constitutional provisions, the country is facing significant challenges in achieving this mandate.

1. Addressing the crisis

South Africa is facing a water crisis caused by insufficient water infrastructure maintenance and investment, recurrent droughts driven by climatic variation, inequities in access to water and sanitation, deteriorating water quality, and a lack of skilled water engineers. This crisis is already having significant impacts on economic growth and on the well-being of everyone in South

South Africa CAN avoid a projected **17%** water deficit by 2030 by taking bold action today!



Over 3 million people still do not have access to a basic water supply service and 14.1 million people do not have access to safe sanitation.

Only 64 % of households have access to a reliable water supply service

56% of waste water treatment works and 44% of water treatment works are in a poor or critical condition. 11% are dysfunctional

More than 50% of South Africa's wetlands have been lost, and of those that remain, 33% are in poor ecological condition

Only 5% of agricultural water used is by black farmers

41% of municipal water does not generate revenue. 35% is lost through leakage

Municipalities are losing about 1660 million m³ per year through non-revenue water. At a unit cost of R6/m³ this amounts to R9.9 billion each year

R33 billion more is needed each year for the next 10 years to achieve water security

Africa. These impacts will be exacerbated if it is not addressed. In April 2017 14,1 million people still used sanitation facilities below the Reconstruction and Development Programme (RDP) standard. Only 10,3 million households (64%) have access to reliable water supply.

Approximately 56% of the over 1 150 municipal wastewater treatment works (WWTWs) and approximately 44% of the 962 water treatment works (WTWs) in the country are in a poor or critical condition and in need of urgent rehabilitation and skilled operators. Some 11% of this infrastructure is completely dysfunctional.

Between 1999 and 2011 the extent of main rivers in South Africa classified as having a poor ecological condition increased by 500%, with some rivers pushed beyond the point of recovery.

South Africa has lost over 50% of its wetlands, and of the remaining 3.2 million hectares (ha), that is, one third are already in a poor condition.

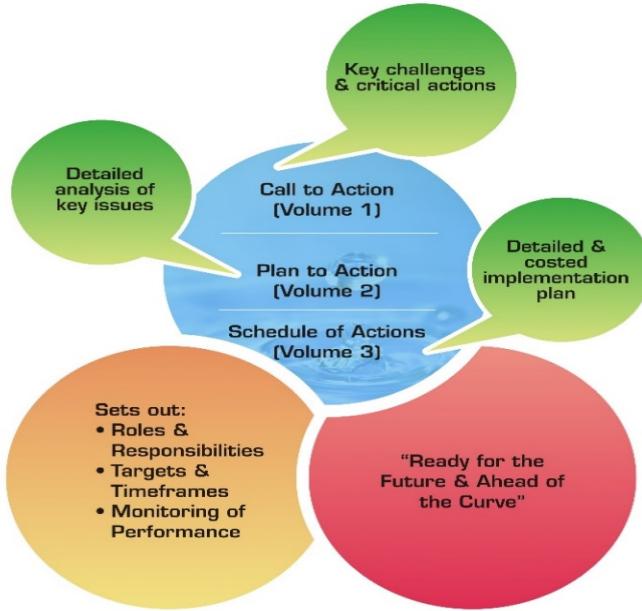
Only 5% of the water that is used in the agricultural sector is used by black farmers.

Water is severely under-priced and cost recovery is not being achieved. To achieve water security, an estimated capital funding gap of around R33 billion per annum for the next 10 years must be closed through, a combination of improved revenue generation and a significant reduction of costs.

This Call to Action of the National Water and Sanitation Master Plan (NW&SMP) is a concise summation of the top priority issues confronting the water and sanitation sector at this time and which seeks to rally all water sector stakeholders in South Africa to work together in order to ensure that the country gets ahead of the curve in relation to both current and future challenges. This includes ensuring that by 2030 and beyond South Africa has a sufficient reserve of supply to take it safely into the future, that accelerated progress towards meeting Constitutional imperatives is made and that service delivery commitments, such as meeting Sustainable Development Goal 6: *Ensure access to water and sanitation for all* is achieved.

In terms of structure, the NW&SMP consists of three volumes:

National Water and Sanitation Master Plan



Volume One of the NW&SMP is this **Call to Action** which sets out the critical priorities to be addressed by the water sector in the period from 2018 – 2030. These priorities are clustered into two sections, namely, Water and Sanitation Management and Enabling Environment. Each of these sections have six sub-sections as indicated in **Figure 1** below. Each section includes the initial identification of critical actions that, when implemented, will have a significant impact on addressing the crisis. These actions are collated at the back of this document for ease of reference.

*The **Call to Action** provided the basis for comprehensive engagement with water sector partners by DWS in late 2017 continuing into 2018 in order to secure stakeholder agreement on the critical challenges confronting the sector at this time [Stakeholder engagement report available from DWS on request].*

Volume 2 of the NW&SMP is the **Plan to Action** which provides the basis for, and a more detailed analysis of, the key issues underpinning the Call to Action.

Volume 3 is a **Schedule of Actions**. The purpose of Volume 3 is to order and define all actions and interventions identified within Volume 1 and Volume 2 of the NW&SMP into annual measurable outcomes inclusive of roles and responsibilities, time frames and associated estimated costs. DWS has worked with key sector partners to develop the first draft of this Volume, and will continue to work with sector partners to refine this schedule, through meaningful engagement. Significant progress has been made to define Key (or Level 1) actions for each area, supported by Supporting (or Level 2) actions. For ease of reference, Level 1 and 2 actions together with the specific numbering for each action, as contained in Volume 3, is recorded in the action summary tables at the end of each section of this document.

The Master Plan also identifies how performance will be monitored. As a plan, rather than a strategy or policy, the prioritised actions with responsibilities are detailed against which relevant players in the

sector can be held accountable by Cabinet, Parliament and the public.

All volumes of the NW&SMP are available for download at www.dws.gov.za

This Master Plan is driven by a sense of urgency and therefore articulates the prioritised actions and investments the country must implement between now and 2030 to overcome challenges and ensure a water secure future supporting inclusive development across the country. This action is also

necessary to ensure that universal sanitation coverage protects the health of our people. Actions have been prioritised according to the level of impact that they are expected to deliver in terms of driving towards a water secure future for all. As the implementation of the NW&SMP will be reviewed and reported on annually, it is considered a 'living plan' and will therefore, be updated utilising an adaptive management approach. The NW&SMP is the implementation plan for the National Water and Sanitation Resources and Services Strategy (NWSRSS)¹ which is reviewed every five years.

In March 2018, the Minister: Water and Sanitation announced his intention to focus the work of the Department on the following five strategic pillars, which confirmed the support of the political leadership of the Department for this ground-breaking initiative. The five strategic pillars are:

- National Water Resources and Services Authority (NWRSA);
- National Water Resources and Services Regulator (NWRSR);
- Water Resources and Services Value Chain;
- **Water Resources and Services Master Plan**; and
- Institutional Rationalisation and Organisational Alignment.

¹ Refer to the NWRS 1 and 2 and the NWRSSS currently under development

In keeping with this Ministerial focus, and following the comprehensive stakeholder engagement on the development of the Master Plan, the Minister: Water and Sanitation tabled the Master Plan for noting by Cabinet on 27 June 2018.

The Master Plan was well-received, with Cabinet also supporting the mobilisation of a detailed planning process in the sector utilising the Phakisa planning methodology. **Cabinet agreed that the NW&SMP will serve as the basis for the Phakisa on Water and Sanitation**, anticipated in late 2018.

The Phakisa on Water and Sanitation will provide the water sector with an opportunity to address the issues confronting the water and sanitation sector in greater depth. The results of this in-depth planning process will be captured in updates to both the NW&SMP and the NWSRSS, and will steer the sector towards a sustainable, equitable and secure water future.

The DWS will work closely with the DPME Phakisa team to mobilise this planning initiative, which also heralds a renewed commitment to the adoption of a sector-wide approach in the water sector. A soon to be established DWS Programme Management Unit (Delivery Unit) will drive the implementation of the Phakisa action plan.

The following actions necessary to give effect to these priorities, are recorded in Volume 3:

About Phakisa ("Hurry up")

The Government of South Africa, led by the Presidency, adopted the Malaysian Big Fast Results (BFR) problem-solving methodology in 2013. The BFR methodology facilitates the development of detailed plans with a strong theory of change, as well as strong monitoring, evaluation, reporting, and accountability frameworks which are essential for the successful implementation of national goals and priorities. The adoption of this methodology is designed to fast track the implementation of solutions on critical delivery issues highlighted in the National Development Plan (NDP). Overall co-ordination of Phakisa is vested in the Department of Performance Monitoring and Evaluation (DPME), who will partner with DWS to mobilise and manage this ground-breaking initiative in the water sector.

Action ²	Responsibility	Completion date
Phakisa on water and sanitation to be held (Volume 3, Action 2.7.1)	DWS, DPME	First quarter 2019/20
Determine cost required to implement NW&SMP and identify where reprioritisation or cost savings can be used to address the NW&SMP priorities (2.7.2)	DWS, WSAs	2019
Appoint skilled Management, Technical and Programme Manager staff for Delivery Unit (2.7.3)	DWS	2019
Monitor, review, evaluate, report on and update NW&SMP (2.7.4)	DWS	Annual report to Parliament

² Where actions apply to more than one chapter, they have been duplicated in the action tables at the end of the relevant chapters. All actions are summarised in a table at the end of the Call to Action, without this duplication.



Figure 1: Overview of the NW&SMP Call to Action structure

2. Building a water secure future

The NW&SMP is based on five key objectives that define a 'new normal' for water and sanitation management in South Africa:

- Resilient and fit-for-use water supply;
- Universal water and sanitation provision;
- Equitable sharing and allocation of water resources;
- Effective infrastructure management, operation and maintenance; and
- Reduction in future water demand.

These five objectives enable the achievement of the National Development Plan's (NDP) Vision for 2030, of affordable and reliable access to sufficient and safe water and hygienic sanitation for socio-economic growth and well-being, with due regard to the environment.

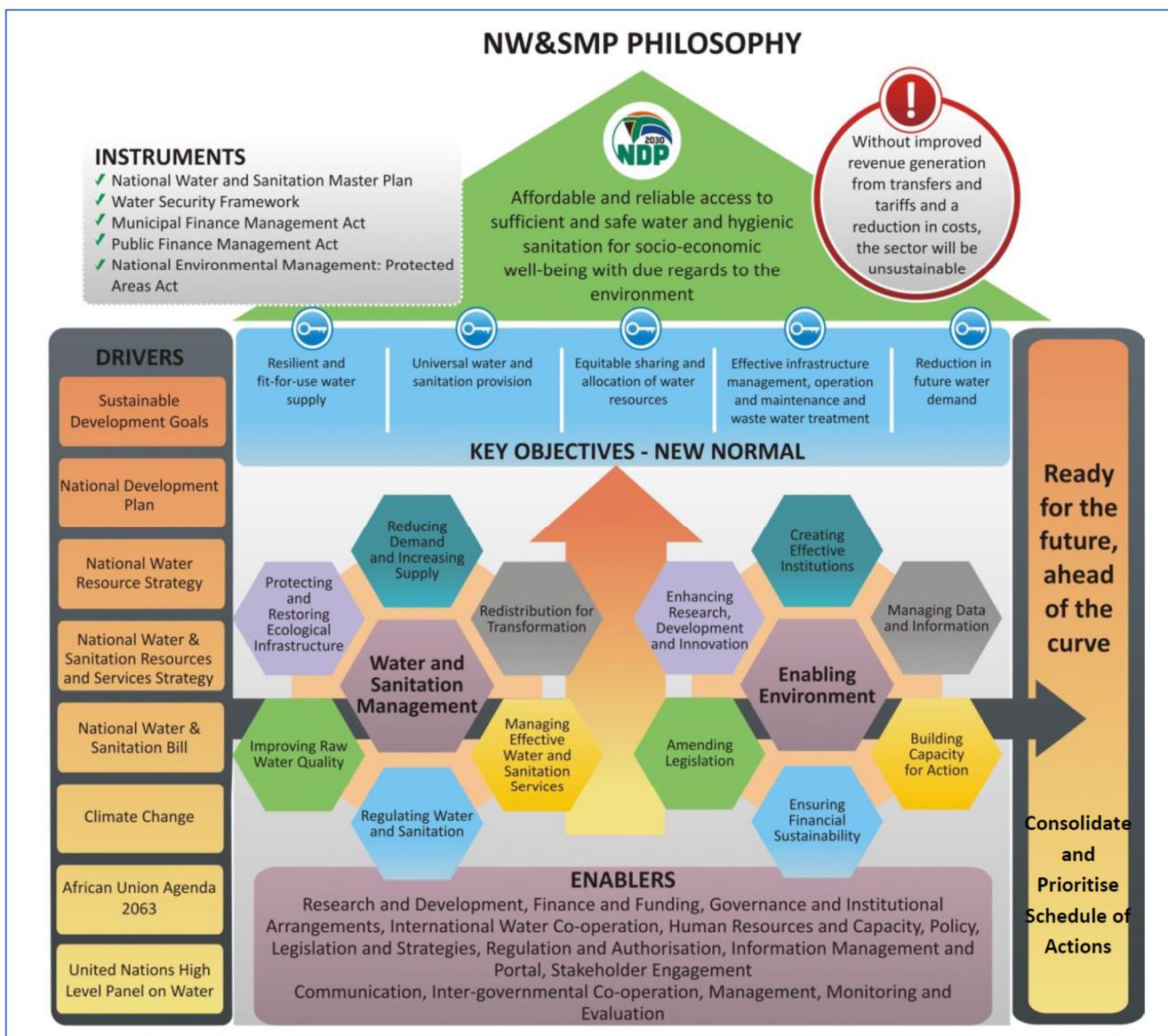


Figure 2: Philosophy of the NW&SMP

Achieving this NDP vision of a water secure future is one of the biggest challenges facing South Africa in the 21st century. It is a critical element of achieving social well-being and sustainable economic growth.

South Africa is facing increasing water demands to meet the needs of a rapidly growing and urbanising population, changing lifestyles, and economic growth. At the same time, climate change is driving the country towards a warmer and drier future, with predicted longer and more extreme droughts, and more intense floods. Climate change means that there will be less water available to meet water needs.

Achieving water security in South Africa requires a new normal: a significant paradigm shift that

- ***recognises the limitations of water availability***
- ***addresses the real value of water***
- ***ensures equitable access to limited water resources***
- ***delivers reliable water and sanitation services to all***
- ***focuses on demand management and alternative sources of water***
- ***considers the impacts of climate change and***
- ***addresses declining raw water quality.***

The new reality:

- Water will become more expensive
- Everyone (except those without access to piped water) **MUST** use less water for the same activities
- Everyone - except the indigent - **MUST** pay for water and sanitation services

To achieve this, decision-making will be based on sound evidence, supported by rigorous research, innovation and appropriate technology development.

The water sector will enforce regulation through accountable and effective leadership, to ensure that the water sector meets the requirements of a current and future South Africa and that demand is brought in line with available water supply.

Working together, government departments, the private sector and civil society will implement the necessary actions to achieve financial sustainability, functional infrastructure and institutions, fair and sustainable water use, and universal water supply and sanitation provision.

Implementation of this plan will enable South Africa to become more resilient to climate change and the increasing intensity of droughts and floods, while meeting the water needs of a growing population and economy.

To achieve water security, all water users in all sectors in South Africa must use water more efficiently, and water use must be addressed in the plans of the municipal, energy, agriculture, forestry, mining and industrial sectors. South Africa has no other option, if the country is to be *READY FOR THE FUTURE AND AHEAD OF THE CURVE*.

To achieve safe sanitation for all and protect the quality of our water resources, all institutions responsible for sanitation services provision must ensure rapid eradication of the backlog, informed choice of appropriate technologies, and effective operation and maintenance of infrastructure.



SECTION 1: WATER AND SANITATION MANAGEMENT

3. Reducing water demand and increasing supply

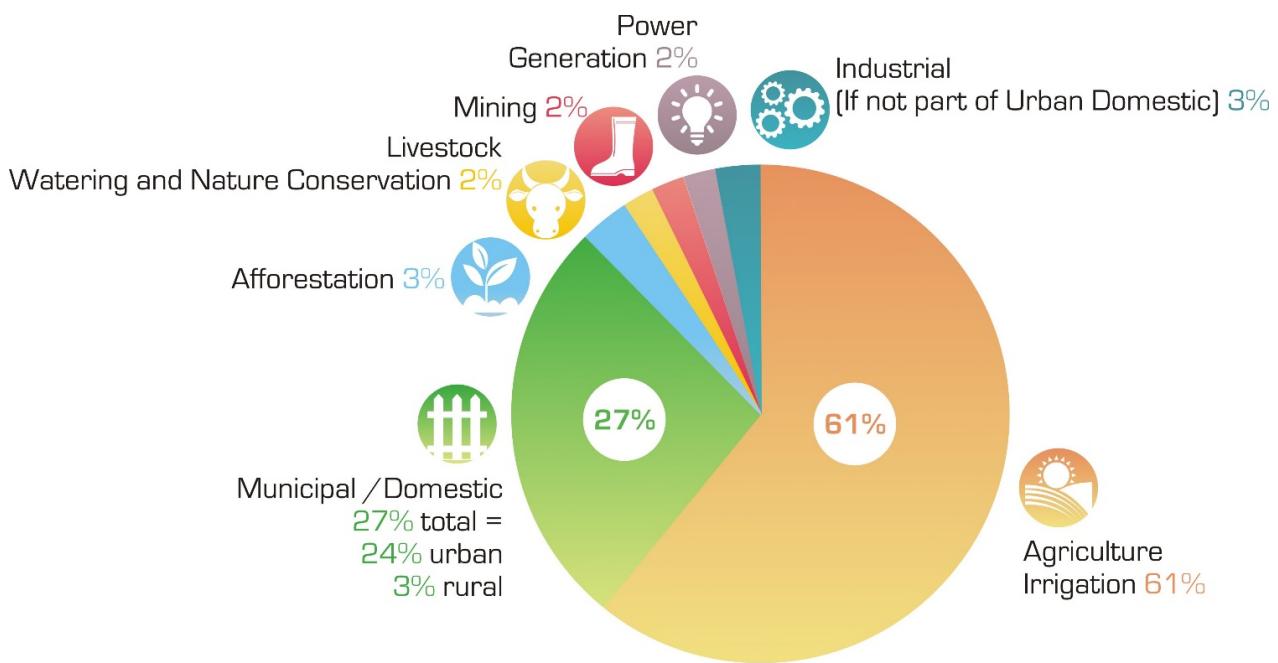
3.1 Status quo

South Africa has an arid to semi-arid climate, with an average annual rainfall of 465 mm (half the world average), producing a total annual runoff of approximately 49 000 million m³/a. The current reliable yield of surface water at an acceptable assurance of supply is approximately 10 200 million m³/a nationally. The combined storage capacity of large dams is in the order of 31 000 million m³.

If demand continues to grow at current levels, the deficit between water supply and demand could be between 2,7 and 3,8 billion m³/a by 2030, a gap of about 17% of available surface and ground water.

The total nationally accessible groundwater potential is about 4 500 million m³/a of which between 2 000 and 3 000 million m³/a is currently being utilised. Of the approximately 5 000 registered dams the vast number (3 832) are small dams (less than 12m) serving farms and municipalities. These smaller dams play a critical role in local water security and climate resilience.

Agriculture is the largest water use at 61% of total water use, followed by municipal use at 27% (including industrial and commercial users provided from municipal systems), with power generation, mining and bulk industrial use, livestock and conservation and afforestation jointly making up the remaining 12% (see Figure 3). The level of assurance at which agricultural water is supplied is lower than that of the other sectors (90%). Water for power generation is seen as strategically important and is provided with the highest assurance of supply (99.5 %) (which translates to 1: 200-year risk of failure).



How we use our water resources in South Africa

Figure 3: Current water use by sector

Agriculture uses the most water in South Africa and pays the lowest tariff

On average, each person in South Africa uses 64 litres per day more than the global average

Municipalities are losing about 1660 million m³ per year through Non-Revenue Water. At a unit cost of R6/m³ this amounts to R9.9 billion each year

Agricultural consumption is largely unmetered, and there are concerns about unauthorised abstraction and water wastage in the sector. In addition, agricultural users pay a much lower tariff than other users of untreated water and the relatively cheap water has not incentivised the adoption of water efficient irrigation practices. However, the agricultural sector is important in terms of jobs and contribution to GDP. The value of primary agricultural production in South Africa was R263,2 billion in 2016.

Average domestic water use³ in South Africa is around 237 litres per person per day, 64 litres per person per day more than the world average of 173 litres per person per day. The high water use is partly due to municipal non-revenue water⁴ which is currently at an unacceptably high 41%. While figures vary greatly between municipalities and services providers, average physical losses in municipal systems are estimated to be around 35%, against a global best practice in the order of 15%.

There is significant opportunity to reduce water requirements in the agricultural and municipal sectors, which are largest and second largest water uses in South Africa respectively. Any percentage reduction in water use in these sectors will therefore

³ This includes industrial water use.

⁴ Non-revenue water includes all water supplied that is not paid for, including physical water losses through leaks in the distribution system, illegal connections, unbilled consumption and billed, but unpaid for water use.

have a significant effect on total water requirements.

DWS, through the Strategic Water Partnership Network (SWPN) has implemented the Water Administration System (WAS) Release Module at several irrigation schemes. With the WAS, it is possible to release the correct amount of water from a source according to demand, thereby reducing wastage.

59 out of 78 large government irrigation schemes submit monthly Water Use Efficiency Accounting Reports which indicate that average water loss in these schemes is around 27%. This is well above the unavoidable seepage and evaporation losses in concrete canals which are about 12% of the total loss.

Achievement of water demand targets in municipalities has been mixed. Figure 4 below indicates the targets and actual achievements for municipalities in eight large water supply systems for 2012 – 2016.

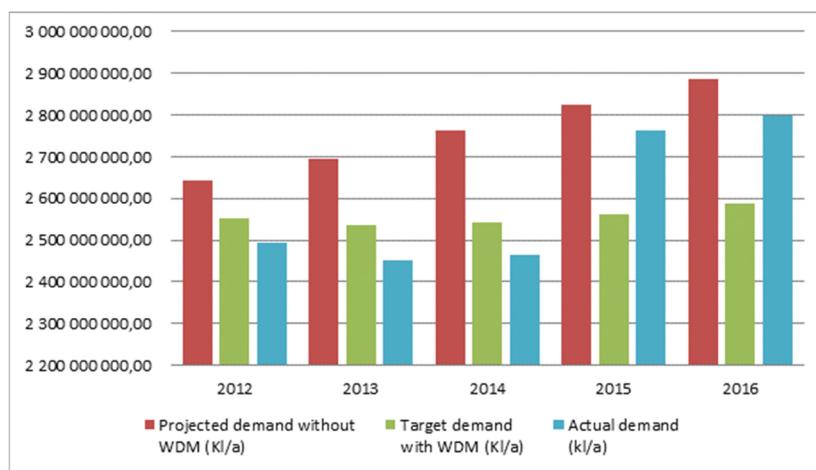


Figure 4: Municipal water use demand targets and actual in eight large water supply systems, 2012 - 2016

Re-use of effluent is becoming more cost effective with advances in technology, and treated effluent from wastewater and acid mine drainage (AMD) is being used to supplement water supply and this can be expanded considerably.

With the cost of desalination decreasing due to advances in technology, desalinated water (sea, brackish groundwater and waste water) is increasingly economically viable. While the utilisation of desalinated sea water is only financially feasible for coastal areas, it will free up surface and ground water for upstream and/or inland use where water is currently transferred or released for use in coastal areas. Desalination also has the potential to add jobs to the Blue Economy.

Water quality and quantity can be further augmented through planning for, restoring and maintaining ecological infrastructure such as strategic water source areas and wetlands, which are currently under-protected and often in poor condition. Investing in ecological infrastructure is often a cost-effective method for enhancing and supporting investment in built infrastructure.

3.2 Drivers

To balance requirements and supply, South Africa will need to **reduce water demand**, as well as **increase supply** for a growing population and economy. The Industrial Policy Action Plan (IPAP) sets out the intentions of South Africa in terms of expanding the manufacturing sector, which will increase water demand in this sector, and which has the potential to increase water pollution if not appropriately regulated.

The provision of waterborne sanitation is unsustainable and South Africa must adopt water-less sanitation technology where appropriate

The projected gap between requirements and supply is driven by low tariffs, inadequate cost recovery, over-consumption, inefficient use, wastage, leakage, inappropriate infrastructure choices (e.g. water borne sanitation in a water scarce country), inadequate planning and implementation, as well as population and economic growth.

Water availability and raw water quality will decline further if the degradation of aquatic ecosystems (including wetlands), poor land use practices, and high levels of water pollution continue.

In addition, climate change is projected to increase the variability of rainfall throughout the country, and to reduce average rainfall, particularly in the western part of the country. Climate change will result in more intense floods and droughts. Climate change may also increase the agricultural demand for water due to higher temperatures, and a reduced ability to rely on rain-fed agriculture.

The total requirements in the country will increase due to population and associated economic growth, but individual users' requirements should be reduced by improving efficiency, adopting new technologies, and reducing losses, especially in the agricultural and municipal sectors, through water awareness, and strict regulation, cost recovery and incentives.

As a target, average domestic consumption must be reduced to 175 litres per person per day by 2025. Further actions linked to reducing demand are addressed in the section on regulation. This must include a focus on water use efficiency, the quality of water and sanitation fittings (to ensure that they are low flow fittings and that they are robust and do not result in premature leakages), and the potential for rainwater harvesting in low income areas. The National Development Plan targets an average reduction in water demand of 15% below baseline levels in urban areas by 2030, where the baseline is taken as year 2012. This plan acknowledges and refers to the targets that have already been set for different catchments through the DWS-led Reconciliation Strategies and All-towns Studies⁵.

On the supply side, there is a need to optimise the water mix which is currently strongly dominated by surface water, with some groundwater and return flows to a water mix that includes increased groundwater use, re-use of effluent from waste water treatment plants, water reclamation, as well as desalination and treated acid mine drainage.

South Africa's dependence on surface water will proportionately decrease over the coming decades (see Figure 5). In the face of climate change, groundwater, which will not experience the increased evaporation that will impact on surface water as temperatures increase, will become increasingly important. Artificial recharge of aquifers will be an important element of water management.

Department of Water and Sanitation developed a National Strategy for Water Re-use (NSWR) in 2011. The intent of the water re-use strategy is to encourage wise decisions relating to water re-use at different scales and levels. The performance of existing wastewater treatment plants in terms of meeting discharge standards and reliability is critical to the successful integration of water reuse into

By 2040, treated acid mine drainage and desalinated seawater will make a significant contribution to South Africa's water mix, ground water usage will increase, and the over-reliance on surface water will reduce.

⁵ http://www.dwa.gov.za/Projects/AllTownsRecStrat_NP/default.aspx

reconciliation strategies and into water supply systems in SA.

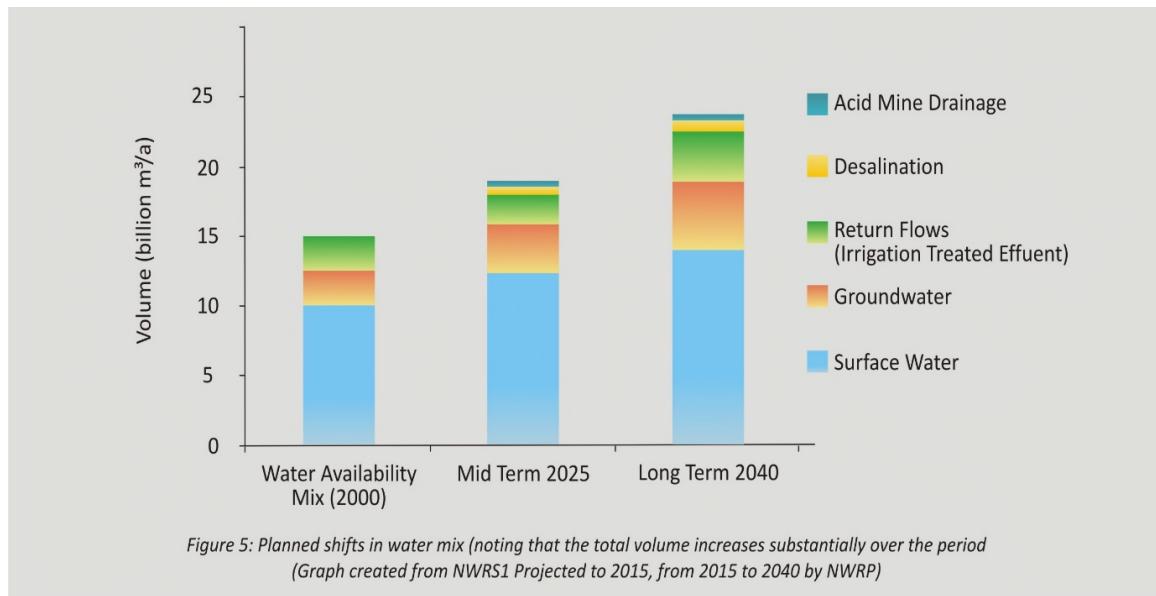


Figure 5: Planned shifts in water mix for short to medium term (noting that the total volume increases substantially over the period (Graph created from NWRS1 Projected to 2015, from 2015 to 2040 by DWS Directorate: National Water Resource Planning)

Delays in the implementation of Phase 2 of the Lesotho Highlands Water Project (LHWP) (to augment the Vaal River System for greater Gauteng), the uMkhomazi Water Project Phase 1 (to augment the Mgeni System for the KwaZulu-Natal Coastal Metropolitan Region) and the augmentation of the Western Cape Water Supply System have significantly impacted on the water security, and subsequently the socio-economies of these areas. The recent water crisis in Cape Town serves as a stark reminder of the impacts of delayed action combined with extreme weather events.

In addition, South Africa has four internationally-shared river basins that contribute 45% of the country's total river flow. These resources must be shared equitably with neighbouring states who also have increasing water needs due to growing populations and economies. Signed partnership framework agreements exists that have paved the way for different South African sectors to enter into cooperation agreements, also known as Memoranda of Understanding (MoU) with these neighbouring states. It is critical that co-basin organisations adequately support IWQM in these shared river basins.

45% of the water in South Africa comes from rivers shared with neighbouring countries

Table 1 below indicates how a range of infrastructure projects as well as demand management are needed if we are to build water security by 2030. Without demand management, currently planned infrastructure development and the broadening of the water mix will not be sufficient to balance supply and demand. *However, if the targets of reducing physical losses in municipal systems are reached, as well as a reduction in the per capita consumption to the global average, in addition to the surface and groundwater supplies, and desalination, re-use and treated AMD, there will be a slight surplus available in 2030.* It must be recognised, however, that achieving these targets will require significant investment and capacity. It must also be recognised, that these figures are national, and do not address specific areas where even bigger interventions will be required to address local shortages.

The National Water Re-use policy aims to develop clear and practical guidelines for typical water re-use projects on what regulatory approvals are needed, the status of reclaimed water in terms of right to use and how these can be obtained cost and time effectively. There is also a need to work with other institutions to align legislation, reduce the regulatory burden wherever practical, and unblock regulatory obstacles to water re-use. These issues are addressed in more detail in **NW&SMP Volume Two: Plan to Action**.

Table 1: Provisional national water balance with and without critical interventions

Water use sectors	2030 water requirements projections (million m ³)		
	Without demand management interventions	With urban losses reduced from 35% to 15%	Reduce domestic demand from 237 l/c/d to 175 l/c/d
Agriculture (irrigation and livestock watering)	9 700	9 700	9 700
Municipal (industries, commerce, urban and rural domestic)	5 800	4 941	3 696
Strategic/Power generation	430	430	430
Mining and bulk industrial	1 017	1 017	1 017
International obligations	178	178	178
Afforestation	434	434	434
Total water requirements (2030)	17 559	16 700	15 455
Total water available (2015)	13 949		
Increased surface water yield	874		
Increased groundwater use	405		
Desalination (including treated AMD)	588		
Re-use	110		
Total water available (2030)	15 926	15 926	15 926
Deficit/surplus	-1 633	-763	527
Deficit/surplus	-10%	-5%	3%

3.3 Key actions

Action	Responsibility	Completion date
PLANNING		
Develop, update and maintain reconciliation planning studies to achieve optimal water mix (surface water, groundwater, re-use and desalination, and incorporate climate change into studies) (Volume 3, Action 1.1.5)	DWS, CMAs, WSAs	2030
Do detailed feasibility study (including EIA) of high priority interventions (identified in Reconciliation Strategies) and develop bankable projects, with business case of required infrastructure, financing, institutional arrangements for ownership and operations as implementation mandate (1.1.6)	WSAs, DWS, CMAs	2030

Action	Responsibility	Completion date
Water Resources Catchment studies (Continuously undertake hydrological monitoring in order to improve the resiliency and sustainability of the available sources on account of future climate change) (1.1.7)	DWS, CMAs	2050
Develop a guideline for the protection, recharge, use and monitoring of groundwater (1.1.8)	DWS, WRC, CSIR	2022
Integrate results of All Towns studies and reconciliation studies into sectoral plans (domestic, agriculture, energy, mining, industrial development, land reform and rural development) (1.1.9)	DWS, DAFF, DoE, DMR, the dti, DRDLR	2022
Develop and implement Provincial Water Services Delivery Master Plans to provide reliable and sustainable water supply and sanitation services to all households within South Africa: • Provincial Bulk Services Master Plans • Reliable Services Delivery Action Plans that includes a backlog analysis and infrastructure asset management plans (1.3.6)	DWS, WSAs, CoGTA, SALGA, NT, WBs	2030
Adopt an integrated planning approach at trans-boundary (international), national, Water Management Area and sub-catchment levels (SA16, SA17, SA18, SA21, SA22, SA23 & SA33) (1.5.7)	DWS, Co-basin States	2030
REDUCING DEMAND		
Reduce Non Revenue Water (NRW) and water losses in all municipalities to 15% below the business as usual (1.1.1)	DWS, CoGTA	2030
Set cap on water use with reducing targets over time (1.1.2)	DWS, CMAs, WSAs, CoGTA	2030
Reduce the water demands and water losses at all major irrigation and agricultural schemes by 2030, without affecting productions (1.1.3)	DWS, DAFF	2030
Reduce water demand and increase water efficiencies of industrial users (1.1.4)	DWS, the dti	2026
Implement the Water Administration System on all government irrigation schemes for transformation (1.2.3)	DWS, DAFF/PDAs	2024
Develop and implement a long-term plan for the turn-around of water supply and sanitation services in the country based on a sector-wide approach, that recognises DWS as regulator of W&S provision that includes the development of centralised programmes to obtain economies of scale and to ensure impact (e.g. driving municipal non-revenue-water improvements, and assessing the cost-effectiveness and appropriate systems for desalination) (1.3.1)	DWS, CoGTA, NT, SALGA	Annually
Revitalise the Green, Blue and No Drop programmes and publish results. Revise and establish norms and standards (1.4.1)	DWS, WSAs	Annually
Include water use efficiency and water loss reduction targets in the KPIs of municipal managers and municipal water supply and sanitation managers, and in municipal implementation plans (1.4.2)	CoGTA, Municipalities	2019

Action	Responsibility	Completion date
Establish Water Efficiency Labelling and Standards (WELS) Scheme (1.4.3)	SABS, DWS	2025
Identify (Blue Scorpions) and prosecute major non-compliant abstractors (water thieves) across the country, with a national communication campaign to accompany the action (1.4.4)	CMAs, NPA, SAPS, DEA, Regulator, DMR, DWS, Blue Scorpions	10 by 2020 Additional 10 by 2023
INCREASING SUPPLY		
Development of strategic water resources infrastructure (1.1.10)	DWS, LHDA, WSAs, WBs, TCTA	2025
Refurbish gauging stations (1.1.11)	CMAs, DWS	2027
Increase groundwater use (including artificial recharge) and re-use of water (1.1.12)	WBs, WSAs, DWS, CMAs	2024

4. Redistributing water for transformation

4.1 Status quo

Transformation is critical in three areas: ensuring that the use of water for productive purposes is equitable, making sure that the governance of water is representative, and ensuring access to decent water and sanitation services for all.

Despite both policy and legislative tools intended to enable the transformation of water allocation to redress the historical racial discrimination in access to water, little has been achieved since the National Water Act (NWA) was promulgated in 1998. This is particularly true in the agricultural sector, where around 95% of the water is estimated to be used by white commercial farmers.

Existing Lawful Use (ELU) was intended as a transitional arrangement. However, 20 years after the NWA was promulgated, ELUs authorise the biggest volume of water used in the country.

More than 70% of commercial farms in South Africa are owned by white farmers, who also use 95% of the water allocated to the agricultural sector

While the restitution of agricultural land has been slower than intended, the reallocation of water has not always even kept pace with the transfer of that land. In some instances, the previous owners traded away their existing lawful water use rights, so that the water allocation was not transferred to land reform beneficiaries. According to The Institute for Poverty, Land and Agrarian Studies, more than 70% of commercial farms in the country are estimated to be owned by white farmers with

about 39 000 white commercial farmers and 5 300 black farmers, according to the African Farmers Association of South Africa. Most of the black commercial farmers have relatively smaller farms.

Transformation of representivity in water governance has also been slow. Membership of water user associations generally reflects land ownership and water use, so that the governance of those associations is often focussed on white commercial farmers' interests.

The Irrigation Strategy developed by the Department of Agriculture, Forestry and Fisheries (DAFF) has identified water schemes where there is the potential for irrigation expansion. This expansion can contribute to access to water for black farmers.

There are over 5 000 registered dams (wall height of over five metres) in South Africa, these being mostly farm dams and privately owned.

4.2 Drivers

The demand for land reform is high on the political agenda and will remain so until adequately addressed. Within the land reform programme, the transfer of some irrigable land without a water allocation has limited the ability of recipients to make productive use of the land. In addition, there are black farmers and entrepreneurs who have expressed their concerns about lack of access to water, and the challenges in getting water allocated for farming and enterprise development. The pressure to reallocate water to achieve more equitable water use thus remains high.

To effect transformation, DWS will work with DAFF to identify available water to allocate to emerging black farmers

4.3 Key Actions

Action	Responsibility	Completion date
Identify alternative sources of water and water that is not utilised (e.g. as mines are closing resulting from War on Leaks, etc) for transformation (Volume 3 Action 1.2.1)	DWS, CMAs, WSAs	2019
Identify where more water can be made available in government water schemes for transformation (1.2.2)	DWS, CMAs, WBs, DAFF/PDAs,	2019
Implement the Water Administration System on all government irrigation schemes for transformation (1.2.3)	DWS, DAFF/PDA	2024
Implement pilot project on voluntary contributions from farmers for water reallocation in prioritised catchments (1.2.4)	DWS, DAFF	2020
Identify areas where small dams or groundwater development can provide water for small scale black farmers (1.2.5)	DWS, CMAs	2019
Align water, land and agrarian reform programmes and link to the Irrigation Strategy (1.2.6)	DWS, CMAs, DAFF, DRDLR	2030
Use General Authorisation to enable small scale water use by black farmers (1.2.7)	DWS, DAFF	2019
Investigate, revitalise, refurbish existing under-performing Black Owned schemes (1.2.8)	DAFF, DWS	2020
Define and implement process to allocate water (new/saved) to black applicants (1.2.9)	DWS, DAFF	2030
Establish the National Water Resources and Services Regulator (NWRSR) (2.1.6)	DWS, NT	2020
Establish regulations on required qualifications and experience for senior and technical positions in DWS, CMAs, water boards and municipal services institutions (2.3.1)	DWS, CoGTA, SETA	2023
Develop regulations in terms of Section 139 (8) of the Constitution, which allows for a national entity to take over the water service functions, including revenue and billing, in a municipality if service deliver criteria are not met (2.4.4)	DWS, CoGTA	2022
Fund research into new models to better understand implementation approaches for water allocation reform, and equity issues (2.6.6)	DWS, WRC, CSIR, DST	Ongoing

5. Managing effective water and sanitation services

5.1 Status quo

Everyone living in South Africa has a constitutional right of access to at least basic water supply and basic sanitation services and the country has progressed well in delivering infrastructure to provide these services with 89% of households now having access to water supply infrastructure⁶. However, while service provision has advanced, reliability of these services remains a challenge. Only 64% of households are estimated to have a reliable water supply service – a lower figure than in 1996 (see Figure 6) with some 11% of water supply schemes being completely dysfunctional. In the 27 priority district municipalities the water reliability is only 42%, with the worst 10 WSAs below 30% reliability.

56% of waste water treatment works in South Africa do not work properly

44% of water treatment works do not work properly

The capacity of WSAs to operate, maintain and manage assets for existing infrastructure needs urgent attention.

Interruption in water supply (unreliability) and blocked and overflowing sewers are two of the key public frustrations leading to protests and vandalism.

Approximately 56% of the over 1 150 WWTW and approximately 44% of the 962 WTWs are in poor or critical condition and in need of urgent rehabilitation. Poor water and wastewater treatment has significant implications for public health.

Current access to sanitation services is around 80% nationally. However, delivery is uneven and, in some municipalities, only 50% of residents have access to adequate sanitation facilities.

Over the years, several interventions have been put in place by national government, including interventions under section 196 of the Constitution, and, most recently, the Back-to-Basics campaign and the Municipal Infrastructure Support Agent (MISA) instituted by the Department of Cooperative Governance and Traditional Affairs (COGTA). Despite these interventions, as well as many water and sanitation specific interventions by DWS, in some cases repeatedly in the same municipality, failures in water supply and sanitation services continue, not least due to a lack of skilled and experienced technical staff.

There are also challenges in the effective operation and maintenance of water supply and sanitation infrastructure by DWS, water boards, other government departments and institutions.

Municipal water reticulation infrastructure includes more than 290 000 km of pipelines, an estimated 7,7 million house connections, over 5 million yard taps and more than 2,1 million street taps⁷.

⁶ StatsSA General Household Survey

⁷ StatsSA Community Survey 2016

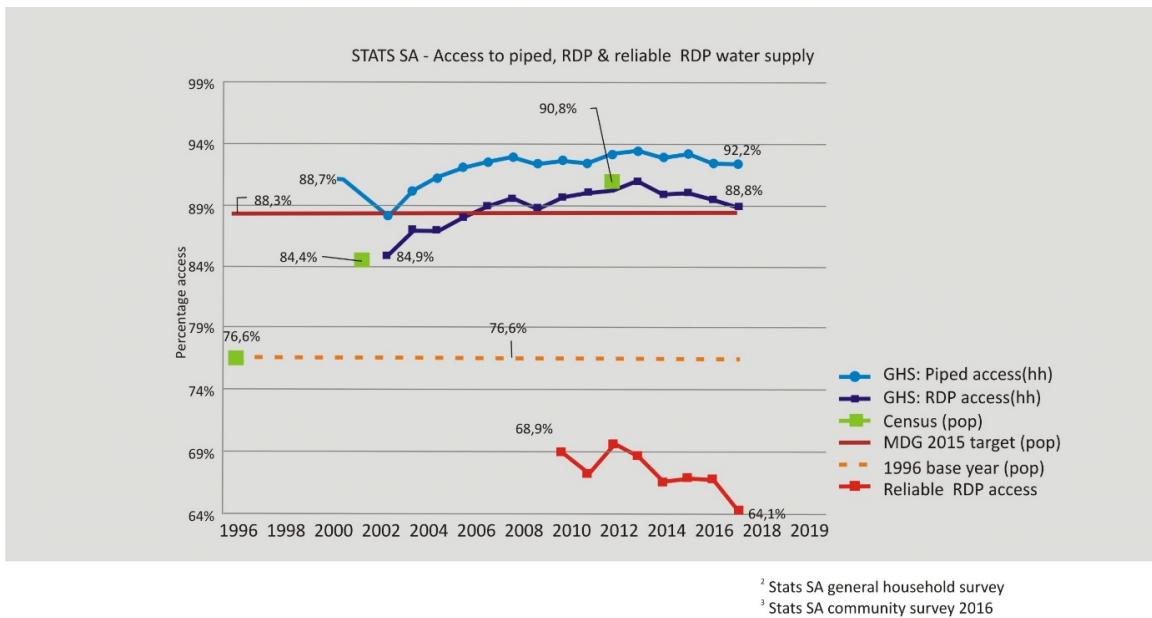


Figure 6: Access to piped, RDP and reliable RDP water supply (Source: StatsSA)

The failure of some municipalities to provide reliable water and sanitation services is largely due to the lack of technical skills, institutional capacity and funding to operate, maintain and manage water and waste water infrastructure assets properly. Further contributors towards the poor reliability of water and sanitation services is the limited budget allocated by some municipalities for operations and maintenance relative to that allocated to new capital works, poor revenue management, and the failure of municipalities to employ appropriately qualified technical staff. In addition, the national infrastructure grant funding mechanisms incentivise the building of new infrastructure, rather than the maintenance of existing infrastructure.

The nature of internal decision-making systems and procedures in municipalities also make it difficult for water supply and sanitation managers to respond effectively to the need to provide reliable services. These systems are informed, *inter alia*, by the Municipal Financial Management Act (MFMA) and the Municipal Systems Act.

It is noteworthy that despite these challenges, South Africa has several well performing municipalities that have been internationally recognised. By example: eThekweni was awarded the Stockholm Water Industry Award in 2014.

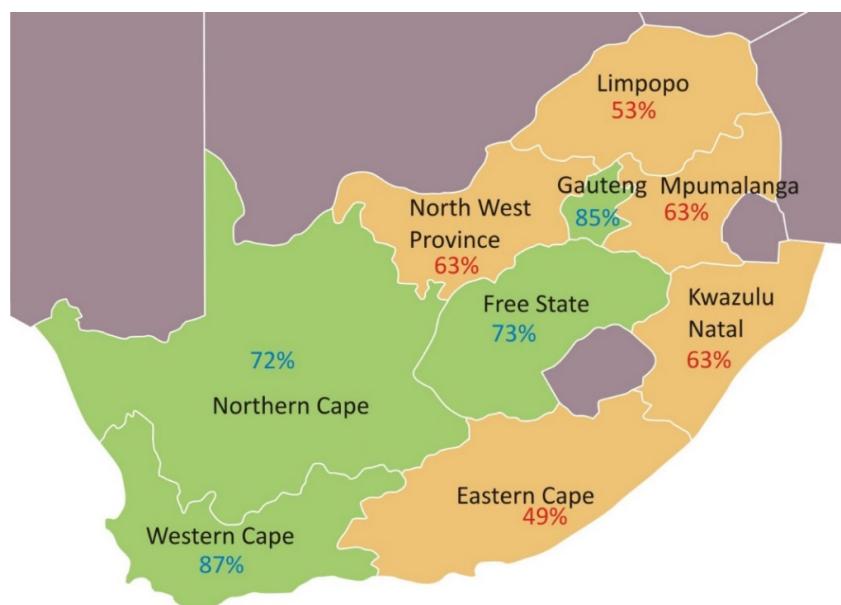


Figure 7: Reliability of water supply and sanitation services per province

5.2 Drivers

In line with the global Sustainable Development Goals, and the aspirations of the NDP, the national targets for water supply and sanitation services are as follows:

Target	Date
Achieve universal, sustainable sanitation provision	2020: 90% 2030: 100%
Achieve universal, sustainable and reliable water supply provision	2019: 90% 2030: 100%

These targets must be met in a sustainable manner, with effective operation and maintenance, so that the services provided are reliable over time, and are accessible to all people, including those living with disabilities.

The constitutional water supply and sanitation services responsibility lies with 144 municipalities that are water services authorities (WSA). At least 33% of these municipalities are regarded as dysfunctional and more than 50% have no or very limited technical staff. The 27 priority district municipalities have been identified as being particularly dysfunctional and requiring specific intervention.

Some 77% of rural households are indigent and are not required to pay for municipal services

In addition, many of the smaller and/or rural municipalities are faced with financial challenges. The socio-economic profile of South Africa is highly variable with 63% of households earning less than R38 000 per year (and therefore classified as indigent). Municipalities with high levels of indigent households are dependent on national grants to provide reliable and affordable water and sanitation services. In rural and/or smaller municipalities, the proportion of indigent households averages 77%. It is consequently difficult for municipalities with a low revenue base to address their backlogs and to allocate sufficient funds for maintaining and operating existing works. In some areas, major water infrastructure runs through rural areas without supplying them (such as the Tugela-Vaal scheme).

South Africa's population is rapidly urbanising, placing strain on service delivery in municipalities

South Africa is currently in a low economic growth climate and the number of indigent households is not expected to decrease in the short term. In addition, high rates of urbanisation have a major impact on the demand for water supply and sanitation services. South Africa is currently 65% urbanised and the NDP estimates that urban populations will grow by 10% every two decades. Increasing urbanisation will place more pressure on cities to deliver affordable and reliable water and sanitation services to larger numbers of poor households.

Aging, poor quality and poorly maintained infrastructure is contributing to high levels of water wastage and pollution of rivers and groundwater with sewage.

5.3 Key Actions

The national capacity to operate, maintain and manage water supply and sanitation services requires urgent attention. Key actions are:

Action	Responsibility	Completion date
Set cap on water use with reducing targets over time (Volume 3, Action 1.1.2)	DWS, CMAs, WSAs, CoGTA	2030
Develop and implement a long-term plan for the turnaround of water supply and sanitation services in the country based on a sector-wide approach, that recognises DWS as regulator of W&S provision that includes the development of centralised programmes to obtain economies of scale and to ensure impact (e.g. driving municipal non-revenue-water improvements, and assessing the cost-effectiveness and appropriate systems for desalination) (1.3.1)	DWS, CoGTA, NT, SALGA	Annually
Plan for disaster management by implementing adequate flood protection and drought management on regional level (1.3.2)	DWS, CMAs, NWRSA, WBs	2022
Revisit levels of service for water supply and sanitation services against issues of affordability (1.3.3)	DWS, CoGTA, NT, SALGA	2025
Investigate and promote alternative service delivery models such as BOTT (build, operate, train and transfer), management contracts and concessions (1.3.4)	NT, DWS	2025
Provide direct Water Services Development Planning support to WSAs as part of a legal requirement and integration into Municipal IDPS (1.3.5)	WSAs, DWS, CoGTA, SALGA, NT	2025
Develop and implement Provincial Water Services Delivery Master Plans to provide reliable and sustainable water supply and sanitation services to all households within South Africa: • Provincial Bulk Services Master Plans • Reliable Services Delivery Action Plans that includes a backlog analysis and infrastructure asset management plans (1.3.6)	DWS, WSAs, CoGTA, SALGA, NT, WBs	2030
Deliver services to achieve (100%) universal sanitation coverage (Municipal Sanitation Projects) (1.3.7)	WSAs, DWS	2030

Action	Responsibility	Completion date
Deliver services to achieve (100%) universal water services provision (Municipal Water Supply Projects) (1.3.8)	WSAs, CoGTA, DWS	2030
O&M of water resources and services infrastructure (1.3.9)	DWS	2050
Align interventions with CoGTA on failing municipalities with existing support programmes e.g. MISA (1.3.10)	CoGTA, MISA, DWS	2019
Lifecycle planning (asset management) conditions to be set by DWS (1.3.11)	DWS	2020
A national water and wastewater treatment performance turnaround plan to be developed and implemented. Turn around the functionality of five, currently dysfunctional, large water and wastewater treatment works with an accompanying publicity campaign, followed by a programme addressing the rest (1.3.12)	DWS, WSAs, NT, WBs, CoGTA	2030
Roll-out of Feasibility and Implementation Readiness studies to align with national grant funding programmes (1.3.13)	WSAs, DWS	2025
Revitalise the Green, Blue and No Drop programmes and publish results. Revise and establish norms and standards (1.4.1)	DWS, WSAs	Annually
Include water use efficiency and conservation targets in the KPIs of municipal managers and municipal water supply and sanitation managers, and in municipal implementation plans (1.4.2)	CoGTA, Municipalities	2019
Ensure fiscal support for IWQM (SA38 & SA39) (1.5.11)	DWS, WSAs	2021
Establish a business case for streamlined institutional arrangements in the water and sanitation sector (2.1.1)	DWS	2020
Establish a Municipal Intervention Unit for Water and Sanitation in DWS, staffed with highly competent experts to drive a national programme of intervention at the municipal level (2.1.2)	DWS	2022
Establish financially sustainable CMAs across the country, and transfer staff and budget and delegated functions, including licensing of water use and monitoring and evaluation of water resources (2.1.3)	DWS	2020
Establish the National Water Resources and Services Authority (NWRSA)(2.1.4)	DWS, NT	2020
Determine the optimal configuration of water boards to manage regional bulk water supply, assist municipalities to perform their primary water and sanitation services mandate where necessary, manage regional water resources infrastructure, manage regional bulk WTWs and WWTWs (2.1.5)	DWS, WBs	2020
Establish the National Water Resources and Services Regulator (NWRSR)(2.1.6)	DWS, NT	2020

Action	Responsibility	Completion date
Establish regulations on required qualifications and experience for senior and technical positions in DWS, CMAs, water boards and municipal services institutions (2.3.1)	DWS, CoGTA, SETA	2023
Develop and implement programme for recruiting experienced technical and managerial staff in South Africa first and then internationally (2.3.2)	DWS, CoGTA, DIRCO	2030
Develop and implement a mandatory, modular hands-on qualification for municipal water managers (technical manager) to be run over 18 months and accredited by EWSETA to include aspects such as asset management, tariffs and revenue management, drought management, stakeholder engagement and customer relations (2.3.4)	DWS, EWSETA, Institutions of Higher Learning	Ongoing
Partner with institutions to fund training of water sector practitioners in the curation, management and use of data as well as the associated technologies (2.3.5)	DWS, EWSETA	Ongoing
Develop and implement institutional arrangement that recognise the diversity of circumstances across South Africa, the legacy of Apartheid and allow for regional cross subsidisation (2.4.1)	NT, DWS	2021
Implement accurate billing and effective revenue management systems in all entities in the water value chain with a strict " <i>No payment = no water</i> " approach to agriculture/industrial/commercial users and restricted supply to domestic users (2.4.2)	WSAs, WBs, DWS, AGSA	2024
All conditional grants to be dependent on meeting of current payments to the next entity in the value chain, improvements to Blue Drop, Green Drop and No Drop Scores to meeting targets and audit outcome. Allow conditional grants to be used for operational costs (2.4.3)	NT, AGSA, DWS	2023
Develop regulations in terms of Section 139 (8) of the Constitution, which allows for a national entity to take over the water service functions, including revenue and billing, in a municipality if service deliver criteria are not met (2.4.4)	DWS, CoGTA	2022
Ensure that sufficient revenue is received through tariffs and grants to operate, maintain and improve the water supply and sanitation system. The tariff structure must allow for cross subsidisation for the indigent and building of a reserve for periods of drought (2.4.5)	WSAs, WBs, DWS, NT, AGSA	2024
In all entities put in place mechanisms to deal with accumulated debts (2.4.6)	WSAs, WBs, DWS, NT, AGSA	2020
Review the Municipal Financial Management Act (MFMA) and the Municipal Systems Act (specifically chapter 8) to ensure that they provide an enabling environment for the provision of reliable water and sanitation services (2.5.4)	NT, DWS, CoGTA, SALGA	2020

Action	Responsibility	Completion date
Develop new policies and strategies on matters not previously addressed, in consultation with all stakeholders, to facilitate the sustainability of various water sector programmes (2.5.5)	DWS	2025
Implement and regularly review/revise Research, Development and Innovation Policies, Plans and Roadmaps across the sector (2.6.1)	DWS, DST, WRC, CSIR	2021
Unlock investment, procurement and other localisation barriers to reposition the sector to implement new/niche solutions and approaches and roadmap the NMIU (2.6.2)	DWS, NT, CoGTA, DST, NMIU	Ongoing
Fund research into new models to better understand implementation approaches for water allocation reform, and equity issues (2.6.6)	DWS, WRC, CSIR, DST	Ongoing
Develop technologies, guidelines and implementation support tools that enable SA to use alternative and appropriate sources as part of water supply (2.6.7)	DWS, WRC, CSIR, DST, SALGA, CoGTA, WSAs	2023
Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation (2.6.10)	WRC, CSIR, DST, DWS	2021
Alternative Sanitation: Develop and demonstrate and validate appropriate alternative, water-less and off grid sanitation solutions (Current – 2025) (2.6.11)	DWS, WRC, CSIR, DST, BMGF, the dti, Municipalities	Ongoing
Domestic and industrial Waste Water: Develop and Demonstrate appropriate waste water technologies for cost effectiveness, energy efficiency and beneficiation (2.6.12)	DWS, TCTA, WRC, CSIR, the dti, DST, TIA, MINTEK	Ongoing
Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation (2.6.13)	WRC, CSIR, DST, DWS	2021

6. Regulating the water and sanitation sector

6.1 Status Quo

DWS is responsible for the regulation of the use of raw water across the country. This includes authorisation for water abstraction, waste discharge, and dam safety, and setting the charges for the use of raw water and the discharge of effluent. There are in the region of 80 000 water use authorisations, either under the existing lawful use or through water use licences, with around 60 000 unique users. Of these, approximately 8 000 obtain their water from state-owned water resources infrastructure.

DWS also sets standards for water and sanitation services provision and associated tariffs, which are also governed by the Municipal Systems Act and the Municipal Finance Management Act. There are significant challenges in ensuring that WSAs set appropriate tariffs that cover costs, including operation and maintenance costs, and that promote water use efficiency.

WSAs are responsible for developing by-laws that, amongst others, enable regulation of water supply and sanitation provision and use within its area of jurisdiction.

The South African Bureau of Standards (SABS) sets several water quality standards for the water sector, including drinking water standards (SANS 241) and other relevant guidelines.

6.2 Drivers

Strong regulation is critical to achieve water security in South Africa, in terms of water quality (in rivers and taps), balancing demand and supply, ensuring the safety of dams, and being resilient to climate change impacts.

Despite strong regulatory tools in the legislation, the quality of raw water continues to deteriorate across the country, with high levels of water theft and water wastage continuing. The continued use of water under ELU of the National Water Act is hampering the redistribution of water and effective regulation of this water use. The need to use the courts to impose sanctions on those contravening water legislation hampers the ability to get speedy resolution on such matters.

In addition, dam safety regulation is under threat from limited qualified personnel in the country: currently there are less than 100 dam safety approved professional persons (APPs) in South Africa (approximately 1 qualified person for every 50 dams on the Dam Safety register), and more than 66% of these are older than 60 years of age.

Some municipalities fail to deliver the requisite level of water supply and sanitation, including failing to meet drinking water quality standards. In the 2014 Blue Drop assessment, 86% of WSAs achieved good or excellent status for microbiological water quality compliance, but only 70% achieved good or excellent status for water quality operational compliance.

DWS will revitalise the Green, Blue & No Drop programmes

There are less than 100 dam safety Approved Professional Persons in South Africa, and more than 66% of these are older than 60.

6.3 Key Actions

Action	Responsibility	Completion date
Set cap on water use with reducing targets over time (Volume 3, Action 1.1.2)	DWS, CMAs, WSAs, CoGTA	2030
Revitalise the Green, Blue and No Drop programmes and publish results. Revise and establish norms and standards (1.4.1)	DWS, WSAs	Annually
Include water use efficiency and conservation targets in the KPIs of municipal managers and municipal water supply and sanitation managers, and in municipal implementation plans (1.4.2)	CoGTA, Municipalities	2019
Establish Water Efficiency Labelling and Standards (WELS) Scheme (1.4.3)	SABS, DWS	2025
Identify and prosecute major non-compliant abstractors (water thieves) across the country, with a national communication campaign to accompany the action inclusive of reviving the Blue Scorpions (1.4.4)	CMAs, NPA, SAPS, DEA, Regulator, DMR, DWS, Blue Scorpions	2020
Replace all Existing Lawful Use (ELU) with licences with enforceable water use conditions (1.4.5)	DWS, CMAs	2030
Development and implementation of the MoU between the DWS and strategic users (1.4.6)	DWS, Chamber of Mines, Eskom, Industries	2020
Develop and implement municipal by-laws to protect water quality (1.4.7)	DWS, WSAs	2020
Identify and prosecute big polluters across the country (including municipalities), with a national communication campaign to accompany the action inclusive of reviving the Blue Scorpions (1.4.8)	CMAs, NPA, SAPS, DEA, DMR, DWS, Blue Scorpions	2020
Establish a mechanism for applying administrative penalties (1.4.9)	DWS, Dept of Justice	2023
Develop improved regulatory approaches to manage pollution from land-based and in-stream activities (SA1, SA7, SA20 & SA29) (1.4.10)	DWS	2022
Develop and implement an action plan to strengthen water use authorisation processes (SA24, SA25, SA26, SA27 & SA28) (1.4.11)	DWS, CMAs, WRC, CSIR	2022
Implement the Waste Discharge Charge System (WDCS) in priority catchments (SA5, SA41, SA42, SA43 & SA44) (1.5.8)	NT, DWS, CMAs	2030
Ensure fiscal support for IWQM (SA38 & SA39) (1.5.11)	DWS, WSAs	2021
Develop and implement a diffuse pollution source strategy that includes the regulation of land use (1.5.14)	DWS, CMAs	2023
Declare strategic water source areas and critical groundwater recharge areas and aquatic ecosystems recognised as threatened or sensitive as protected areas (1.6.1)	DWS, CMAs, DEA	2021

Action	Responsibility	Completion date
Establish a business case for streamlined institutional arrangements in the water and sanitation sector (2.1.1)	DWS	2020
Establish financially sustainable CMAs across the country, and transfer staff and budget and delegated functions, including licensing of water use and monitoring and evaluation of water resources (2.1.3)	DWS	2020
Determine the optimal configuration of water boards to manage regional bulk water supply; assist municipalities to perform their primary water and sanitation services mandate where necessary, manage regional water resources infrastructure, manage regional bulk WTWs and WWTWs (2.1.5)	DWS, WBs	2020
Review and develop comprehensive and appropriate Management, Monitoring and Reporting Structures of the DWS data portal (2.2.1)	DWS	Annually
Establish regulations on required qualifications and experience for senior and technical positions in DWS, CMAs, water boards and municipal services institutions (2.3.1)	DWS, CoGTA, SETA	2023
Develop and implement programme for recruiting experienced technical and managerial staff in first South Africa and then internationally (2.3.2)	DWS, CoGTA, DIRCO	2030
Define (and reinstate in some cases) career paths with defined training and on the job experience to build a knowledgeable sector of professionals (2.3.3)	DWS, WSAs, WBs, CMAs	2023
Develop and implement a mandatory, modular hands-on qualification for municipal water managers (technical manager) to be run over 18 months and accredited by EWSETA to include aspects such as asset management, tariffs and revenue management, drought management, stakeholder engagement and customer relations (2.3.4)	DWS, EWSETA, Institutions of Higher Learning	Ongoing
All conditional grants to be dependent on meeting of current payments to the next entity in the value chain, improvements to Blue Drop, Green Drop and No Drop Scores to meeting targets and audit outcome. Allow conditional grants to be used for operational costs (2.4.3)	NT, AGSA, DWS	2023
Ensure that sufficient revenue is received through tariffs and grants to operate, maintain and improve the water supply and sanitation system. The tariff structure must allow for cross subsidisation for the indigent and building of a reserve for periods of drought (2.4.5)	WSAs, WBs, DWS, NT, AGSA	2024
Review the Municipal Financial Management Act (MFMA) and the Municipal Systems Act (specifically chapter 8) to ensure that they provide an enabling environment for the provision of reliable water and sanitation services (2.5.4)	NT, DWS, CoGTA, SALGA	2020

Action	Responsibility	Completion date
Develop new policies and strategies on matters not previously addressed, in consultation with all stakeholders, to facilitate the sustainability of various water sector programmes (2.5.5)	DWS	2025
Continue to invest in understanding emerging contaminants (detection and treatment) in order to improve our transition to reuse, reclamation and recycling of water (2.6.15)	DWS, WRC, CSIR, Municipalities	Ongoing
Improving raw water quality: Invest in Communities of practise that bring together built and ecological infrastructure experts and solutions (2.6.16)	DWS, DEA, SANBI, WRC, CSIR, DST	Ongoing
Link the Global Environment Fund 6 project on Water Pricing and Ecosystems to Water Master Plan implementation and position DWS to be closely involved in this process (2.6.17)	DWS, DEA, SANBI, WRC, CSIR	2024

7. Improving raw water quality

7.1 Status quo

Raw water quality, being the chemical, physical and biological characteristics of water bodies (rivers, dams, lakes, wetlands, estuaries and ground water) shows ongoing deterioration in many parameters. This deterioration poses a threat to economic growth, social development, health and hygiene and aquatic ecological functioning.

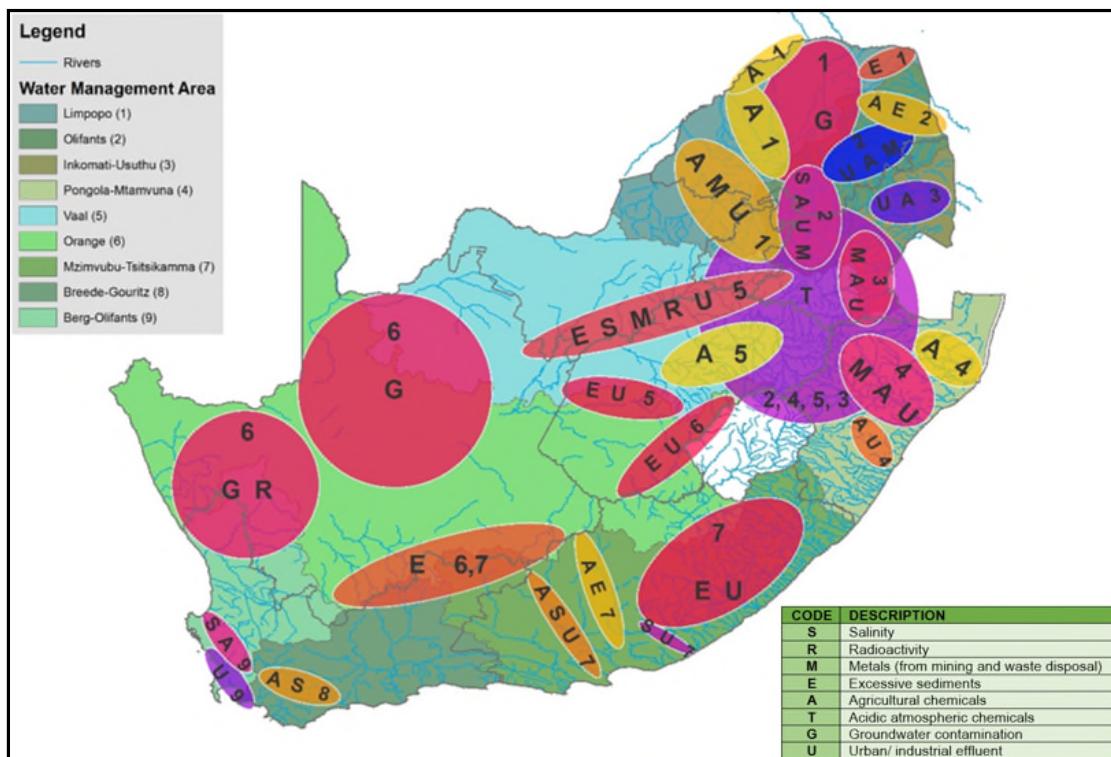


Figure 8: Different types of Water Quality problems across South Africa (Ashton, 2012)

Raw water quality is altered by:

- point source discharges such as the effluent discharged from municipal and industrial wastewater treatment works, untreated effluent discharges by industrial users, inadequate on-site sanitation facilities, and polluted stormwater.
- diffuse pollution sources, such as runoff affected by atmospheric deposition or land use practices, including water either draining through or running off fertilized agricultural land, wash-off from industrial sites, mine residue deposits and mining areas, wash-off from settlements and built up areas, and erosion.

Pollution of rivers results in poor raw water quality which is driving up the cost of municipal water treatment

- Raw water quality is also dependent on the amount of water remaining in the source that is available to dilute the discharges. Current regulation focuses mostly on the control of point sources of pollution.

Poor raw water quality increases the costs of treatment for domestic and industrial use. Poor water quality also impacts negatively on agricultural production. It is generally cheaper to treat water at the

point of discharge, where the pollution is still relatively concentrated and hence contained, than it is to treat water once the pollution has dispersed into a larger water body and mixed with multiple other pollutant types. The cost of pollution should be borne by the polluter and not externalised to downstream water users or the state.

Poor raw water quality, together with sedimentation caused by elevated levels of suspended solids in water, and the damming of rivers, have significant impacts on the ecology of rivers, estuaries and wetlands and their subsequent ability to provide services and benefits to people.

The discharge of water into a water source is classified as a water use and is governed by the National Water Act (NWA) and regulated by DWS to ensure that the water in receiving water resources is fit for use.

7.2 Drivers

South Africa is already experiencing significant impacts on water quality from mining, industry, agriculture, settlements, and poorly operated and maintained municipal wastewater treatment works, in many cases operated beyond design capacity. Without effective regulation, several “megatrends”, in addition to the current challenges, can be expected to lead to new or accelerated water quality challenges. These include: climate change; hydraulic fracturing; further industrial development including the discharge of emerging pollutants, excessive use of fertilisers, insecticides and herbicides in the agricultural sector, and rural-urban migration and the growth of inadequately serviced densely populated settlements. Deteriorating water quality is putting human and animal health at risk, impacting negatively on aquatic ecosystems, and imposing significant costs on the economy.

7.3 Key Actions

Action	Responsibility	Completion date
Development of strategic water resources infrastructure (Volume 3, Action 1.1.10)	DWS, LHDA, WSAs, WBs, TCTA	2025
A National water and wastewater treatment performance turnaround plan to be developed and implemented. Turn around the functionality of five, currently dysfunctional, large water and wastewater treatment works with an accompanying publicity campaign, followed by a programme addressing the rest (1.3.12)	DWS, WSAs, NT, WBs, CoGTA	2030
Develop and implement municipal bylaws to protect water quality (1.4.7)	DWS, WSAs	2020
Identify and prosecute big polluters across the country (including municipalities), with a national communication campaign to accompany the action (1.4.8)	CMAs, NPA, SAPS, DEA, DMR, DWS, Blue Scorpions	2020
Establish a mechanism for applying administrative penalties (1.4.9)	DWS, Dept of Justice	2023
Implement measures to ensure that water users use and discharge water responsibly and adhere to regulatory requirements (1.5.1)	DWS, CMAs, WSAs	2022

Action	Responsibility	Completion date
Determine in-stream Resource Water Quality Objectives (RWQOs), based on the SA Water Quality Guidelines (SA36), in support of RQO's (1.5.1)	DWS, CMAs	2020
Routinely monitor resource water quality (SA46, SA47 SA48) (1.5.2)	DWS, CMAs	2030
Establish and maintain appropriate and accessible information management system(s) for resource water quality (SA49, SA51 & SA60) (1.5.3)	DWS, CMAs	2030
Assess resource water quality information (SA52 & SA59) (1.5.4)	DWS, CMAs	2030
Implement adaptive source control-based water quality management interventions, in accordance with relevant catchment plans and strategies (SA34 & SA35) (1.5.5)	Chamber of Mines, DWS, CMAs, DMR	2030
Develop and implement a strategic action plan for the rehabilitation and upgrade of prioritized WWTWs (SA17) (1.5.6)	DWS, WSAs, NT, SALGA, CoGTA	2023
Adopt an integrated planning approach at trans-boundary (international), national, Water Management Area and sub-catchment levels (SA16, SA17, SA18, SA21, SA22, SA23 & SA33) (1.5.7)	DWS, Co-basins states	2030
Implement the Waste Discharge Charge System (WDCS) in priority catchments (SA5, SA41, SA42, SA43 & SA44) (1.5.8)	NT, DWS, CMAs	2030
Ensure IWQM is supported by effective departmental arrangements (SA8 & SA9) (1.5.9)	DWS	2020
Formalise governance frameworks to support engagements on water quality management (SA10, SA11, SA12, SA13, SA14, SA15, SA54 & SA61) (1.5.10)	DWS, CMAs, WSAs	2030
Ensure fiscal support for IWQM (SA38 & SA39) (1.5.11)	DWS, WSAs	2021
Build water quality management capacity through recruitment, education and training (SA53, SA54, SA55 & SA56) (1.5.12)	DWS, CMAs, NT, WRC, CSIR, SETA	2030
Create an informed, supportive and responsible public (SA62) (1.5.13)	DWS, CMAs, WSAs	2030
(1.5.14) Develop and implement a diffuse pollution source strategy that includes the regulation of land use	DWS, CMAs	2023
Implement programmes to rehabilitate catchments through development of Catchment business plans (1.5.15)	DWS, NT, CMAs	2025
Secure funds for restoration and ongoing maintenance of ecological infrastructure through operationalising the water pricing strategy (1.6.4)	DWS, CMAs, DEA, SANBI	Annually
Establish a business case for streamlined institutional arrangements in the water and sanitation sector (2.1.1)	DWS	2020
Establish financially sustainable CMAs across the country, and transfer staff and budget and delegated functions, including licensing of water use and monitoring and evaluation of water resources (2.1.3)	DWS	2020

Action	Responsibility	Completion date
Establish the National Water Resources and Services Authority (2.1.4)	DWS, NT	2020
Review and develop comprehensive and appropriate Management, Monitoring and Reporting Structures of the DWS data portal (2.2.1)	DWS	Annually
Review and develop a comprehensive DWS information management strategy to include among other: <ul style="list-style-type: none">• Amended authorisation conditions to provide for self-reporting• Harmonization of monitoring actions by all responsible institutions• Perform information V&V audit (2.2.2)s	DWS	Annually
Alignment of monitoring institutions to support National and International reporting programmes, e.g. SDGs, Agenda 63 and AMCO (2.2.3)	DWS	2021
Establish regulations on required qualifications and experience for senior and technical positions in DWS, CMAs, water boards and municipal services institutions (2.3.1)	DWS, CoGTA, SETA	2023
Develop and implement programme for recruiting experienced technical and managerial staff first in South Africa and then internationally (2.3.2)	DWS, CoGTA, DIRCO	2030
Define (and reinstate in some cases) career paths with defined training and on the job experience to build a knowledgeable sector of professionals (2.3.3)	DWS, WSAs, WBs, CMAs	2023
Develop and implement institutional arrangement that recognise the diversity of circumstances across South Africa, the legacy of Apartheid and allow for regional cross subsidisation (2.4.1)	NT, DWS	2021
Develop new policies and strategies on matters not previously addressed, in consultation with all stakeholders, to facilitate the sustainability of various water sector programmes (2.5.5)	DWS	2025
Improving raw water quality: Invest in Communities of practise that bring together built and ecological infrastructure experts and solutions (2.6.16)	DWS, DEA, SANBI, WRC, CSIR, DST	Ongoing
Continue to do research on land use impact on water linked ecosystems (2.6.18)	WRC, CSIR, DEA, DWS, DAFF, ARC	Ongoing
Ongoing research, modelling and planning around climate change and its impacts on water security and water infrastructure needs to be conducted (2.6.19)	DWS, DEA, DST WRC, CSIR	Ongoing

8. Protecting and restoring ecological infrastructure

8.1 Status quo

South Africa is known for its rich diversity of ecosystems. Our aquatic ecosystems include seven of the world's freshwater ecoregions, and are characterised by a wide range of river, wetland and estuarine ecosystem types. Together with their catchments, many of these aquatic ecosystems make up South Africa's ecological infrastructure (nature's equivalent of built infrastructure) that generates and delivers benefits in the water value chain. Ecological infrastructure is currently an under-realised asset that can play a significant role in enhancing returns on investment in built infrastructure (such as dams), especially if the maintenance of ecological infrastructure is explicitly incorporated into the planning and construction of built infrastructure.

Many of our high value aquatic ecological infrastructure assets are poorly protected, and in some areas of the country they are under severe pressure, for example from intensive agriculture, mining and urban sprawl that results in loss or degradation of ecosystems. Like built infrastructure, ecological infrastructure needs to be maintained, and in some cases restored, in order for its socio-economic benefits to be realised.

Between 1999 and 2011 river health deteriorated across all South Africa's nine water management areas. The extent of main rivers in South Africa with a poor ecological condition increased by 500% between 1999-2011 with many rivers pushed beyond the point of recovery. The extent of tributaries with a poor ecological condition increased by 229% in this same period (see Figure 9). Healthy tributaries often play a critical role in maintaining flow and water quality in hard-working main rivers.

It is estimated that South Africa has lost over 50% of its wetlands, and of the remaining 3.2 million ha (less than 5% of SA's land cover) a third are already in a poor condition (see Figure 10), limiting their ability to, for example, regulate water flow and purify water.

About 50% of South Africa's water resources originate from 10% of our land.

These strategic water sources ('water factories') must be protected and maintained through appropriate regulation.

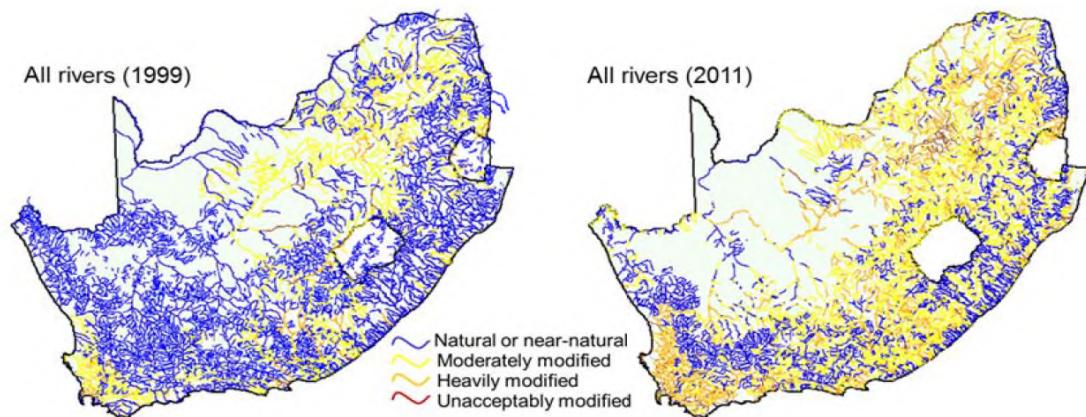


Figure 9: Deterioration of ecological condition of South African rivers, 1999 – 2011 (Source: Nel, J.L. & Driver, A. 2015. National River Ecosystem Accounts for South Africa)

The loss and degradation of ecological infrastructure negatively affects system yield and increases water-related risks. Degraded wetlands, for example, lose their ability to release water in times of drought, or to recharge groundwater supplies. Degraded ecological infrastructure increases the vulnerability of people and built infrastructure to floods and increases maintenance and repair costs on built infrastructure. It is often more cost effective to rehabilitate ecological infrastructure than to be faced with an ongoing need to repair or replace built infrastructure.

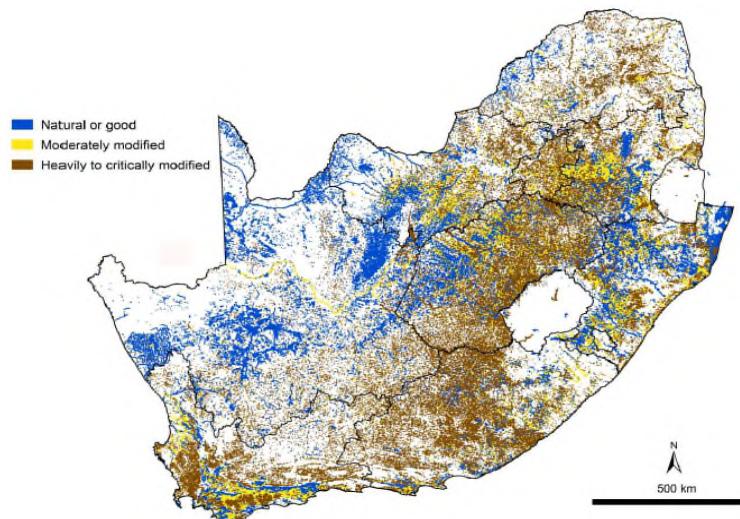


Figure 10: Ecological condition of South African wetlands, 2011 (Source: Nel J.L. and Driver A. 2012. South African National Biodiversity Assessment 2011: Technical Report. Volume 2: Freshwater)

8.2 Drivers

Annual loss of water from Cape Town's catchments due to invasive alien plants is at least equivalent to a dam the size of Wemmershoek.

The capacity of catchment-based institutions to harness the value of ecological infrastructure in the water value chain needs urgent attention.

An increasing population, rapid urban expansion, widespread mining, increasing water storage and abstraction, the spread of invasive alien species and poor agricultural practices are the main drivers of degradation of water-related ecosystems and ecological infrastructure. Mining in strategic water source areas poses a threat to water security both in the short-term but also in the long-term.

The main pressures on river ecosystems arise from the alteration of flow through dams and abstraction, the destruction of natural vegetation along river banks, the growth and spread of invasive alien species, and pollution from point and diffuse sources.

The main pressures on wetland ecosystems are mining, construction, cultivation, urban development, and inadequate grazing management which causes erosion.

The South African Biodiversity Institute (SANBI), DWS and the Council for Scientific and Industrial Research (CSIR) have identified key strategic water source areas in the country which must be protected and maintained if water security is to be achieved (Figure 11 below). The Department of Environmental Affairs (DEA) and SANBI have received funding from the Global Environment Facility

(GEF) for improving financial flows for restoring ecological infrastructure and for strengthening institutional capacity for this task.

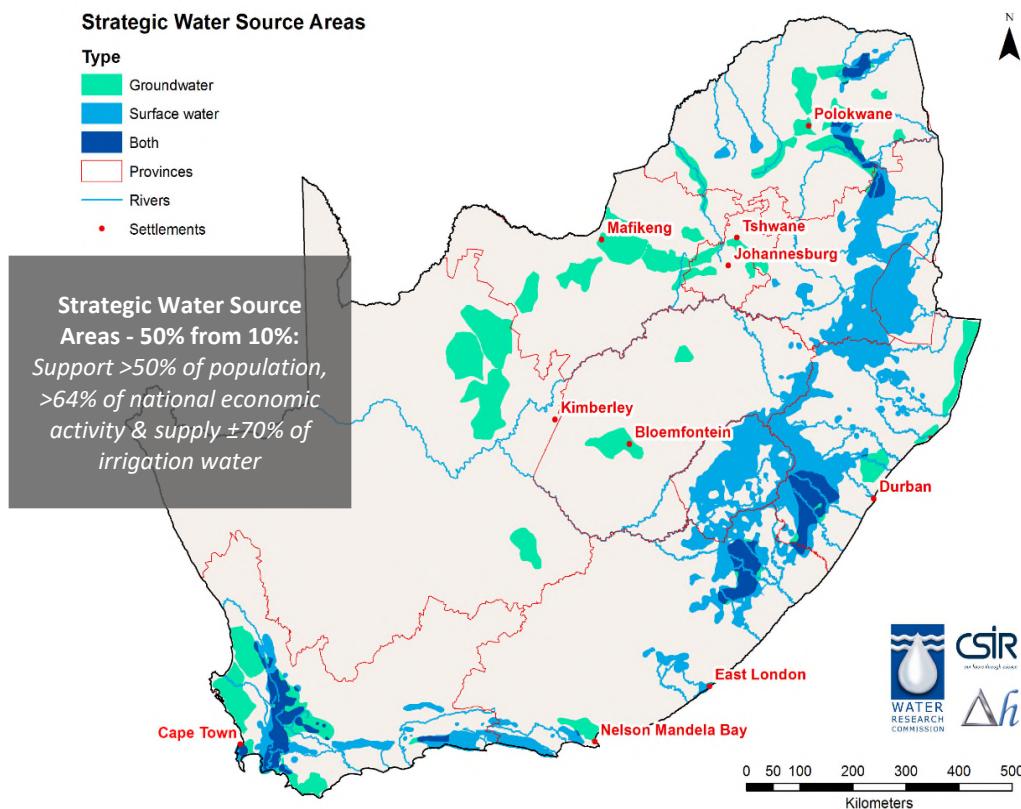


Figure 11: Strategic water source areas: the 10% of South Africa's land that delivers 50% of our water

8.3 Key Actions

Action	Responsibility	Completion date
Declare strategic water source areas and critical groundwater recharge areas and aquatic ecosystems recognised as threatened or sensitive as protected areas (Volume 3, Action 1.6.1)	DWS, CMAs, DEA	2021
Review and promulgate aggressive restrictions within the legislation to restore and protect ecological infrastructure (1.6.2)	DEA, DWS, CMAs, SANBI, CSIR	2020
Implementation of the Reserve: (The classification, RQO's and the Reserve (collectively known as Resource Directed Measures (RDM)) for main stem rivers starting with the Berg, Breede and Gouritz, Middle and upper Vaal WMA's) (1.6.3)	DWS, CMAs	2022
Secure funds for restoration and ongoing maintenance of ecological infrastructure through operationalising the water pricing strategy (1.6.4)	DWS, CMAs, DEA, SANBI	Annually
Develop and implement a diffuse pollution source strategy that includes the regulation of land use (1.5.14)	DWS, CMAs	2023
Implement programmes to rehabilitate catchments through development of Catchment business plans (1.5.15)	DWS, NT, CMAs	2025

Action	Responsibility	Completion date
Develop new policies and strategies on matters not previously addressed, in consultation with all stakeholders, to facilitate the sustainability of various water sector programmes (2.5.5)	DWS	2025
Link the Global Environment Fund 6 project on Water Pricing and Ecosystems to Water Master Plan implementation and position DWS to be closely involved in this process (2.6.17)	DWS, DEA, SANBI, WRC, CSIR	2024
Ongoing research, modelling and planning around climate change and its impacts on water security and water infrastructure needs to be conducted (2.6.19)	DWS, DEA, DST, WRC, CSIR	Ongoing



SECTION 2: ENABLING ENVIRONMENT

9. Creating effective water sector institutions

9.1 Status quo

The state water and sanitation sector is currently comprised of a large number of institutions with a complex suite of functions divided amongst them, which creates an overly complex value chain.

The Department of Water and Sanitation (DWS) is the executive arm of national government responsible, amongst other things, for water and sanitation policy, regulation of water supply and sanitation provision, oversight of water sector institutions, water resources planning, operation and maintenance of 320 large dams and associated bulk infrastructure, regulation of water use and the collection and assessment of water data.

The Department of Co-operative Governance and Traditional Affairs (COGTA) is responsible for ensuring that all municipalities perform their basic responsibilities and functions consistently, including supporting the delivery of municipal services to the right quality and standard; promoting good governance, transparency and accountability; and ensuring sound financial management and accounting. However, in relation to water supply and sanitation, DWS is the accountable national department.

The South African Local Government Association (SALGA) is an autonomous association of all South African local governments, with the mandate to represent, promote and protect the interests of local governments and to raise the profile of local government.

National Treasury (NT) plays a critical role in the water and sanitation sector, not only through the provision of grants for water and sanitation provision, but also through their oversight of municipal finances. In 2017 they introduced a municipal standard chart of accounts (mSCOA) which enforces the

uniform collection of local government transactional information including on asset management and maintenance. The Trans Caledon Tunnel Authority (TCTA) was initially established to fund the Lesotho Highlands Water Project (LHWP), but subsequently directed by the Minister to fund and implement a variety of water resource projects as an implementing agent for DWS.

Only two (2) of the nine (9) envisaged catchment management agencies (CMAs) have been established in terms of the National Water Act. No functions have been delegated to these bodies which are therefore currently only responsible for the limited initial functions of a CMAs as set out in the Act.

Water boards, established in terms of the Water Services Act, have a primary function of providing water services to other water services institutions and with secondary functions which could include supporting municipalities.

144 municipalities are designated as WSAs, responsible for the constitutionally mandated task of supplying potable water and sanitation services, either as water service providers (WSPs) themselves, or externally through third party WSPs.

At present, some 90 Water User Associations (WUAs) and 177 Irrigation Boards (IBs) exist to manage common water resources, in some cases including infrastructure for irrigation and some of these for government water schemes (GWS).

There are transboundary watercourse commissions in the Orange Senqu, the Limpopo and InkoMaputo basins, as well as KOBWA (Komati basin water authority) and the Lesotho Highlands Water Commission which are responsible for transboundary integrated water resource management.

The Water Research Commission (WRC) commissions research into water and sanitation issues, funded by a levy paid by water users. The WRC thus exists to drive research, development and innovation (RDI) strategy, fund research activities and organisations and synergise with partners to shift solutions to practice.

9.2 Drivers

There are several challenges associated with the current institutional arrangements that need to be addressed to create appropriate and effective institutions with clear mandates, not least the overly complex value chain of institutions currently in place.

DWS is policy maker, regulator, implementer and operator of water resource infrastructure and acts as CMAs in most of the country. Some of these roles have potential conflicts of interest, while, water resources regulation, which is local in nature, could be performed better by more decentralised institutions.

The institutional landscape of the water sector in South Africa must be simplified to improve efficiency. A lack of transformation in certain areas must also be addressed.

Possible future institutional arrangements for the water sector are set out in Figure 12. Those outlined in blue are currently under discussion and/or consultation, and final decisions are awaited.

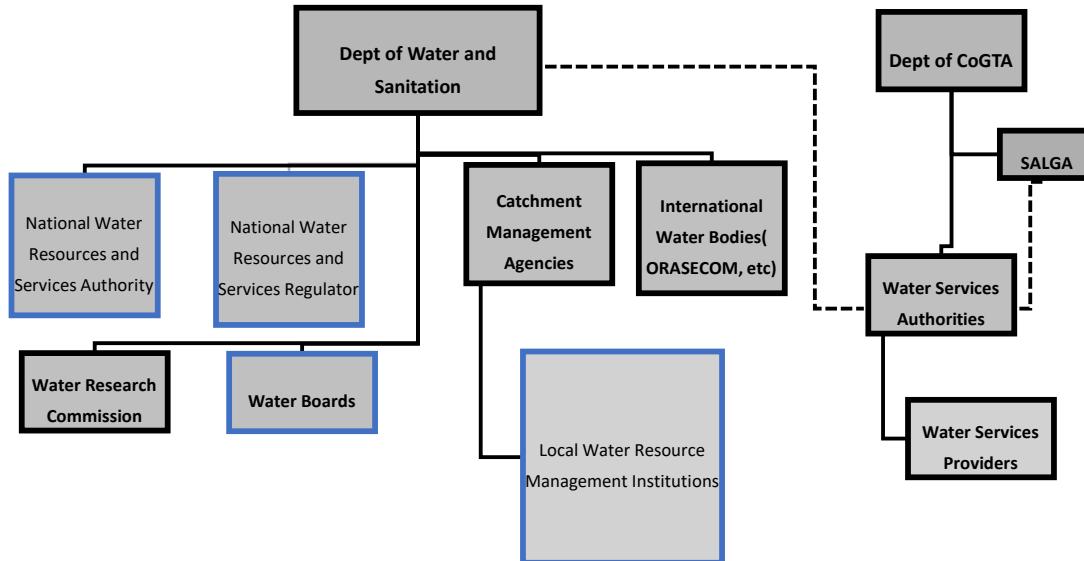


Figure 12: Planned institutional arrangements for the water sector

A National Water Resources and Services Authority (NWRSA) will be established to finance, develop, manage and operate national water resource infrastructure and sanitation. A National Water Resources and Services Regulator (NWRSR) will be established which will be responsible for ensuring the development, implementation, monitoring and review of regulations across the water and sanitation value chain in accordance with the provisions of the National Water Act (1998), the Water Services Act (1997) and related water and sanitation policies. The possibility of an independent economic regulator to regulate tariffs, standards and performance in the water services sector has been proposed.

While the establishment of a single Catchment Management Agency for the country was raised during the initial development of this Call to Action, this proposal has not carried and the implementation of a total of nine CMAs is envisaged.

The establishment of CMAs has progressed slowly with only two of nine planned CMAs established and functional. To make this effective at the local level, stakeholder structures in the WMAs being Local Water Resource Management Institutions are critical.

The water boards are of different sizes and capabilities, with only a few technically and financially strong, each serving one or more major cities, while the smaller boards are technically and financially stretched and are serving

economically weaker and less dense areas. Rand Water and Umgeni Water together make up 75% of national water board capacity. A process is underway to configure some of the boards which will have an expanded mandate, including for regional bulk infrastructure.

All irrigation boards should have been transformed into WUAs by 1999. A policy position that all WUAs and IBs will cease to exist in future was approved by Cabinet in 2013. A roadmap has been developed to transform all IBs and WUAs into local water resources management institutions.

The challenges faced by WSAs are addressed under the section on water supply and sanitation.

Institutional Rationalisation and Organisational Alignment is urgently required and is supported by the Presidential review on State Owned Enterprises (SOEs). However, implementation of changes must not impact negatively on the implementation of other aspects of this plan.

9.3 Key Actions

DWS, as the leader of the water and sanitation sector, will lead a process, with other sector partners, to simplify and streamline the currently complex institutional arrangements in the sector. In addition, it will drive increased functionality and efficiency in institutional arrangements, as follows:

Action	Responsibility	Completion date
Develop and implement a long-term plan for the turn-around of water supply and sanitation services in the country based on a sector-wide approach, that recognises DWS as regulator of W&S provision that includes the development of centralised programmes to obtain economies of scale and to ensure impact (e.g. driving municipal non-revenue-water improvements, and assessing the cost-effectiveness and appropriate systems for desalination) (Volume 3, Action 1.3.1)	DWS, CoGTA, NT, SALGA	Annually
Develop and implement Provincial Water Services Delivery Master Plans to provide reliable and sustainable water supply and sanitation to all households within South Africa: <ul style="list-style-type: none"> • Provincial Bulk Services Master Plans • Reliable Services Delivery Action Plans that includes a backlog analysis and infrastructure asset management plans (1.3.6) 	DWS, WSAs, CoGTA, SALGA, NT, WBs	2030
Establish a business case for streamlined institutional arrangements in the water and sanitation sector (2.1.1)	DWS	2020

Action	Responsibility	Completion date
Establish a Municipal Intervention Unit for Water and Sanitation in DWS, staffed with highly competent experts to drive a national programme of intervention at the municipal level (2.1.2)	DWS	2022
Transform all WUAs into Local water resources management institutions as per the developed roadmap (2.1.7)	DWS, WBs, WRMI, CMAs	2021
Establish financially sustainable CMAs across the country, and transfer staff and budget and delegated functions, including licensing of water use and monitoring and evaluation of water resources (2.1.3)	DWS	2020
Establish the National Water Resources and Services Authority (2.1.4)	DWS, NT	2020
Determine the optimal configuration of water boards to manage regional bulk water supply; assist municipalities to perform their primary water and sanitation services mandate where necessary, manage regional water resources infrastructure, manage regional bulk WTWs and WWTWs (2.1.5)	DWS, WBs	2020
Establish the National Water Resources and Services Regulator (NWRSR) (2.1.6)	DWS, NT	2020
Implement accurate billing and effective revenue management systems in all entities in the water value chain with a strict <i>“No payment = no water”</i> approach to agriculture/industrial/commercial users and restricted supply to domestic users (2.4.2)	WSAs, WBs, DWS, AGSA	2024
Ensure that sufficient revenue is received through tariffs and grants to operate, maintain and improve the water supply and sanitation system. The tariff structure must allow for cross subsidisation for the indigent and building of a reserve for periods of drought (2.4.5)	WSAs, WBs, DWS, NT, AGSA	2024

10. Managing data and information

10.1 Status quo

Reliable data, information and knowledge on the status of the country's water resources, water supply and sanitation is required to understand and enable spatial and non-spatial analysis and presentation of water use and water demand including the manner in which various economic, social and environmental activities in catchments affect (consume, pollute, increase) or constrain (limit, degrade) water quality, quantity and ecosystems. DWS has developed a systematic knowledge base and associated knowledge products of their water services and resources business with the aim to share the knowledge in the public domain. Information is available in a Geographic Information System (GIS) format as well as various separate and supporting formats that are of non-spatial nature.

Inadequate data and information resulting from a weak monitoring system poses high risks to decision making and planning and urgently need to be addressed through the formalisation of an effective national hydrological monitoring centre

Water resources data includes regular measurements of rainfall, streamflow, dam levels, and of chemical and biological determinants based on a well-established network of monitoring points. It further includes information on the ecological properties of water resources, both surface and groundwater. The coverage of rainfall and runoff gauging in the country has, however, been allowed to deteriorate and many rainfall measurement stations and gauging weirs are no longer functional. The South African Weather Service and HydroNET joined forces to provide reliable weather information. HydroNET is a web-based decision support

system which transfers weather and water data into sophisticated applications and dashboards to make well-informed and transparent decisions.

Information on water and sanitation infrastructure and related supply information as captured in the Water Services / Regulation Systems Menu maintained by DWS, are also critical for effective management of water and sanitation. The DWS has initiated the development of a National Integrated Water Information System (NIWIS) as integrator of existing DWS programmes and information systems in order to ensure that sector decision-makers have access to the best data possible. DWS recognises that reliable data is also required on the performance of water sector institutions and on the state of water and sanitation assets in order to monitor progress on the implementation of the NW&SMP, and in order to monitor progress towards the goals set out in the Second Edition of the National Water Resources Strategy (NWRS2) and the NDP. Current data on water authorisation and use is captured in the WARMS database. The MuSSA programme, together with its supporting databases is also an important tool to assess the capacities and constraints of water services institutions.

While DWS has worked alongside sector partners in the development of other ambitious regulatory and/or benchmarking databases, such as the National Benchmarking Initiative undertaken by SALGA, the WRC and the South African Association of Water Utilities (SAAWU), these exercises have unfortunately never achieved full coverage and most have been allowed to lapse. It is also a hinderance that there are insufficient, accessible and up-to-date information available within the DWS on supporting datasets such as agricultural activities, energy generation, water requirements for all sectors – various scales, socio-economic data or scenario planning, to assist in water management and governance activities.

To date, one of the more successful and informative regulatory programmes was the Blue Drop and Green Drop certification developed and operated for a number of years by DWS, but which has now lapsed. The same applies to the No Drop programme that focused on water conservation and water demand management. A key element of success of these initiatives was that the information generated by these programmes was made available to the broader public and in many cases promoted consumer confidence and greater transparency in service delivery. Currently the most reliable information on municipal financial performance is maintained in the National Treasury databases, but unfortunately water and sanitation financial information is still not clearly ring-fenced.

10.2 Drivers

Effective information management, monitoring and evaluation is crucial for the successful management and regulation of water resources or water services as it creates the platform to initiate interventions / actions, understand trends, adapt management plans appropriately or plan effectively for the future. This is particularly critical in an environment facing significant change. The lack of data and information resulting from weak monitoring systems, information systems that are outdated or not maintained, pose a high risk to the achievement of the goals set out in the NWRS2 and the NW&SMP.

Therefore, improved and modernised information systems must be developed in support of the implementation of the NW&SMP and continue to build and expand on the suite of knowledge products and communication channels that are utilised to share knowledge in a customized manner. Spatial and non-spatial datasets should be packaged as time-series knowledge products such as atlases, interactive dataset exploration and visualization toolkits (appropriate charts, maps and schematic). Online mapping and interfacing with modelling tools inclusive of systematic metadata and factsheets on the knowledge base should also be included. In addition, there will be a need to include other non-spatial data and information such as existing information, maps reports, data on policies, programs, and projects, institutional information to name a few.

10.3 Key Actions

Action	Responsibility	Completion date
Revitalise the Green, Blue and No Drop programmes and publish results. Revise and establish norms and standards to be applied in the Green, Blue and No Drop programmes (Volume 3, Action 1.4.1)	DWS, WSAs	Annually
Review and develop and implement comprehensive and appropriate Management, Monitoring and Reporting Structures of the DWS data portal (2.2.1)	DWS	Annually
Review, develop and implement a comprehensive DWS information and knowledge management strategy to include among other: <ul style="list-style-type: none"> • Amended authorisation conditions to provide for self-reporting • Harmonization of monitoring actions by all responsible institutions • Perform information V&V audits (2.2.2) 	DWS	Annually
Alignment of monitoring institutions to support National and International reporting requirements and programmes, e.g. SDGs, Agenda 63 and AMCO (2.2.3)	DWS	2021

Monitor, review, evaluate, report on and update NW&SMP (2.7.4)	DPME, DWS	Annual report to Parliament
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11. Building capacity for action

11.1 Status Quo

The NW&SMP sets out the challenges that must be addressed to ensure a secure water future. These will not be achieved without addressing the issue of capacity – the skilled people required to undertake the work.

A skills gap analysis conducted by the WRC in 2015, looking at numbers of staff and their skills relative to required skills, showed significant skills gaps in water sector institutions, including DWS, CMAs, water boards and municipalities.

On the positive side, the number of Civil Engineering graduates doubled between 2010 and 2015 from approximately 1 000 to 2 000 graduates per year. It is not clear how many of these graduates seek work in the water and sanitation sector. Other graduate numbers with qualifications that apply to the water and sanitation sector also increased dramatically in this period, leading to no shortage of science graduated applying to work in the sector. However, the challenge of appointing qualified and experienced staff will remain, particularly in rural municipalities.

The Energy and Water Sector Education and Training Authority (EWSETA) is the skills development authority serving the water and sanitation sector.

11.2 Drivers

Implementing the NW&SMP requires the right mix of skills and expertise in the water and sanitation sector. This includes the capacity expressed as number of persons and skills expressed by qualification and experience required to fulfil the requirements in water resources and water and sanitation services planning, management and operations. A critical need is to use the expertise of experienced water managers to mentor and develop younger and less experienced managers in the water and sanitation sector including, but not limited to, the municipal sector.

11.3 Key Actions

Action	Responsibility	Completion date
Establish regulations on required qualifications and experience for senior and technical positions in DWS, CMAs, water boards and municipal services institutions (Volume 3, Action 2.3.1)	DWS, CoGTA, SETA	2023
Develop and implement programme for recruiting experienced technical and managerial staff in first South Africa and then internationally (2.3.2)	DWS, CoGTA, DIRCO	2030
Define (and reinstate in some cases) career paths with defined training and on the job experience to build a knowledgeable sector of professionals (2.3.3)	DWS, WSAs, WBs, CMAs	2023
Develop and implement a mandatory, modular hands-on qualification for municipal water managers (technical manager) to be run over 18 months and accredited by EWSETA to include aspects such as asset management, tariffs and revenue management, drought management, stakeholder engagement and customer relations (2.3.4)	DWS, EWSETA, Institutions of Higher Learning	Ongoing

Action	Responsibility	Completion date
Partner with institutions to fund training of water sector practitioners in the curation, management and use of data as well as the associated technologies (2.3.5)	DWS, EWSETA	Ongoing
Initiate a focused research capability initiative in water sector economics to address this existing skills gap (2.3.6)	DWS, WRC, CSIR, DST	Ongoing
Continue to develop high end skills (post graduate) to ensure a future science, technology and innovation capability in South Africa (2.3.7)	DWS, DST, NRF, WRC, CSIR, the dti (THRIP)	Ongoing
Continue to support programmes that enable development of critical skills and exposure to emerging innovations (e.g. Young Engineers Programme) (2.3.8)	SALGA, DST, WRC, CSIR, DWS, CoGTA, MISA	Ongoing

12. Ensuring Financial Sustainability

12.1 Status Quo

The water and sanitation sector is currently not financially sustainable. Funding needs are on the increase and available funding is limited due to the economic recession, reduced revenues and accumulating debt. The financial health of the water and sanitation sector is challenged by the following factors:

- Lack of understanding of the strategic value of water (particularly the importance of water security);
- Degradation of existing asset value (backlogs in operations, maintenance and refurbishment);
- Funding gap (expectations exceeding current capacity);
- Water use not optimised (lack of demand management, water allocations insufficient);
- High non-revenue water (non-paying users, insufficient revenue management system, growing debt);
- Backlogs on Free Basic Water supply and sanitation provision (still catching up);
- Inefficient sector institutions (complex structure and governed under different legislation);
- Fiscal constraints (limited capacity by fiscus to provide funding or guarantees);
- Tariffs not cost-reflective (under-recovery, agricultural subsidies);
- Capacity constraints (lack of skills and integrated, practical support programmes);
- Non-alignment on priorities and strategic value of water;
- Institutions not creditworthy (financially constrained municipalities - especially in rural areas);
- Private sector participation not optimized;
- Reducing water quality (increasing costs and environmental risks); and
- Value-for-money procurement not optimal.

The South African water sector is in decline with highly vulnerable municipalities characterised by declining levels of service, a continued increase in customer dissatisfaction, rising levels of unpaid bills and aging infrastructure. In terms of the Vulnerability Assessment report⁸, 78% of municipalities rate between 'high' and 'extreme' in terms of vulnerability. The dire situation is confirmed by No-Drop and Green Drop Reports which show high levels of non-revenue water and large numbers of wastewater treatment works not meeting the discharge standards.

Funding of the water sector comprises capital for infrastructure development, operation and maintenance (O&M) along the water supply chain, as well as funding for governance (plan, organize, lead and control) and effective management of water and sanitation services provisioning. The Capital requirement of the sector totals approximately R90 billion per annum, comprising about R70 billion

A turn-around towards financial sustainability is not optional and requires dedicated, purposeful intervention and a serious mind-shift by all stakeholders



⁸Department of Water and Sanitation (DWS). 2015. Municipal Strategic Self-Assessment (MuSSA)

for water supply infrastructure from source to end-user and about R20 billion for sanitation and wastewater collection and treatment.

A funding gap of R 333 billion is anticipated over the next 10 years between funding required (R 898 billion) and available funding (R 565 billion). This funding gap of R 33,3 billion *per annum* must be reduced through purposeful interventions such as policy reviews, enhanced regulation, implementation of cost efficiency measures and proper management of user expectation and demands.

Funding Gap over the next decade

Funding Requirement	-	Funding Available	=	Funding Gap
• R 898 billion		• R 565 billion		• R 333 billion (37%)



The capital replacement value of the existing water and sanitation infrastructure was estimated at R 1 362 billion in 2017. The existing assets are however also depreciating, resulting in a current book value of the infrastructure of about R 584 billion, or 43% of capital replacement cost⁹. The operational reality is that existing infrastructure was “stretched” because of significant underinvestment in infrastructure maintenance and delays in renewal of aged infrastructure which has resulted in an accumulated backlog in refurbishment of R 59 billion. National guidelines target 8% of asset replacement value to be set aside for maintenance. Proper life-cycle asset management is required to address the backlog. Good asset management actions will optimise asset life and improve return on investment.

- * Infrastructure is ageing (57% depreciated) and needs urgent refurbishment and renewal.
- * Refurbishment backlog of R59 billion needs about R12 billion per annum over 5 years to recover.
- * Renewal backlog total R332 billion with R125 billion a priority need

Available capital investment in water infrastructure is in the order of R40 to R42 billion per annum, while investment in sanitation is approximately R13 to R15 billion per annum, totalling R55 billion for the sector¹⁰. However, capital investment over the next 10 years of at least R90 billion per annum is required, is based on the following priority needs:

- remaining backlog in basic water and sanitation services (at current street tap service levels);
- critical refurbishment backlogs (caused by poor maintenance);
- critical renewals of aged infrastructure;
- provision for water resource developments identified in DWS planning studies; and
- provision of new bulk, connector and reticulation infrastructure to meet the demands of population growth and agreed water use extensions aimed at promoting economic growth.

Annual operating expenditure in the water and sanitation sector is estimated at R 100 to R 120 billion per annum¹¹. This is a first-order estimate as water and sanitation services are currently not ring-fenced in municipal accounting. The current revenue from water and sanitation services amounts to

⁹ Department of Water and Sanitation (DWS). 2018. National Water Investment Framework

¹⁰ Department of Water and Sanitation (DWS). 2017. National Water Investment Framework. National Treasury. 2017. Division of Revenue Act

¹¹ DWS and National Treasury. 2017. National Water Investment Framework & Municipal Budget Data Base

R72 billion per annum along the full water and wastewater supply chain. Operating grants are primarily from Equitable Share and total an additional R29 billion per annum, based on the DoRA allocation guidelines. The Equitable Share is however unconditional, and municipalities can use it at own discretion. The total funding for water and sanitation operations is estimated at R 98 billion, if the full revenue is allocated to operation and maintenance. Revenue is however, also needed to finance capital, which decreases the available funding for operation proportionally. A funding gap for good operations is estimated at R 5 billion if all water services revenue is allocated to operations or up to R 10 billion per annum if revenue is committed to new capital financing.

An additional challenge referred to above, is that the governance of the water sector is fragmented between different Acts (legislation) and different institutions, which makes it difficult to resolve the financial challenges confronting the sector, particularly at municipal level.

Finally, the reality of the sector is that funding options are limited. There are essentially only two means to pay for capital and operation of infrastructure, being either taxes (national) and/or tariffs (users). Economic infrastructure represents infrastructure where the investment can be recovered from users (tariffs), whereas social infrastructure is reliant on fiscal funding (taxes). Most schemes comprise of economic and social use and require a combined funding approach.

The balance of the funding requirements can adequately be addressed through loans and funding structures. However, loan funding is not “new funding”, but is used to address immediate funding needs to be repaid over a longer-term with interest from future tariffs. Affordability of tariffs should therefore be carefully established before loans are committed. Loans provide immediate relief, but increase pressure on future tariffs and debt obligations for future generations. Loan funding should be limited to capital investment and not be applied to fund operating costs.

The reality is that various funding structures are available which merit consideration. Whilst project finance will continue to be applied to fund large infrastructure projects, smaller projects could benefit from alternative funding options offered by the market.

The ability to raise funding is constrained by low credit ratings. Apart from the TCTA and larger water boards and metropolitan municipalities, the sector generally lacks the capacity to raise long-term debt and appropriately manage the associated risks.

Funding for specific activities is also available from international donor sources such as the Global Environmental Facility, Adaptation Fund and Green Climate Fund. Dedicated funding will be required to implement the interventions identified in the entire Master Plan including project planning, programme management, sector coordination, implementation monitoring, and performance regulation. Current funding of water and sanitation services functions in national, provincial and local government institutions must be reviewed, adjusted and augmented where necessary to ensure that there is adequate capacity and resourcing to implement the NW&SMP.

The funding of the initial implementation of the NW&SMP has been considered, but will be reviewed annually as the plan itself is reviewed. In the 2018/19 financial year, the budget of the water sector is largely set, as are the actions for the various organs of state in the sector, through their annual performance plans. *This NW&SMP will, therefore, begin to make most impact on the sector from the 2019/20 financial year onwards when it will substantially begin to influence reprioritisation of budgets, cost savings, and the identification of options for additional sources of money over time.* Some of the actions proposed in this plan, such as the implementation of water conservation and demand measures, may require up-front investment which will contribute substantially to improved financial

sustainability over time.

12.2 Drivers

Water and sanitation infrastructure is capital intensive and the sector is faced with increasing funding needs whilst fiscal funding is limited. The current dependency on the fiscus to develop the sector will need to be addressed through purposeful interventions.

Although funding is a critical enabler to achieve the objectives of the Master Plan, the implementation of the plan, including in terms of regulation, anti-corruption, efficiencies and enforcement, will be the enabler to attract value-for-money funding, making the Master Plan critical to achieving financial sustainability.

To achieve financial sustainability, costs need to decrease, and revenue needs to increase.

The following drivers will play a key role to maintain positive cash flows and affordable service delivery:

- Reduce costs
 - Delay replacement of existing assets through proper operations, maintenance and refurbishment;
 - Reduce demand and physical water losses;
 - Address agricultural sector benefiting from a large subsidy on the price of water.
- Increase revenue
 - Increase in revenue collectively considers the cost of water (pricing) as well as revenue management (metering, billing and collection);
 - A mindset-shift is required by users and water utilities with regard to the value of water. Scarcity of water should increase the value of water and enforce water demand and conservation measures for sustainable water use between competing uses.
- Increase fiscal transfers
 - Further fiscal transfers would be unlocked if cost efficiencies and revenue challenges are addressed;
 - Increase Government support for funding structures.
- Increase loan funding
 - Increase loan funding through the private sector and simplify PPP structures;
 - Ring-fence water revenue and grants intended for loan repayment.

In support of the above, the following pointers could be considered:

- Establish integrated long-term cash flow plan to map the full capital and operating costs along the full infrastructure life-cycle;
- Determine funding required to implement the “turn-around” in financial health;
- Implement dedicated programme and governance. A Systematic “turn-around” requires inclusive political support, institutional mandate, leadership, a formal programme and dedicated funding;

- Assess appropriate funding options from Transfers – Public Sector Focus, Revenue – User Focus, Loans – Private Sector Focus or a combined approach / Blended funding; and
- Address raw water as well as potable water tariffs and revenue collection.

12.3 Key Actions

Action	Responsibility	Completion date
Set cap on water use with reducing targets over time (Volume 3, Action 1.1.2)	DWS, CMAs, WSAs, CoGTA	2030
Develop and implement a long-term plan for the turnaround of water supply and sanitation services in the country based on a sector-wide approach, that recognises DWS as regulator of W&S provision that includes the development of centralised programmes to obtain economies of scale and to ensure impact (e.g. driving municipal non-revenue-water improvements, and assessing the cost-effectiveness and appropriate systems for desalination) (1.3.1)	DWS, CoGTA, NT, SALGA	Annually
Implement the Waste Discharge Charge System (WDCS) in priority catchments (SA5, SA41, SA42, SA43 & SA44) (1.5.8)	NT, DWS, CMAs	2030
Ensure fiscal support for IWQM (SA38 & SA39) (1.5.11)	DWS, WSAs	2021
Establish a business case for streamlined institutional arrangements in the water and sanitation sector (2.1.1)	DWS	2020
Develop and implement institutional arrangements that recognise the diversity of circumstances across South Africa, the legacy of Apartheid and allow for regional cross subsidisation (2.4.1)	NT, DWS	2021
Implement accurate billing and effective revenue management systems in all entities in the water value chain with a strict “No payment = no water” approach to agriculture/industrial/commercial users and restricted supply to domestic users (2.4.2)	WSAs, WBs, DWS, AGSA	2024
All conditional grants to be dependent on meeting of current payments to the next entity in the value chain, improvements to Blue Drop, Green Drop and No Drop Scores to meeting targets and audit outcome. Allow conditional grants to be used for operational costs (2.4.3)	NT, AGSA, DWS	2023
Develop regulations in terms of Section 139 (8) of the Constitution, which allows for a national entity to take over the water service functions, including revenue and billing, in a municipality if service deliver criteria are not met (2.4.4)	DWS, CoGTA	2022

Action	Responsibility	Completion date
Ensure that sufficient revenue is received through tariffs and grants to operate, maintain and improve the water supply and sanitation system. The tariff structure must allow for cross subsidisation for the indigent and building of a reserve for periods of drought (2.4.5)	WSAs, WBs, DWS, NT, AGSA	2024
In all entities put in place mechanisms to deal with accumulated debts (2.4.6)	WSAs, WBs, DWS, NT, AGSA	2020
Roll out of ring-fenced institutional models to increase private sector investment (2.4.7)	DWS, NT, CoGTA	2021
National Treasury – linkage to Medium Term Sector Expenditure Framework (MTSEF) (2.4.8)	NT, DWS	Ongoing

13. Amending the legislation

13.1 Status quo

The water sector is governed primarily by two Acts: The National Water Act (Act 36 of 1998), which governs the use, protection, development, management and control of raw water, and the Water Services Act (Act 108 of 1997) which governs the provision of water and sanitation services. The National Water Act has been amended twice since it was promulgated: by Act 45 of 1999 and by Act 27 of 2014. The Water Services Act was amended by Act 30 of 2004. In addition, the Water Research Commission was established under the Water Research Act (Act 34 of 1971). The Municipal Financial Management Act (MFMA), the Municipal Systems Act (Act 32 of 2000) and the Municipal Structures Act (Act 117 of 1998) also govern water and sanitation services at the municipal level. The Municipal Systems Act governs the powers and functions allocated to Water Services Authorities. The Public Finance Management Act (PFMA) governs financial matters at national and provincial government level.

As discussed elsewhere in this Call to Action, there is acknowledgement that the current legislative environment is overly complex, insufficiently streamlined and hampering effective service delivery, the attainment of transformation objectives and the leveraging of economic growth. The Department of Water and Sanitation will therefore lead a process that ensures that water sector legislation is amended and aligned, and ready for the future and ahead of the curve.

13.2 Drivers

Learning from practise, in the implementation of the National Water Act and the Water Services Act over the years since their promulgation, certain issues have been identified that require amendment. As a result, some of the amendments to be tabled for consideration may aim to:

- Align the legislation to subsequent policy decisions including:
 - introducing mechanisms to enforce the polluter pays principle
 - the 'Use-It or Lose-it' principle under which any water which is not utilised reverts to the state
 - the removal of temporary or permanent trading between authorised water users
 - equity as the primary consideration in water allocation
 - adopting a multiple water use approach in planning infrastructure
 - the role of DWS in planning for regional bulk water infrastructure
 - free basic water and free basic sanitation to be provided to indigent households only
 - the optimal configuration of, powers and functions of Water Boards and Water Services Authorities
 - the establishment of CMAs, and
 - the alignment of appeal functions with NEMA and other appeal mechanisms.
- Address issues pertaining to ownership of water and sanitation infrastructure, differential levels of service for sanitation, and appropriate technologies for sanitation
- Empower the Minister to effectively regulate the water supply and sanitation sector

- Address issues pertaining to water use authorisation
- Enable the setting of tariffs for the whole value chain linked to levels of service and economic conditions,
- Enable the protection of strategic water source areas and
- Ensure linkages between spatial planning and the NW&SMP and create the mandate for a National Water and Sanitation Strategy.

In addition, the Water Research Act, now over 40 years old, must be amended to align to current governance best practice, contemporary institutional arrangements, and the PFMA. A Water Research Amendment Bill has been developed, which will be tabled before Parliament.

13.3 Actions

Action	Responsibility	Completion Date
Gazette the National Water Amendment Bill, Water Services Amendment Bill and Water Research Amendment Bill (Volume 3, Action 2.5.1)	DWS, Portfolio Committee, Standing Committee	2021
Hold public consultation on National Water Amendment Bill, Water Services Amendment Bill and Water Research Amendment Bill (2.5.2)	DWS, Portfolio Committee, Standing Committee	2022
Revise and promulgate the National Water Amendment Bill, Water Services Amendment Bill, and the Water Research Amendment Act (2.5.3)	DWS, Portfolio Committee, Standing Committee	2023
Review the Municipal Financial Management Act (MFMA) and the Municipal Systems Act (specifically chapter 8) to ensure that they provide an enabling environment for the provision of reliable water and sanitation services (2.5.4)	NT, DWS, CoGTA, SALGA	2020
Develop new policies and strategies on matters not previously addressed, in consultation with all stakeholders, to facilitate the sustainability of various water sector programmes (2.5.5)	DWS	2025

14. Enhancing Research, development and innovation

14.1 Status quo

South Africa has received international recognition for its water and sanitation research and development with several internationally recognised products and solutions. Despite this, there is still much to be done in maturing how we shift new solutions into practise. Getting this right demands a highly coordinated system of institutions supporting innovation, demonstration, validation and deployment.

There is an active array of institutions engaged in different aspects of water research, development and innovation to start building from. The WRC is the leading funder of water research in South Africa. It is funded from water user charges and leverages additional resources from various partnerships and programmes. Various government departments are involved with funding and supporting research and innovation activities in different ways. There is also a range of science councils, tertiary academic institutions, non-profit organisations and private sector role players that are involved in developing and supporting water research and innovation.

Whilst there is a rich institutional and skills environment to draw from; water research, development and innovation continues to face a range of challenges including: poor coordination and synergising of activities between institutions; a weak understanding of the role of all water sector organisations in driving innovation and shifting solutions to practise, challenges in scaling up of solutions to be ready for the market, and highly limited funding for innovation (particularly in its scale up/ deployment stages). This results in many solutions that emerge from the research and development space not being implemented in practise. For South Africa to be ready for the future we must be able to address the innovation chasm where emerging solutions fail to be tested at scale or developed into viable business that are able to engage with different public and private sector role players.

To better synergise South African institutions involved in water innovation around the different gaps and opportunities of the sector, the Department of Science and Technology (DST) has collaborated with the DWS and the WRC to develop a Water Research, Development and Innovation Roadmap.

This Roadmap identifies RDI gaps and opportunities and orients the sector towards addressing these opportunities in a more coordinated way through investments in research, high end skills development and actions that shift new solutions into practise. The plan focuses across six themes: i) Unlocking alternative sources of water (including reuse, improved groundwater utilization, desalination and harnessing of storm water); ii) Exploring ecological and built water infrastructure opportunities in relation to climate resilience (including supporting the alternative and water-less sanitation revolution) iii) Ensuring greater water efficiency and reduced losses and iv) water governance, planning and management for supply and demand; v) orientating the water sector towards more business savvy and bankable solutions; and vi) supporting monitoring, metering and water data innovation.

This Roadmap, which forms the basis of the RDI aspects of this Master Plan, is also an important linker to the Industrial Policy Action Plan ambition to drive water industry in areas of sanitation, membranes and waste water treatment.

A Water RDI Roadmap Implementation Unit has been put in place in partnership between DST and WRC to support intelligence gathering, sector tracking and facilitate aspects of coordinating the role

players of the water innovation landscape.

The overall minimum investment required to achieve all aspects of the RDI master plan over a 10-year period is R 8.4 billion. In 2015 it was estimated that an average of R 300 million was spent on water research, development and innovation. This illustrates that the current spend on Water RDI is woefully inadequate to address the countries' needs (an approximately R 500 million a year shortfall).

Traditional funders in this space, such as the WRC and DST, cannot be the sole investors in the RDI Roadmap. Sector wide ownership and investment will be needed to realise this RDI ambition, especially when it comes to the costlier issues of technology testing, demonstration, upscaling and solution deployment. If we are to develop a water industry in terms of localisation, manufacturing and job creation, it also requires investment from role players such as DTI and its entities, metros, and utilities.

14.2 Drivers

It is vital to recognise that RDI is an activity that has cross cutting linkages with all aspects and chapters of the NW&SMP. All aspects of the water sector have their own set of research, innovation and solutions requirements.

RDI is an activity that has cross cutting linkages with all aspects and chapters of the NW&SMP

Ongoing research, development and innovation, and the harnessing of international developments, is a critical element of delivering effectively on this Call to Action, as is the translation of research and innovation into implementation at scale. The RDI system is key to being 'ahead of the curve' as it supports the development of new solutions and technology, provides evidence to support robust decision making, and builds capabilities that enable South Africa to respond to challenges. This is critical in terms of shifting the country into a more proactive planning space that abates some of the more reactive activities that emerge when we are not properly prepared for droughts and other extreme events.

Innovation also offers a significant opportunity to develop a water sector industry which can contribute to job creation, and to the development of economic opportunities for the country.

14.3 Key Actions

Action	Responsibility	Completion Date
Implement and regularly review/revise Research, Development and Innovation Policies, Plans and Roadmaps across the sector (Volume 3, Action 2.6.1)	DWS, DST, WRC, CSIR	2021
Unlock investment, procurement and other localisation barriers to reposition the sector to implement new/niche solutions and approaches and roadmap the NMIU (2.6.2)	DWS, NT, CoGTA, DST, NMIU	Ongoing
Coordinate, and where needed establish new platforms, to enable a synergised set of institutions that enable the shifting of innovations into the market (including business development and SME support) (2.6.3)	DWS, the dti, Dept Small Business, EDD	2019
Strengthen partnerships with key water sector institutions to accelerate research and solutions into practice (2.6.4)	DWS, WRC, CSIR, DST, CoGTA, SALGA, the dti, DAFF	2020

Action	Responsibility	Completion Date
Structure test bed partners with key water sector institutions in order to accelerate innovations to the market/public sector (2.6.5)	WRC, CSIR, DWS, DST, SALGA, Municipalities	Ongoing
Fund research into new models to better understand implementation approaches for water allocation reform, and equity issues (2.6.6)	DWS, WRC, CSIR, DST	Ongoing
Develop technologies, guidelines and implementation support tools that enable SA to use alternative and appropriate sources as part of water supply (2.6.7)	DWS, WRC, CSIR, DST, SALGA, CoGTA, WSAs	2023
Apply the concepts of water sensitive urban design to a robust city-wide case study to demonstrate and learn how a city can transition to a sustainable city (2.6.8)	DWS, SALGA, Metros, District Municipalities	2027
Tools for agriculture early warning systems need to be developed and tested at scale (2.6.9)	WRC, CSIR, DWS, DAFF, ARC	Ongoing
Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation (2.6.10)	WRC, CSIR, DST, DWS	2021
Alternative Sanitation: Develop and demonstrate and validate appropriate alternative, water-less and off grid sanitation solutions (Current – 2025) (2.6.11)	DWS, WRC, CSIR, DST, BMGF, the dti, Municipalities	Ongoing
Domestic and industrial Waste Water: Develop and Demonstrate appropriate waste water technologies for cost effectiveness, energy efficiency and beneficiation (2.6.12)	DWS, TCTA, WRC, CSIR, the dti, DST, TIA, MINTEK	Ongoing
Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation (2.6.13)	WRC, CSIR, DST, DWS	2021
Drinking Water Treatment: Develop and Demonstrate solutions that allow for the use of alternative sources of water for safe human consumption and water security (2.6.14)	DWS, WRC, Municipalities	Ongoing
Continue to invest in understanding emerging contaminants (detection and treatment) in order to improve our transition to reuse, reclamation and recycling of water (2.6.15)	DWS, WRC, Municipalities	Ongoing
Improving raw water quality: Invest in Communities of practise that bring together built and ecological infrastructure experts and solutions (2.6.16)	DWS, DEA, SANBI, WRC, CSIR, DST	Ongoing
Link the Global Environment Fund 6 project on Water Pricing and Ecosystems to Water Master Plan implementation and position DWS to be closely involved in this process (2.6.17)	DWS, DEA, SANBI, WRC, CSIR	2024
Continue to do research on land use impact on water linked ecosystems (2.6.18)	WRC, CSIR, DEA, DWS, DAFF, ARC	Ongoing

Action	Responsibility	Completion Date
Ongoing research, modelling and planning around climate change and its impacts on water security and water infrastructure needs to be conducted (2.6.19)	DWS, DEA, DST WRC, CSIR	Ongoing
Initiate a hydrological monitoring centre for South Africa in order to re-establish a robust data, monitoring and information capability for more effective water resources planning and climate change forecasting in future (2.6.20)	DWS, DEA, ARC, DAFF, WRC, CSIR, DST, SAWS, CSIR, StatsSA	2021
Test a suit of ICT and citizen science tools for data sourcing (2.6.21)	WRC, CSIR, DWS, DST, CoGTA, SALGA, the dti, DAFF	Ongoing
Partner with institutions to fund training of water sector practitioners in the curation, management and use of data as well as the associated technologies (2.6.22)	DWS, EWSETA	Ongoing
Review all relevant guidelines and R&D products to understand where training modules need to be developed around new knowledge (2.6.23)	DWS, WRC, CSIR, SETAs, WISA, DHET	

READY FOR THE FUTURE AND AHEAD OF THE CURVE – LET'S DO IT!

South Africans share common interests and challenges in the pursuit of water security. Achieving water security requires sound evidence to inform policy and dialogue, good governance, advances in research and technology, the mobilisation of finance and investment, management of climate risks, and cooperation in managing transboundary water resources. It requires balancing supply and demand, redistributing water for equitable access and use, managing water and sanitation services effectively, regulating the water sector with a focus on high impact use, improving raw water quality and protecting and restoring ecosystems. These themes orient the NW&SMP and provide a rallying point for government, civil society, the private sector, researchers and innovators, the international community and ordinary South Africans.

The NW&SMP: Call to Action has identified priority challenges and the critical actions that must be implemented to address the current crisis in the water sector and to achieve the constitutional and legal mandate given to the sector. *The Call to Action prioritises the actions that will deliver the greatest impact with limited resources, with a focus on reducing water demand, increasing supply, ensuring universal and reliable water supply and sanitation, protecting infrastructure through effective asset management, improving raw water quality, and ensuring equity in access to water.*

Of critical importance is the issue of financial sustainability. Currently the sector is not financially sustainable and increases more than inflationary targets will be required to address the historic undervaluation of water and sanitation services. High levels of debt at municipal level reverberate up the value chain, impacting on the financial sustainability of all institutions in the water sector, exacerbated by poor revenue collection by DWS itself. There are five legs to the financial sustainability issue that must be addressed:

- Implement accurate billing and effective revenue management systems in all entities in the water value chain with a strict “No payment = no water” approach to agriculture/industrial/commercial users and restricted supply to domestic users;
- All conditional grants to be dependent on meeting of current payments to the next entity in the value chain, improvements to Blue Drop, Green Drop and No Drop Scores to meeting targets and audit outcome. Allow conditional grants to be used for operational costs;
- Develop regulations in terms of Section 139 (8) of the Constitution, which allows for a national entity to take over the water service functions, including revenue and billing, in a municipality if service deliver criteria are not met;
- Ensure that sufficient revenue is received through tariffs and grants to operate, maintain and improve the water supply and sanitation system. The tariff structure must allow for cross subsidisation for the indigent and building of a reserve for periods of drought;
- In all entities put in place mechanisms to deal with accumulated debts;
- Roll out of ring-fenced institutional models to increase private sector investment; and

Improved financial sustainability will enable the sector to turn around the currently poor levels of maintenance and refurbishment that are contributing to the decline in reliability of services and the high levels of wastage of water through leaks. Improvement in the condition of WWTWs will also contribute to improved water resource quality and the reduction of public health risks.

Addressing unacceptably high levels of water loss is a critical element of reducing water demand. Non-revenue water levels in municipalities are estimated at an average of 41%, which is unacceptably high. As a result, municipalities are losing some R 9.9 billion of potential revenue per year. The reduction of water losses and the introduction of water conservation and demand management measures in municipalities must be enforced to achieve the targets in the NDP. A national programme is proposed that will drive the reduction of non-revenue water levels to meet national and catchment targets. In addition, water conservation and demand management targets will be set for all municipalities and reflected in the KPIs of Municipal Managers and other senior staff.

On 27 June 2018, Cabinet noted the NW&SMP and supported the mobilisation of a detailed planning process in the sector utilising the Phakisa planning methodology.

The NW&SMP will serve as the basis for the Phakisa on Water and Sanitation.

The implementation of the programme of action resulting from the Phakisa will be driven by the DWS PMU in collaboration with sector partners.

At the municipal level, the current crisis will need the combined engagement of DWS, COGTA, National Treasury, SALGA, water boards and WSAs. The reintroduction of a sector-wide approach (SWAP) programme is proposed, led by DWS, to tackle the current challenges. In this programme, a differentiated (triage) approach will be adopted in which WSAs will be categorised according to the challenges that they are facing, and targeted responses will be developed and implemented for the various categories. A specialised municipal intervention unit for water and sanitation (MIUWS) will be established by DWS, staffed with a small team of highly competent experts, to run the diagnostic analysis necessary to categorise the WSAs, and to drive the national programme of interventions where required.

A national programme, driven by the MIUWS, is also proposed to support the adoption of alternative water sources such as desalination and water re-use. It is proposed that DWS lead a programme that will examine the costs and benefits of these technologies at a regional level to support WSAs in making decisions on the most appropriate water sources to use to increase supply. In addition, a national, targeted programme of refurbishing and turning around failing WWTWs to protect our natural resources and citizen health is non-negotiable. DWS will also, with effect from 2018/19, re-introduce the highly-respected Blue, Green and No Drop programmes.

At present, the constitutional water supply and sanitation services responsibility lies with 144 municipalities that are WSAs. At least a third of these WSAs are regarded as dysfunctional and more than half have no, or very limited, technical staff. Twenty-seven priority district municipalities have been identified as being particularly dysfunctional and requiring specific intervention (though not all are WSAs). High levels of corruption have impacted on service delivery in several municipalities. Where WSAs show consistent inability to deliver effective water and sanitation services, a national intervention lead by the MIUWS will determine the appropriate water services provider to be used as well as the appropriate service delivery model such as management contracts and concessions. This will require a revision of Chapter 8 of the Municipal Systems Act which DWS will engage COGTA and NT on. In addition, a legislative review will be done to ensure that internal procedures and decision-making systems in local government support effective water and sanitation provision. A national curriculum will be put in place for municipal water managers, which will become a mandatory qualification for all such water managers.

The strategic water source area - the 10% of the land which produces 50% of the nation's water resources - are under threat from development, so to ensure the water security of the country, these

areas will be declared as protected areas and DWS will engage DEA on this. Metering of water use in the agricultural sector and the removal of the subsidy on agricultural water charges will drive water conservation in this sector.

DWS, working in partnership with DEA, will get tough on enforcement. A high-profile campaign of enforcement of water use licence conditions for both abstraction and waste discharge, accompanied by a public communication programme will see the prosecution of high-impact non-compliant water users with significant publicity around the campaign and the results. This is aimed at reducing non-compliant water use and creating an awareness of the work being done by DWS in this regard. This will be an important signal that this is 'business unusual' and that those who are non-compliant can no longer risk continued illegal activities.

The water sector research, development and innovation programme, driven by the DST and the WRC will support the implementation of the NW&SMP. The initial focus on water services and water resources delivery was also build around the 27 priority municipalities but since the start of the NW&SMP, no fewer than 57 municipalities have been identified as distressed or dysfunctional in need of technical capacity to be able to conduct infrastructure planning, delivery, operation and maintenance, infrastructure management, financial management as well government and administration issues.

Finally, the water sector has, over the past 20 years, failed to deliver on its mandate for water allocation reform, or the reallocation of water to black water users. This, along with land reform, remains a major challenge facing the country, and one that must be addressed. It is proposed that a joint land, water and agrarian reform programme, to be led by the Department of Rural Development and Land Reform be established to ensure that the reallocation of both land and water are aligned and take place within a framework of agrarian reform and effective rural development.

This NW&SMP: Call to Action has been widely consulted on and has been developed with input from a range of stakeholders and organs of state and has been greatly improved and informed by these engagements and inputs. The NW&SMP in its entirety, Volumes 1 – 3, remain a "living" document to be annually reviewed, updated and improved. Greater detail regarding the motivations informing the recommendations made by the Call to Action, are contained in Volume 2: Plan to Action. Volume 3 contains details of specific actions to be implemented by water sector partners to make the first National Water and Sanitation Master Plan a reality. Only by working together to tackle prioritised challenges can the water sector ensure that South Africa will indeed be ***Ready for Future and Ahead of the Curve***.

National Water and Sanitation Master Plan



SUMMARY OF ACTIONS

Key Action No from Volume 3	Action	Responsibility	Completion date
1. Water & Sanitation			
<i>Reducing Water Demand and Increasing Supply</i>			
1.1.1	Reduce Non Revenue Water (NRW) and water losses in all municipalities to 15% below the business as usual.	DWS, CoGTA	2030
1.1.2	Set cap on municipal water use with reducing targets over time	DWS, CMAs, WSAs, CoGTA	2030
1.1.3	Reduce the water demands and water losses at all major irrigation and agricultural schemes by 2030, without affecting productions	DWS, DAFF	2030
1.1.4	Reduce water demand and increase water efficiencies of industrial users	DWS, the dti	2026
1.1.5	Develop, update and maintain reconciliation planning studies to achieve optimal water mix (surface water, groundwater, re-use and desalination, and incorporate climate change into studies)	DWS, CMAs	2030
1.1.6	Do detailed feasibility study (including EIA) of high priority interventions (identified in Reconciliation Strategies) and develop bankable projects, with business case of required infrastructure, financing, institutional arrangements for ownership and operations as implementation mandate.	WSAs, DWS, CMAs	2030
1.1.7	Water Resources Catchment studies (Continuously undertake hydrological monitoring in order to improve the	DWS, CMAs	2050

Key Action No from Volume 3	Action	Responsibility	Completion date
	resiliency and sustainability of the available sources on account of future climate change)		
1.1.8	Develop a guideline for the protection, recharge, use and monitoring of groundwater.	DWS, WRC, CSIR	2022
1.1.9	Integrate results of All Towns studies and reconciliation studies into sectoral plans (domestic, agriculture, energy, mining, industrial development, land reform and rural development)	DWS, DAFF, DoE, DMR, the dti, DRDLR	2030
1.1.10	Development of strategic water resources infrastructure	DWS, LHDA, WSAs, WBs, TCTA	2025
1.1.11	Refurbish gauging stations	CMAS, DWS	2027
1.1.12	Increase groundwater use (including artificial recharge) and re-use of water	WBs, WSAs, DWS	2024
<i>Redistributing Water for Transformation</i>			
1.2.1	Identify alternative sources of water and water that is not utilised (e.g. as mines are closing resulting from War on Leaks, etc) for transformation	DWS, CMAs	2019
1.2.2	Identify where more water can be made available in government water schemes for transformation	DWS, CMAS, DAFF/PDAs, IUCMAS	2019
1.2.3	Implement the Water Administration System on all government irrigation schemes for transformation	DWS, DAFF/PDA	2024
1.2.4	Implement pilot project on voluntary contributions from farmers for water reallocation in prioritised catchments	DWS, DAFF	2020
1.2.5	Identify areas where small dams or groundwater development can provide water for small scale black farmers	DWS, CMAs	2019
1.2.6	Align water, land and agrarian reform programmes and link to the Irrigation Strategy	DWS, CMAs, DAFF, DRDLR	2030
1.2.7	Use General Authorisation to enable small scale water use by black farmers	DWS, DAFF	2019
1.2.8	Investigate, revitalise, refurbish existing under-performing Black Owned schemes	DAFF, DWS	2020
1.2.9	Define and implement process to allocate water (new/saved) to black applicants	DWS, DAFF	2030
<i>Managing Effective Water and Sanitation Services</i>			
1.3.1	Develop and implement a long-term plan for the turn-around of water supply and sanitation services in the country based on a sector-wide approach, that recognises DWS as regulator of W&S provision that includes the development of centralised programmes to obtain economies of scale and to ensure impact (e.g. driving municipal non-revenue-water improvements, and assessing the cost-effectiveness and appropriate systems for desalination)	DWS, CoGTA, NT, SALGA	Annually
1.3.2	Plan for disaster management by implementing adequate flood protection and drought management on regional level	DWS, CMAs, NWRSA, WBs	2022

Key Action No from Volume 3	Action	Responsibility	Completion date
1.3.3	Revisit levels of service for water supply and sanitation services against issues of affordability	DWS, CoGTA, NT, SALGA	2025
1.3.4	Investigate and promote alternative service delivery models such as BOTT (build, operate, train and transfer), management contracts and concessions	NT, DWS	2025
1.3.5	Provide direct Water Services Development Planning support to WSAs as part of a legal requirement and integration into Municipal IDPS	WSAs, DWS, CoGTA, SALGA, NT	2025
1.3.6	Develop and implement Provincial Water Services Delivery Master Plans to provide reliable and sustainable water supply and sanitation services to all households within South Africa: • Provincial Bulk Services Master Plans • Reliable Services Delivery Action Plans that includes a backlog analysis and infrastructure asset management plans	DWS, WSAs, CoGTA, SALGA, NT, WBs	2030
1.3.7	Deliver services to achieve (100%) universal sanitation coverage (Municipal Sanitation Projects)	WSAs, DWS	2030
1.3.8	Deliver services to achieve (100%) universal water services provision (Municipal Water Supply Projects)	WSAs, CoGTA, DWS	2030
1.3.9	O&M of water resources and services infrastructure	DWS	2050
1.3.10	Align interventions with CoGTA on failing municipalities with existing support programmes e.g. MISA	CoGTA, MISA, DWS	2019
1.3.11	Lifecycle planning (asset management) conditions to be set by DWS	DWS	2020
1.3.12	A National water and wastewater treatment performance turnaround plan to be developed and implemented. Turn around the functionality of five, currently dysfunctional, large water and wastewater treatment works with an accompanying publicity campaign, followed by a programme addressing the rest	DWS, WSAs, NT, WBs, CoGTA	2030
1.3.13	Roll-out of Feasibility and Implementation Readiness studies to align with national grant funding programmes	WSAs, DWS	2025
<i>Regulating the Water and Sanitation Sector</i>			
1.4.1	Revitalise the Green, Blue and No Drop programmes and publish results. Revise and establish norms and standards	DWS, WSAs	Annually
1.4.2	Include water use efficiency and conservation targets in the KPIs of municipal managers and municipal water supply and sanitation managers, and in municipal implementation plans	CoGTA, Municipalities	2019
1.4.3	Establish Water Efficiency Labelling and Standards (WELS) Scheme	SABS, DWS	2025
1.4.4	Identify (Blue Scorpions) and prosecute major non-compliant abstractors (water thieves) across the country, with a national communication campaign to accompany the action	CMAs, NPA, SAPS, DEA, Regulator, DMR, DWS, Blue Scorpions	2020

Key Action No from Volume 3	Action	Responsibility	Completion date
1.4.5	Replace all Existing Lawful Use (ELU) with licences with enforceable water use conditions	DWS, CMAs	2030
1.4.6	Development and implementation of the MoU between the DWS and strategic users	DWS, Chamber of Mines, Eskom, Industries	2020
1.4.7	Develop and implement municipal bylaws to protect water quality	DWS, WSAs	2020
1.4.8	Identify and prosecute big polluters across the country (including municipalities), with a national communication campaign to accompany the action	CMAs, NPA, SAPS, DEA, DMR, DWS	2020
1.4.9	Establish a mechanism for applying administrative penalties	DWS, Dept of Justice	2023
1.4.10	Develop improved regulatory approaches to manage pollution from land-based and in-stream activities (SA1, SA7, SA20 & SA29)	DWS	2022
1.4.11	Develop and implement an action plan to strengthen water use authorisation processes (SA24, SA25, SA26, SA27 & SA28)	DWS, CMAs, WRC	2022
<i>Improving Raw Water Quality</i>			
1.5.1	Determine in-stream Resource Water Quality Objectives (RWQOs), based on the SA Water Quality Guidelines (SA36), in support of RQO's	DWS, CMAs	2020
1.5.2	Routinely monitor resource water quality (SA46, SA47 SA48)	DWS, CMAs	2030
1.5.3	Establish and maintain appropriate and accessible information management system(s) for resource water quality (SA49, SA51 & SA60)	DWS, CMAs	2030
1.5.4	Assess resource water quality information (SA52 & SA59)	DWS, CMAs	2030
1.5.5	Implement adaptive source control-based water quality management interventions, in accordance with relevant catchment plans and strategies (SA34 & SA35)	Chamber of Mines, DWS, CMAs, DMR	2030
1.5.6	Develop and implement a strategic action plan for the rehabilitation and upgrade of prioritized WWTWs (SA17)	DWS, WSAs, NT, SALGA, CoGTA	2023
1.5.7	Adopt an integrated planning approach at trans-boundary (international), national, Water Management Area and sub-catchment levels (SA16, SA17, SA18, SA21, SA22, SA23 & SA33)	DWS	2030
1.5.8	Implement the Waste Discharge Charge System (WDCS) in priority catchments (SA5, SA41, SA42, SA43 & SA44)	NT, DWS, CMAs	2030
1.5.9	Ensure IWQM is supported by effective departmental arrangements (SA8 & SA9)	DWS	2020
1.5.10	Formalise governance frameworks to support engagements on water quality management (SA10, SA11, SA12, SA13, SA14, SA15, SA54 & SA61)	DWS, CMAs, WSAs	2030
1.5.11	Ensure fiscal support for IWQM (SA38 & SA39)	DWS, WSAs	2021

Key Action No from Volume 3	Action	Responsibility	Completion date
1.5.12	Build water quality management capacity through recruitment, education and training (SA53, SA54, SA55 & SA56)	DWS, CMAs, NT, WRC, CSIR	2030
1.5.13	Create an informed, supportive and responsible public (SA62)	DWS, CMAs, WSAs	2030
1.5.14	Develop and implement a diffuse pollution source strategy that includes the regulation of land use	DWS, CMAs	2023
1.5.15	Implement programmes to rehabilitate catchments through development of Catchment business plans	DWS, NT, CMAs	2025
<i>Protecting and Restoring Ecological Infrastructure</i>			
1.6.1	Declare strategic water source areas and critical groundwater recharge areas and aquatic ecosystems recognised as threatened or sensitive as protected areas	DWS, CMAs, DEA	2021
1.6.2	Review and promulgate aggressive restrictions within the legislation to restore and protect ecological infrastructure	DEA, DWS, CMAs, SANBI, CSIR	2020
1.6.3	Implementation of the Reserve (The classification, RQO's and the Reserve (collectively known as Resource Directed Measures (RDM)) for main stem rivers of the Berg, Breede and Gouritz, Middle and upper Vaal WMA's)	DWS, CMAs	2022
1.6.4	Secure funds for restoration and ongoing maintenance of ecological infrastructure through operationalising the water pricing strategy	DWS, CMAs, DEA, SANBI	Annually
2. Enabling Environment			
<i>Creating Effective Water Sector Institutions</i>			
2.1.1	Establish a business case for streamlined institutional arrangements in the water and sanitation sector	DWS	2020
2.1.2	Establish a Municipal Intervention Unit for Water and Sanitation in DWS, staffed with highly competent experts to drive a national programme of intervention at the municipal level	DWS	2022
2.1.3	Establish financially sustainable CMAs across the country, and transfer staff and budget and delegated functions, including licensing of water use and monitoring and evaluation of water resources	DWS	2020
2.1.4	Establish the National Water Resources and Services Authority	DWS, NT	2020
2.1.5	Determine the optimal configuration of water boards to manage regional bulk water supply; assist municipalities to perform their primary water and sanitation services mandate where necessary, manage regional water resources infrastructure, manage regional bulk WTWs and WWTWs	DWS, WBs	2020
2.1.6	Establish the National Water Resources and Services Regulator (NWRSR)	DWS, NT	2020

Key Action No from Volume 3	Action	Responsibility	Completion date
<i>Managing Data and Information</i>			
2.2.1	Review and develop comprehensive and appropriate Management, Monitoring and Reporting Structures of the DWS data portal	DWS	Annually
2.2.2	Review and develop a comprehensive DWS information management strategy to include among other: <ul style="list-style-type: none"> • Amended authorisation conditions to provide for self-reporting • Harmonization of monitoring actions by all responsible institutions • Perform information V&V audits 	DWS	Annually
2.2.3	Alignment of monitoring institutions to support National and International reporting programme, e.g. SDG, Agenda 63 and AMCO	DWS	2021
<i>Building Capacity for Action</i>			
2.3.1	Establish regulations on required qualifications and experience for senior and technical positions in DWS, CMAs, water boards and municipal services institutions	DWS, CoGTA, SETA	2023
2.3.2	Develop and implement programme for recruiting experienced technical and managerial staff in first South Africa and then internationally	DWS, CoGTA, DIRCO	2030
2.3.3	Define (and reinstate in some cases) career paths with defined training and on the job experience to build a knowledgeable sector of professionals	DWS, WSAs, WBs, CMAs	2023
2.3.4	Develop and implement a mandatory, modular hands-on qualification for municipal water managers (technical manager) to be run over 18 months and accredited by EWSETA to include aspects such as asset management, tariffs and revenue management, drought management, stakeholder engagement and customer relations	DWS, EWSETA, Institutions of Higher Learning	Ongoing
2.3.5	Partner with institutions to fund training of water sector practitioners in the curation, management and use of data as well as the associated technologies	DWS, EWSETA	Ongoing
2.3.6	Initiate a focused research capability initiative in water sector economics to address this existing skills gap	DWS, WRC, DST	Ongoing
2.3.7	Continue to develop high end skills (post graduate) to ensure a future science, technology and innovation capability in South Africa	DWS, DST, NRF, WRC, the dti (THRIP)	Ongoing
2.3.8	Continue to support programmes that enable development of critical skills and exposure to emerging innovations (e.g. Young Engineers Programme)	SALGA, DST, WRC, DWS, CoGTA, MISA	Ongoing
<i>Ensuring Financial Sustainability</i>			
2.4.1	Develop and implement institutional arrangements that recognise the diversity of circumstances across South Africa,	NT, DWS	2021

Key Action No from Volume 3	Action	Responsibility	Completion date
	the legacy of Apartheid and allow for regional cross subsidisation.		
2.4.2	Implement accurate billing and effective revenue management systems in all entities in the water value chain with a strict “ <i>No payment = no water</i> ” approach to agriculture/industrial/commercial users and restricted supply to domestic users.	WSAs, WBs, DWS, AGSA	2024
2.4.3	All conditional grants to be dependent on meeting of current payments to the next entity in the value chain, improvements to Blue Drop, Green Drop and No Drop Scores to meeting targets and audit outcome. Allow conditional grants to be used for operational costs.	NT, AGSA	2023
2.4.4	Develop regulations in terms of Section 139 (8) of the Constitution, which allows for a national entity to take over the water service functions, including revenue and billing, in a municipality if service deliver criteria are not met.	DWS, CoGTA	2022
2.4.5	Ensure that sufficient revenue is received through tariffs and grants to operate, maintain and improve the water supply and sanitation system. The tariff structure must allow for cross subsidisation for the indigent and building of a reserve for periods of drought.	WSAs, WBs, DWS, NT, AGSA	2024
2.4.6	In all entities put in place mechanisms to deal with accumulated debts	WSAs, WBs, DWS, NT, AGSA	2020
2.4.7	Roll out of ring-fenced institutional models to increase private sector investment	DWS, NT, CoGTA	2021
2.4.8	National Treasury – linkage to Medium Term Sector Expenditure Framework (MTSEF)	NT, DWS	Ongoing
Legislation			
2.5.1	Gazette the National Water Amendment Bill, Water Services Amendment Bill and Water Research Amendment Bill	DWS, Portfolio Committee, Standing Committee	2019
2.5.2	Hold public consultation on National Water Amendment Bill, Water Services Amendment Bill and Water Research Amendment Bill	DWS, Portfolio Committee, Standing Committee	2020
2.5.3	Revise and promulgate the National Water Amendment Bill, Water Services Amendment Bill and the Water Research Amendment Act	DWS, Portfolio Committee, Standing Committee	2022
2.5.4	Review the Municipal Financial Management Act (MFMA) and the Municipal Systems Act (specifically chapter 8) to ensure that they provide an enabling environment for the provision of reliable water and sanitation services	NT, DWS, CoGTA, SALGA	2020

Key Action No from Volume 3	Action	Responsibility	Completion date
2.5.5	Develop new policies and strategies on matters not previously addressed, in consultation with all stakeholders, to facilitate the sustainability of various water sector programmes	DWS	2025
<i>Enhancing Research, Development and Innovation</i>			
2.6.1	Implement and regularly review/revise Research, Development and Innovation Policies, Plans and Roadmaps across the sector	DWS, DST, WRC, CSIR	2021
2.6.2	Unlock investment, procurement and other localisation barriers to reposition the sector to implement new/niche solutions and approaches and roadmap the NMIU	DWS, NT, CoGTA, DST, NMIU	Ongoing
2.6.3	Coordinate, and where needed establish new platforms, to enable a synergised set of institutions that enable the shifting of innovations into the market (including business development and SME support)	DWS, the dti, Dept Small Business, EDD	2019
2.6.4	Strengthen partnerships with key water sector institutions to accelerate research and solutions into practice	DWS, WRC, DST, CoGTA, SALGA, the dti, DAFF	2020
2.6.5	Structure test bed partners with key water sector institutions in order to accelerate innovations to the market/public sector	WRC, DWS, DST, SALGA, Municipalities	Ongoing
2.6.6	Fund research into new models to better understand implementation approaches for water allocation reform, and equity issues	DWS, WRC, CSIR, DST	Ongoing
2.6.7	Develop technologies, guidelines and implementation support tools that enable SA to use alternative and appropriate sources as part of water supply	DWS, WRC, CSIR, DST, SALGA, CoGTA, WSAs	2023
2.6.8	Apply the concepts of water sensitive urban design to a robust city-wide case study to demonstrate and learn how a city can transition to a sustainable city	DWS, SALGA, Metros, District Municipalities	2027
2.6.9	Tools for agriculture early warning systems need to be developed and tested at scale	WRC, CSIR, DWS, DAFF, ARC	Ongoing
2.6.10	Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation	WRC, CSIR, DST, DWS	2021
2.6.11	Alternative Sanitation: Develop and demonstrate and validate appropriate alternative, water-less and off grid sanitation solutions (Current – 2025)	DWS, WRC, CSIR, DST, BMGF, the dti, Municipalities	Ongoing
2.6.12	Domestic and industrial Waste Water: Develop and Demonstrate appropriate waste water technologies for cost effectiveness, energy efficiency and beneficiation.	DWS, TCTA, WRC, the dti, DST, TIA, MINTEK	Ongoing

Key Action No from Volume 3	Action	Responsibility	Completion date
2.6.13	Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation	WRC, CSIR, DST, DWS	2021
2.6.14	Drinking Water Treatment: Develop and Demonstrate solutions that allow for the use of alternative sources of water for safe human consumption and water security	DWS, WRC, CSIR, Municipalities	Ongoing
2.6.15	Continue to invest in understanding emerging contaminants (detection and treatment) in order to improve our transition to reuse, reclamation and recycling of water	DWS, WRC, CSIR, Municipalities	Ongoing
2.6.16	Improving raw water quality: Invest in Communities of practise that bring together built and ecological infrastructure experts and solutions	DWS, DEA, SANBI, WRC, CSIR, DST	Ongoing
2.6.17	Link the Global Environment Fund 6 project on Water Pricing and Ecosystems to Water Master Plan implementation and position DWS to be closely involved in this process	DWS, DEA, SANBI, WRC, CSIR	2024
2.6.18	Continue to do research on land use impact on water linked ecosystems	WRC, CSIR, DEA, DWS, DAFF, ARC	Ongoing
2.6.19	Ongoing research, modelling and planning around climate change and its impacts on water security and water infrastructure needs to be conducted	DWS, DEA, DST WRC, CSIR	Ongoing
2.6.20	Initiate a hydrological monitoring centre for South Africa in order to re-establish a robust data, monitoring and information capability for more effective water resources planning and climate change forecasting in future	DWS, DEA, ARC, DAFF, WRC, CSIR, DST, SAWS, StatsSA	2021
2.6.21	Test a suit of ICT and citizen science tools for data sourcing	WRC, CSIR, DWS, DST, CoGTA, SALGA, the dti, DAFF	Ongoing
2.6.22	Partner with institutions to fund training of water sector practitioners in the curation, management and use of data as well as the associated technologies	DWS, EWSETA	Ongoing
2.6.23	Review all relevant guidelines and R&D products to understand where training modules need to be developed around new knowledge	DWS, WRC, CSIR, SETAs, WISA, DHET	
<i>Implementation of NW&SMP</i>			
2.7.1	Phakisa on water and sanitation masterplan	DWS	2019
2.7.2	Determine cost required to implement NW&SMP and identify where reprioritisation or cost savings can be used to address the NW&SMP priorities	DWS, WSAs	2019
2.7.3	Appoint skilled Management, Technical and Programme Manager staff for Delivery Unit	DWS	2030
2.7.4	Monitor, review, evaluate, report on and update NW&SMP	DPME, DWS	Annual report to Parliament

