WATER CONSERVATION AND WATER DEMAND MANAGEMENT STRATEGY FOR THE WATER SERVICES SECTOR

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Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

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FOREWORD BY THE DIRECTOR-GENERAL

South Africa is located in a predominantly semi-arid part of the world. The climate varies from desert and semi desert in the West to sub–humid along the Eastern Coastal Area, with an average rainfall for the country of about 450 mm per year (mm/a), well below the world average of about 860 mm/a, while evaporation is comparatively high. As a result, South Africa's water resources are, in global terms, scarce and extremely limited (NWRS1, 2004).

In addition, 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 longer and more extreme droughts, and more intense floods. The results are less water available to meet the growing demand, thus a threat to water security. Given constraints and demands on the resource, we cannot afford practices which reduce water supply, such as inefficient water management practices, lack of infrastructure maintenance, non-revenue water and poor governance.

Water demand is likely to grow at about 1.2% over the next ten years, therefore a need to find new ways of reducing water demand and increasing availability – which move beyond 'traditional engineering solutions' of infrastructure development (NWRS2, 2013). Water Conservation and Water Demand Management (WC/WDM) is an integral part of broader strategies needed to reconcile the available supply with the demand for water. It is key to ensure sustainable use of our water resources, and to ensure sufficient water is available for the current and future requirements. The Water Conservation and Water Demand Management Strategy is a fundamental step in promoting water use efficiency as provided in the United Nations Sustainable Development Goal number 6. This is consistent with both the National Water Act (Act 36 of 1998) and Water Services Act, 1997 (Act 107 of 1997) which emphasizes effective management of our water resources and conservation. Water Conservation and Water Demand Management should not be seen as punitive or restrictive but as a responsible approach that will contribute to postponement of infrastructure augmentation, mitigation against climate change, support to economic growth and ensuring that adequate water is available for equitable allocation.

This WC/WDM strategy emphasizes the fact that all consumers and water institutions have a duty towards our country, our environment and themselves to implement adequate measures that contribute to water use efficiency through Water Conservation and Water Demand Management.

Let us work together towards the prosperity of our nation for the benefit of future generations. Let us seize all opportunities of ensuring responsible use of our water resources.

DR SD PHILLIPS
DIRECTOR-GENERAL

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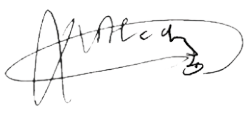

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EXECUTIVE SUMMARY

Water is a critical socio-economic enabler. Water is fundamental in the production of food and energy and, in South Africa, access to water is a constitutional right. Inequality and poverty are widespread in South Africa and the economic growth required to alleviate poverty needs water for the production of goods and services. South Africa is a water-scarce country where water creates significant socio-economic challenges. Population growth is increasing demand for water. Additionally, increased temperatures due to the effects of climate change are likely to exacerbate water scarcity in South Africa in the future. In order to enable economic growth to reduce poverty and inequality in an increasingly water-scarce environment, South Africa needs to maximise the benefit of every drop of water and ensure that not a single drop of this precious resource is wasted.

The National Water and Sanitation Masterplan (NWSMP) puts the National Water Resource Strategy (NWRS2, now updated to NWRS 3) into action and comprises a number of interventions with a specific focus on reducing water demand. The Department of Water and Sanitation (DWS) has also developed its first Integrated Water Quality Management Policy and Strategy in support of this. This indicates acknowledgement of the necessity to formulate enhanced water sector strategies in order to improve South Africa's resilience to climate change. A water deficit is predicted for South Africa by 2030 (DWS, 2018) and it is amidst increasing concern regarding water security that the importance of updated strategies targeting water use efficiency (WUE) in various sectors has become apparent.

Water Conservation and Water Demand Management (WC/WDM) constitutes a vital initiative that supports the implementation of integrated water resources management (IWRM) principles in order to strengthen the country's ability to address future water deficits. Water conservation and water demand management (WDM) are respectively defined as follows (DWAF, 2004):

- ***Water Conservation:*** *The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.*
- ***Water Demand Management:*** *The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.*

WC/WDM is thus concerned not only with reducing water usage and water wastage but also safeguarding the quality and quantity of water resources. Figure i presents a graphical representation indicating how demand can be constrained to within supply augmentation plans and that this can delay the need for augmentation.

The potential benefits of WC/WDM include the following:

- Water security whereby water demand does not exceed the

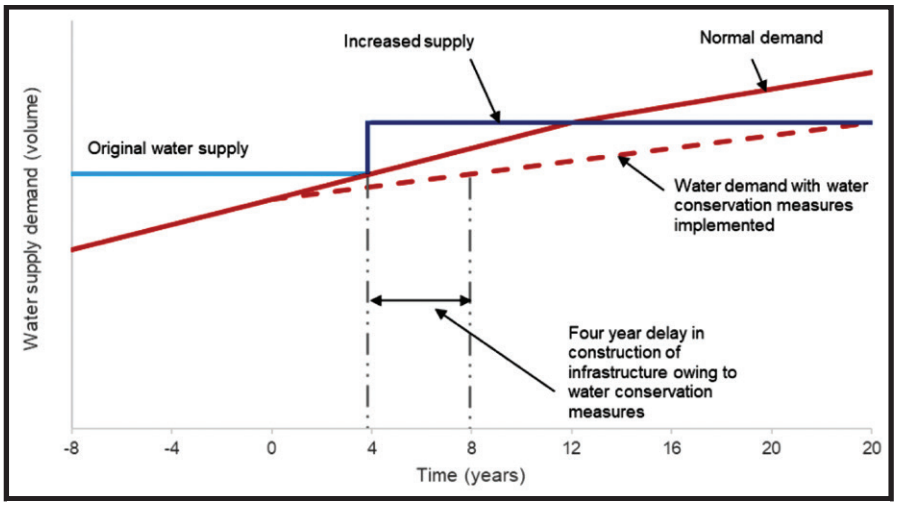


Figure i: Graphical illustration of the positive impact of WC/WDM in a system water balance

reliable supply or there is balanced water supply and demand.

- Financial sustainability of the water utility, particularly in those instances where metering, billing and cost recovery are properly implemented.
- Effective operation and maintenance of infrastructure which prevents excessive leakages, avoids deterioration in service delivery, prevents intermittent supply and water rationing, reduced pressures etc. This also prevents intermittent supply which is often caused by excessive leakages as well as depressurisation which damages water supply infrastructure and contributes to water borne diseases due to contaminants seeping into water distribution pipelines.
- Well maintained water supply infrastructure and assets resulting in good service delivery and decreased water leakages.
- Prevention of the creation of unnatural wetlands at microenvironment level which provides a breeding ground for mosquitoes and other health hazards to communities.
- Relatively short timeframes and cost-effective approaches are possible at a macro-level through WC/WDM interventions. By postponing the construction of augmentation schemes such as large dams, WC/WDM can be implemented in a relatively short time span with a relatively smaller budget as opposed to large augmentation schemes which usually require major capital investment with considerable implementation times of 10 to 25 years, with associated environmental impacts.
- Improved water production through reduced pumping and pipe failures, reduction in chemical costs and associated greenhouse gases.
- Reduction in water use which requires less infrastructure, less debt and lower fixed water costs.
- Flexibility in implementation of WC/WDM intervention measures which can be introduced incrementally.
- Build relationships between government and citizens as the community plays an active role in successful WC/WDM projects.
- Cost reflective water charges that support sustainable water services by implementing WC/WDM that creates well measured components of the water cycle. This promotes improved knowledge management and costs reductions.

This context led DWS to develop WC/WDM strategies in 2004. The aim of these strategies was to promote sustainable use and management of water resources in South Africa. Since the development of these strategies, new information, concepts and guidelines have been developed which promotes the effective implementation of WC/WDM. To incorporate these advances, the WC/WDM strategies have been updated.

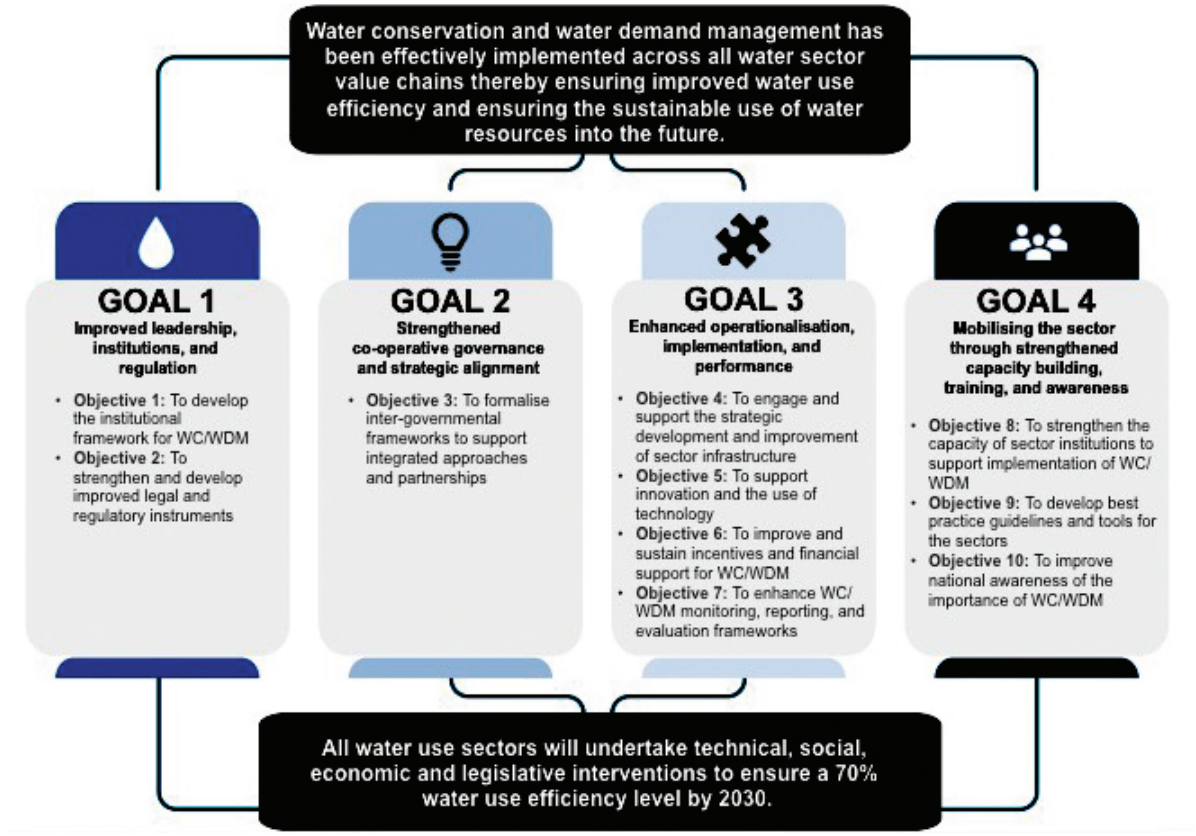
It is important to note that the WC/WDM strategies and implementation plan provide guidance for the water sector as a whole. Although these documents have been developed by DWS, the sector needs to mobilise and work together to implement WC/WDM.

The National WC/WDM strategy provides the overarching framework for the sector strategies. The National WC/WDM strategy provides a number of core purposes:

- To provide a framework against which the more practically focused sub-sector strategies can be structured. This coherence is important in ensuring alignment in approach at local, provincial and national levels, as well as being consistent between sectors.
- To support in unlocking more strategic aspects that enable the sub-sector strategies to be implemented.
- To create an improved enabling environment that will facilitate the implementation of WC/WDM nationally and locally.

Towards this end, the WC/WDM strategies have three core focal areas, namely, 1) effective government structures to oversee and regulate the implementation of WC/WDM; 2) strategic development and management of best practice, supporting tools, and financial instruments that guide the effective implementation of WC/WDM; and 3) knowledge management, capacity building and innovation that are leveraged to support improved WC/WDM implementation.

These have been translated into Goals and Objectives, as follows:



There are four WC/WDM strategies with the National Strategy serving as the overarching strategy for South Africa. Three sector strategies have been developed which includes a strategy for the agricultural sector; the industry, mining and power sectors; and the water services sector. These sectors are significant water users in South Africa, and thus sector-specific strategies have been designed to define the way forward to improved water use and management in these sectors. This document presents the water services sector strategy.

Water Services Summary

This WC/WDM Strategy for Water Services (WS) represents the revision of a previous document with a similar title and purpose, developed in 2004. Bearing in mind the global and local events that have occurred in the intervening period, this update is timely, and in many ways its adoption and implementation is of some urgency.

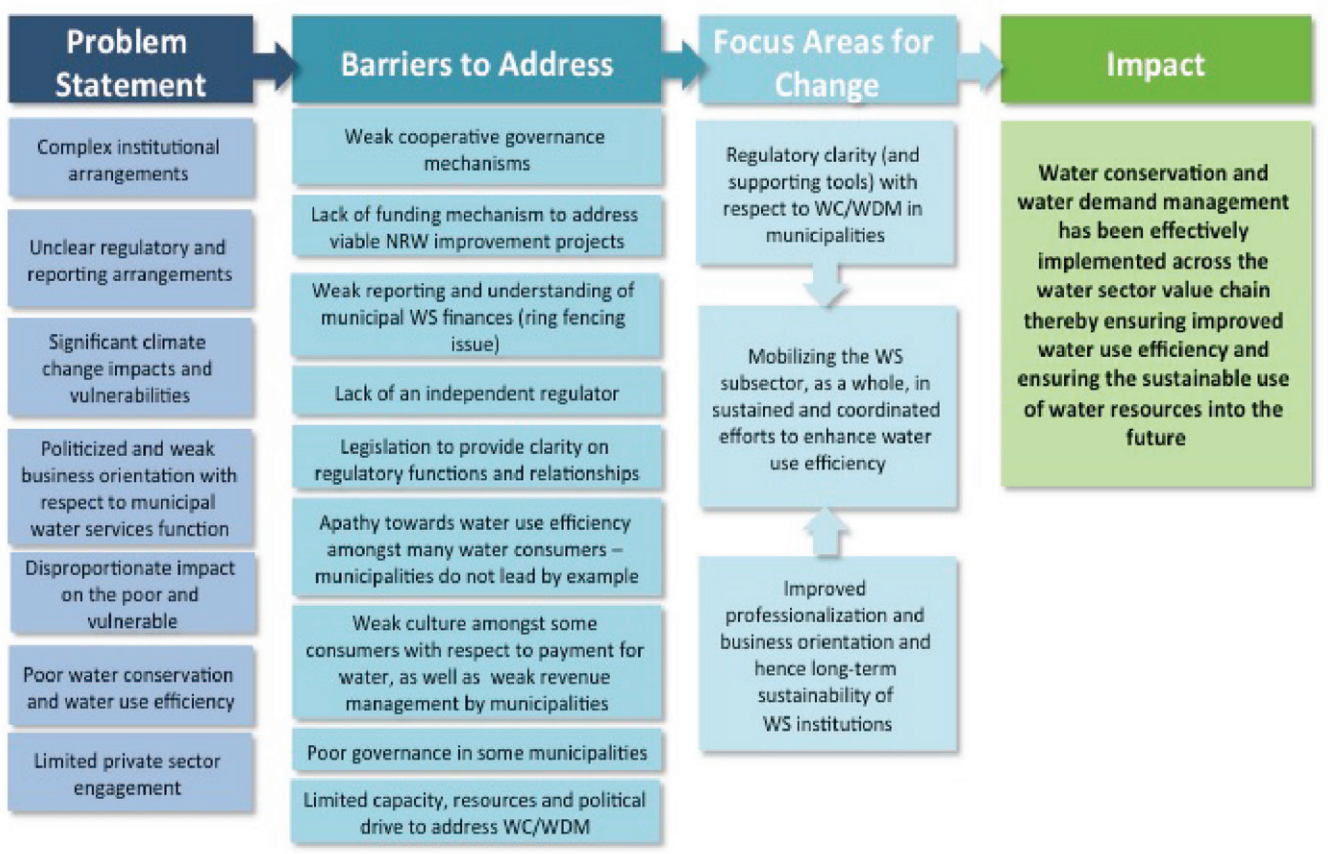
The process undertaken in its development included a local and international literature review, engagement with a range of key sector stakeholders and the development and refinement of the strategy via a number of intermediate steps and several iterations. In truth, the strategies, techniques and approaches required to achieve more effective and efficient use of water are well known and have been so for several decades. Although there have been and will be new technologies and innovation, the core methodology is well established. In spite of this, significant analytical and research work undertaken in recent years provides evidence that in South Africa non-revenue water (NRW), for example, has not improved and in fact shows signs of having deteriorated. As for many of the other challenges in South Africa, the solutions are known, it is in the area of implementation that the country is weak.

This document includes a brief summary of international experiences in this arena, drawing on practical aspects and the developing country context. This included a review of case studies of utilities in South and Southern Africa that have performed excellently with respect to NRW. Sadly, there are very few of these! It also spends some time discussing the local context as that informs the process of crafting strategy. That includes consideration of the legislative and policy instruments, institutional and governance aspects and the social and technical elements. Systems thinking has informed our approach and this has been applied to a holistic assessment of what is required for the water services function to succeed in South Africa, and specifically in the municipal context. In many cases, difficult choices will need to be made and a ruthless process of prioritisation and action undertaken.

The reality is that the water services sector, or sub sector, is complex in any country. Water is a cross cutter for so many sectors and yet is often

undervalued. While its social value is rightly emphasised, its economic value is often not, leading to tariffs that are too low and also the use of pernicious subsidies. It is also often characterised by institutional complexity, with a host of relevant role players. This is certainly the case in South Africa, where the institutional complexity is compounded by regulatory arrangements that lack clarity. Unfortunately, this can lead in some cases to a regulatory vacuum, which is a risky situation when one bears in mind that water services supply is characterised by natural monopolies. When customers do not have another option and yet they are being supplied with a poor quality service, that could even be unsafe in some cases, this is not only an untenable situation but also one that is unstable and could lead to protests and unrest.

The strategic process included a review of the key strategic drivers in the sector, culminating in the development of a high-level analysis of strengths, weaknesses, opportunities and threats. This then directly informed development of the strategy thereafter. The first component of this was the Theory of Change. This sets out the core problem statement(s), the barriers, focus areas for change and desired impact. This process has been forthright and honest in its assessment in view of the inherent urgency of the subject matter. A Vision is then set out, supported by Strategic Principles which are designed to guide both the crafting of the strategy and its implementation thereafter.



The Goals and Objectives are structured around the 4 core areas of leadership, institutional and regulatory arrangements, cooperative governance and sector wide approaches (SWAP), enhancing operationalisation, implementation and performance, and mobilising and supporting sector institutions and stakeholders. While the sector leadership of DWS is emphasised, the reality is that this Strategy will not be successfully implemented without an approach that achieves very effective cooperative governance and SWAP. The complexities of the South African context dictate this. At the same time, profound change and improvement will be needed in water services provision at the municipal level. This is the level at which customers deal with "the lived experience" every day. In this regard, a range of objectives have been set out as shown in Table i, which will provide tangible support to municipalities to help them to achieve the desired change. At the same time, little will be accomplished if the municipalities themselves do not demonstrate substantive improvements in aspects such as governance, leadership and commercial management (business orientation). South Africa's best performing municipalities are as good as those anywhere and much can be learnt from them. The objectives are supported by a range of activities designed to achieve practical implementation.

Table i: Water Services WC/WDM Strategic Goals, Objectives, and Actions

GOALS	OBJECTIVES	STRATEGIC ACTIONS		RESPONSIBLE*
GOAL 1 Improved leadership, institutions, and regulation	**Objective 1:** To develop the institutional framework for WC/WDM	1.1	Institutionalise Water Use Efficiency in Water and Sanitation Services Management	DWS, SALGA, COGTA, NT, AGSA, WSAs, Water Boards
		1.2	Develop a differentiated organogram for a WC/WDM Unit in a WSA	
		1.3	Include WC/WDM KPIs in municipal business plans and strategies, as well as performance agreements of municipal managers and municipal water services managers	
		1.4	Strengthen the alignment of WUE definitions and KPIs within the water services sector	
	Objective 2: To strengthen and develop improved legal and regulatory instruments	2.1	Establish WC/WDM regulation within the Branch: Policy, Regulation and Enforcement	DWS, COGTA, SALGA, NT, WRC, CSIR, SABS
		2.2	Enhance the regulatory tools and options that are available for DWS to support WC/WDM (Norms and Standards and the No drop Programme)	
		2.3	Continue implementation of the No Drop Programme	
		2.4	Develop a National Standard Operating Procedure for dealing with WSAs with high NRW	
GOAL 2 Strengthened co-operative governance and strategic alignment	**Objective 3:** To formalise inter-governmental frameworks to support integrated approaches and partnerships	3.1	Engage sector departments to discuss and agree on roles, responsibilities, funding models, and targets in implementing WC/WDM	DWS, COGTA, SALGA, NT, WRC, government departments, CMAs, private sector, civil society, grant administrators
		3.2	Create alignment of the institutional frameworks, WSA programmes and principles of the relevant government departments and stakeholders in support of WC/WDM	
		3.3	Design (e.g., develop ToR) and establish a national sector wide approach to coordinate the rollout of the WC/WDM Strategy (this could be a subcommittee of the WSLG)	
		3.4	Strengthen the NRW Programme under the DBSA	
GOAL 3 Enhanced operationalisation, implementation, and performance	**Objective 4:** To engage and support the strategic development and improvement of sector infrastructure	4.1	Utilise the DWS Asset Management Guideline and any other relevant tools to improve asset management in WSAs	DWS, WSAs, WSPs, MISA, COGTA
	Objective 5: To support innovation and the use of technology	5.1	Promote the uptake and use of new and emerging technologies, water saving devices, and smart meters	DWS, COGTA, NT, WSAs, suppliers, WRC
	Objective 6: To improve and sustain incentives and financial support for WC/WDM	6.1	Ensure water tariffs are structured to promote efficient use of water	DWS, WSAs, MWIG and RBIG administrator, COGTA, NT, SALGA
		6.2	vIntroduce conditionalities linking municipal grants to NRW performance	

GOALS	OBJECTIVES	STRATEGIC ACTIONS		RESPONSIBLE*
		6.3	Promote metering, billing, cost recovery, and revenue collection as the first source of funding for WC/WDM	
		6.4	Reinstate WC/WDM incentives, such as the WC/WDM Sector Awards, innovation recognition awards	
	Objective 7: To enhance WC/WDM monitoring, reporting, and evaluation frameworks	7.1	Promote and rollout support for developing accurate water balances and performance targets, and report on these targets on a regular basis	DWS, WSAs, Water Boards, AGSA, NT, COGTA
		7.2	Encourage WSAs to increase their efforts to achieve the targets set under the water reconciliation strategies to ensure water security	
		7.3	Encourage WSAs to increase their efforts to meter or control demand to curb losses on private properties	
GOAL 4 Mobilising the sector through strengthened capacity building, training, and awareness	**Objective 8:** To strengthen the capacity of sector institutions to support implementation of |WC/WDM	8.1	Sustain the National NRW Training Program	DWS, CMAs, Water Boards, private sector, EWSETA
		8.2	Continue training WSAs on the development of the IWA Water Balance	
		8.3	Work with EWSETA to enable accreditation of the NRW Training Program	
	Objective 9: To develop best practice guidelines and tools for the sectors	9.1	Review and update the IWA Water Balance and No Drop Guidelines	DWS, WSAs, NT, AGSA
	Objective 10: Improve national awareness of the importance of WC/WDM	10.1	Develop a national behavioural change campaign designed to improve opinions and attitudes towards water use	DWS, WSAs, WRC, higher education, schools, COGTA, SALGA
		10.2	Participate in Knowledge Sharing Platforms	
		10.3	Update and publish the water loss benchmark report to create awareness and monitor progress made with the implementation of WC/WDM in the water services sector	

*The parties listed as responsible for these actions may not comprise an exhaustive list.

There is a suite of interventions required for achieving the Vision for WC/WDM in the country. Given the current resources available, it is not possible to address all of WC/WDM Strategic Actions simultaneously; human, technical and financial resources as well as information and systems constraints will inhibit this. Nevertheless, it is critical that all water use sectors undertake the necessary interventions to improve the levels of water use efficiency that currently exist. As such, the strategic target is that all water use sectors must ensure a minimum of 70% water use efficiency by 2030, understanding that there is an obligation on all water use sectors to be continually seeking for improvements in these levels.

Therefore, the focus of the implementation plan is to be on delivering change for prioritised challenges. This does not mean that work on other areas pertinent to WC/WDM will not continue, but it serves to guide the allocation of human and financial resources for the 5-year period of the strategy, with the objective of building for longer term improvements. Therefore, a key approach will be to prioritising critical concerns, while ensuring that other issues are addressed through ongoing management or monitoring for future prioritisation and action.

The following aspects are critical to create an enabling environment:

- Political Will and Leadership
- Financing
- Institutionalisation
- Coordination
- Public Support
- Enforcement
- Monitoring and Evaluation.

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DEFINITIONS

Annual Real Losses (ARL): The difference between the system input volume and the authorised consumption (the water which can be accounted for).

Apparent Losses: The apparent losses include all unauthorised consumption (theft or illegal use) as well as all technical and administrative inaccuracies associated with customer metering and billing.

Billed Consumption: The volume of authorised consumption which is billed and paid for.

Blue Drop: Potable water incentive-based Regulation Certification Programme

Free Basic Water (FBW): The volume of authorised consumption, which is billed at a zero rate and represents free basic water.

Green Drop: Wastewater incentive-based Regulation Certification Programme

Infrastructure Leakage Index (ILI): The infrastructure leakage index (ILI) is a performance indicator used to measure the extent of leakage in a particular system.

International Water Association Water Balance: An International Water Association (IWA) system that compares the volume of potable water entering system with the volume of water registered by the consumer meters. The purpose is to improve efficiency, management, cost recovery, etc. The quality of the water balance/audit is reliant on the consumer database and monitoring results.

No Drop: Water loss reduction incentive-based Regulation Certification Programme

Non-Revenue Water: This is the difference between the volume of water supplied into the system and the billed authorised consumption.

Passive Leakage Control: Passive leakage control addresses leakage and pipe burst reported by the public.

Regulations R509: GNR.509 of 8 June 2001: Regulations relating to compulsory national standards and measures to conserve water.

Unavoidable Annual Real Losses (UARL): This represents the minimum level of real losses for a specific system that can be reached under the most efficient operating conditions. It is an indication of the level of leakage that can theoretically be attained if the system is operated very efficiently, and all practical measures are taken to minimise leakage.

Water Conservation: The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.

Water Demand Management: The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.

Yield: The average annual volume that can be drawn from a supply source or supply option to meet a specific demand at a specified service level.

LIST OF ABBREVIATIONS

ARL	Annual Real Losses
AGSA	Auditor-General of South Africa
CIWEM	Chartered Institution of Water and Environmental Management
CMA	Catchment Management Agency
COGTA	Cooperative Governance and Traditional Affairs (consists of the Department of Cooperative Governance (DCOG) and the Department of Traditional Affairs (DTA); the Municipal Demarcation Board (MDB), South African Local Government Association (SALGA) and South African Cities Network (SACN) are entities reporting to the COGTA Minister; the Municipal Infrastructure Support Agent (MISA) reports to DCOG.)
DBSA	Development Bank of Southern Africa
DoRA	Division of Revenue Act
DWS	Department of Water and Sanitation
EWSETA	Energy and Water Sector Education Training Authority
FBW	Free Basic Water
GDP	Gross Domestic Product
ICPs	International Cooperating Partners
ILI	Infrastructure Leakage Index
IMP	Industry, Mining, and Power Generation
IWA	International Water Association
IWRM	Integrated Water Resources Management
KPIs	Key Performance Indicators
M&E	Monitoring and Evaluation
MIIF	Municipal Infrastructure Investment Framework
MIS	Management Information System
MISA	Municipal Infrastructure Support Agent
mSCOA	Municipal Standard Chart of Accounts
MWIG	Municipal Water Infrastructure Grant
ND	No Drop
NDP	National Development Plan
NRW	Non-Revenue Water
NSoW	National State of Water
NT	National Treasury
NWRP	National Water Resource Planning

NWRS	National Water Resources Strategy
NWSMP	National Water and Sanitation Master Plan
OECD	Organisation for Economic Co-operation and Development
PAT	Progress Assessment Tool
PPP	Public Private Partnerships
RBIG	Regional Bulk Infrastructure Grant
SALGA	South African Local Government Association
SDG	Sustainable Development Goal
SIV	System Input Volume
SWAP	Sector-Wide Approach
SWOT	Strengths, Weaknesses, Opportunities and Threats
SWPN	Strategic Water Partners Network
ToR	Terms of Reference
UARL	Unavoidable Annual Real Losses
WASH	Water, Sanitation and Hygiene
WC/WDM	Water Conservation and Water Demand Management
WDM	Water Demand Management
WS	Water Services
WSA	Water Service Authority
WSIG	Water Services Infrastructure Grant
WSLG	Water Sector Leadership Group
WSP	Water Services Provider
WSS	Water Services Sector
WUE	Water Use Efficiency

1 Introduction

1.1 BACKGROUND

The developmental imperatives of South Africa are significant and challenging in the face of increasing socio-economic pressures, climate change and ever-increasing demands on a limited water resource. South African livelihoods are dependent on water which is essential to day-to-day life as well as a broader economy that requires water as part of processes and production. Due to the uneven distribution of water resources across the country, the water sector has developed extensive infrastructure to transfer water between catchments to address supply deficits, particularly for key economic nodes. Nevertheless, South Africa falls within the top quarter (25%) of the world's most water-stressed nations (Water Resources Institute, 2023). South Africa is situated in a region that is predominantly semi-arid with an average rainfall for the country of about 450 mm per annum (mm/a), which is well below the world average of about 860 mm/a, while evaporation is comparatively high (DWS, 2004a). According to the 2020/2021 National State of Water (NSoW), 98% of the country's available water resources are already allocated (DWS, 2022). The third edition of the National Water Resource Strategy (NWRS3) highlights that South Africa is currently over-exploiting its renewable water resources on a national level and requires both demand-side and supply-side interventions to address a projected supply deficit of 17% by 2030 (DWS, 2021). There are also limited opportunities to supplement future water requirements with conventional surface water resources.

South Africa is ranked amongst the top half of most vulnerable countries in terms of climate change vulnerability and particularly with regards to water-related climate change vulnerability (University of Notre Dame, 2023). It is also ranked amongst the top half of countries that have suffered the most climate change-related historic losses in the last two decades (Eckstein, et al., 2019). Therefore, the need to develop improved levels of climate resilience in conjunction with efforts to address developmental objectives will be important for the medium- to long-term.

This will require a coherent multi-sectoral response, undertaken with the leadership of the Department of Water and Sanitation (DWS). A climate resilient water sector, that underpins the country's sustainable development objectives, will require the combined efforts of public sector, private sector and civil society stakeholders.

While the national strategic framework sets the overall direction, its development was the result of concurrent top-down and bottom-up approaches in which the emerging issues from the sectors were taken into account at the national level while the national context also informed the sectoral frameworks. This allowed for alignment between the national and sector frameworks, while allowing for the sectoral frameworks to capture the sector-specific nuances that may not be applicable across all sectors at a national level. The strategy development process incorporated an ongoing dialogue with key stakeholders.

The water services sector is the second largest in South Africa, following the agricultural sector, and is also the fastest growing. It is a sector that has been characterised historically by high water losses and high per capita consumption. This means that there is significant potential for improving efficiencies in the sector, and this is imperative for the country, bearing in mind the increasing pressure on water resources. Evidence of how critical this is, can be found in the recent experiences in Cape Town from 2018 to 2020, and in the current situation in Nelson Mandela Bay Metro. These illustrate that the problem is real and current. The fact that it could impact on two of South Africa's Metros, with significant potential negative effects on gross domestic product (GDP), provides additional imperatives to the subject matter.

If demand continues to grow at current levels, the deficit between water supply and demand for all sectors could be between 2,7 and 3,8 billion m^3 /a by 2030, a gap of about 17% of available surface and ground water. The National Development Plan (NDP) targets an average reduction in water demand of 15% below baseline levels in urban areas by 2030, where the baseline is taken as the 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 Studies.

The NWRS3 (DWA, 2021) builds on the NWRS1 (DWS, 2004) and NWRS2 (DWS, 2013). The purpose of the NWRS3 is to ensure that national water resources are protected, used, developed, conserved, managed and controlled in an efficient and sustainable manner. The NWRS3 acknowledges that South Africa is a water-stressed country and is facing several water challenges and concerns, which include security of supply, environmental degradation and resource pollution, and the inefficient use of water. In light of the urgency to protect our water resources and the adverse effects of climate change, the NWRS3 submits that WC/WDM should be one of the top priorities, and measures to reconcile demand and supply in order to provide for the national goals of a better life for all through job creation and economic growth. The same sentiment is echoed in the NDP 2030, National Water and Sanitation Master Plan (NWSMP), National Water Security Framework for South Africa: Summary, Principles and Recommendations.

The Water Services WC/WDM Strategy has been developed to facilitate the above imperatives. Engagements with sectors stakeholders and departmental have been instrumental in updating this strategy.

1.2 RATIONALE

South Africa falls within the top quarter (25%) of the world's most water-stressed nations (Water Resources Institute, 2023). According to the 2020/2021 NSoW, 98% of the country's available water resources are already allocated (DWS, 2022). The second edition of NWRS2 (issued in 2013, now in its third revision) already highlighted that South Africa is currently over-exploiting its renewable water resources on a national level and requires both demand-side and supply-side interventions in order to address a projected supply deficit of 17% by 2030 (DWS, 2018). There are also limited opportunities to supplement future water requirements with conventional surface water resources.

Water has been identified as key to ensure social, economic and environmental viability, sustainability and growth. The water–energy-food interrelationship is critical to building more resilient and sustainable economy. Not taking water insecurity into account when planning can – apart from affecting a country's economic growth - also lead to fragility and conflict. Ensuring that the available water supplies are optimally utilised, and the current resources are optimally stretched is important in ensuring equitable access to and sharing of resources. This contributes directly to the National Development Plan (NDP) 2030 goal of **"reducing demand rather than increasing supply",** particularly when considering the impact of climate change that will continue to disrupt already stressed water resources.

Water demand in South Africa is expected to increase over coming years especially in the agricultural, industrial, and municipal sectors. The rising demand is driven by a combination of population growth, urbanisation, rising incomes, irrigation expansion, non-renewable electricity generation and a growing manufacturing sector (Donnenfeld, et al., 2018). Despite this, South Africa has managed to enable continued socio-economic development through the strategic use of bulk water transfers and the ongoing development of large-scale infrastructure. Nonetheless, the national water resource system is under pressure.

The above is further exacerbated by South Africa's vulnerability to climate change and is ranked amongst the top half of most vulnerable countries in terms of climate change vulnerability overall, and water-related climate change vulnerability in particular. The increased frequency and severity of droughts in recent years – such as Cape Town's 'Drought of the Century' between 2016 and 2018 – and other similar extreme weather events such as the Cape storms and occasional flooding in Gauteng and Kwa-Zulu Natal have exacerbated the situation. At the time of publishing the NSoW, water restrictions were still applicable for all water supply systems in the Eastern Cape (which is currently experiencing a drought), the Polokwane system in Limpopo, and the Bloemfontein system in Free State Province (DWS, 2022). While the water required for human consumption (including commercial and industrial use), is not as large as other uses, it can be highly significant in catchments where there are high levels of allocation, and this is exacerbated in drought conditions which are expected to increase in frequency and severity due to climate change.

When water resources become scarce, domestic water supply will generally be prioritised over agriculture and the environment. This is becoming increasingly important as South Africa works towards the attainment of the Sustainable Development Goals (SDGs) Goal 6, as well as addressing historic imbalances in terms of access to safe and secure water and sanitation services. This while also considering the increasing challenges related to population growth and urbanisation.

While the quantity of water is the main focus in improving water use efficiency (WUE), water quality cannot be removed from the discourse as South Africa is plagued with a range of pollution problems in many of its

catchments, further impacting on the water security of the country. Poor water quality impacts upon the fitness for use of water resources and can reduce the volumes of water available for use. As such, effective and efficient use of scarce water resources is becoming increasingly critical. Adaptation actions are considered essential to building resilience to climate change impacts and the WC/WDM strategy is a key strategy to address growing water stress.

There are many dimensions to the business of water resource management that are interdependent and interconnected, and as such this creates considerable complexity in ensuring the attainment of strategic objectives. Towards this end, progressive development of the NWRS (now in its third edition) has endeavoured to provide structured implementation plans to support the national development agenda.

Giving effect to the NWRS3, is the National Water and Sanitation Masterplan (NWSMP), with its rallying "Call to Action", makes a specific note to reduce water demand among other intervention options. In support of this, and the NWRS, DWS is undertaking important studies such as the updating of the water reconciliation strategies and updating the national water balances to provide a more informed baseline from which directed actions can be developed and implemented. This demonstrates the recognition of the need to develop improved water sector strategies that help to build a more climate resilient South Africa. In response, the National Water and Sanitation Masterplan is also being updated to ensure the country is incrementally improving its sectoral resilience. Noting the water security concerns and the projected deficit by 2030 (DWS, 2018), the development of updated strategies to drive WUE across various sectors have become equally important.

At the centre of all these strategic instruments, WC/WDM is an essential part of the national imperative to address all three of the integrated water resources management (IWRM) principles (social equity, economic efficiency and environmental sustainability) and to underpin the country's ability to address future water deficits. According to the 2004 National WC/WDM strategy (DWAF, 2004), water conservation and water demand management (WDM) are respectively defined as follows:

- ***Water Conservation:*** *The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.*
- ***Water Demand Management:*** *The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability*.

The Organisation for Economic Co-operation and Development (OECD, 2001) defines water conservation as "the preservation, control and development of water resources, both surface and groundwater, and prevention of pollution". According to Brooks, WDM can be seen as any actions that reduce the amount of water used or enable water to be used more efficiently or any action that keeps the water cleaner during that use than it otherwise would be (Brooks, 1997). Other scholars have defined WDM as a strategy or approach that stresses making better use of existing water supply rather than developing new ones; and uses a set of incentives to achieve this (Savenije & Van Der Zaag, 2002). From these definitions, it can be concluded that while water conservation has a broader scope which includes the protection of water resources and prevention of pollution, WDM is specifically focused on reducing water use/consumption by water users. WC/WDM intervention are thus concerned not only with reducing water usage and water loss but also preserving the state of water resources both in terms of quality and quantity. Figure 1-1 illustrates graphically how water conservation can be used to constrain demand to levels that align with planned supply augmentation. The reduced demand can also delay the need for increased supply projects.

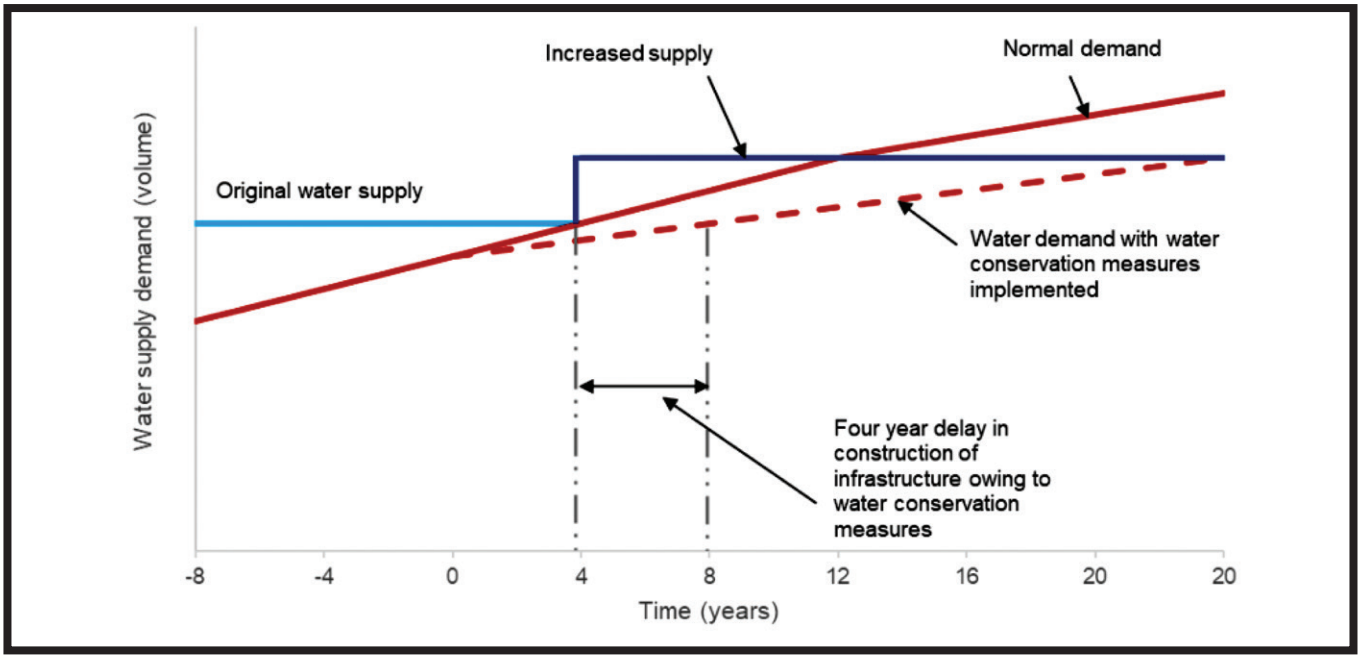

Figure 1-1: Graphical illustration of the positive impact of WC/WDM in a system water balance

Unfortunately, the term 'water use efficiency' is used with different meanings in the literature and by stakeholder groups and sectors, creating confusion. The California Water Code calls water use efficiency "the efficient management of water resources for beneficial uses, preventing waste, or accomplishing additional benefits with the same amount of water." This aligns with the fact that for many water use efficiency is generally understood to be the ratio between water use and water withdrawn from the resource. In this regard, the NWRS (Editions 2 and 3) both recognise that WC/WDM strategies are an important approach to driving water use efficiency across the various socio-economic sectors.

The current national and sectoral WC/WDM strategies were developed in 2004 with sectoral strategies covering the agriculture, water services, and industry, mining, and power generation (IMP) sectors. Since 2004, it can be appreciated that there have been significant shifts in the status of the country's water resources, both in water availability and quality, as well as a range of changes to the broader social economy of the country. The past decade has also seen significant changes in the understanding of climate change and the detrimental impacts that this is having on water resource globally. The onset of the Covid-19 pandemic has also placed renewed focus on SDG 6 and has specific water, sanitation and hygiene (WASH) implications. With water now being considered Personal Protective Equipment in the fight against Covid-19, and others future pandemics, it becomes even more critical to improve our country's WUE. Additionally, there have also been advancements in technology and innovative approaches to water management. It is in this regard that the 2004 WC/WDM national and sectoral strategies have been updated.

Parallel to the updating of the WC/WDM strategies, DWS has undertaken the development and finalisation of the NWRS3, is updating of the National Water and Sanitation Masterplan, is updating and revising the country's National Water Balances which looks to support the reconciliation of water supply and demand, is undertaking processes to establish Catchment Management Agencies while reforming other elements of the institutional framework, as well as a significant range of other essential interventions to improve water security and ensure sustainable growth and development. The water sector is inherently complex and as such these concurrent processes create the unique opportunity for improved levels of alignment that provide the basis for a resilient and sustainable future. The developmental agenda as set out in the National Development Plan (National Planning Commission, 2012) recognises the importance of water and as such this will require horizontal integration between sectors as well as vertical integration between levels of government, the private sector and society. This requirement is well understood by the water sector, albeit complex, and will require active support and guidance. Towards this end, it will be essential to:

- Provide clear sector leadership that fosters engagement and active participation in interventions to ensure a water secure future.
- Progressively establish, develop and capacitate the institutional frameworks that manage and develop water resources to provide effective water governance.

- Improve the levels of cooperative government between the spheres of government to ensure aligned approaches that support development while recognising the criticality of reducing water demand.
- Develop approaches to operational management and development of water resources that underpin improved levels of WUE.
- Undertake initiatives to build capacity and create awareness so that the WC/WDM becomes an entrenched behaviour amongst all South Africans.

1.3 WATER SERVICES SECTOR (WSS) INSTITUTIONAL CONTEXT

As was noted in the NRW Status Report of 2015, NRW is intimately related to practices with respect to operation and maintenance and asset management. In addition, it is important also to highlight that improving NRW management is part of a broader range of influences and activities within the water services function that are inherently systemic in nature. This is illustrated in Figure 1-2 below.

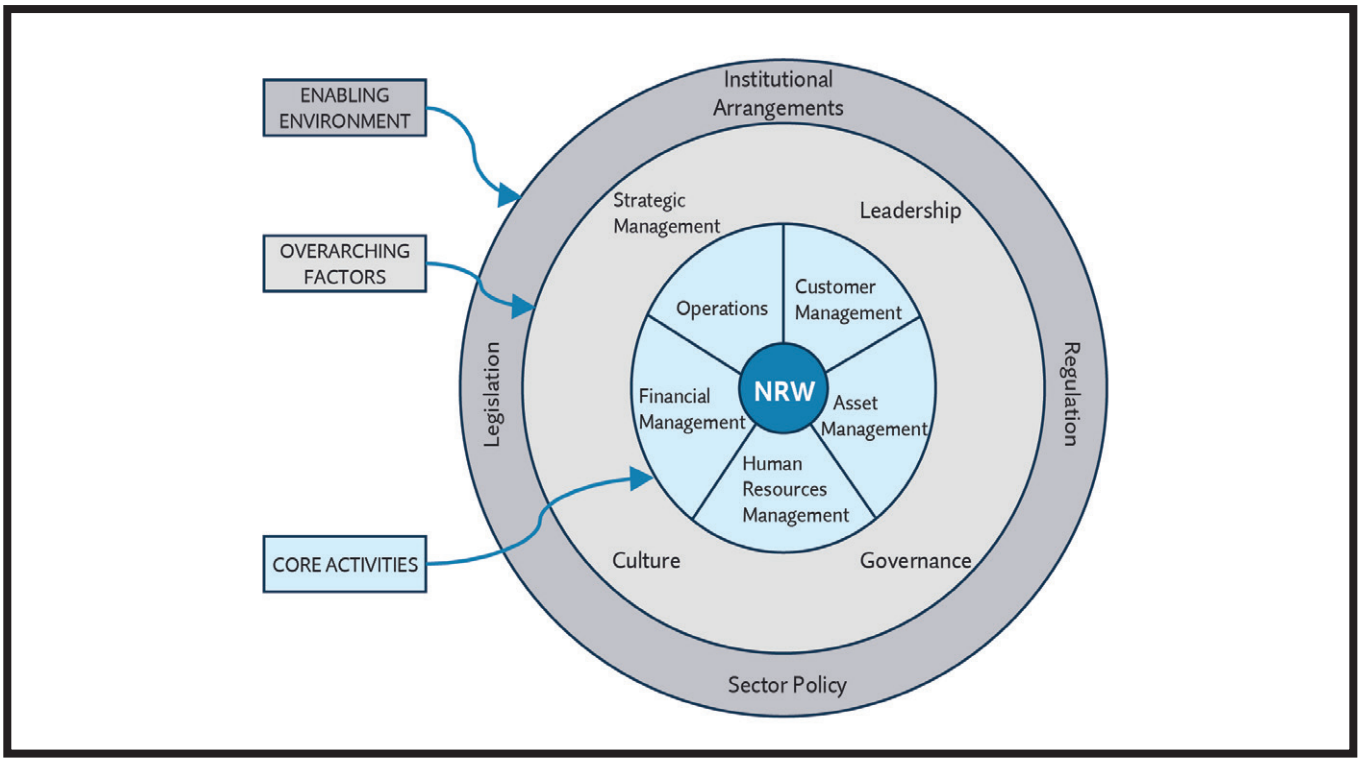

Figure 1-2: Conceptual Institutional Model for NRW Management

This highlights that, as much as the technocratic aspects within the core are critical, they are also hugely influenced by so-called "software" issues such as culture and leadership, governance and the overall institutional arrangements. A strategy focussing on water conservation and demand management will not of course necessarily be able to address these issues, but this broader context needs to be taken into account and is particularly pertinent in the context of the severe challenges faced by many municipalities in South Africa and declining performance across a range of criteria. The holistic systems thinking highlighted in Figure 1-3 guides our approach to the analysis and discussion of the water services sector and will also influence the development of the strategy and workplan to follow. This is reflected in the structure of the discussion in Chapters 2 and 3 addressing the international and national status quo and also informs the case study discussions in Chapter 4.

Throughout the discussion on water services, we will use the term "Water Services Sector (WSS) utility" in a generic sense, which includes both the municipal WSS function and/or a corporatised WSS utility. The latter is the institutional model adopted in most Sub-Saharan African countries, and is vertically integrated, addressing everything from the water resource facility (and sometimes including managing that), bulk raw water management, treatment, bulk potable water, through to reticulation and supply to the final customer. In South Africa, most water services are managed by a department or section in a municipality. Typically, this is not ring fenced institutionally or financially, with one or two exceptions. Water Boards, on the other hand, typically only deal with bulk treatment and supply (and this institutional model appears to be unique to South Africa).

2 Strategic Imperatives

2.1 ALIGNING TO DEVELOPMENT AGENDAS

2.1.1 Global

In this section, we outline some lessons that have emerged from global practice in this area. Optimising the management of water resources is a global issue, and in some cases becoming a matter of urgency. The pressure on water resources is increasing due to climate change, population growth and rampant urbanisation, among other factors. While having access to clean drinking water is a key issue for citizens, the distribution of drinking water is a major concern for local authorities and operators (Figueres, 2022).

As was noted earlier, a utility's enabling environment, characterised by its legal and governance framework and sector institutional arrangements has a significant impact on its effectiveness. It is therefore important to understand the current state of the enabling environment in order to assess the binding constraints preventing the utility from taking action (Cordoba, et al., 2021). The *l*egal and governance framework, for example, affects what actions the utility can take and when.

Addressing NRW is a relatively complex undertaking that requires a range of approaches and strategies to address effectively. At policy level, this requires a systemic approach, involving not only the utilities but also collaboration with different stakeholders and often will need to be complemented by changes in institutional, cultural, and governance structures. For instance, reducing water theft requires both changing consumer mindsets and eliminating institutional corruption (Farley, 2005). To solve the complex water issue, countries must move their water regimes towards an integrated framework able to respond to the complex human–technology–environment system (Pahl-Wostl, et al., 2008).

NRW reduction is not an objective itself. It is implemented to accomplish a more comprehensive goal, such as "effective utilisation of water resources" or "improvement of the financial condition of a water utility company" (Japan International Cooperation Agency (JICA), 2020). Therefore, it is important to clarify the overall goal and then design the program to accomplish the goal. NRW reduction would thus become a key part of the program. In South Africa's case this speaks to supporting the NWRS3.

Many NRW reduction projects in the past were designed and implemented in a rather uniform and inflexible manner. As a result, some projects contained activities too demanding for the targeted water utility companies, while others could not accomplish the expected outcomes because of the limitation of the available facilities. These experiences showed that an NRW reduction project should not be designed by simply replicating previous projects. The program or projects should be designed and tailored to fit the actual capacity of the target water supply sector or the water utility company. When required, it is effective to design a program that combines a technical cooperation project with an institutional development project.

A company that can supply water only during limited hours of a day due to a serious shortage of water supply capacity is likely to face difficulty in carrying out measures to control water leakage. As a result, one cannot expect much improvement in performance through the project. In such cases, the shortage of water supply capacity should be improved first by facility development. This will improve the service hours and the water pressures in the system. Then, the countermeasures to address water leakage could become more effective. Similarly, it is more effective to strengthen water tariff collection after the improvement of water supply services.

The importance of preventive measures, in addition to responsive measures, should not be overlooked. Improvement of pipe installation work technique, strict enforcement of standards for structure and materials of water supply facilities, and establishment of the registration system and training programs for plumbers, are among the preventive measures that need more attention. To scale up the improvement of water supply services through combining technical cooperation and facility development, coordination with other

development partners is effective. However, it should be noted that there is a potential risk of unforeseeable delay of one project due to the delay of another project (JICA 2020).

Many water utilities have continued to perform poorly despite a number of interventions. Donors have historically invested billions to improve water utility performance in developing countries — providing lending (and some grants) for capital investments, institutional reform, and technical assistance (Soppe, et al., 2018). In setting a framework for utilities to turnaround their performance, the World Bank, for example, provides a turnaround strategy for utilities, where a successful turnaround relies on certain key actions being taken in roughly the same order, although the context and duration may vary. These actions include establishing a baseline, cleaning up finances, setting clearly defined objectives and targets, updating management information systems (MISs), and improving human resources.

Successful NRW reduction is not about solving an isolated technical problem, but is instead tied to overall asset management, operations, customer support, financial allocations, and other factors in Figure 2-1.

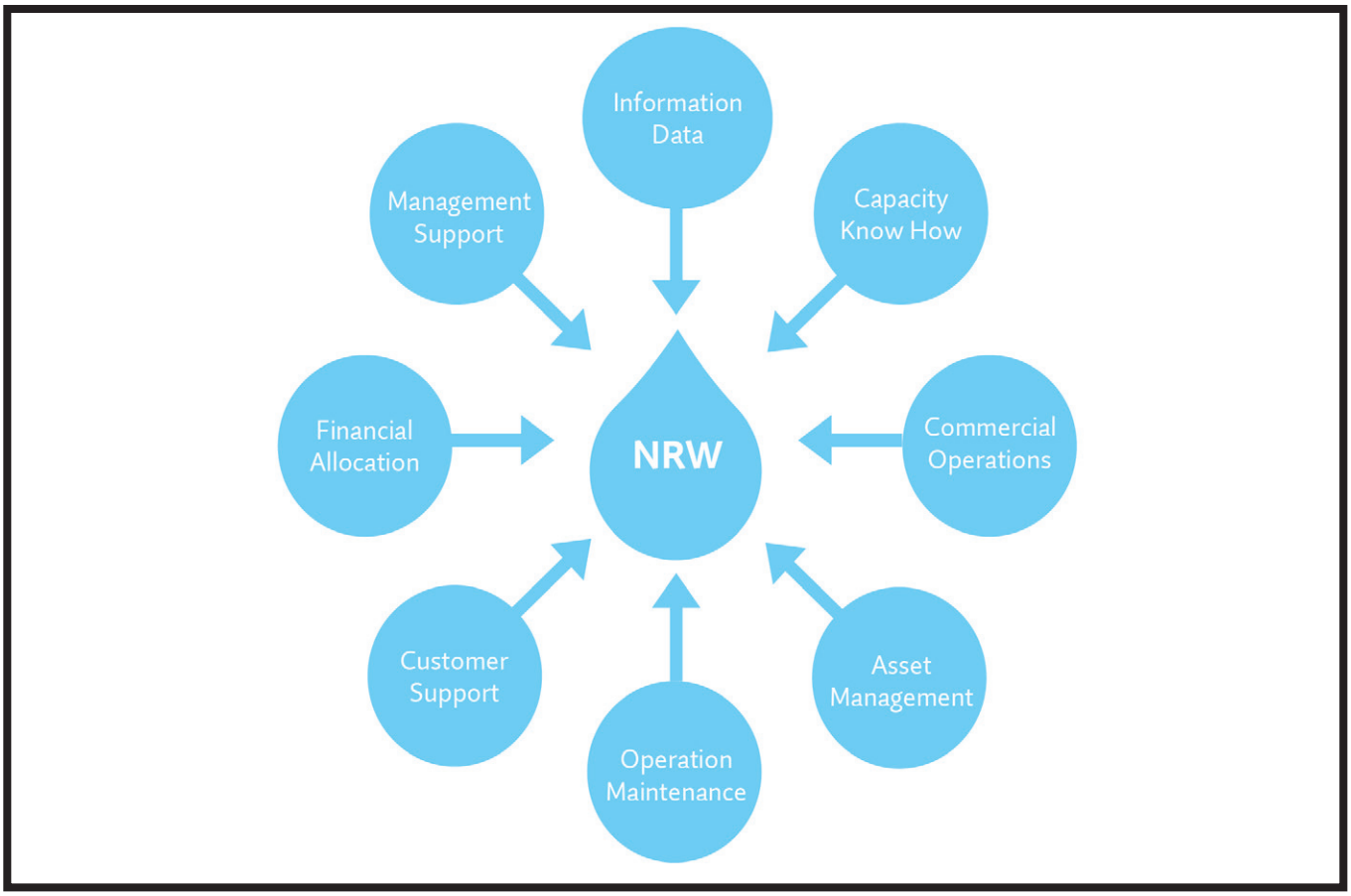

Figure 2-1: Reducing NRW is everyone's responsibility

In almost all of the utilities studied internationally, the first actions in their business plans were improving human resources and MISs. Once improvements were under way, some utilities focused on making sizable capital investments to meet ambitious targets. Most utilities reviewed signed performance contracts with the government at some point during their turnaround. This resulted in formal structures that defined the utility's expected performance, as well as the government's financial support to achieving it.

Insufficient allocation of finance is one cause of weak NRW management. From a utility's point of view, not allocating finance to NRW reduction is a short-sighted strategy: effective NRW management will lead to increased revenues and profitability. The inclusion of financial Key Performance Indicators (KPIs) linked to NRW can be used as incentives to seek increased budget allocations for NRW management (Baghirathan, 2017).

The availability and allocation of finance to initiate and maintain a long term NRW programme is challenging for many utilities. However, contrary to widespread belief, the levels of funding required to initiate and develop a long term NRW programme is a relatively small percentage of a utility operating costs, while the financial returns are usually significant. It is feasible to seek or allocate finance for NRW programme based on an attractive return on investment (Baghirathan, 2017).

Growing national demand for water, as a result of a growing population and the requirements of agriculture and industry is driving the need to use water resources more efficiently. There is also strong political pressure on the water industry to constrain any price inflation of water bills and legislative requirements to retain enough water in the environment to protect important aquatic flora and fauna (The Chartered Institution of Water and Environmental Management (CIWEM), 2016).

Efficiency is currently a key topic in the water sector as customers' expectations are continuously increasing, legislation becomes more demanding, utilities become more exposed to public opinion. Expectations are increasing towards a high-quality service at an affordable cost, combined with high-risk avoidance (Ramalho, et al., 2020). The implementation of efficiency projects, such as NRW reduction projects are fundamental both from an economic and an environmental perspective.

Encouraging customers to use less water and therefore save on their bills, raises challenges for an industry which is in a large part focused on selling water by volume. Market forces alone are unlikely to achieve efficiency aims and therefore the industry needs to be regulated and incentivised to be able to influence such behaviour by its customers.

There are a range of measures that will be needed to establish greater water efficiency, such as metering and smart metering, the use of well-designed tariffs, water efficient labelling, retrofitting water saving products, standards for new homes and water neutral developments. All these mechanisms will help drive down average water use by the population providing a significant contribution to reducing overall demand. The Government, regulators, local authorities and the water industry must work collaboratively with all stakeholders to deliver meaningful, measurable and impactful change in these areas.

2.1.2 National

WC/WDM as key concepts were established in South Africa, after the advent of the new democratic dispensation in 1994. Key tenets of the concept were formulated shortly after, which broadly encapsulated equity, optimal and sustainable use of water, as well as responsibility and accountability (DWAF, 1996). The primary thinking around the construct focussed on redressing the gross disparities that existed in service provision and basic access to water resources and a government grappling with providing those resources and services to a more expansive populace, as opposed to a small minority. This brought into stark focus the need to advance efforts to ensure the sustainability of the resource in the long term.

The first round of sector specific WC/WDM strategies were subsequently developed in 2004 and presented the first accepted definitions of Water Conservation and Demand Management. Water Conservation was defined as; "the minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water" whereas WDM was defined as; "the adaptation and implementation of a strategy or a programme by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability (DWAF, 2004).

The key strategic issues for the country as they relate to WC/WDM hinge upon a clear cognisance of the role and impact of nexus issues at a time when global trends are already impacting on the sustainability of our water resource as demonstrated in the past, and future looming day zero, which attests to the changing climatic conditions. IWRM however does provide exciting avenues for achieving the key goals of WC/WDM. One such avenue is off setting, which has, at times, been used successfully to establish a business case. This can be implemented when an actor has cause to trade/offset its total water reduction requirement by undertaking WDWDM in an area outside of its area of operation or undertakes work that differs from its normal scope when it is deemed that such an alternative approach is more beneficial in promoting and achieving water loss reduction.

Water services in the municipal environment have historically been complex and there has often been significant shortfalls in terms of operating it on sound business principles. A useful test case was that of Johannesburg Water and Metsi-a-Lekoa. This provided some clear lessons with respect to the inefficiencies in dealing with basic day to day operations and maintenance of infrastructure, partly due to the lack of ring fencing of water services revenues to effectively maintain the service loop and infrastructure upkeep. International experience has shown that ring fencing of the water services function in a utility is virtually a non-negotiable if a more business orientated approach is to be attained. This in turn will lead to better decision making, reduced NRW and better quality of water services (PPIAF, 2009).

WC/WDM can be regarded as a critical adaptation strategy in order to respond to the global and local crises that SA has endured as a country, from droughts linked to changing climatic conditions and pandemics such as Covid, to financial crises which impact on the ability of consumers to afford increasingly scarce resources. In the short to long term, WC/WDM will be more important as the country faces

new and more severe resource and economic challenges. Successful implementation of WC/WDM however requires careful consideration in order to reap the maximum results from limited resources. Current studies indicate that starting with the most basic interventions, which improve the management information to make better decisions, is the best place to start, amongst a plethora of possible interventions that could be considered (WRC, 2014). Figure 2-2 below presents the potential suite of interventions that can be considered to manage NRW.

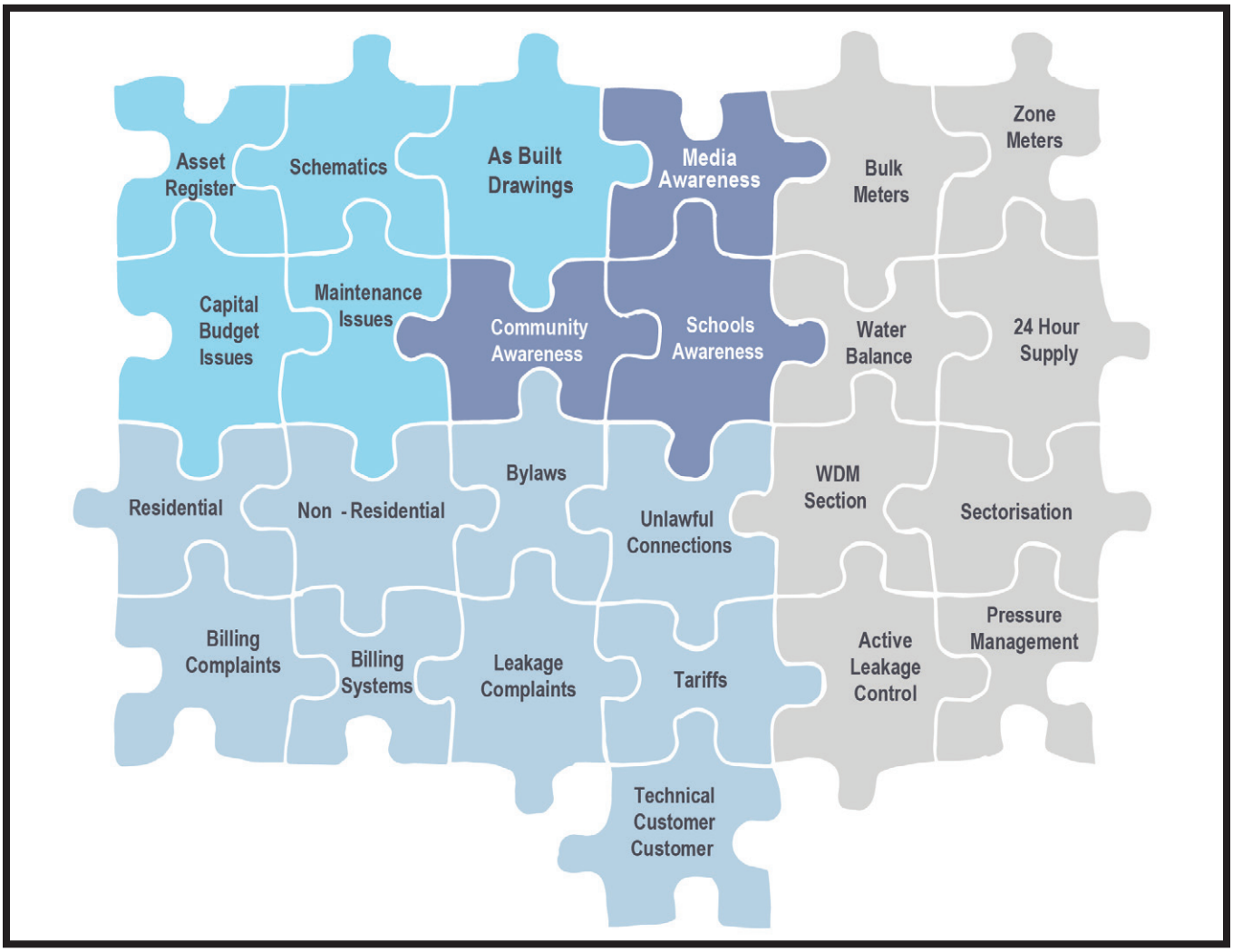

Figure 2-2: Range of interventions for the management of NRW

3 Water Services WC/WDM Context

3.1 LEGAL AND POLICY INSTRUMENTS

From a legislative perspective, the original mandate for efficient and effective distribution and use of water resources came from the Constitution; Act 108 of 1996 (Government of South Africa, 1998), which states that every citizen has a right to, amongst other things, sufficient food and water, placing water at the forefront of human development and therefore emphasising the importance of its management and beneficial use. The Constitution is the foundation for sound water management, as it expounds the view that the resource cannot be carelessly used in order to meet the condition of sufficiency for all.

The National Water Act (36 of 1998) recognises that water is a scarce and precious resource that belongs to all the people of South Africa and that the ultimate goal of water resource management is to achieve the sustainable use of water for the benefit of all South Africans. The Act aims to develop, protect, use, conserve, manage and control water resources as a whole, promoting the integrated management of water resources, with the participation of all stakeholders. The NWA, amongst others, deals with the development of strategies to facilitate the proper management of water resources.

The Water Services Act (108 of 1997) provides a framework for the provision of water supply and sanitation services to end users, such as households, business and industries within municipalities. It sets the standards for the local and provincial spheres of government and establishes the norms and standards for tariffs.

The NWSMP (DWS, 2018) articulates that building a water secure future will require proactive infrastructure management, effective water infrastructure operations and maintenance and overall reduction in future water demand, while looking at further infrastructure development and augmentation, if necessary. Management of NRW is central to the achievement of these objectives, based on the principle that measurement and monitoring of water resources is the foundation of sound decision making, allocation of resources and effective implementation.

The NWRS3 (DWA, 2021) builds on the NWRS1 (DWS, 2004a) and NWRS2 (DWA, 2013). The purpose of the NWRS3 is to ensure that national water resources are protected, used, developed, conserved, managed and controlled in an efficient and sustainable manner. The NWRS3 acknowledges that South Africa is a water-stressed country and is facing a number of water challenges and concerns, which include security of supply, environmental degradation and resource pollution, and the inefficient use of water. In light of the urgency to protect our water resources and the adverse effects of climate change, the NWRS3 asserts that WC/WDM should be one of the top priorities, as well as measures to reconcile demand and supply in order to provide for the national goals of a better life for all through job creation and economic growth.

3.2 STRATEGIES AND OTHER INSTRUMENTS

To support the legislative framework upon which WC/WDM pivots, the DWS Strategic Plan for 2020/21 to 2024/25 sets out a performance target approach to WC/WDM, highlighting its importance as one of the key priority implementation areas for the DWS. The Strategic Plan clarifies that set targets could be met using existing grant mechanisms, considering the impact of WC/WDM on bulk infrastructure requirements. The strategy includes a requirement for the development of individual sector WC/WDM strategies for industrial, agricultural, mining, power generation and municipal water and domestic water use, with targets set for each water use sector (DWA, 2021). The water services sector, in particular, should aim to meet the parameters of the Reconciliation Strategies and All Town Studies in keeping with the principles of Integrated Water Resources Management (IWRM), which is a core pillar of WC/WDM.

Though progress has been modest since the advent of the WC/WDM Strategies in 2004, there have been successes in some areas. Perhaps the most significant of these is the development of the No Drop (ND) incentive-based regulation programme. This is largely based on the approach and philosophy adopted in the Blue Drop and Green Drop Programmes. The latter have achieved some degree of success, and certainly recognition in the South African context, though they have experienced challenges in some areas. The ND work has sought to build on these learnings. Of note here also is that whilst the Blue Drop and Green Drop were "dormant" for some while, they are now the making a comeback under the new leadership at DWS. Work on the ND was concluded some while ago and has not been rolled out to date. Whilst this is a concern, to implement it now is a relatively low-hanging fruit, bearing in mind that nearly all the preparatory work has been done.

The challenges experienced over the years in the public sector with respect to addressing NRW have, to some extent, created a fertile environment for greater participation of the private sector and this is being fostered and encouraged by the new DWS leadership. Evidence of this is found in the work undertaken by organisations such as the Strategic Water Partners Network (SWPN). This provides opportunities for aspects such as partnerships and stewardship going forward. There are also potentially opportunities for different types of public private partnership (PPP) to address the challenges. In this regard, modalities such as performance based NRW management and stewardship contracts are increasingly being used.

In general, there is better understanding and appreciation amongst stakeholders in the sector with regards to the different components of WC/WDM, NRW and efficiency benchmarks.

With respect to the water resources analysis, demand targets have been included as part of the reconciliation strategies.

Though co-operative governance remains a challenge, there have been successes in some quarters, in particular it is of note that water loss indicators are now included in National Treasury's (NT's) Municipal Standard Chart of Accounts (mSCOA). In addition, municipalities are required to report on water losses in their Annual Reports for the Auditor-General of South Africa.

There is also improved understanding of the availability and usage of funding mechanisms such as Regional Bulk Infrastructure Grant (RBIG) and Water Services Infrastructure Grant (WSIG), as well as funding from the Development Bank of South Africa (DBSA), for NRW projects. The issue of linking grant funding to NRW performance has not yet been put in place formally, though some of the DWS Regional Offices apply pressure on municipalities in that regard.

Water stewardship and PPP promotes collective, multi-stakeholder action around water security challenges, including the reduction of NRW, and represents an opportunity for municipalities to work together with communities and the private sector to reduce water losses and increase revenue. A stewardship non-revenue water reduction project includes the provision of funding, expertise, corporate governance, resources, capacity, and skills to the municipality to reduce non-revenue water.

WC/WDM benchmarks for the water services sector are tracked by the DWS Head and Regional Offices. The Western Cape, KwaZulu Natal and Gauteng Regions have excelled in this regard and have active monitoring programmes. It has taken many years to establish these reporting programmes through strong leadership and persistency. The information from these programmes is assisting the Regions and municipalities to make informed decisions with regards to prioritising projects, budget allocations and identifying potential risks. Directives are issued and budgets are cut if municipalities do not comply. The other regions have weak or no reporting structures and there are no clear benchmarks and little informed decision making.

3.3 INSTITUTIONAL AND GOVERNANCE FRAMEWORK

In terms of the constitution of South Africa, local government has the responsibility and accountability to provide water services to communities in an effective and efficient manner to ensure sustainable economic and social development. Local government, however, has lost its technical and financial management ability to provide its services to a large degree, as has been highlighted in the NDP 2030. Local government is currently relying on assistance from all spheres of government, which is largely dealt with by means of 'co-operative governance. Co-operative governance support to local government should therefore strengthen the capacity of municipalities to enable them to manage their own affairs, to exercise their powers and to perform their constitutional functions.

The role of key stakeholders in the water and sanitation sector are summarised in Figure 3-1.

Figure 3-1: Key stakeholders in the Water Services or Local Government Sector

Water service institutions in South Africa are, in essence, Metros, local municipalities or district municipalities, with the authority to provide water services to end users (DWAF, 2005). Some of the core functions of these institutions include provision of water services from abstraction and purification (in some cases) to distribution, as well as operations and maintenance of the water distribution infrastructure. This also encompasses the implementation of measures to ensure operational and resources efficiency, equity, environmental sustainability, and effective service provision. Financial management in a large number of municipalities however continues to be dire, due to poor revenue collection, poor decision making regarding the use of existing funds and funds leakage (corruption).

The ability to attract and retain a good skills base to appropriately manage the water services functions and the management of municipal assets, depends on the funding available to create a conducive environment for this to take place. This highlights the importance of looking at a water service authority (WSA) as a whole, in order to understand the push and pull factors that impact on the ability of the institution to successfully implement WC/WDM. Current experience emanating from ND data suggest that operation and maintenance of the physical infrastructure is sorely lacking, along with a serious shortage in skills to carry out the functions necessary to maintain healthy systems. It is also clear that a champion is required at the municipal level to drive WC/WDM. The structures to support this are however often unclear. While most municipalities have a water services department, it is not the case for all municipalities with, in some cases, this function falling under public works or other alternative departments. Going forward, these structural issues must be resolved to ensure that WC/WDM is driven effectively.

The availability and allocation of finance to initiate and maintain a long term NRW programme is challenging for many utilities. However, contrary to widespread belief, the levels of funding required to initiate and develop a long term NRW programme is a relatively small percentage of a utility operating costs, while the financial returns are usually significant. It is feasible to seek or allocate finance for NRW programme based on an attractive return on investment (Baghirathan, 2017).

If the level of available funding is initially limited, the utility could adopt a phased approach, with an initial set of activities that would lead to quick wins in reducing NRW and justify the allocation of more NRW funding to the subsequent phases.

3.4 BENEFITS OF IMPLEMENTING WC/WDM

The potential benefits of WC/WDM include the following:

- Water security whereby water demand does not exceed the reliable supply or there is balanced water supply and demand.
- Financial sustainability of the water utility, particularly in those instances where metering, billing and cost recovery are properly implemented.
- Effective operation and maintenance of infrastructure which prevents excessive leakages, avoids deterioration in service delivery, prevents intermittent supply and water rationing, reduced pressures etc. This also prevents intermittent supply which is often caused by excessive leakages as well as depressurisation which damages water supply infrastructure and contributes to water borne diseases due to contaminants seeping into water distribution pipelines.
- Well maintained water supply infrastructure and assets resulting in good service delivery and decreased water leakages.
- Prevention of the creation of unnatural wetlands at microenvironment level which provides a breeding ground for mosquitoes and other health hazards to communities.
- Relatively short timeframes and cost-effective approaches are possible at a macro-level through WC/WDM interventions. By postponing the construction of augmentation schemes such as large dams, WC/WDM can be implemented in a relatively short time span with a relatively smaller budget as opposed to large augmentation schemes which usually require major capital investment with considerable implementation times of 10 to 25 years, with associated environmental impacts.
- Improved water production through reduced pumping and pipe failures, reduction in chemical costs and associated greenhouse gases.
- Reduction in water use which requires less infrastructure, less debt and lower fixed water costs.
- Flexibility in implementation of WC/WDM intervention measures which can be introduced incrementally.
- Build relationships between government and citizens as the community plays an active role in successful WC/WDM projects.
- Cost reflective water charges that support sustainable water services by implementing WC/WDM that creates well measured components of the water cycle. This promotes improved knowledge management and costs reductions.

4 Situational Analysis

4.1 STATUS QUO

4.1.1 Strategic Aspects

South Africa is a water-scarce country, and the sustainable provision of water is amongst its most significant socio-economic challenges. The country is located within southern Africa's 'drought belt' and, according to the World Bank, is the fifth most water-scarce country in sub-Saharan Africa. Since the 1960s, South Africa has already experienced a rise in average annual temperatures country-wide, by 1.5 °C. While the temperature has increased more markedly across arid, inland areas of the country, with records showing that daily temperatures have risen, rainfall trends display less clarity, with significant inter-annual variability. There are also considerable geographic variances in historic rainfall patterns.

With mean annual precipitation being only 60% of the global average and with this being spatially and temporally variable, the country has challenges in meeting water requirements with some regional disparities. This is exacerbated by major urban centres and growth nodes not being situated in alignment with water resource availability. These nodes, such as Cape Town, Port Elizabeth, and Johannesburg (amongst others) are therefore interconnected with key water resources through a network of bulk water transfers. These transfers have enabled the continued socio-economic development of the country; however, this also means that the status of water resources within these water supply systems is very dependent on water resources within other catchments in other parts of the country.

Noting this context, the DWS developed a suite of WC/WDM strategies to promote water use efficiency indicating that these strategies would provide guidance as to a responsible approach with multiple water sector institutions playing an important role in the implementation of these strategies.

There is not good clarity currently with respect to the institutional and regulatory arrangements for water services in South Africa. It is understood that the DWS is committed to the establishment of an independent regulator and is currently undertaking a study to give effect to that. That will however take some time and, in the view of the authors, may also require not only legislative harmonisation, but also potentially, broader sector reform. This could easily take five to ten years to materialise and in the meantime, WC/WDM efforts will need to progress. Pragmatic approaches will be required to achieve this. In this regard, the Regulator (DWS), can call on the broad regulators' toolkit to give effect to the promotion of improved water conservation and water demand management. This, for instance, could include aspects such as publishing performance, benchmarking, peer review, providing incentives, developing improved or more focussed regulations and utilising directives.

The work already undertaken on the ND approach/methodology is a significant opportunity to move the WC/WDM paradigm forward. In some ways, this represents a low-hanging fruit in the sense that a lot of work has been done already, it just needs to be rolled out. This draws on a number of the regulatory strategies mentioned above. One of the things that will have to be watched with respect to the rollout of ND is how to ensure it is effective in addressing the weak and very weak municipalities, though there is confidence that it will have a beneficial impact on the strong and medium-level performers.

In terms of freeing up additional water resources, water conservation and water demand management is nearly always the cheapest option when compared to the other alternatives, such as building new dams, inter-basin transfers, developing new well-fields or wastewater recycling projects. In theory, this should mean that finance is readily available to undertake NRW projects but in practice this is often not the case. While ideally municipalities should prioritise their own funding, there is also a case to be made for the establishment of a fund that can facilitate and support NRW activities.

This should probably take the form of a revolving fund that primarily provides loan finance but also has a small grant element available to carry out initial feasibility and strategy work. This concept has also been mooted for Southern Africa in view of the wide need to support NRW initiatives.

The timescales to achieve effective results for WC/WDM on a national scale are significant; probably of the order of greater than ten years to achieve significant results. This reality should ideally be recognised at the political level so that there are sustained efforts and appropriate funding. At the same time, there are often low-hanging fruit or quick wins and the WS Strategy and associated Implementation Plan, should therefore address short-term, medium-term, and long-term plans and actions.

The DWS, as sector leader and de facto Regulator, has a critical role to play. Admittedly, its image has taken a knock in the last ten years, however there are now signs that under the new leadership a new trajectory has been charted and this will create new opportunities. To facilitate this, strong leadership, and ownership of the new WC/WDM strategies will be required at the highest level within the DWS, and a high level "sponsor" defined. Consideration will also need to be given to the capacity within the Department and DWS Regions to lead, promote and support activities within water services, which is currently extremely limited (one person).

There are very good technological options available which are well understood and have been implemented successfully in many cases in South Africa, and capacity to implement these in the private sector. The use of various types of PPPs and performance-based approaches to address NRW management is starting to emerge internationally and has also been used to a limited extent in SA. Further work to explore this modality should be a key action, going forward.

It is apparent that success will only be achieved through utilisation of a range of integrated hardware and software solutions. The importance of behavioural factors in addressing WC/WDM cannot be underestimated. In particular, a significant focus on customer management, education and outreach is fundamental to successful WC/WDM efforts. There are international examples of where an approach based on behavioural science has achieved excellent results in the water sector. Utilities that have achieved success in the NRW space have all made use of a major customer outreach programme.

Successful WC/WDM is multi-faceted and has important cross-cutting characteristics. This means that to be successful, there will need to be enhanced coordination with other Directorates within the Department and also improved cooperative governance with other key players, such as Department of Cooperative Governance and Traditional Affairs (COGTA), in particular.

The impacts of climate change are demonstrating that the issue of improving water use efficiency is becoming more pressing. At the same time, one should "never waste a good crisis" and this may well create opportunities in terms of renewed focus and access to cheap funding.

The best performing municipalities in South Africa are on a par with peers in the developed world. This creates the opportunity to leverage off them and apply their lessons more broadly. Most of these are in the Western Cape, however there is the need to move beyond narrow political distractions when it comes to addressing this critical water sector issue. At the same time, every municipality is in a very different place and context, and a "cookie cutter" approach is certainly not applicable. Some municipalities that are very dispersed in nature with large, low-income communities, will require focussed and customised strategies.

4.1.2 Sub-sector Aspects

The municipal water requirements, including industries, commerce, urban and rural domestic, targets are shown in Figure 4-1. The targets were extracted from the NWSMP. To avoid a 17% deficit in the national water balance by 2030, water losses need to be reduced to 15% by 2030. This will close the deficit gap to 5%. In order to close the 17% gap by 2030, municipalities need to reduce water losses to 15% and improve efficiency from 237 l/c/d to 175 l/c/d. Based on the latest 2021/22 national water balance information, this can be achieved if the current trend can be sustained. However, it will require significant political willpower, resources, and finances. The successes achieved in the past were often as a result of water restrictions and rationing and not effective WC/WDM programmes. In order to achieve the 2030 15% loss reduction with efficiency target, the current municipal water use of 4 282.3 million m^3/annum needs to reduce by 587 million m^3 or 65 million m^3/annum.

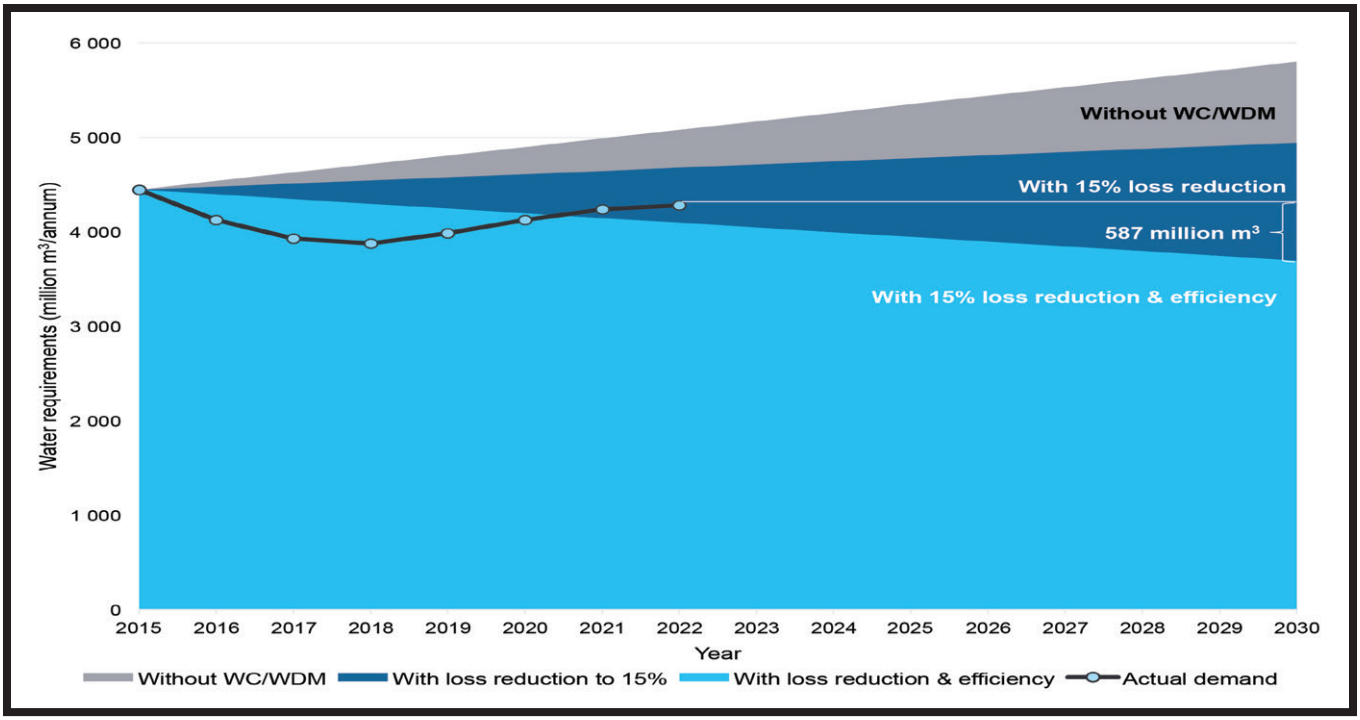

Figure 4-1: Municipal water WC/WDM targets

The current status in terms of the overall national water balance for water services is illustrated in Figure 4-2. This illustrates vividly that the situation with respect to NRW is critical due to the fact that almost half of all water produced is effectively NRW. The 2020/21 national water balance indicates a system input volume (SIV) of 4 233.8 million m^3/annum, NRW of 1 908.7 million m^3/annum (45.1%) and water losses of 1 686.4 million m^3/annum (39.9%). There has been a noticeable increase in billed unmetered consumption because of incorporating free basic water supply in the estimated water balances, especially for rural municipalities. Unbilled unmetered consumption remains lower than expected, considering the high number of unbilled properties in South Africa. Municipalities need to correct their water balance calculations and show any water use after an accepted connection as authorised consumption and not water loss.

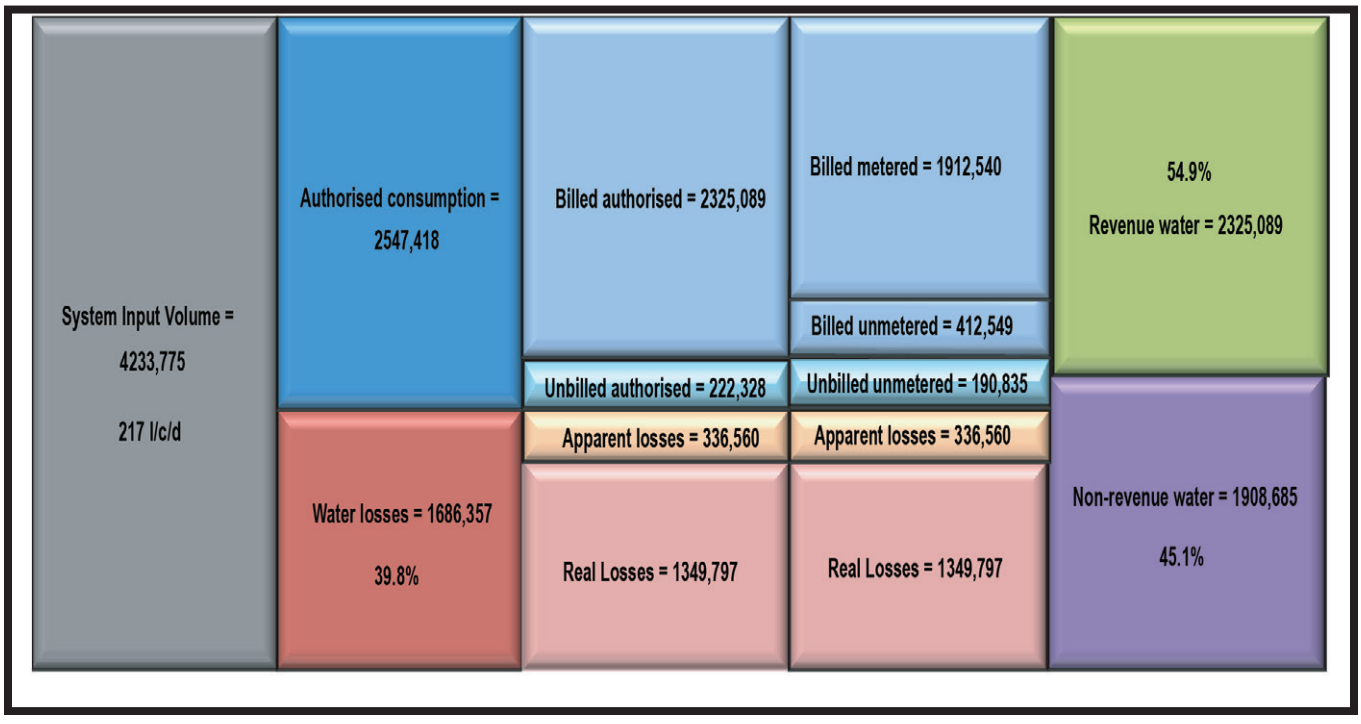

Figure 4-2: National Water Balance (million m^3/annum)

The NRW and water losses have increased by a notable 3.5% and 3.4% respectively from June 2016, however, the greatest increase was in the past two years and could be attributed to the increased demand and COVID-19 pandemic. The fluctuation between 2016 and 2019 was generally less than 1%. The national NRW and water loss trends show a steady increase in NRW over the past 10 years and gradual exceedance of the SIV projections with WC/WDM scenario. The figures are highly influenced by the Category A, B1 and B2 municipalities, most of whom have made significant strides in improving NRW management, reducing water losses and managing the demand in line with reconciliation strategy targets. There is significant scope for improvement of NRW and all municipalities would benefit from targeted demand management programmes including community education and awareness, leak repair, infrastructure refurbishment, pressure management, installation of bulk meters amongst other measures.

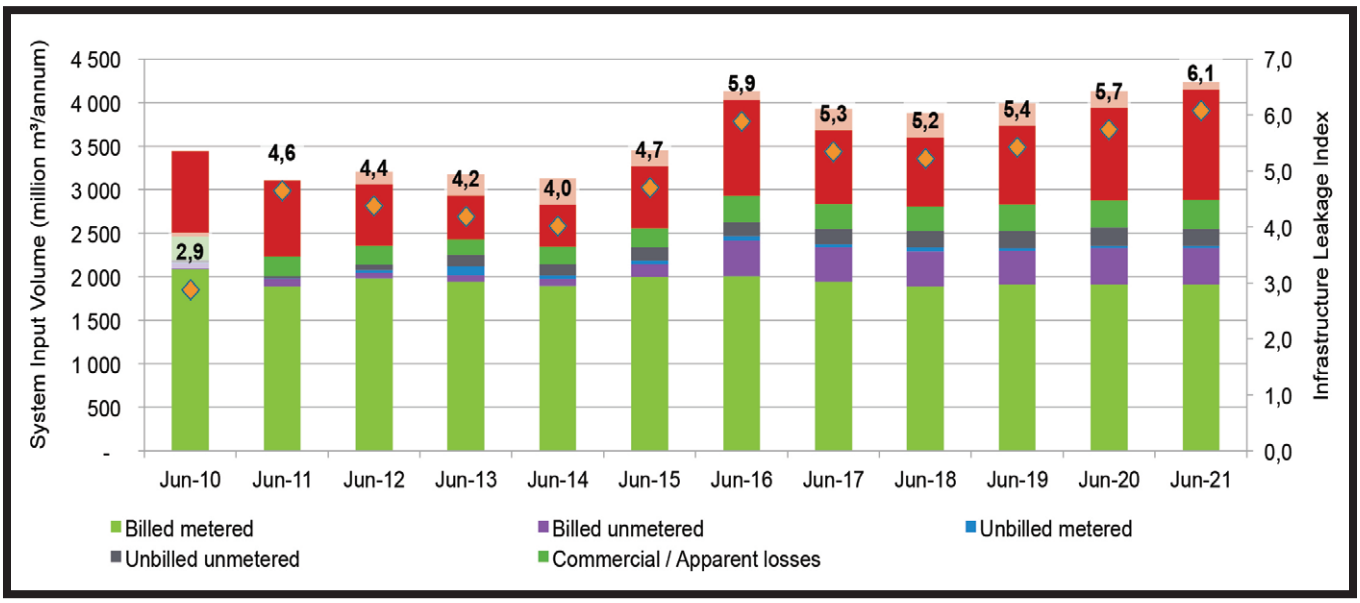

Figure 4-3: National NRW and Water Loss Trends

National trends suggest that the per capita consumption has remained almost constant over the past 10 years, which is commendable, however, WC/WDM efforts must be elevated considering the reliability and level of service and inefficiencies, and that South Africa is one of the 30 driest countries in the world. The per capita consumption is however significantly lower than the previous national average of 237 l/c/d presented in June 2016.

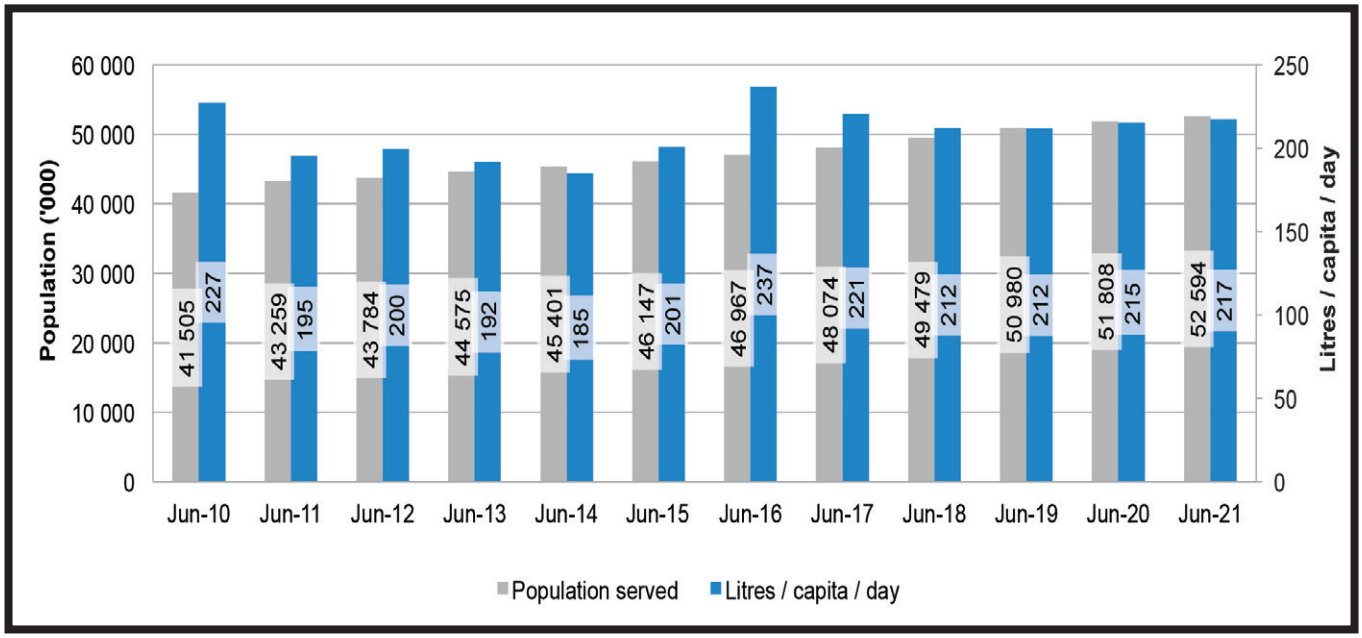

Figure 4-4: Per Capita Consumption Trends

The infrastructure leakage index (ILI) deteriorated slightly from 2016 to 2021 and showed signs of improvement in 2017 and 2018. The Covid-19 pandemic has played havoc with municipal water losses and this trend is expected to improve once municipalities have return to normal and have eliminated the leak repair back-logs and improved revenue collection.

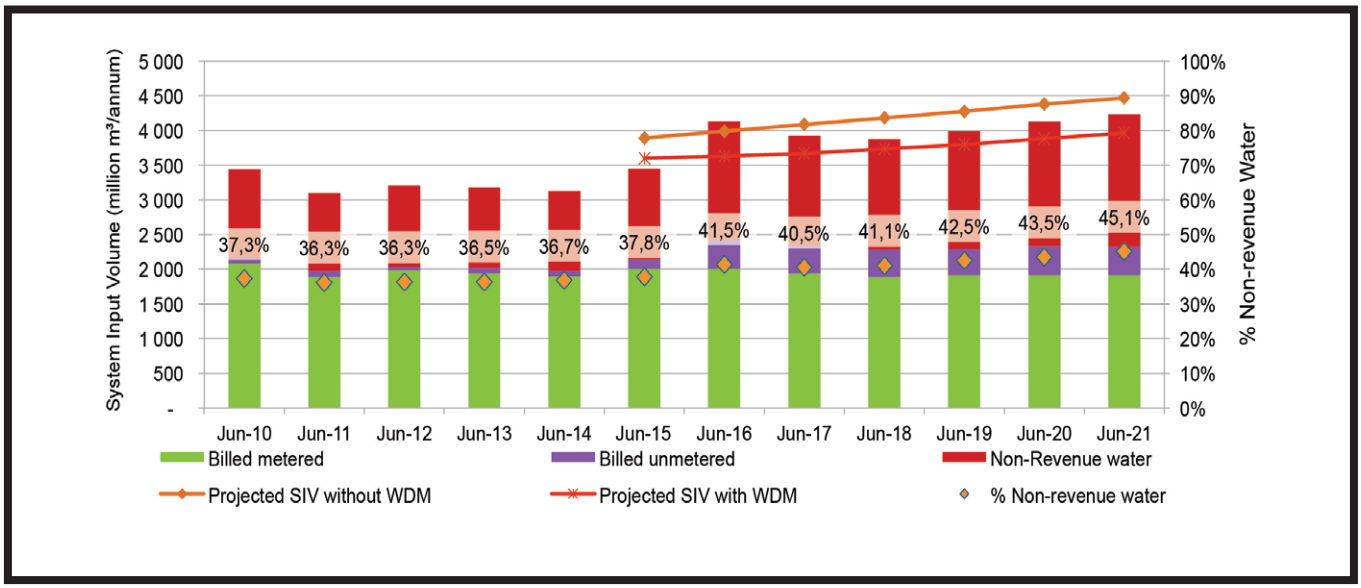

Figure 4-5: Infrastructure Leakage Trends

The results indicate increased NRW, water losses and ILI but a significant decrease in the national per capita consumption. Given the increases on three key NRW metrics, WC/WDM must be implemented as a matter of urgency in all Regions, especially considering that several Regions have NRW and water losses above 50%. There is significant scope for improvement in reporting levels, data accuracy and a reduction of SIV, NRW, water losses and improved efficiency across South Africa. Only continuous monitoring and analyses will provide a credible benchmark against which the progress made with the implementation of WC/WDM can be measured.

4.2 CHALLENGES AND OPPORTUNITIES

There is a rich diversity of strategic issues and lessons that have emerged from the process followed in undertaking this project. In order to be able to make sense of these and facilitate their assessment, we have utilised a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis as illustrated in Table 4-1 below. In practice, there are always constraints, issues and challenges and these inform what is, and what is not possible, in terms of developing implementation plans that will gain traction.

Table 4-1: SWOT Analysis

Strengths	Weaknesses
• ND approach is potential powerful tool • Some regulatory tools in place via Water Services Act • Potential for much more widespread use of water efficient devices/measures • The measures to achieve effective WCDM are well known • Supported by Director General and Minister • Solid baseline assessment • Focus on Metros and Secondary Cities (80/20 approach) • Potential to link grant funding for municipalities to NRW performance	• Institutional and regulatory ambiguity • DWS capacity at national • WC/WDM capacity in regions • DWS image (recent signs of positive change) • ND and water use licence regulation not established • DWS leadership (e.g., sponsor at deputy director-general level) • Poor interdepartmental linkage • Weak overall project/programme governance for WC/WDM e.g., coordinating structures etc. • Limited results from funded WC/WDM programmes

Opportunities	Threats
• Some municipalities perform excellently • Well capacitated private sector • Strong community of practice • Accessing external finance to address NRW initiatives • Good NRW projects demonstrate excellent payback characteristics • Potential for significant outreach programmes geared towards behavioural change* • Reduced NRW greatly increases viability of the WSS function • Innovative modalities such as performance based NRW reduction	• Climate change • Demotivated and disinterested municipalities • Lack of business approach in municipalities • Lack of ring-fencing of WSS function in municipalities • Lack of cooperative governance • Large indigent customer base in some municipalities • Old and deteriorating infrastructure such as asbestos cement pipes • Poor operation and maintenance • Tariffs that are too low or unaffordable for low-income earners • Non-payment for water • Collapse of municipal financial systems (only 16% achieved a clean audit in 2020/21

***Also, potential strength**

4.3 THEORY OF CHANGE

The proposed Theory of Change for water services is set out in Figure 4-6 below. This highlights that the key problems to be addressed include the complex institutional arrangements. This includes the challenges with providing oversight for a very large number of water services authorities and water services providers, combined with complex regulatory and reporting requirements, involving DWS, COGTA and NT. In addition, as was noted earlier, the significant changes and challenges emanating from climate change will increasingly impact on the resilience of the water services function, with Cape Town and Nelson Mandela Bay being recent examples of this. At the same time, there are major institutional and organisational challenges within municipalities resulting in a poorly run water services function and weak business orientation in many cases. As noted earlier, in many cases there is a poor understanding of the water services business model within municipalities, evidence of which is found in the lack of ring-fencing of the water services function.

The experience in many countries with respect to high NRW is that it has a disproportionate impact on the poor as it often results in a lower level of service and the poor generally receive the lowest level of service anyway. Consumers/customers with higher income levels will make their own additional arrangements to address issues with a poor quality of service, while the poor are not able to do this. In addition, because the income generated from sales from lower income customers is small, there is a tendency for utilities to not give them sufficient focus. This is made more complex in South Africa by Free Basic Water (which is more-or-less unique to South Africa), which is often poorly implemented and administered, resulting in many cases not in Free Basic Water but complete non-payment.

In addition to the challenges with the management of NRW, there is also a lack of awareness of the need for water conservation and water-use efficiency measures within households, industries and commerce. There is also very limited private sector engagement in the operational side in NRW management in South Africa. While the role of the private sector is well defined in the design and construction elements, generally there is very little involvement in operation and maintenance, with notable exceptions being for the PPPs in Mbombela, Dolphin Coast and Queenstown.

Some of the key barriers to address in terms of the Theory of Change include, as it stands, weak cooperative governance. As was noted earlier, the complexity of the institutional arrangements in South Africa means that there are at least three Ministries that need to be intimately involved in providing oversight to water services. As it stands, there is no overarching or guiding mechanism to facilitate the WC/WDM efforts.

NRW projects have in many cases very good payback, often better than other projects designed to make available additional water resources. In spite of this, it can be a challenge to obtain funding in these areas, while noting also that some municipalities are neither well motivated nor capacitated sufficiently to be able to undertake the due diligence processes necessary to obtain this funding.

The lack of some kind of financial ring-fencing of municipal water services in most municipalities is a fundamental

problem area. International experience indicates that effective regulation of the water services function will have no chance of success until this has been done.

While it has been a national policy for some while to set up an independent regulator for water services, at the time of writing, this is still not in place. It is understood that there are processes currently underway to address this, but this will need to be associated with legislative changes to facilitate the establishment of an independent regulator. There will probably be significant work required with respect to policy harmonisation, in addition to the enabling legislation for the regulator.

In general, there is a poor attitude and awareness amongst consumers in South Africa with respect to not only the need to conserve water, but also the need to pay for water over and above Free Basic Water (FBW). Much water in South Africa is effectively stolen by means of illegal connections and in many cases, FBW is abused, with free consumption way above the FBW allocation. These problems are broad-based among consumers but also very poorly managed by many municipalities.

And of course, there are significant political economy challenges in many municipalities due to poor governance and corruption. Historically, there has been limited political support with respect to WC/WDM but there are signs of things changing now, with climate change providing an obvious impetus.

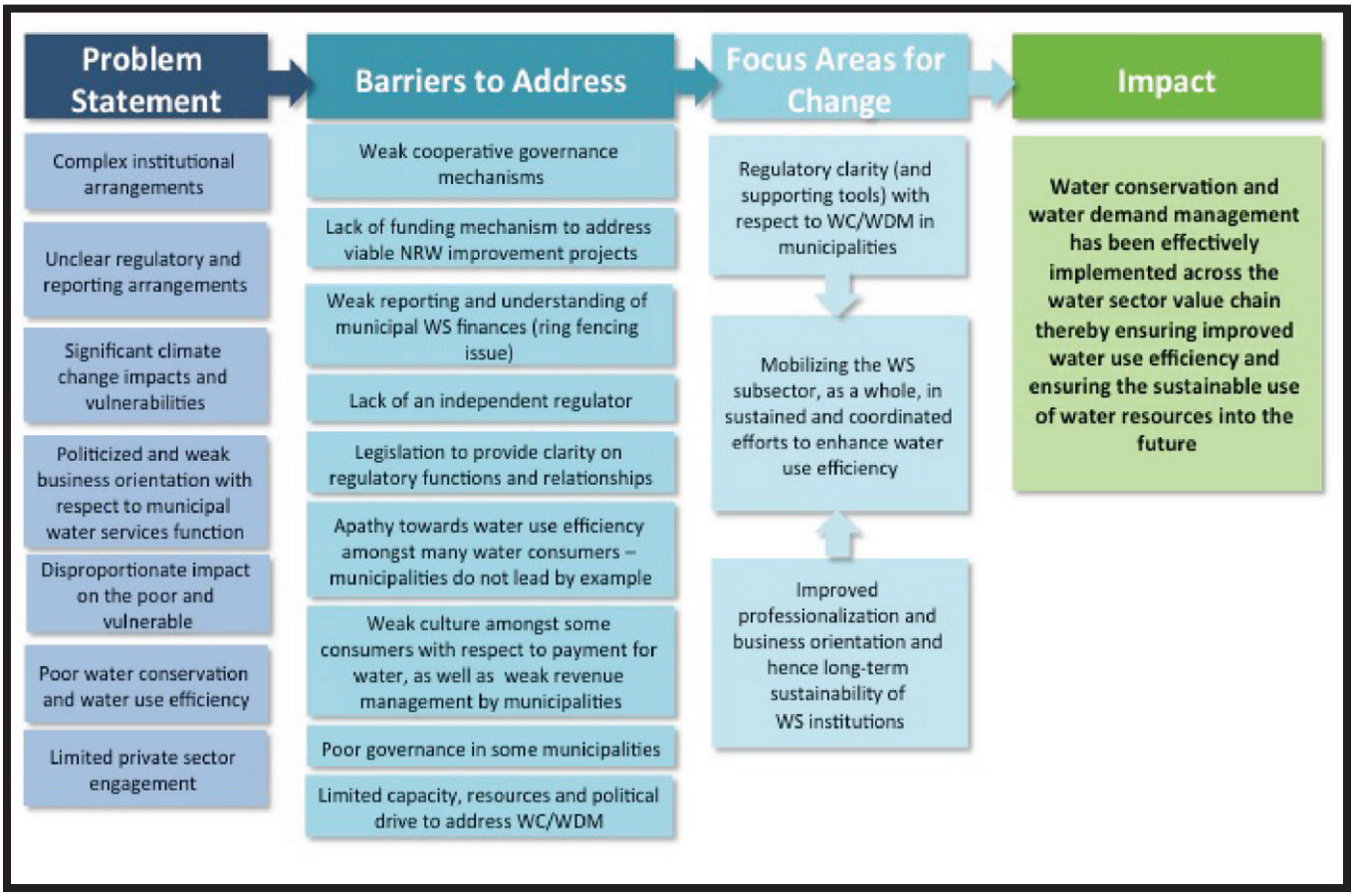

Figure 4-6: Theory of Change for Water Services

The critical focus areas for change revolve around regulatory clarity and supporting tools with respect to WC/WDM, and this is combined with the need for improved professionalisation and business orientation of water services institutions. Noting that the latter is intimately connected to the long-term sustainability of WSAs/water service providers (WSPs). In essence, these institutions will never be viable with very high NRW. Combined with the focus on these aspects, the Theory of Change seeks to mobilise the water services sector, including all of the institutions and the public at large, in sustained and coordinated efforts to enhance water use efficiency. The ultimate impact will be that WC/WCDM will be effectively implemented across the sector, resulting in enhanced water use efficiency and sustainable use of the resource in the future.

5 Strategic Response

5.1 VISION

The NWRS3 Vision provides the framing for the sector: *"The protection and management of water resources to enable equitable and sustainable access to water and sanitation services in support of socio-economic growth and development for the well-being of current and future generations."*

In support of the overarching Vision above, the vision for the WC/WDM strategies is:

"Water conservation and water demand management has been effectively implemented across all sector water value chains thereby ensuring improved water use efficiency and ensuring the sustainable use of water resources into the future."

5.2 STRATEGIC TARGET

Key strategic water sector instruments such as the NWRS and the NWSMP have indicated that with the current water use patterns and developmental trajectory, South Africa will face a 17% water deficit by the year 2030. Indications are that this could indeed be a conservative estimation and as such DWS is undertaking a range of studies to provide an updated assessment of water supply and demand. In the meantime, it is critically important that as a country there is collective effort to improve WUE, thereby driving down water demand. Towards this end:

All water use sectors will undertake technical, social, economic and legislative interventions to ensure a 70% water use efficiency level by 2030.

This target is understood as a minimum requirement and that all sub-sectors must strive for continued improvements and innovations that will support the collective effort to drive down water demands and to set new standards in terms of attainable water use efficiency.

5.3 STRATEGIC PRINCIPLES

There are four pillars of WC/WDM that guide the strategic principles, namely technical, social, economic and legislative. These guiding principles underpin the high-level principles identified below as essential in what needs to happen in the water services sector:

- Good quality governance of municipal institutions is in place.
- Good regulatory clarity, roles and responsibilities are in place to support WC/WDM efforts in municipalities.
- There is transparency with regard to municipal reporting and performance for NRW management.
- DWS' role as sector leader and WC/WDM leader is defined and established.
- The roles of other key government institutions in WC/WDM are well defined.
- There should be a strong emphasis on self-regulation in the sector.
- Municipal performance on WC/WDM needs to improve so as to enhance climate resilience.
- Enhanced WC/WDM should be prioritised as it is often the cheapest option to free up additional water resources (as well as having a number of other benefits).
- The public sector will not solve this problem alone. The private sector, civil society and Development Partners can, and should, play key roles.
- Addressing (and changing) behavioural aspects of consumers (and relevant institutions) is fundamental to successful WC/WDM efforts.
- Clear NRW, efficiency, water loss and water resource targets with accountability and consequences if not achieved.

5.4 GOALS AND OBJECTIVES

Four goals have been identified to effectively implement WC/WDM across the various sector value chains. Supporting these goals are ten objectives, which link the key pillars of WC/WDM (legislative, social, technical and financial) as they cut across multiple goals. The National WC/WDM strategy presents the overarching framework for the strategies as shown in Figure 5-1. The goals and objectives are presented in more detail below with a specific focus on how these apply to the water services sector.

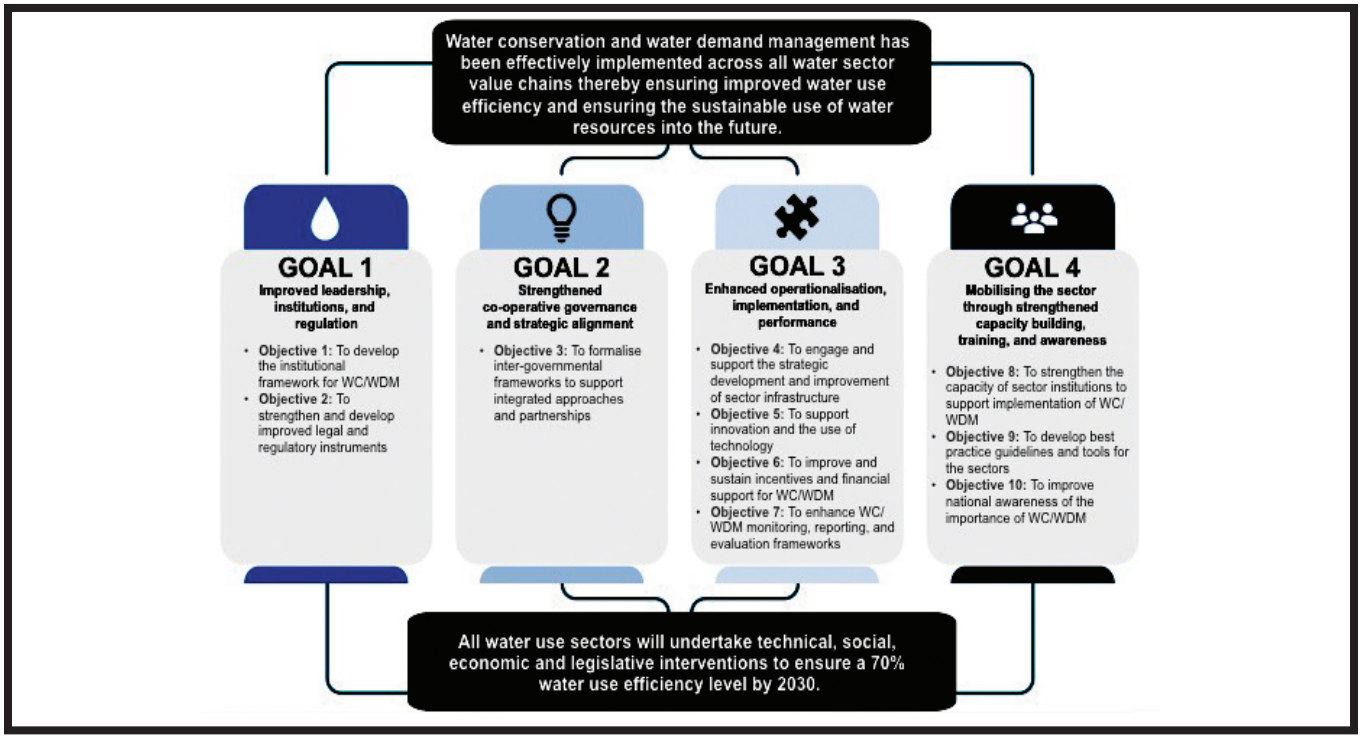

Figure 5-1: WC/WDM Strategy framework

GOAL 1: Improved leadership, institutions, and regulation

- **Objective 1: To develop the institutional framework for WC/WDM.** Improving the governance and institutional aspects of water resource management and development will provide for the foundation for operational response to WC/WDM strategies. The various sub-sectors have varying and complex institutional arrangements and there is a definite need to ensure that WC/WDM is mainstreamed into the business, planning and resourcing to ensure the implementation of actions. This will require in some instances that interventions to strengthen institutional capacity are required, this particularly the case regarding other sectoral institutions. From a water sector perspective, the institutional arrangements as set out in the NWA and national water policy have been in flux over a number of years. Clarifying the various institutional roles and responsibilities with regards to WC/WDM is important in ensuring effectiveness in the implementation of the various strategies. Ensuring that the necessary powers and duties are delegated to institutions is essential in enabling these institutions to take up these functions. Ensuring that these institutions have sufficient capacity, the appropriate skills as well as the necessary tools and systems will be imperative to support implementation. In addressing these institutional arrangements, it will be critical to also clarify the role of the DWS and ensure that it is equally capacitated.
- The effective implementation of WC/WDM in the water services sector will require the establishment of operational institutional frameworks in the DWS and municipalities. WC/WDM cuts across many departments and these frameworks will be responsible for leading and managing WC/WDM with clear key performance indicators. Municipalities also require guidelines for the establishment of effective institutional frameworks.
- **Objective 2: To strengthen and develop improved legal and regulatory instruments.** The law and supporting regulations codify policy and provides clear articulation of what is required to ensure WC/WDM is affected. The NWA does provide guidance in this regard, but it is important to strengthen both law and its supporting regulations from time to time based on improved knowledge and developments in practice. It is equally essential to review those legal instruments from other sectors to ensure that WC/WDM is effectively mainstreamed into these sectoral instruments. The review and amendment of these instruments can be lengthy and require significant engagements, however, this can have profound impact upon the water sector. It will be important to consider a range of approaches that look to incentivise behavioural changes rather than using purely "command and control" approaches, and these can be introduced in a phased and progressive manner. The role of the various water sector institutions in supporting and regulating will

need to be clarified and developed accordingly. Linked to Objective 1, as these instruments are developed it will be essential to ensure that institutions have the capacity and systems to perform these regulatory roles.

The No Drop Incentive Based Regularity tool was developed to measure and, more importantly, reveal performance with regard to the achievement of water use targets, water losses, non-revenue water and water use efficiency, which WSAs are obligated to comply with through legislation. The establishment of a unit within the Branch: Regulation, Compliance and Enforcement to champion the implementation of the programme and alignment with the Compliance, Monitoring and Enforcement Strategy is critical.

GOAL 2: Strengthened co-operative governance and strategic alignment

- **Objective 3: To formalise inter-governmental frameworks to support integrated approaches and partnerships.** There is recognition in the NWRS that the management of the national water resource requires the support of a range of public sector institutions and cannot only be the responsibility of the DWS. With the developmental imperative of the country being based upon scarce water and environmental resources, the ability to ensure sustainable and resilient growth will require an integrated approach. The linkages between water and other sectors are inextricable and this, therefore, requires cooperative government support horizontally between sector departments and vertically between the spheres of government. The nature of the approaches used to formalise these relationships will be variable, according to context and may include a number of aspects along the water sector value chain.

Key stakeholders in the water services sector include DWS, National Treasury, municipalities, Auditor-General of South Africa (AGSA), CoGTA, funding institutions and SALGA. These stakeholders must work together to enforce the implementation of WC/WDM. The newly established Water Partnerships Office at the Development Bank of Southern Africa (DBSA) will assist with project preparation, project/infrastructure finance, project structuring, financial modelling, bankable feasibility studies, risk management, transaction advisory services, project and programme management, Public-Private Partnerships (PPP), infrastructure development, and legal documentation.

GOAL 3: Enhanced operationalisation, implementation, and performance

- **Objective 4: To engage and support the strategic development and improvement of sector infrastructure.** There are a range of infrastructural solutions that will need to be considered in improving the approach to WC/WDM and that will result in improved WUE within sectors. Infrastructure takes time to plan, develop and finance and requires coordinated effort between sector partners. This process to unlock these solutions will need to start sooner, to realise impact later and will require engagements with key actors such as Municipal Infrastructure Support Agent (MISA), Infrastructure South Africa, DBSA amongst others. The role of the National Water Partnerships Office in supporting and facilitating these solutions is important and will act as a hub in pulling together these various partners.

Asset management programmes in municipalities are required to reduce physical losses and improve operations and maintenance. Municipalities must continuously upgrade, renew and replace assets to avoid a backlog. Key assets that must be maintained include bulk and consumer meters, control valves, pipelines and storage reservoirs. Municipalities must distinguish between mains replacement and connection replacement programmes. Often only the connection pipes need replacement which is more economical than mains replacement programmes.

- **Objective 5**: **To support innovation and the use of technology.** The research and development agenda plays a critical role in gathering knowledge and assimilating best practice and using this to drive innovation. There are a number of key actors in this space that, as a collective, will play a key role in assisting the country to develop game-changing approaches and technologies. Providing opportunities to share knowledge and build competencies will be critical to ensure uptake and replication of the new approaches and best practice.

There are a wide range of technologies available to reduce water losses and inefficiencies. These include data loggers, leak detection equipment, pressure control, smart meters, and water efficient devices for the home, business and industry. The capital and operational costs of technologies are generally expensive, and municipalities should consider the life cycle cost and affordability before implementation. Further research is required to find cost effective solutions for controlling the demand in rural areas. Consumers should be encouraged to install water efficient devices.

- **Objective 6: To improve and sustain incentives and financial support for WC/WDM.** Limited financial resources have been a challenge to the water sector for many years, and this has also been the case for WC/WDM. Putting in place a process to develop a financial investment framework that will support ongoing WC/WDM interventions will be imperative. This will need to consider the economic value of water and the implications on regional economies through cost-benefit analyses. It will be important to ensure that approaches

are financially sustainable, and projects need to be bankable. The development of diverse and innovative financing mechanisms as well as mechanisms to reduce financial risk will be important and the National Water Partnerships Office, working with various partners, can be valuable conduit for realising these approaches. WC/WDM incentives such as the WC/WDM sector awards and innovation recognition awards should be reinstated to encourage the adoption of WC/WDM initiatives.

The national fiscus is under pressure to support the health, infrastructure, security, and education needs of the country. Municipalities need to investigate alternative funding sources and implementation models to expedite the roll-out of WC/WDM programmes. Effective water metering and billing could potentially be the quickest source of income for municipalities to fund WC/WDM programmes. Conditionalities should be attached to existing funding programmes to enhance the outcomes and sustainability.

- **Objective 7: To enhance WC/WDM monitoring, reporting, and evaluation frameworks.** The ability to manage processes adaptively is underpinned by data and information, as well as regular reporting. This will require the support of differing government actors and the development of agreed-upon reporting protocols. These approaches need to be relatively easy and pragmatic in order to support regular reporting. Clarification of institutional roles and responsibilities will be imperative with regards to reporting, data collation and information management.

"To accurately measure is to know" and the monitoring of actual use against set targets should be promoted in municipalities. WSAs should increase their efforts to achieve the targets set under the various water reconciliation strategies to ensure water security. Greater efforts to meter or control the demand to curb losses on private properties are required, especially in low-income areas.

GOAL 4: Mobilising the sector through strengthened capacity building, training, and awareness

- **Objective 8: To strengthen the capacity of sector institutions to support implementation of WC/WDM.** The revised WC/WDM strategies will require staff with capacity and resources to manage and oversee the range of interventions outlined in the various strategies – this will include staff both within DWS and in the supporting sector institutions to understand how to translate these strategic actions into implementation. Typically, this staff would be required within the DWS, DWS Regional Offices and possibly CMAs. However, noting the importance of other sub-sector institutions and partners, it will be important to look at the needs more holistically. This undertaking would need to look at the various roles and responsibilities and then to develop the capacity needed within line functions to service these functional needs.

Continuous water balance and NRW training and capacity building are required to promote WC/WDM, improve data accuracy, standardise reporting, identify and implement cost-effective interventions (low hanging fruit), and to provide support for municipalities. The Energy and Water Sector Education Training Authority (EWSETA) should be involved in the development of accredited NRW Training Programmes to formalise qualifications required for the sector.

- **Objective 9: To develop best practice guidelines and tools for the sectors.** The DWS has over the years developed various guidelines, performance standards and benchmarking tools for WC/WDM within key sectors. Likewise, other sector focused institutions have also produced such tools. While there is a need to access these various materials and collate these into a broader WC/WDM toolkit, there will be the need to develop newer and up-to-date tools that consider the various innovative approaches that have been, and are being, developed.

Guidelines and tools developed by the WRC, DWS, and other organisations must be updated regularly. This should include Knowledge Sharing Platforms to standardise reporting formats. Guidelines, tools and water loss benchmark reports should be published and easily accessible to create awareness and monitor progress made with the implementation of WC/WDM in the water services sector.

- **Objective 10: Improve national awareness of the importance of WC/WDM.** The development and implementation of a national awareness campaign will be critical in supporting the drive to change behaviours and practices. This will require longer-term programming and the support of senior government actors. The development of supporting materials and knowledge products will be imperative, ensuring that these are accessible through knowledge sharing platforms.

All water consumers should be treated as customers. Customers can make the biggest difference by fixing leaks in the household, using water efficiently and paying for water services which will all contribute to a sustainable WSA. Customers can also hold the WSA accountable for physical and commercial loss reduction.

5.5 STRATEGIC ACTIONS

A summary of the Strategic Actions for the water services sector in response to the ten objectives are presented below:

Table 5-1: Water Services WC/WDM Strategic Goals, Objectives, and Actions

GOALS	OBJECTIVES	STRATEGIC ACTIONS		RESPONSIBLE*
GOAL 1 Improved leadership, institutions, and regulation	**Objective 1:** To develop the institutional framework for WC/WDM	1.1	Institutionalise Water Use Efficiency in Water and Sanitation Services Management	DWS, SALGA, COGTA, NT, AGSA, WSAs, Water Boards
		1.2	Develop a differentiated organogram for a WC/WDM Unit in a WSA	
		1.3	Include WC/WDM KPIs in municipal business plans and strategies, as well as performance agreements of municipal managers and municipal water services managers	
		1.4	Strengthen the alignment of WUE definitions and KPIs within the water services sector	
	Objective 2: To strengthen and develop improved legal and regulatory instruments	2.1	Establish WC/WDM regulation within the Branch: Policy, Regulation and Enforcement	DWS, COGTA, SALGA, NT, WRC, CSIR, SABS
		2.2	Enhance the regulatory tools and options that are available for DWS to support WC/WDM (Norms and Standards and the No drop Programme)	
		2.3	Continue implementation of the No Drop Programme	
		2.4	Develop a National Standard Operating Procedure for dealing with WSAs with high NRW	
GOAL 2 Strengthened co-operative governance and strategic alignment	**Objective 3:** To formalise inter-governmental frameworks to support integrated approaches and partnerships	3.1	Engage sector departments to discuss and agree on roles, responsibilities, funding models, and targets in implementing WC/WDM	DWS, COGTA, SALGA, NT, WRC, government departments, CMAs, private sector, civil society, grant administrators
		3.2	Create alignment of the institutional frameworks, WSA programmes and principles of the relevant government departments and stakeholders in support of WC/WDM	
		3.3	Design (e.g., develop ToR) and establish a national sector wide approach to coordinate the rollout of the WC/WDM Strategy (this could be a sub-committee of the WSLG)	
		3.4	Strengthen the NRW Programme under the DBSA	
GOAL 3 Enhanced operationalisation, implementation, and performance	**Objective 4:** To engage and support the strategic development and improvement of sector infrastructure	4.1	Utilise the DWS Asset Management Guideline and any other relevant tools to improve asset management in WSAs	DWS, WSAs, WSPs, MISA, COGTA

GOALS	OBJECTIVES	STRATEGIC ACTIONS	RESPONSIBLE*
	Objective 5: To support innovation and the use of technology	5.1 Promote the uptake and use of new and emerging technologies, water saving devices, and smart meters	DWS, COGTA, NT, WSAs, suppliers, WRC
	Objective 6: To improve and sustain incentives and financial support for WC/WDM	6.1 Ensure water tariffs are structured to promote efficient use of water 6.2 Introduce conditionalities linking municipal grants to NRW performance 6.3 Promote metering, billing, cost recovery, and revenue collection as the first source of funding for WC/WDM 6.4 Reinstate WC/WDM incentives, such as the WC/WDM Sector Awards, innovation recognition awards	DWS, WSAs, MWIG and RBIG administrator, COGTA, NT, SALGA
	Objective 7: To enhance WC/WDM monitoring, reporting, and evaluation frameworks	7.1 Promote and rollout support for developing accurate water balances and performance targets, and report on these targets on a regular basis 7.2 Encourage WSAs to increase their efforts to achieve the targets set under the water reconciliation strategies to ensure water security 7.3 Encourage WSAs to increase their efforts to meter or control demand to curb losses on private properties	DWS, WSAs, Water Boards, AGSA, NT, COGTA
GOAL 4 Mobilising the sector through strengthened capacity building, training, and awareness	**Objective 8:** To strengthen the capacity of sector institutions to support implementation of WC/WDM	8.1 Sustain the National NRW Training Program 8.2 Continue training WSAs on the development of the IWA Water Balance 8.3 Work with EWSETA to enable accreditation of the NRW Training Program	DWS, CMAs, Water Boards, private sector, EWSETA
	Objective 9: To develop best practice guidelines and tools for the sectors	9.1 Review and update the IWA Water Balance and No Drop Guidelines	DWS, WSAs, NT, AGSA
	Objective 10: Improve national awareness of the importance of WC/WDM	10.1 Develop a national behavioural change campaign designed to improve opinions and attitudes towards water use 10.2 Participate in Knowledge Sharing Platforms 10.3 Update and publish the water loss benchmark report to create awareness and monitor progress made with the implementation of WC/WDM in the water services sector	DWS, WSAs, WRC, higher education, schools, COGTA, SALGA

*The parties listed as responsible for these actions may not comprise an exhaustive list.

6 Implementation Considerations

6.1 MONITORING AND EVALUATION

Successful implementation of this strategy will be based on the ability of the state, particularly at the catchment level and local-levels, to implement a deliberate, systems-based, adaptive management approach. This approach must be inclusive, bringing together state, private sector and civil society players on a regular basis to review and adapt plans and actions. This adaptive management enables the refinement of strategies and plans and the refocusing of financial and human resource allocation once certain actions have been implemented or certain milestones achieved, when the expected results from implemented actions are not achieved or when new information becomes available that informs improved approaches.

The main focus of Monitoring and Evaluation (M&E) is on assessing the contributions of various actors and factors to a given activity outcome, with such factors including outputs, partnerships, policy advice and dialogue, advocacy, and coordination within the sector. The success of the WC/WDM strategy shall hinge on the effective monitoring of the implementation of the actions that emanate from this strategy. The DWS, as a custodian of this strategy shall put in place a results-monitoring framework that shall guide the implementation of this strategy. The monitoring framework shall among other things provide the actors within the sector with specific indicators and targets. As the strategy is being implemented, it will be crucial for the actors and the DWS within the sector to take stock of the gains or indeed losses that have been made over a given period through a structured evaluation process. This should be done through regular reporting on the set targets and indicators. Figure 6-1 below presents a typical M&E process from which the M&E framework can be developed.

The implementation plan should look to support this approach, supported by an effective monitoring and evaluation system. This system needs to be structured around a broader programmatic monitoring and evaluation that would include a reflection of impact upon water resources themselves. The DWS Head and Regional offices should be capacitated and equipped to support this M&E approach and plan. Support is discussed in more detail in the sections that follow.

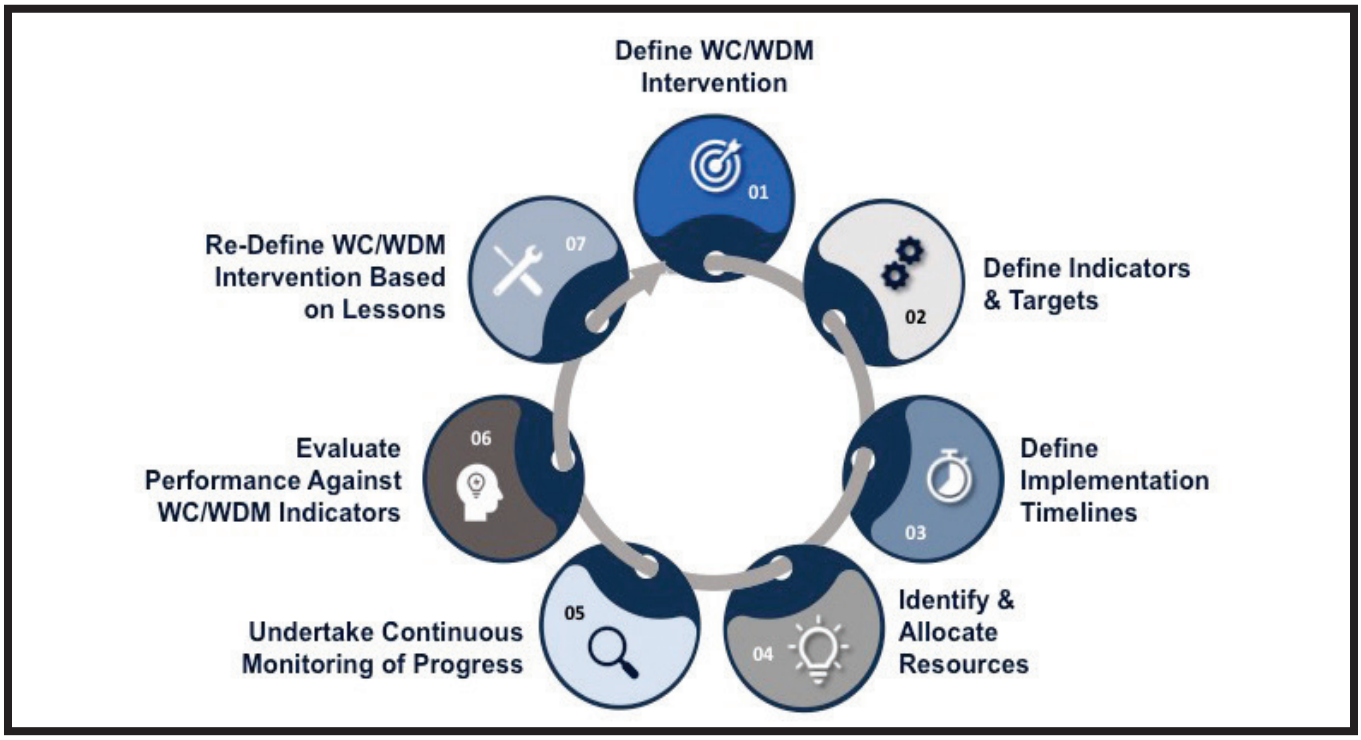

Figure 6-1: Monitoring and Evaluation Framework for Implementation

Regulatory role

The ND programme was developed to monitor and evaluate the performance of WSAs/WSPs. It follows a strategy of incremental and gradual improvement over time. This will allow the municipalities who are not on par with basic WC/WDM measures to come on board, whilst providing for the stronger players to prepare according to the full ND requirements. Increasingly comprehensive and stringent criteria are applied from cycle 1 onwards to facilitate an incremental and continuous improvement approach to water use efficient practices as illustrated in Table 6-1. Initially priority will be given to criteria which reflect a WSA's understanding of its current situation, strategy and planning and performance against compliance related criteria. In subsequent cycles, focus will fall on areas of proactive care such as strategy and planning and asset management. Scoring against the Compliance and Performance criterion remains as a substantial feature in the score weighting.

Table 6-1: No Drop progressive scoring regime

Criteria	Description	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
1	WDM strategy and planning	30	20	20	20	20
2	Asset management	10	10	15	20	20
3	Technical skills	10	10	5	5	5
4	Credibility	15	15	10	10	10
5	Compliance and performance	35	35	35	30	30
6	Local regulation	0	0	5	5	5
7	Customer care	0	10	10	10	10
Bonus		(17%)	(17%)	(17%)	(17%)	(17%)
Qualifiers		None	none	(100%)	(100%)	(100%)
TOTAL		**100**	**100**	**100**	**100**	**100**

The multi-year scoring projection is subject to change. Due to the scope and depth of the audits, and the significance of its findings, water service institutions generally require time between audits to react on the findings. Similarly, the Regulator needs time to analyse its findings and to implement corrective measures which need to find traction before the next round of audits can present a meaningful indication of the sector's response to the newly implemented initiatives. Both the Blue Drop and Green Drop programme have therefore adopted a two-year cycle between audits with the intent that the sector uses the time to work toward continued improvement.

To measure the performance between cycles, the Regulator wants to introduce a Progress Assessment Tool (PAT) which is run annually in order to continuously measure progress in the water sector. The PAT sets out to measure risk levels in the sector in a consistent and objective manner and allows for the trending of sector movement on a year-to-year basis. The trending data further informs water service institutions and the Regulator regarding the need for certain short- and long-term interventions.

To guide the implementation of the sub-sector strategies, implementation plans have been developed for each and provides for interventions that will require the active engagement and participation of multiple national and provincial government departments, municipalities, the private sector and civil society. Due to the complexity of this, and the fact that it is essential that nothing gets left behind, an effective M&E system is required. This system needs to be structured around a broader programmatic M&E that would include a reflection of impact upon water resources themselves. The DWS Head and Regional offices should be capacitated and equipped to support this M&E approach and plan. This M&E system will be progressively developed and support could include the following:

- Co-ordinate forums that will track the planning and implementation of WC/WDM in the Region.
- Collect and collate data and information.
- Analyse data and compile reports to report on the progress made with the implementation of WC/WDM in the water services sector.
- Provide or arrange training on the various aspects of WC/WDM including the water balance calculation, metering, sectorisation, pressure management, funding, auditing, ND, leak detection, etc.

- Advise on the development of a WC/WDM strategy and business plan.
- Influence the allocations of funds for WSIG, RBIG, etc., based on informed decision making.
- Continuously monitor and evaluate the performance of the WSA and assist to improve ND performance.
- Set clear targets in conjunction with WSA.

WC/WDM staff in the Head and Regional offices should be suitably qualified and skilled to perform ND audits on a biannual basis.

6.2 SECTOR WIDE-APPROACH

Sector wide approaches or SWAP are widely regarded as good or best practice when it comes to coordinating major national initiatives or drives. As the name implies, their focus is sector wide however one can apply the same philosophy to a narrower initiative such as WC/WDM. The strength of SWAPs lies in the ability to address aspects such as the following:

- High levels of complexity.
- The need to align a multitude of government institutions and hence the need for strong cooperative governance.
- The need to involve a multitude of other institutions and partners such as the private sector, civil society and International Cooperating Partners (ICPs).
- A requirement for high levels of communication in order to enhance alignment and cooperation.
- Initiatives involving a wide range of strategies, actions and projects.

The typical design of effective SWAPs includes elements such as the following:

- A sound strategy or master plan that guides implementation.
- A big emphasis on collaborative structures, involving all of the key stakeholders.
- Active participation of decision makers on the structures.
- A commitment to high levels of communication, discussion and consensus decision making.
- A strong technical secretariat that supports and facilitates the workings of the various collaborative structures.
- Strong outreach processes.
- A commitment to knowledge sharing and management to facilitate adaptive management.
- A strong emphasis on action orientation to ensure that the structures remain vital and energised.
- Strong M&E processes to support implementation and also contribute to adaptive management.
- Dedicated resources (budgets) to ensure rollout.

As is noted above, the need for an effective collaborative structure(s) is key. This is a critical enabler for SWAP. This may require the adaptation of existing structures, as opposed to the creation of new structures. An example of this could be the Water Sector Leadership Group (WSLG). This was originally established as a SWAP mechanism under the Masibambane initiative and was very effective for many years. It has fallen into disuse in recent years however it is understood that DWS are keen to revive it. A sub-committee or task team of the WSSLG could potentially be established that is dedicated to driving WC/WDM.

It is important also to emphasise that the SWAP mechanism(s) at national level will have to be mirrored at the provincial level if the WC/WDM strategy is to be implemented effectively. South Africa is far too big and complex to expect that national mechanisms alone will be successful. Again, the same principles apply with respect to the scope, modus operandi and the potential to utilise existing collaborative structures at the provincial level.

In conclusion on this aspect, it is worth emphasising again that WC/WDM for water services in South Africa is a complex undertaking, involving a multitude of players. In many respects therefore SWAP, or something similar is almost compulsory if there is to be a reasonable chance of success. It will also require strong, participative and mature leadership that is able to galvanise the support of a wide range of players.

6.3 ENABLING FACTORS

The National Water Act (Act 36 of 1998) recognises the pivotal role that WC/WDM plays in water resource management with the objective of reconciling water supply and demand. An enabling environment is required to implement WC/WDM strategies and legislation. Although local government is ultimately responsible for implementing WC/WDM in the water services sector, other government departments, institutions and citizens all have an important role to play by influencing, through co-operative governance, and implementing WC/WDM in all spheres of government and at home. The following aspects are critical to create an enabling environment.

Factor	Background	Action
Political will and leadership	Whilst WC/WDM appears in all national strategic instruments, it falls short in its implementation. This is not an activity that sits solely under DWS, but it a country-wide imperative.	There is a need for strong political will and support to facilitate implementation of this strategy. There should be a high-level champion for WC/WDM in the sector (e.g., Deputy Director-General or above) whose voice should lead the sector's efforts and direction at a higher level. Create awareness and water use efficiency in Government. Government institutions must lead by example and fix all visible leaks and internal plumbing leaks with 48 hours as stipulated in the Regulations.
Financing	A conducive environment is needed to attract funding for WC/WDM interventions, which is linked to the bankability of the municipality but also innovative financing mechanism and incentives.	Improved cooperative governance and SWAP provide opportunities for stakeholders and departments to pool their resources to fund WC/WDM interventions, in a more coordinated manner. Tapping into global climate financing mechanisms are also a potential way in which to fund a few the interventions required.
Institutionalisation	WC/WDM is included as a key strategic objective in the NDP, NWSMP, NWRS3, and the DWS Strategic Plan. WC/WDM is cross cutting in the Department of Water and Sanitation, let alone other Sector Departments like DMRE, DTIC, DARLRRD amongst others. It requires strong and focussed engagement with various other directorates and Ministries.	Elevate Directorate WUE to a Chief Directorate to give it the prominence it requires to make a meaningful impact. Establish defined champions in the regional offices that can plan and co-ordinate WC/WDM regionally. Encourage WC/WDM institutional ownership whereby sector-wide stakeholders bring in extra capacity and technologies to the lead institution in the implementation of the interventions.
Coordination	Lack of coordination can lead to fragmented WC/WDM efforts within the sector. The implementation of WC/WDM is complex and thus there is an important need for key lessons to be shared with the entire sector. There are 13 key government departments actively involved with various aspects of WC/WDM. The roles and responsibilities of each Department must be clearly defined, and Departments must work together to achieve National objectives.	Strengthen and clarify roles and responsibilities (team effort). Establish coordination meetings[1], with DWS taking the lead, to define roles and responsibilities, understand processes, procedures and programmes to avoid duplication and bureaucracy.

1 *It makes sense that these are closely linked with, or part of, the sector SWAP structures.*

Factor	Background	Action
Public support	There are 60 million water users in South Africa. A concerted effort by each water user to fix leaks and use water sparingly could significantly contribute to achieving the national target. Government has an obligation to supply water services to end users. End users have an equal obligation to conserve water and become responsible citizens.	In addition to the Sector WC/WDM, promote water use efficiency in the home, at work and in public spaces. This will require a major outreach programme to be designed using the latest behavioural science and professional marketing techniques.
Enforcement	Clause 82 (1) of The Water Services Act (Act No. 108, 1997) states no person may continue the wasteful use of water after being called upon to stop by the Minister, a Province or any water services authority. Any person who contravenes subsection (1) is guilty of an offence and liable, on conviction, to a fine or to imprisonment or to both such fine and imprisonment.	Government must enforce ALL legislation, Regulations and by-laws[2].
Monitoring and Reporting	Monitoring and reporting is currently very inconsistent in some areas, and piece-meal. Without consistent and up-to-date information, it becomes difficult to make any evidence-based decision making.	A consistent and coordinated monitoring and reporting framework for WC/WDM interventions is needed for the sector to measure its progress. Better quality information, together with widespread publication by the sector lead, will provide impetus for better accountability throughout the sector.
Clear targets and timelines	Water resource targets are included in the reconciliation and all town strategies. Very few WSAs have adopted and implemented these strategies. There is no national NRW target and many WSAs do not have targets.	Update the water resource reconciliation strategies and set clear NRW and water loss targets for various municipal categories.

2 Noting, once again, that good practice regulation strategies nearly always combine application of both "the carrot and the stick."

6.4 IMPLEMENTATION PLAN

The implementation plan for the water services sector is presented in Table 6-2. The implementation plan will be key to putting the strategy into action and achieving the WC/WDM target. The implementation plan should be a living document that the various stakeholders engage with and adapt to their needs in order to bring the actions to fruition. The plan also provides an indication of the responsible parties and those that can be enablers of the various actions. The lists of parties provided in these areas is not exhaustive, and additional parties may need to be included.

Table 6-2: Implementation Plan for the Water Service Sector

Strategic Action	Sub-activities	Priority	Deliverables	Timeframe (years)			Responsible	Enablers
				1-3	3-5	5+		
GOAL 1: Improved leadership, institutions, and regulation								
Objective 1: To develop the institutional framework for WC/WDM								
1.1 Institutionalise Water Use Efficiency in Water and Sanitation Services Management	1.1.1 Scope human resource requirements at DWS head office and within regions and recruit staff	High	Capacitated directorate				DWS	DWS DDG support
1.2 Develop a differentiated organogram for a WC/WDM Unit in a WSA	1.2.1 Develop a differentiated organogram guideline for WSA WC/WDM units to improve efficacy	Medium	Organogram guideline				DWS, COGTA	SALGA
	1.2.2 Assist with the enforcement of the minimum qualifications criteria for WSA department head and support staff	Medium	Capacitated WSAs and WSPs				DWS, COGTA	SALGA

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
1.3	Include WC/WDM KPIs in municipal business plans and strategies, as well as performance agreements of municipal managers and municipal water services managers	1.3.1	Agree approach, standardise KPIs and discuss implementation with key partners	High	KPIs adopted and included in performance agreements				DWS, SALGA, COGTA	DWS DDG support
		1.3.2	Include disincentives for WSA and or senior officials if targets are not achieved.	Medium	Self-regulation. Achieving target and improving service delivery				WSAs, COGTA	DWS
		1.3.3	Include WC/WDM in strategic planning tools such the Medium-Term Strategic Framework and DWS Strategic Plan. Hold executive accountable for achieving targets.	High	Inclusion of WC/WDM in key policy, monitoring and evaluation tools				DWS, COGTA	DWS DDG support
1.4	Strengthen the alignment of WUE definitions and KPIs within the water services sector	1.4.1	Review WUE definitions, KPIs and develop guideline. Set differentiated KPIs for urban & rural WSA categories	Medium	Revised WUE definitions and KPIs				DWS, WSAs	DWS DDG support
		1.4.2	Clarify and incorporate WUE definitions, terminology and KPIs used in other departments to get alignment.	High	Aligned WUE definitions and KPIs across technical, financial and audit departments				DWS, NT, AGSA, COGTA	DWS DDG support
		1.4.3	Incorporate revised definitions and KPIs in No Drop programme and provide training	Medium	Guideline on WUE definitions and KPIs, training programme				DWS, WSAs, Water Boards	DWS DDG support

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
Objective 2: To strengthen and develop improved legal and regulatory instruments										
2.1	Establish WC/WDM regulation within the Branch: Policy, Regulation and Enforcement	2.1.1	Scope human resource requirements to establish and implement WC/WDM regulation	High	Capacitated branch				DWS	DWS DG support
2.2	Enhance the regulatory tools and options that are available for DWS to support WC/WDM (Norms and Standards and the No Drop Programme)	2.2.1	Review and rethink the approach to Free Basic Water[3] by reviewing the current status, identifying problem areas, and developing and implementing a plan to address these	High	Status quo assessment, free basic water plan				DWS	DWS DDG support, NT support, WSA
		2.2.2	Increase regulatory directives and enforcement of drought conditions to promote performance.	High	Enforcement of policies, acts and regulations				DWS	DWS DDG support
		2.2.3	Continue with the development of the Water Efficiency Labelling & Standards (WELS) programme	Medium	Reduced water use and improved efficiencies				DWS, WRC, CSIR, SABS	WSA
		2.2.4	Ensure alignment with the CME strategy	Medium	Updated CME strategy				DWS, Regional Offices	Support from Regional Offices is critical

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
2.3	Continue implementation of the No Drop Programme	2.3.1	Clearly define responsibility within DWS to rollout No Drop and develop a structured plan	High	Rollout plan developed				DWS, COGTA, SALGA, NT	DWS DDG support
		2.3.2	Review efficacy of the No Drop, and other Drop programmes. Review and adjust programme to ensure WSAs remain focussed and motivated	Medium	Updated No Drop programme				DWS, COGTA, SALGA, NT	DWS DDG support
2.4	Develop a National Standard Operating Procedure for dealing with WSAs with high NRW	2.4.1	Develop and implement National Standard Operating Procedure for addressing high NRW in dysfunctional WSAs	High	Standard Operating Procedure				DWS, COGTA, SALGA	WSA
GOAL 2: Strengthened co-operative governance and strategic alignment										
Objective 3: To formalise inter-governmental frameworks to support integrated approaches and partnerships										
3.1	Engage sector departments to discuss and agree on roles, responsibilities, funding models, and targets in implementing WC/WDM	3.1.1	Meet with other departments to disseminate the WC/WDM strategy(ies)	High	Communication of strategy				DWS, COGTA, SALGA, NT, and others	DWS DDG support
		3.1.2	Establish inter-departmental working group to determine and define responsibilities	Medium	Working Group established				DWS, COGTA, SALGA, NT, and others	DWS DDG support
		3.1.3	Develop plan to clarify roles and processes and rollout	Medium	Plan developed and being rolled out effectively				DWS, COGTA, SALGA, NT, and others	DWS DDG support
		3.1.4	Improve and formalise communication channels with WSAs and senior management	Medium	Communication plan developed and being rolled out effectively				DWS, SALGA	COGTA

Strategic Action	Sub-activities	Priority	Deliverables	Timeframe (years)			Responsible	Enablers
				1-3	3-5	5+		
3.2 Create alignment of the institutional frameworks, WSA programmes and principles of the relevant government departments and stakeholders in support of WC/WDM	3.2.1 Review and align the institutional frameworks between DWS, COGTA, and SALGA	Medium	Review Report				DWS, WRC, government departments, CMAs	SWPN
	3.2.2. Align the WC/WDM interventions with the priorities of the DWS, COGTA, and SALGA	Medium	WC/WDM Interventions Alignment Report				DWS, WRC, government departments, CMAs	SWPN
	3.2.3 Review the Water & Sanitation Masterplan, NWRS3, NWSF 2020 to identify areas of alignment	Medium	Review Report				DWS, WRC, government departments, CMAs	SWPN
	3.2.4 Engage with DWS SDG6 Task Team	Medium	Engagement Report				DWS, WRC, government departments, CMAs	SWPN
3.3 Design (e.g., develop ToR) and establish a national sector wide approach to coordinate the rollout of the WC/WDM Strategy (this could be a subcommittee of the WSLG)	3.3.1 Develop terms of reference for the sector wide approach WC/WDM structure	Medium	ToR developed				DWS, COGTA, SALGA, NT and other departments, private sector, civil society	DWS DDG support
	3.3.2 Lobby with prospective members and also ideally position within Water Sector Leadership Group (WSLG)	Medium	Members agree to join structure				DWS, COGTA, SALGA, NT and other departments, private sector, civil society	DWS DDG support

Strategic Action	Sub-activities	Priority	Deliverables	Timeframe (years)			Responsible	Enablers
				1-3	3-5	5+		
	3.3.3 Establish the structure	Medium	Structure in place and meeting regularly				DWS, COGTA, SALGA, NT and other departments, private sector, civil society	DWS DDG support
3.4 Strengthen the NRW Programme under the DBSA	3.4.1 Design and implement a modality that can rollout, at scale, small to medium sized PPPs to address NRW in WSAs	High	Approach developed and implemented				DWS, NT, SALGA, COGTA	WSA
	3.4.2 Carry out a feasibility assessment for the establishment of a mechanism (loan fund) to support viable NRW reduction projects	High	Feasibility assessment				DBSA, NT, COGTA, SALGA	DWS DDG support
	3.4.3 Promote existing and alternative sources of funding to implement WC/WDM, including: DoRA, WSIG, RBIG, stewardship and PBC projects	High	Increased implementation of effective WC/WDM projects				DWS, grant administrators, COGTA, NT	DWS DDG support
GOAL 3: Enhanced operationalisation, implementation, and performance								
Objective 4: To engage and support the strategic development and improvement of sector infrastructure								
4.1 Utilise the DWS Asset Management Guideline and any other relevant tools to improve asset management in WSAs	4.1.1 Obtain accurate system input volume information for planning and monitoring purposes by embarking on a national water treatment metering programme ensuring that all WTWs and WWTWs are metered and monitored	Medium	Accurate system input volume and return flows of all WTW and WWTW				DWS, WSAs, WSPs, MISA	MISA, COGTA, SALGA
	4.1.2 Support continuous upgrade and renewal of water and sanitation infrastructure to reduce water losses.	Medium	Upgraded water infrastructure				WSAs, COGTA, DWS	MISA

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
Objective 5: To support innovation and the use of technology										
5.1	Promote the uptake and use of new and emerging technologies, water saving devices, and smart meters	5.1.1	Promote and rollout the use of household and commercial water saving devices for water sanitation infrastructure	Medium	Increased water use efficiency				DWS, COGTA, NT	DWS DDG support
		5.1.2	Promote continuous monitoring of water supply systems to reduce water losses and response times	Medium	Improved understanding and reduced response times to water losses				WSAs, suppliers	WRC
		5.1.3	Promote the development of a cost-effective water metering and or control device	Medium	Cost effective metering and or control of authorised consumption				DWS, WRC, suppliers	WSA
		5.1.4	Promote the development of waterless sanitation technologies, reuse and rainwater harvesting	Medium	Reduced water use and pressures on sanitation services				DWS, WRC, suppliers	WSA
Objective 6: To improve and sustain incentives and financial support for WC/WDM										
6.1	Ensure water tariffs are structured to promote efficient use of water	6.1.1	Review water tariff practices of WSAs throughout the country to ensure tariffs remain affordable for basic needs and discourage waste and inefficiency use.	Medium	Review of current practice completed				DWS, WSAs	NT
		6.1.2	Develop a guideline on best practice (if it does not exist already)	Medium	Guideline developed				DWS, WSAs	NT
		6.1.3	Promote the rollout of the guideline (and regulate, where appropriate)	Medium	Guideline being effectively implemented				DWS, WSAs	NT
		6.1.4	Revise regulations on municipal water tariffs, ensuring compliance with Norms and Standards, and introduce a surcharge for high levels of use	Medium	Revised and compliant water services tariffs				DWS, WSAs	NT
		6.1.5	Implement sustainable water tariffs that encourage efficient use through user pay principles, drought tariffs and surcharges.	Medium	Water tariffs that promote water use efficiency				DWS, WSAs	NT

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
6.2	Introduce conditionalities linking municipal grants to NRW performance	6.2.1	Develop approach/policy within DWS regarding conditionalities associated with funds like MWIG and RBIG (promote self-regulation)	High	Policy developed and implemented				DWS, MWIG and RBIG administrator	DWS DDG support
		6.2.2	Discuss possible conditionalities related to water projects funded with CoGTA and NT	Medium	Conditionalities applied				DWS, NT, COGTA	DWS DDG support
6.3	Promote metering, billing, cost recovery, and revenue collection as the first source of funding for WC/WDM	6.3.1	Promote funding of WC/WDM programmes through the improvement of metering, billing and cost recovery	Medium	Increased revenue, sustainable WSAs, and funding for WC/WDM programmes				DWS, COGTA, NT, SALGA	DWS DDG support
6.4	Reinstate WC/WDM incentives, such as the WC/WDM Sector Awards, innovation recognition awards	6.4.1	Develop incentives programme	Medium	Incentives programme				DWS, COGTA	Sector bodies, requires DWS high-level support
		6.4.2	Host awards ceremony to recognise leaders in the implementation of WC/WDM	Medium	Awards ceremony				DWS, COGTA	Sector bodies, requires DWS high-level support

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
Objective 7: To enhance WC/WDM monitoring, reporting, and evaluation frameworks										
7.1	Promote and rollout support for developing accurate water balances and performance targets, and report on these targets on a regular basis	7.1.1	Develop training materials and guidelines related to accurate water balances and reporting on targets	High	Training materials and guidelines				DWS, WSAs, Water Boards	
		7.1.2	Encourage regular reporting of performance targets and publish annual reports	High	Annual reports				DWS, AGSA, NT	WSAs
		7.1.3	Develop and implement a standard approach to water balance calculations and database clean up that can be widely promoted	High	Approach and standards developed				DWS, WSAs, NT, AGSA	COGTA
7.2	Encourage WSAs to increase their efforts to achieve the targets set under the water reconciliation strategies to ensure water security	7.2.1	Update and maintain the water resource reconciliation strategies and develop targets and timelines for implementation	Medium	Updated strategies				DWS, Water Boards	WSA
		7.2.2	Enforce water use licences and results from reconciliation studies	Medium	Penalties for users that exceed allocations				DWS, Water Boards	WSA
		7.2.3	Cascade water use licences down to secondary users (from Water Boards to WSAs)	Medium	Penalties for users that exceed allocations				DWS, Water Boards	WSA
7.3	Encourage WSAs to increase their efforts to meter or control demand to curb losses on private properties	7.3.1	WSAs must measure or control water use in accordance with R.509. clause 13	High	Reduced water losses on private properties				DWS, WSAs, COGTA	Water users

Strategic Action	Sub-activities	Priority	Deliverables	Timeframe (years)			Responsible	Enablers
				1-3	3-5	5+		
GOAL 4: Mobilising the sector through strengthened capacity building, training, and awareness								
Objective 8: To strengthen the capacity of sector institutions to support implementation of WC/WDM								
8.1 Sustain the National NRW Training Program	8.1.1 Train and capacitate the DWS, CMAs and Water Boards to fulfil a support and regulatory role	High	Implementation of capacity building plan				DWS, CMAs, Water Boards	DWS DDG support
8.2 Continue training WSAs on the development of the IWA Water Balance	8.2.1 Continue implementing IWA Water Balance training	Medium	Implementation of training				DWS, private sector, EWSETA	WSA
8.3 Work with EWSETA to enable accreditation of the NRW Training Program	8.3.1 Continue developing accredited NRW training programmes	Medium	Accredited NRW Training Program				DWS, EWSETA	Private sector
Objective 9: To develop best practice guidelines and tools for the sectors								
9.1 Review and update the IWA Water Balance and No Drop Guidelines	9.1.1 Review and update guidelines	Medium	Revised guidelines				DWS, WSAs, NT, AGSA	CoGTA
Objective 10: Improve national awareness of the importance of WC/WDM								
10.1 Develop a national behavioural change campaign designed to improve opinions and attitudes towards water use	10.1.1 Develop and implement a national behavioural change campaign to improve opinions and attitudes towards water use	High	Campaign				DWS	COGTA, SALGA, water users

Strategic Action		Sub-activities		Priority	Deliverables	Timeframe (years)			Responsible	Enablers
						1-3	3-5	5+		
10.2	Participate in Knowledge Sharing Platforms	10.2.1	Continue to engage and participate in Knowledge Sharing Platforms and Conferences	Medium	Participation in platforms and conferences				DWS, WSAs	IWA, WISA, IMIESA
		10.2.2	Promote dissemination of guidelines, papers, lessons, etc. through courses, schools, conferences, WRC, training institutions, etc.	Medium	Knowledge sharing and capacitated sector				WRC, higher education, schools	DWS
		10.2.3	Communicate and workshop best practice and use of appropriate technologies with WSAs.	Medium	Knowledge sharing and eliminate fruitless expenditure. Use of appropriate technologies				DWS, WSA	WRC, SANS, CSIR
10.3	Update and publish the water loss benchmark 'report to create awareness and monitor progress made with the implementation of WC/WDM in the water services sector	10.3.1	Update and publish the water loss benchmark report to create awareness and monitor progress made with the implementation of WC/WDM	High	Water loss benchmark report				DWS, COGTA, SALGA	DWS DDG support, water users

7 Conclusions

There is an uneven distribution of water resources across South Africa, with parts of the country having more abundant water resources than others. However, many of the country's key economic areas are not necessarily located close to these water resources. As a result, the country has developed a significant number of dams and bulk water transfer schemes to ensure that water reaches these hubs. Nevertheless, the growth and development trajectory for South Africa will place increasing pressures on these limited supplies, to the extent that there will be a projected 17% deficit by 2030 (DWS, 2018). Climate change will also have significant impacts upon this. There is increasing realisation that infrastructural options for water resource development are declining and hence, WC/WDM interventions that will aim to reduce water demands and improve water use efficiency will become increasingly imperative if we are to avoid water constraining the developmental agenda.

While there are a range of strategic interventions that the DWS must lead and undertake, it is important to understand that this will require the combined efforts of all sectors of government, of the private sector and business as well as civil society and all South Africans. It is imperative that as a nation there is a change in the relationship that we all have with water and that we recognise that this scarce natural resource requires the active control, management, conservation, protection, use and development by each and every citizen.

To strengthen the approach to WC/WDM the DWS has led the development of a National Water Conservation and Water Demand Management Strategy and this provides the framework for sub-sector strategies for Agriculture, for Industry, Mining and Power, and for Water Services. Each of these sub-sector strategies provides an implementation plan that guides the array of interventions needed to give effect to these sub-sector strategies. This will require the active support and participation of all key sub-sector partners and stakeholders, as emphasised above. Each sub-sector is inherently complex and as such there is a need for considerable innovation and the development of bespoke approaches to ensure the minimum target of 70% water use efficiency is reached. However, the expectation is that all sub-sectors should strive for continual improvements. These implementation plans have outlined priority interventions and have indicated some of the key stakeholders that are important to support these, however, it is not possible for that to be a fully comprehensive list of actors. These interventions will require all stakeholders to "put up their hands" and step forward to engage with these interventions.

To this end, the DWS as water sector lead, will continue to provide the guidance and support required to unlock processes and facilitate successful outcomes, as well as put in place the tools and systems to enable adaptive management approaches towards achieving the goals and strategic objectives that these strategies outline.

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Annexure A

The Municipal Infrastructure Investment Framework (MIIF) categorise municipalities as shown in Table 8-1.

Table 8-1: Municipal Infrastructure Investment Framework (MIIF) municipality categories

Category	Number	Short description	Long Description	% of SIV	% of Population
A	8	Metros	Metropolitan municipalities	52.2%	46.7%
B1	19	Secondary cities	Local municipalities with the largest budgets	17.0%	15.8%
B2	27	Large cities	Local municipalities with a large town as core	4.3%	4.7%
B3	110	Small towns	Local municipalities with a small population and a significant proportion of urban population but with no large town as core	6.6%	8.5%
B4	70	Mostly rural	Local municipalities which are rural with, at most, one or two small towns in their area	2.6%	3.8%
C1	23	Districts without WSA status	District municipalities which are not WSAs	-	-
C2	21	Districts with WSA status	District municipalities which are WSAs	17.3%	20.5%
Total				**100.0%**	**100.0%**

Using the MIIF, municipalities were split into three categories for prioritisation of WC/WDM as shown in Table 8-2.

Table 8-2: WC/WDM priorities for municipal categories

Category	Description	Requirements
First level (Highest priority) ±44 Municipalities ±65% of population ±70%% of SIV	• Mainly category A, B1 and B2 municipalities with a large or small town as core, • Within areas of economic significance • Municipalities with largest budgets, high capacity and low vulnerability • Municipalities included in recon studies. • Water resources under pressure	Fully conversant with the ND score card
Second level (Medium priority)	• Category A, B1 and B2 municipalities excluded from the first level, • Capable category B3, B4 and C2 municipalities • Within areas of economic significance • Municipality with medium capacity and some vulnerability	Strive towards the implementation of a comprehensive WC/WDM programme which complies with Regulations R509 and will assist with achieving national and regional WDM targets.
Third level (Lowest priority)	• Mainly category B3 and B4 municipalities • Outside areas of economic significance • Municipalities with low capacity and high vulnerability	Implement basic WC/WDM measures to ensure compliance with Regulations R509. The main objective would be to obtain management information to gain an understanding of the problem.

NOTES

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