STRATEGIC PLAN

For the 2023/24 to 2027/28 Planning Cycle

WATER
RESEARCH
COMMISSION

VISION

To have highly informed water decision-making through science and technology at all levels, in all stakeholder groups, and innovative water and sanitation solutions through research and development for South Africa, Africa and the world.

MISSION

To be a global water knowledge node and South Africa's premier water knowledge hub active across the innovation value chain that:

- informs policy and decision making
- creates new products, innovation and services for socio-economic development
- develops human capital in the water and sanitation science sector
- empowers communities and reduces poverty
- supports the national transformation and redress project
- develops sustainable solutions and deepens water and sanitation research and development in South Africa, Africa and the developing world

VALUES

- A culture of learning and sharing
- Innovation and creativity
- Integrity and fairness
- A spirit of professionalism and service orientation
- Facilitating empowerment and social change
- Good governance

OFFICIAL SIGN-OFF

It is hereby certified that this Strategic Plan:

1. Was developed by management and the Board of the Water Research Commission under the guidance of Mr S Mchunu MP, the Minister of Water and Sanitation
2. Takes into account all relevant policies, legislation and other mandates for which the Water Research Commission is responsible
3. Accurately reflects the impact and outcomes which the Water Research Commission will endeavour to achieve over the period 2023/24 to 2027/28

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Dr S Liphadzi
Group Executive: Research, Development and Innovation

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Dr M Msibi
Group Executive: Knowledge and Impact

_____
Ms R Lutchman
Group Executive: Corporate Services

_____
Mr F Ismail (CA)SA
Chief Financial Officer

_____
Dr JB Molwantwa
Chief Executive Officer

_____
Dr N Mjoli
Chairperson of the Governing Board

Approved by:

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Mr S Mchunu MP
Minister of Water and Sanitation

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LIST OF **ACRONYMS**

Agenda 2063	African Union, Agenda 2063
4IR	Fourth Industrial Revolution
AI	Artificial intelligence
CBOs	Community-based organizations
DSI	Department of Science and Innovation
DWS	Department of Water and Sanitation
ERRP	Economic Reconstruction and Recovery Plan
GDP	Gross domestic product
GERD	Gross domestic expenditure on research & development
HCD	Human capital development
HEIs	Higher education institutions
HLPW	High Level Panel on Water
ICT	Information and communication technology
IWRM	Integrated water resource management
MTSF:2024	Medium-Term Strategic Framework: 2019–2024
NDP	National Development Plan, 2030
NRF	National Research Foundation
NSI	National System of Innovation
NW&SM	National Water and Sanitation Masterplan
NWA	National Water Act, 1998 (Act 36 of 1998)
NWRS3	National Water Resource Strategy 3
PC4IR	Presidential Commission on the Fourth Industrial Revolution
PFMA	Public Finance Management Act, 1998 (Act 1 of 1998)
RDI	Research, development and innovation
SDG	Sustainable Development Goals
SMME	Small, medium and micro enterprise
Wader	Water Technologies Demonstration Programme
WMI	Water management institutions
WRC	Water Research Commission
WRL	Water Research Levy
WSA	Water Services Act, 1997 (Act 108 of 1997)
WSDP	Water services development plan

FOREWORD

BY THE MINISTER OF WATER AND SANITATION

Water and sanitation are necessary for human dignity and economic growth; water also connects public health, food security, liveable cities, energy, and environmental wellbeing into a water–energy–food nexus. Pressure on water is rising due to growing populations, water-intensive patterns of growth, increased rainfall variability and pollution – thus water is a risk to sustainable development. The consequences of such a risk are local, transboundary and global, culminating in huge social and economic costs. The strategy 2028 of the Water Research Commission (WRC) takes such developments into account and provides an opportunity to strategically reimagine the position of the WRC in its response.

The strategy 2028 of the WRC is premised on its desire to contribute towards improved water security through research, development and innovation. The WRC thus intends to advance its wider contribution in the strategic use of water to foster economic development in advancement of national aspirations to reduce poverty, unemployment, and inequalities.

The outcomes of the research process always take time to occur, although when they occur, they are always novel and unpredictable. The Commission will therefore continue to enable research in alignment with priorities reflected primarily in the National Development Plan: Vision 2030, the Medium-Term Strategic Framework: 2020 to 2024, and in several policies, white papers and strategies. Internationally, the strategy is aligned, among others, to the African Union: Vision 2063 enabling the WRC to be an acclaimed water research institution in the continent and globally.

Nationally, the WRC is a vital component of the research enterprise and has a unique position of being the only research institution mandated to advance water-related research. The mandate of the WRC is complementary to that of other public entities and the Department of Water and Sanitation. Partnerships, collaboration and overall stakeholder engagement therefore underpin an operational model of the WRC to be a critical player within the research enterprise. The research enterprise has three elements: research funding, research capacity and research performance, with research funding and capacity being the fundamental enablers, when research performance refers to processes, outcomes and impact of knowledge production. The WRC has over the past five decades been involved in investment in water research and development, including human capacity development and enhancement of knowledge expertise in the water research area. The impact of knowledge production in water security, including adaptation and resilience to climate change will be one of the key focus areas in this strategy cycle.

South Africa has made significant progress in meeting the Sustainable Development Goals in terms of water and sanitation services provision; more than 70% of people now have access to water and sanitation services. Besides this significant achievement, there are still people that should be reached. According to studies concluded by the United Nations in 2018, globally, 2 billion people lacked water services that met the Sustainable Development Goals standards, and 159 million people were compelled to drink untreated water

from surface sources. South Africa is not an exception to this global challenge as there are people that must still be reached in terms of service provision. Besides the service delivery challenges, there is a shortage of technical skills in water and insufficient infrastructure capacity. The WRC will continue to provide technical input on policy and governance for creation of a conducive institutional environment and programmes that should be put in place to prioritise outcomes for inclusive access to services, especially for the previously disadvantaged and the vulnerable.

A healthy natural environment is critical to store and filter water, thus improving water quality and quantity. Many crises have their root causes in environmental degradation and other factors such as pollution, which reduce the capacity of the environment to sustain life. The severity of economic losses from environmental degradation and pollution are also high. Advancement of research into nature-based solutions may address water challenges if planned in harmony with the built infrastructure for improved water security.

Mr S Mchunu MP
Minister of Water and Sanitation

FOREWORD

BY THE CHAIRPERSON OF THE GOVERNING BOARD

The Water Research Commission has been at the cutting edge of water and sanitation research in South Africa for the past five decades and has also remained resilient in carrying out its legislative mandate. It is envisaged that its research approaches will continue to evolve due to the impacts of its internal and external operating contexts and this strategic plan, provides an opportunity for the Commission to reflect and reimagine the future as a response. The impact and outcomes approach was adopted in preparation of this strategic plan which will enable integration of information, data, techniques, concepts and theories to obtain a fundamental understanding to vexing socio-economic challenges. Those vexing challenges will be addressed in an integrative manner to generate long term solutions that will result in a positive societal impact.

Society in general needs to understand the quantity, quality, distribution, use and risks associated with the water they require, so that investments can be made in data- and water-related systems. These investments will enable society to be educated on the value of water in all its dimensions – social, cultural, economic and environmental. In this way, society will be motivated to reduce water wastage and pollution so that water services can be more sustainable. Communities should be able to engage with water-related science, thus making science communication and communities engagement with science an important element of this strategy.

Water governance is also a serious imperative as a mechanism to effectively manage water among an array of stakeholders, ranging from communities to business, so that they can take responsibility for water resources. The Commission will thus in this strategic planning cycle embark on several initiatives to capacitate the water user. Initiatives will also be carried out to strengthen water governance and reduce water related risks through stakeholder engagement for inclusive and sustainable management of water throughout the entire value chain.

The Fourth Industrial Revolution in the water and sanitation sector, artificial intelligence and fast advances in high-resolution remote sensing are contributing to the proliferation of big data in the water sector and are likely transforming traditional decision-making strategies. Big data analytics together with AI are set to bring new opportunities and challenges to the water sector which may have policy and labour outcomes. In addition to this, machine learning, whose potential is yet untapped, can combine with other technologies to drive innovation in the water and sanitation sector in unbelievable ways. The most recent radical innovations have not come from linear improvements within a single subject or expertise but from a combination of distinct disciplines. Driving innovation in the water and sanitation sectors will create breakthroughs in service delivery models, data collection, water use efficiency and application of new technologies.

Globally, countries have been shown to be unprepared for water-related disasters which amount to the majority of devastating disasters over the past few decades. Water-related disasters often leave a legacy of damage

that affects economies in an adverse manner. South Africa has in 2022 experienced a massive water-related natural disaster in the KwaZulu-Natal Province, through floods exacerbated by climate change. What can be understood with these disasters is that financing for disaster management is often geared towards response and rehabilitation instead of prevention and preparedness. This WRC strategy provides initiatives that are intended towards climate change resilience and adaptation programmes as a foundation towards sustainable societies and livelihoods. With increased adaptation and resilience, economic growth will also be stimulated and, in this way, the Commission will be realising its desired impact, contributing towards reduction of unemployment, poverty and inequality.

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Dr N Mjoli
Chairperson of the Governing Board

PART A

OUR MANDATE

1 LEGISLATIVE AND POLICY MANDATES

1.1 LEGISLATIVE MANDATES

The legislative environment, policies and frameworks of Government, which among others provide developmental priorities for the country and the water sector in particular are a strategic impetus for the WRC. Key legislation and policy mandates relevant to the functioning and delivery of the WRC mandate are as follows:

1.1.1 Constitutional mandate

The Constitution of the Republic of South Africa, 1996, as amended, encompasses the Bill of Rights which is a cornerstone of democracy and enshrines the rights of all people, including affirmation of democratic values of dignity, equality and freedom. The WRC, therefore, aligns with the following Constitutional imperatives:

- Everyone has the right to an environment that is not harmful to their health
- Everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation; and secure ecologically sustainable development and use of national resources while promoting justifiable economic and social development
- Everyone has the right to (access) sufficient food and water (Section 27(1b))

The Constitution further provides a foundation to effect the Individual rights of academic freedom and freedom of scientific research which also aligns to the WRC mandate.

1.1.2 Water Research Act (Act 34 of 1971)

The primary aim of the Water Research Act, 1971 (Act 34 of 1971) is to provide for the promotion of research in connection with water affairs. The objective of the WRC is provided as being to co-ordinate, to promote, to encourage or to cause to be undertaken as determined by the Minister research in respect of occurrence, preservation, conservation, utilisation, control, supply distribution, purification, pollution or reclamation of water supplies and water. Further, the objective of the WRC includes research on the use of water for agricultural, industrial or urban purposes.

The Water Research Act further stipulates the functions of the WRC to perform water research in collaboration with other research institutions, and to take any other such measures as the WRC considers conducive to attainment of its objectives.

1.1.3 Public Finance Management Act (Act 1 of 1999)

The Public Finance Management Act (Act 1 of 1999) (PFMA) regulates financial management in the national government and provincial governments to ensure that all revenue, expenditure, assets and liabilities of those governments are managed efficiently and effectively; to provide for the responsibilities of persons entrusted with financial management in those governments; and to provide for matters connected therewith. The WRC is listed in Schedule 3: Part A as a National Public Entity and the provisions of the PFMA and its Treasury Regulations apply to its operations.

1.1.4 National Water Act (Act 36 of 1998)

The objective of the National Water Act (Act 36 of 1998) (NWA) is to ensure that South Africa's water resources are protected, used, developed, conserved, managed, and controlled in a sustainable and equitable manner for the benefit of all persons. The NWA also provides for the pricing strategy for water use charges, the primary mechanism for the calculation of a charge, payable by some or all raw water users, that is set for research purposes. The role of the WRC is to align its funding priorities with those key national water challenges articulated in the NWA, and to help solve water-related problems which are critical to South Africa's sustainable development and economic growth.

1.1.5 Water Services Act (Act 108 of 1997)

The Water Services Act (Act 108 of 1997) (WSA) provides for the right of access to basic water supply and basic sanitation by setting national standards and

norms. Section 156, read in conjunction with Part B of Schedule 4 of the Constitution of the Republic of South Africa, vests in the Executive Authority the responsibility to support and strengthen the capacity of municipalities to manage their own affairs, to exercise their powers and to perform their functions. Applicability of the WSA to the WRC rests in the WRC's duty to respond through research and development to water supply and sanitation needs with research and development that helps to address those needs.

1.1.6 Water Research Amendment Bill

Evolution of governance structures will address how the current and future water knowledge gaps and how they are currently prioritised in the South African context are structured. The Water Research Amendment Bill, 2013, seeks to enable that through:

- Amendment of the WRA so as to insert certain definitions and substitute others
- Effecting certain textual improvements and name changes
- Regulating the governance of the Water Research Council (Water Research Commission in the current Act)
- Aligning the Act with applicable legislation, such as the NWA, WSA and PFMA

The new clauses in the Amendment Bill do not signify a fundamental change in the current legislation. The WRC will thus embark on engagements with the DWS on this matter to ensure that this Bill is passed as an Act.

1.2 POLICY MANDATES

1.2.1 National Water Resource Strategy 3

The scope and purpose of the third instalment of the National Water Resource Strategy (NWRS-3) provides a vision for 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. NWRS-3 aims to enable achievement of this vision through the following overarching goals:

- Water and sanitation supporting development and elimination of poverty and inequality
- Water and sanitation contribution to the economy and job creation
- Water that must be protected, used, developed, conserved managed and controlled sustainably and equitably

NWRS-3 considers research and innovation in the water sector as crucial elements in the achievement of both national and international imperatives of water conservation and demand management, water security and the public health benefits of sanitation. The key focus area will be on development of tools for skills development and the capacity required to address the current and future needs of the water and sanitation sector. The participation of all stakeholders, including the private sector, will be encouraged to increase the relevance and strengthen implementation of products and knowledge from research and innovation.

Emphasis is also placed on the desired future institutional landscape, with close ties between the WRC and the DWS to determine research needs; and between the WRC, Department of Science and Innovation (DSI) and the National Research Foundation (NRF) to ensure consistency of approaches between water and sanitation research needs and South Africa's broad policy on science and innovation and the overall collaboration with various science councils. The research institutional landscape will also include other role-players, such as Eskom, Sasol, mining, agricultural companies, government departments, and the South African Local Government Association, for coordinated dissemination of new technologies, knowledge and skills.

1.2.2 National Development Plan, 2030

The National Development Plan, 2030 (NDP) provides an overarching policy framework for a trajectory to deal with the triple challenges of inequality, unemployment and poverty. The NDP further supports a new societal deal of increased cooperation between government, business, labour and other social partners for economic growth and development. The NDP further puts an emphasis on investment and development of bulk water,

including water resource management infrastructure for water conservation and demand management, integrated catchment management and resource protection, and human capital development, such that there is water security for development.

1.2.3 National Water and Sanitation Masterplan

The National Water and Sanitation Masterplan (NW&SM) intends to coalesce water users and all the water management institutions (WMI) to resolve issues on water and sanitation service delivery. The NW&SM is a novel plan that guides the South African water sector, led by the DWS, and is implemented at the local government level and with other sector partners. The plan is directed towards implementation of tangible actions that have an impact on the management of South Africa's water resources and the supply and use of water and sanitation in the country.

The NW&SM proposes three pillars for research development and innovation: research activities, skills and deployment of innovation. The research activities pillar aims to address ongoing research gaps, deepen insights and outputs in areas where South Africa has a unique global contribution to make, and continue growing capabilities in areas that are key to South African water security. The pillar on skills focuses on high-end skills to ensure that there are suitably qualified individuals to drive the system of water for innovation, and to obtain an understanding of how universities are preparing their graduates for careers in the water sector. It further focuses on postgraduate, post-doctoral and research skills in alignment with international trends. The third pillar focuses on deployment of innovation into practice in a number of ways: firstly, to package research outputs in a way that supports decision making or policy making, with demonstration and validation of a range of technology and decision support tools.

1.2.4 African Union, Agenda 2063

Agenda 2063 of the African Union provides a blueprint and master plan for transformation of Africa into a global powerhouse of the future. It is a strategic framework for the continent that aims to deliver on the goals for inclusive and sustainable development. It serves as a concrete manifestation of the pan-African drive for unity, self-determination, freedom, progress and collective prosperity. South Africa has prioritised its contribution to the development of the continent and in this regard the African Union Agenda 2063 is key. It provides the strategic framework for the socio-economic transformation of the continent and builds on the initiatives for growth and sustainable development. A prosperous Africa based on inclusive growth and sustainable development is one of Agenda 2063's aspirations and is significant to the WRC in particular, as it places an emphasis on Africa's unique natural endowments, health and protection of its environment and ecosystems, and climate-resilient economies and communities.

1.2.5 United Nations Sustainable Development Goals

The Sustainable Development Goals (SDGs) are designed to be a blueprint for the achievement of a sustainable future across the world. The SDGs seek to address key systematic barriers to sustainable development, such as inequality, unsustainable consumption patterns, weak institutional capacity and environmental degradation. The SDGs further seek to improve quality of water through pollution reduction, and to ensure sustainable withdrawals and supply of freshwater to address water scarcity. The United Nations further convened a High Level Panel on Water (HLPW) which made recommendations on how to accelerate progress in achievement of availability and sustainable management of water and sanitation for all, as well as achievement of multiple other SDGs. High-level recommendations by the HLPW included, among others: understanding, valuing and managing water so as to provide a foundation for broader integrated water management; an integrated approach at local, country and regional levels, including building partnerships and international collaboration at the global level.

1.2.6 Presidential Commission on the Fourth Industrial Revolution

The Presidential Commission on the Fourth Industrial Revolution (PC4IR) outlined a vision for the development of South Africa to achieve prosperity, wealth creation, and inclusiveness, in being connected, digitally

advanced and technologically 'smart'. Furthermore, development of 4IR systems can help to reach several goals articulated in the South Africa: Vision 2030, specifically those that relate to:

- Economy and unemployment
- Economic infrastructure
- Improving education, training and innovation
- Environmental sustainability and resilience
- South Africa's role in the region and the world
- Transforming human settlements

The PC4IR further identifies that South Africa's National System of Innovation (NSI) needs research and ideas for how it can be more effective, which is an element that the WRC will adequately respond to. Smart management and infrastructure are needed for South Africa to meet the needs of its growing population and those of its economic sectors.

1.2.7 Economic Reconstruction and Recovery Plan

The Economic Reconstruction and Recovery Plan (ERRP), published by the National Treasury in the midst of the COVID-19 pandemic, aims to stimulate equitable and inclusive growth. One of the nine priority interventions the ERRP has identified is 'green economy interventions', which can be linked to the water sector as they guarantee the security of water supply, and effective wastewater management, among others. The ERRP indicates that, as part of South Africa's green agenda, private and public buildings will be retrofitted with measures to improve water efficiency. The plan earmarks the creation of 1 560 new opportunities for facilities maintenance, water and energy efficiency, including the construction of rural bridges.

1.2.8 White Paper on Science, Technology and Innovation, 2019

The National System of Innovation (NSI) concept was introduced into the formal public discourse through the 1996 White Paper on Science and Technology. The NSI is conceptualised as a means by which a country seeks to create, acquire, diffuse and put new knowledge into practise so that the country and its people achieve their individual and collective goals. The 2019 White Paper on Science, Technology and Innovation advocates for a coherent, inclusive NSI. The NSI concept is thus retained as an organising framework for the institutional landscape, wherein interactions and partnerships are encouraged among business, research institutions, higher education institutions (HEIs) and civil society. Coherence in key policy areas is encouraged and should be strengthened through shared values, information and competencies. Further, the White Paper provides a reflection on expansion of the scientific knowledge base, the strengthening of institutions, and expansion and upgrading of the policy position, including monitoring and evaluation of the NSI.

1.3 RELEVANT COURT RULINGS

There are no relevant court rulings that may have an impact on implementation of strategy over the five-year planning period.

PART B

OUR STRATEGIC FOCUS

Water is a strategic resource, critical for basic human needs and a driver for powering key economic sectors for the socio-economic benefit of South Africans. Thus, the sustainable management of this scarce and finite resource underpins the wellbeing and prosperity of South Africa and its people. For the water science community, the mandate is to translate research, development and innovation (RDI) into real solutions to address poverty, inequality and unemployment, while applying knowledge solutions to advance opportunities to enable economic growth, improve competitiveness and ensure prosperity.

The vision, mission and values of the WRC are as follows:

2 VISION

To have highly informed water decision-making through science and technology at all levels, influencing all stakeholder groups, on innovative water and sanitation solutions through research, development and innovation for South Africa and the world.

3 MISSION

To be a global water knowledge node and South Africa's premier water knowledge hub active across the innovation value chain that:

- Informs policy and decision making;
- Creates new products, innovation and services for socio-economic development;
- Develops human capital in the water and sanitation science sector;
- Empowers communities and reduces poverty;
- Supports the national transformation and redress project; and
- Develops sustainable solutions and deepens water and sanitation research and development in South Africa, Africa and the rest of the developing world.

4 VALUES

A culture of learning and sharing;

- Innovation and creativity;
- Integrity and fairness;
- A spirit of professionalism and service orientation;
- Facilitating empowerment and social change; and
- Good governance.

5 SITUATIONAL ANALYSIS

The WRC's performance environment is created on the premise that the crux of the water and sanitation challenge in South Africa is a capacity and capability challenge which requires evidence-based and scientific decision making. The three dimensions of this challenge addressed by the WRC are new knowledge, human capital, and technological solutions, through: funding and facilitation of water RDI; knowledge generation and dissemination; and the translation of research and innovation products for the advancement of national water security. The recipients of this knowledge may be HEIs, science councils, the private sector, as well as the various tiers of government.

There is convergence across the globe that increasing water scarcity on the back of decreased availability, deteriorating quality and impacts of climate change is a crowning global crisis. South Africa is not immune to this. As a response, the WRC has heightened its efforts to not only grow scientific and technological knowledge, but to translate this repository of knowledge into tangible, accessible and cost-effective products that provide options for use on the ground. While the Commission's increased efficiencies, innovation and partnerships will continue to maintain knowledge production levels, it is becoming increasingly difficult to meet two very basic challenges in the South African water value-chain: The first is the ability to address the increasingly complex nature of problems such as non-revenue water, water quality and quantity, food security and the burden of disease, which are inter-linked and water related. The second is the WRC's ability to both transform the South African RDI community through the development of researchers from the designated groups and to create further avenues for job creation and entrepreneurship development, which are all restricted by the limited availability of funds. At the same time, technological

innovation, improvements in communication, increased collaboration and international partnerships have enhanced the ability of the South African water RDI community to contribute to global knowledge and communities of practice.

With the aforesaid, pursuit and success in execution of the strategy of the WRC can be achieved when the required strategic resources and capabilities have been built and deployed. The WRC is thus considered to be a system, with an array of parts with their own distinct functions that can be affected by internal and external environmental factors.

The external and internal environmental factors are discussed below.

5.1 EXTERNAL ENVIRONMENT

The outcome of an external environmental analysis provides the identification of strategic capabilities that may affect delivery on the WRC's mandate. These are derived from global influences whose impacts on industry drivers are immense, and is disruptive to current business models. The water sector, including the WRC are no exception.

The external environmental analysis was organised across the following key dimensions:

5.1.1 Climate change

Climate change is one of the. most powerful global forces inspiring a new business narrative as it may destabilise markets and curb economic growth. Weather patterns are increasingly becoming less favourable, and the frequency and severity of extreme events is increasing as temperatures are projected to continue rising and rainfall patterns are expected to shift.

Climate change is a global issue; however, its severe impacts are equally local, as it is expected to make agricultural development in Africa more challenging. This makes African economies acutely vulnerable as they are highly dependent on agriculture, which makes up one-fifth of Sub-Saharan Africa's economic output. The gross domestic product (GDP) exposure in African nations that are vulnerable to extreme climate patterns is projected to grow to approximately 1.4 trillion US dollars in 2023 from a baseline of 895 billion US dollars in 1998, showing the blistering economic impacts of climate change.

Potential impacts of climate change on the South African economy are projected in Table 1, which shows that if South Africa adopts the agreement as per the Paris Accord and temperature increases are kept at or below 1°C, the potential GDP losses could be minimized. If there are no countervailing actions to reduce emissions, temperatures could increase by 4°C by the year 2100 resulting in increased potential GDP losses of 3.4%.

Table 1: Potential South Africa GDP losses due to climate change by 2100

Increase in temperature	1°C	2°C	3°C	4°C
Impact on South African GDP	−0.74%	−1.57%	−2.46%	−3.43%

Source: Kompas, Ha & Che, 2018

Africa is one of the regions largely exposed to climate change with most areas already disproportionately feeling the impacts. It is expected that the Southern and North Africa will be severely impacted as it is estimated that their 'share of decade spent in drought' will average 80% by the year 2050. With the current climate change trajectory, 100 million people could be forced into extreme poverty by 2030 globally, with devastating effects on approximately 3 million people in Southern Africa due to cyclones.

To the extent that climate change has adverse impacts, there are also opportunities that can be created. Research by the New Climate Economy project reflects that bold climate change action could in the year 2030 deliver at least 26 trillion US dollars in global economic benefits, generate 65 million new low-carbon jobs, avoid 700 000 premature deaths from air pollution and generate 2.8 trillion US dollars in government revenues through subsidy reform and carbon pricing alone.

Delivering the benefits of a new climate economy will require ambitious actions across key economic systems, for instance, creation of conditions for the phase-out of coal and scaling up of renewables in the energy sector, scaling up sustainable food and land use systems, forest landscape restoration, reduction of emissions from industrial value chains and investment in resilient water infrastructure. Climate change challenges are also water security challenges. As a water-scarce country, South Africa has experienced severe droughts followed by episodic floods, which have left serious drinking water shortages or degraded water and wastewater infrastructures. The WRC's role in developing tools and knowledge for supporting early warning systems for weather-related disasters has become very critical at local and national levels.

With the abundance of solar, wind and geothermal resources, African countries have a comparative advantage with regard to renewable energy, providing an opportunity for delivery of the new energy revolution. Beyond the energy sector, food and land use are an integral component of the Sub-Saharan African economy. It is estimated that in 2030, opportunities in food and land use could deliver 320 billion US dollars, comprised of 120 billion in forest ecosystem services and restoration of degraded land, 100 billion in increased agricultural yields, and 100 billion in supply chain efficiency improvements.

A policy priority in Africa at large and in South Africa particularly, is to achieve food and nutrition security by 2030 in order to address a deteriorating food security situation that is exacerbated by climate change. Production of food from irrigated land reduces the risk of crop failure and is an important element of enhancing food security in South Africa.

Given the aforesaid, there is a need to leverage science for innovations to improve climate change adaptation. Science offers enormous potential to provide sustainable solutions for food security, through science-based management of land, soil and water. Further, leveraging of science must lead to translation of scientific solutions into packages that can be disseminated to water users. Solutions should thus be co-generated between researchers and a wide range of users so that resilience challenges can be addressed in a demand-driven and knowledge-intensive manner. Digital technologies can be harnessed to monitor climate change risks to identify the onset of climatic shocks before they happen, in order to facilitate responses that build resilience.

5.1.2 Fourth Industrial Revolution in the water sector

The Fourth Industrial Revolution (4IR) involves a range of new technologies and new forms of connection between various economic actors, with information and communication technology (ICT) and digitisation being particularly critical to 4IR. Technologies related to 4IR are disruptive to traditional business models, resulting in 4IR being one of the global forces that is inspiring a new narrative in doing business. While traditional business models involved customer-to-business type relations, the 4IR technologies enhance development of new industries and online platforms that enable customer-to-customer exchange.

Notwithstanding its disruptive nature, 4IR can also provide opportunities to global and even national economies by creating the potential to influence and address complex societal challenges. The adoption of 4IR can thus be enhanced through adoption of innovation systems that enable diffusion and use of new and economically useful knowledge. Innovation systems can contribute towards national environmental outcomes, wherein 4IR technologies can bring change in the relationship between industry and the environment through technologies such as advanced agriculture, efficient factories that utilise less water and circular economy models.

In addition to 4IR, the water sector is undergoing its own revolution, which involves establishing water conservation strategies and transitioning toward closing water use loops. While the academic and industrial water sectors are advancing towards consolidation of 4IR, another revolution concerning big data and artificial intelligence (AI) has recently emerged in all societal sectors, the water sector included.

It is estimated that 80% and 50% of utilities in the developed and developing worlds, respectively, are expected to undergo digital transformation by 2025, meaning that fast advances in affordable sensors, high-resolution remote sensing, communication technologies, and social media are contributing to the proliferation of big data in the water sector and are likely transforming traditional decision-making strategies. Big data analytics together with AI are set to bring new opportunities and challenges into the water sector which may have policy and labour outcomes. The combination of AI with big data science, with new ways to analyse, organize, and extract information from large volumes of varying types of data, is bringing new opportunities for data-driven discoveries.

Progress in these revolutions in the water sector, intertwined with AI and big data, may be a catalyst for socio-economic changes that will cross sector boundaries (for instance, water and health sectors), as emergence of new needs and business models will influence research in the water sector, with new forms of research based on large amounts of data being possible. Research enabling new technological approaches and more effective management strategies will enable development of emergent frameworks for the water sector to meet future societal needs. New skills will therefore be required to prepare the next generation of water researchers to be more proficient in data science in order to design data products.

While technology will not be a panacea to address the current water-related challenges, technological advances are changing the resources equation in several ways; for instance, advances in analytics, robotics and other elements such as materials science are already reducing resource consumption. The Fourth Industrial Revolution in the water sector will thus lead to an acceleration of a water resources innovation cycle.

5.1.3 A new societal 'deal'

Cooperation among business, society in general and government is required for sustainable economic development; thus a new societal 'deal' is required. This new societal deal will spur advancement of research impact across the user community and the WRC stakeholders at large. The 2019 White Paper on Science, Technology and Innovation puts an emphasis on the contribution that research can make to national development and posits a policy intent to support a science-literate and science-aware society.

A society that is aware of the value and potential of science can evaluate the products of science and utilize them in their daily lives. Greater awareness of science also enables stimulation of interest of young South Africans in science-related careers. The reach and effectiveness of science engagement and communication is therefore vital to ensure that users are empowered, can analyse data and results, and are able to participate in water-related projects.

5.1.4 State of the South African water research enterprise

The South African research enterprise has seen some growth in the past two decades as there has been a substantial amount of research collaboration in various fields culminating in an increased production of academic articles. In addition, there has been an improvement in the quality of articles produced and the citation impact of journals. There are, however, still weaknesses in the system that require attention, particularly that investments in research and development in South Africa has not increased substantially in comparison to the world, meaning that strategic research areas such as water, energy and food security still remain underfunded.

The minimum funding requirements to achieve all the aspects of water research in the three main crucibles, i.e., access to water and sanitation, water and sanitation services, and preservation of ecological water resources, have indicated a wide range of priorities indicative of the need for more resources.

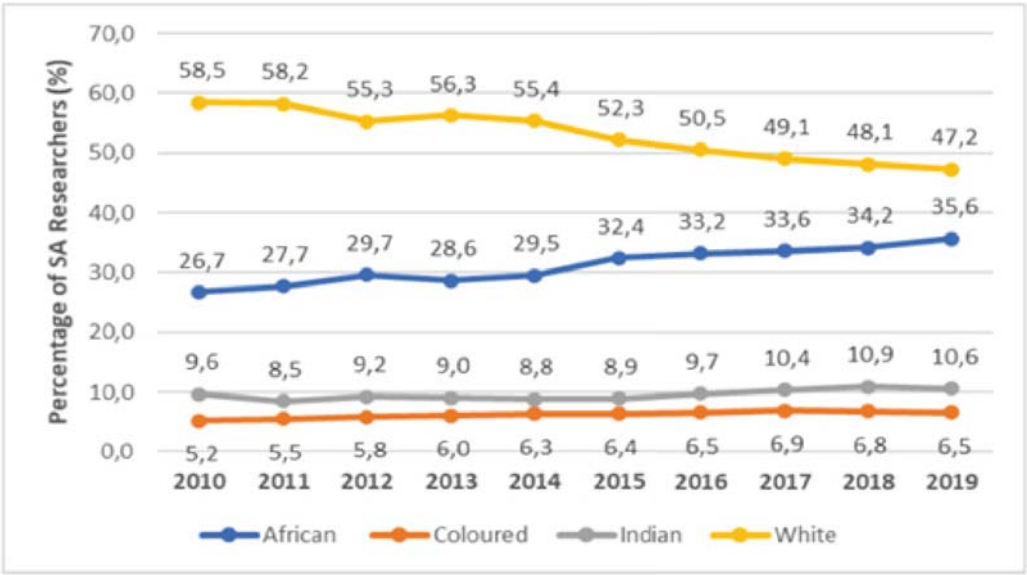
The 2015 Development and Innovation Masterplan indicates a minimum funding requirement estimated at 8.4 billion rand over a 10-year period to 2025. This is

a reflection of the situation for funding for research in the water sector as being quite dire. The DWS, through the WRC and the National Research Foundation (NRF), are the biggest funders of water research in South Africa. The South African Gross Domestic Expenditure on Research and Development (GERD) averaged 0.6% compared to the global average of 2.6%. Across all science, technology and innovation sectors, South Africa is struggling to break through the 1% benchmark. Thus, there is a need to explore other funding sources for water research and development, with the private sector being the most obvious partner. Countries that have business funding a major component of research have recorded huge economic growth in comparison to those where funding is mostly from government.

The institutional landscape in water research is composed of a number of research groups located within the HEIs. The institutional landscapes governing water research is sub-critical in comparison to the socio-economic importance of water in South Africa, with the additional challenge being that of data management, to the effect that datasets are incompatible and maintained in different databases.

The National Water and Sanitation Masterplan points to a need for recruitment of human resources at technical and managerial levels. The number of Masters and Doctoral graduates in the field is quite low, which is a concern. The water sector will not perform at its optimum if the current proficiency levels are not enhanced to the required levels across the entire value chain. Human capital development (HCD) is therefore required to increase the amount of locally produced expertise throughout the researcher pipeline.

Figure 1: Racial profiles of South African researchers



Source: Department of Higher Education and Training, 2018

Therefore, support and funding of research and development by DWS and other government departments, as well as other public and private funders and investors, is important for South Africa to realise its socio-economic growth and development; otherwise water will remain the key limiting factor to the good endeavours of the state regarding development and growth.

5.1.5 State of South African water resources and services

Enormous pressure is mounting in terms of the demand for freshwater resources, due to an increase in demand for water and the prevalence of drought in Southern Africa. In South Africa's water sector and, more specifically, its water services sector, there are current dire and complex challenges linked to drought and associated management of water, as well as the critically concerning nature of the country's service delivery crisis. This has in turn put pressure on wastewater treatment infrastructure and sanitation systems as key contributors of pollution in the water value chain.

The roots of this crisis have been linked to multiple issues which have led to the failure by local authorities to deliver water and sanitation services with commonly cited key issues being:

- Insufficient infrastructure capacity, coupled with poor maintenance of infrastructure
- A shortage of technical skills and overall human capacity shortages

The DWS leads and regulates the water sector in South Africa, develops policy and applicable sector strategies, and provides support to the sector. Thus, the value chain is accounted for by various tiers and spheres of government, making the regulation process complex – more so as entities of government cannot litigate each other as per the Intergovernmental Governance Relations (IGR) Framework Act.

To assist better planning and management in the water services sector, there has been a proliferation of technocratic tools, including spatial development frameworks, water services development plans (WSDPs), water safety plans, wastewater risk abatement plans and other planning mechanisms. However, South Africa's forward-thinking water legislation (which has been internationally acclaimed for its ambition to align with the ideologies of integrated water resource management (IWRM), considered as a progressive step toward addressing the complexity of water governance) and technocratic tools have not succeeded in effecting any significant improvements in the sector.

South Africa is generally well-endowed with water resources infrastructure and is highly dependent on it to maintain reliable water supplies. Most of South Africa's rivers have been dammed with a storage capacity exceeding 100 million m^3 and approximately 20% provisioned for the ecological reserve. The biggest challenge affecting water resources is increasing pollution, mainly from industrial and domestic effluents, which is impacting the biotic diversity of freshwater ecosystems.

Notwithstanding the above, South Africa has made progress since the advent of democracy in providing water and sanitation services, which has contributed toward the SDG targets, with some of the key achievements as follows:

- 73.4% of households have access to piped water inside the yard and 17.9% to piped water outside the yard
- 79.5% of households have access to RDP-standard sanitation services

5.1.6 The South African economic environment

Global economic growth has slowed at a rate that is greater than anticipated, with global GDP having stagnated in the second quarter of 2022. High inflation is also persisting for longer than expected, exacerbated by the lingering impacts of the COVID-19 pandemic and the current conflict between Russia and Ukraine. These adverse effects have resulted in slowed global expansion, with the global economy expected to enter into a recession in 2023.

South Africa's GDP growth has remained constrained, and worsened in the second quarter of the 2022 year, albeit that economic growth started on a steady recovery path at the beginning of 2022. Adverse international developments contributed to the deterioration in economic growth with the outlook remaining weaker, with expected growth of approximately 1%.

Inflation has recently been at its highest in the past decade in most economies, with some developed economies announcing packages to countervail the rising inflation. High inflation will continue to put

upward pressure on prices, mainly of food and energy. It is expected that these inflationary pressures will ease in 2023 to about 5.3%, as some of the underlying factors seem to be subsiding, particularly the disruptions to global supply chains which precipitated an initial spike in price increases.

Interest rates have been on the rise globally as central banks across the world have tightened monetary policies in response to inflation levels that have risen more than the inflation targets. South Africa, as a participant in the globalised economy, has not been spared, with the South African Reserve Bank maintaining an aggressive monetary policy stance by raising interest rates. The interest rate outlook will continue to be dependent on international factors, the monetary policy stances of central banks in major economies, and inflation.

Most of the research and innovation projects in South Africa are funded through appropriations from the National Government. The rising inflation and increasing interest rates have had adverse implications for the value of money. Slowing economic growth has adverse implications for cash flows from Government to finance the research and innovation portfolio, meaning that funding will continue to decrease over time.

The WRC has in the past 5 years noted the challenges faced by the bulk water boards to recover monies owed by local municipalities, as these have been stretched to pay the water research levy. Owing to the major source of the water research revenue coming from the bulk water sales by the two major water boards, the risk to financial sustainability has increased.

5.2 INTERNAL ENVIRONMENT

The outcome of the internal environment analysis is the identification of core competencies and a focus on addressing critical internal vulnerabilities to build an effective water research institution. The internal environmental analysis is organised along the following dimensions:

5.2.1 Resourcing of the water research mandate

The funding model of the WRC is that income is derived from two sources, the Water Research Levy (WRL) and leverage income. The WRL is the main source of revenue derived as a result of the primary mandate of WRC and receivable in terms of the Water Research Act (Act 34 of 1971). Rand Water, Umgeni Water and the DWS collect the WRL on behalf of the WRC from various water users, based on their water sales volumes, and pay it over to the WRC for dispensing into water research.

Leverage income arises when the WRC, in partnership with other organisations, undertakes research and innovation projects where it may or may not also be a co-funder. The leverage-funded component of WRC operations is an important funding mechanism that augments the WRL and enables the WRC to perform more research than it would have otherwise been able to. This is implemented by ensuring that the leverage-funded projects do not adversely impact on the primary mandate of the WRC but complement fulfilment of the mandate of the organisation.

The operating environment of the WRC is impacted by the sluggish economic growth, reduced capacity of the fiscus and the ongoing uncertainty of undulating business cycles. Leveraged income is not guaranteed, and as the DWS has embarked on a process to realign the water services institutions and disestablish some, resourcing of the WRC mandate may be adversely impacted in the future.

While the leverage funds may be attractive and useful to ensure there is visible research, development and innovation from the WRC, the associated overheads related to accommodation, HR and Finance resources is growing, making it necessary to grow the support structure at a rate at which the technical structure is growing. The high cost of doing business at the WRC is also exacerbated by the uncontrolled rates paid to researchers owing to the high cost of doing research.

5.2.2 Information and communication technology

The water sector continues to face increasing pressures due to the aforementioned external factors, such as the

impacts of climate change, increasing water demand, declining quality, rapid urbanisation and increasing populations. Resilience and sustainability of the sector can be achieved through innovation and utilisation of technology which will result in resilience of the business models in the sector. The water sector in general is considered to be one of the sectors which is under-invested with regard to technology. The ICT environment within the WRC has been identified as an area that requires attention so that the organisation can digitally transform. A digitally transformed WRC will be well placed to harness the technological capabilities to enable innovation in the entire water sector.

5.2.3 Organisation and culture

In order to define and communicate a consistent message of the prevailing culture, multidisciplinary interventions matched to the requirements of the strategy delivery and execution effort are required. A healthy culture that embraces execution-supportive attitudes, behaviours and work practices where a results oriented work climate is encouraged is espoused. This type of culture will enable alignment of rewards and incentives directly to achievement of strategic outcomes.

5.3 HIGH-LEVEL ORGANIZATIONAL STRUCTURE

The WRC structure (Figure 2) has been organised to enable it to be fit-for-purpose and comprises elements that enable its governance framework and are supportive towards effective strategy execution.

Figure 2: High-level organisational structure

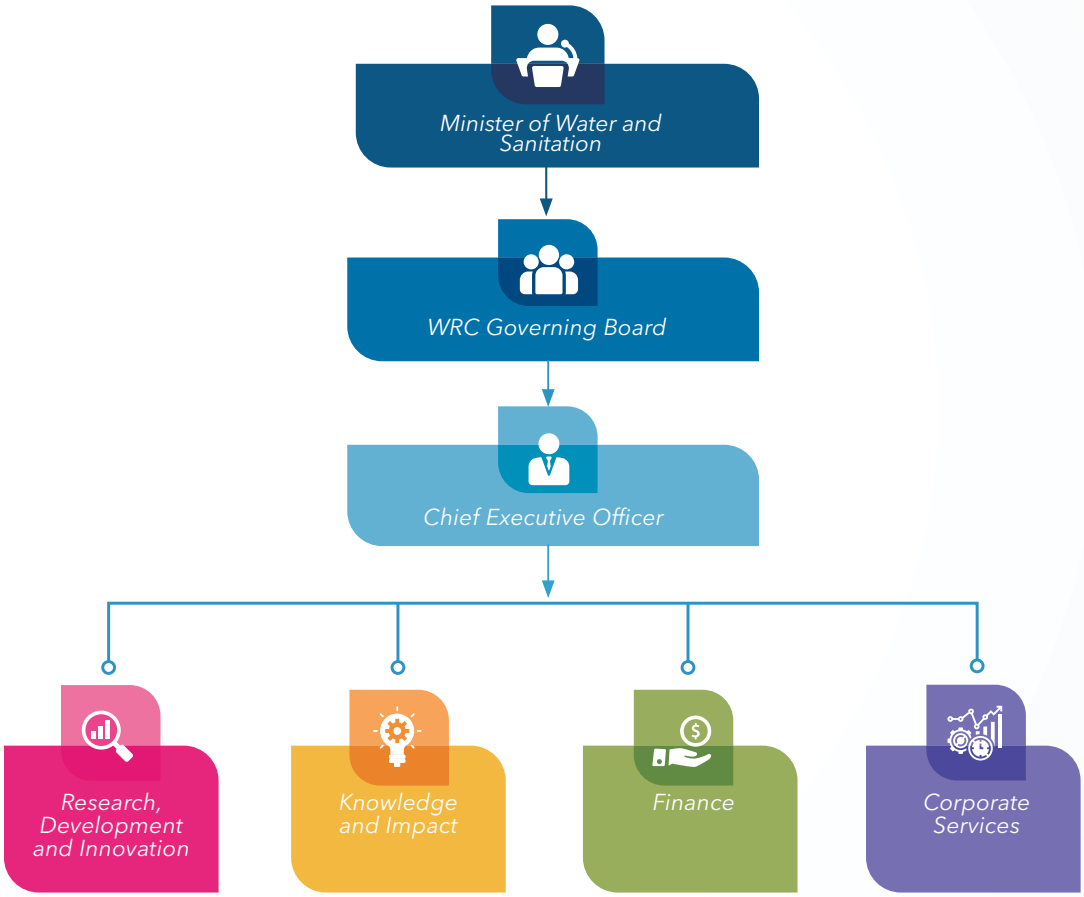


Figure 2 also depicts the relationship between the Governing Board and the Minister of Water and Sanitation as the Shareholder. Governance principles having implications for the Shareholder, Executive Management and the Governing Board apply.

PART C

MEASURING OUR PERFORMANCE

6 INSTITUTIONAL PERFORMANCE INFORMATION

6.1 MEASURING THE IMPACT

One of the characteristics of this Strategic Plan is a shift towards emphasizing the impact and outcomes of WRC interventions, thus articulation of the impact statement and selection of performance outcomes. The strategic plan is developed at a point of convergence in research, innovation and the Fourth Industrial Revolution in the water sector, which is a distinguishing feature of the institutions who drive the knowledge economy of the country. With the position of the WRC as a key institution that enables water research, it is best placed to enable research that will result in societal impact. The impact statement seeks to portray a long-term change that the WRC intends to contribute towards and is as follows:

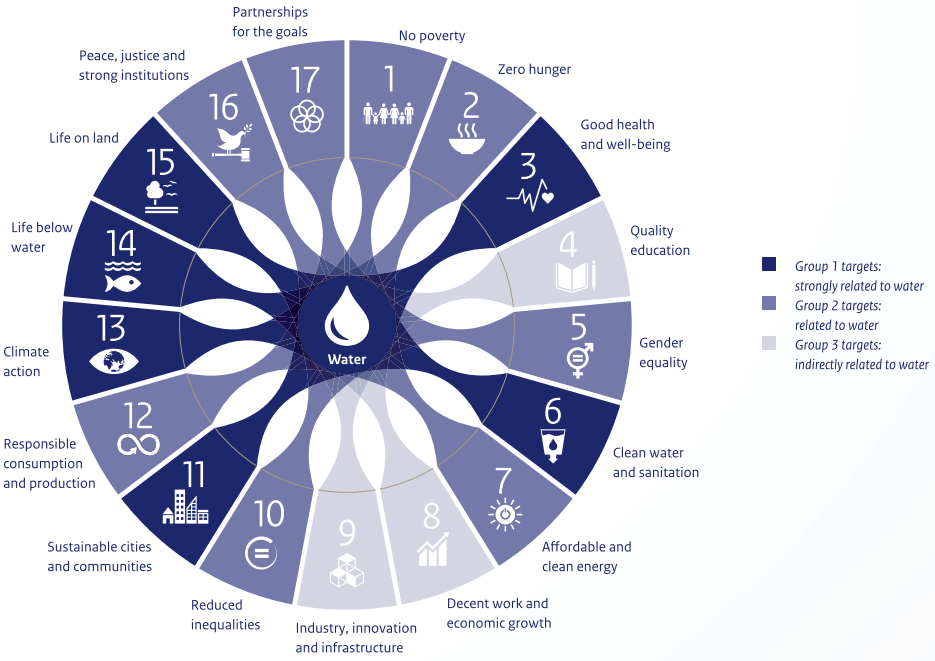
"CONTRIBUTE TOWARDS IMPROVED WATER SECURITY THROUGH RESEARCH, DEVELOPMENT AND INNOVATION"

The impacts of the research and innovation that the WRC enables take time to occur, and when they do occur, they are novel, diverse and unpredictable. The selected impact statement, therefore, enables the WRC to measure the value of its research and innovation to the water users, communities and, internally, its effectiveness as an organisation. The impact statement also advances a contribution of the WRC in the strategic use of water to foster economic development in advancement of the national aspirations to reduce poverty, unemployment and inequalities.

6.2 ALIGNMENT TO THE SUSTAINABLE DEVELOPMENT GOALS

The aforementioned impact statement is aligned to and shows how the contribution of the WRC to acceleration of achievement of SDG 6 in particular as well as other SDGs that require progress in integrated management of water resources. Water is the common currency that links nearly every SDG. Water supply is vital for food production and is essential in attaining food security, and health, and in powering industries and job creation. The SDGs 3, 11, 14 and 15 are strongly related to water and Figure 3 reflects this.

Figure 3: How water links to the SDGs



6.3 ALIGNMENT WITH THE MEDIUM-TERM STRATEGIC FRAMEWORK

In execution of its strategy, the WRC long-term impact and outcomes seek to align with the priorities of the Medium-Term Strategic Framework: 2019–2024 (MTSF:2024).

The MTSF: 2024 seven priorities are as follows:

- Priority 1: Capable, ethical and developmental state
- Priority 2: Economic transformation and job creation
- Priority 3: Education, skills and health
- Priority 4: Consolidating the social wage through reliable and quality basic services
- Priority 5: Spatial integration, human settlements and local government
- Priority 6: Social cohesion and safer communities
- Priority 7: A better Africa and world

The WRC activities and outcomes align with the MTSF:2019-2024 priorities in the following key areas (Table 2):

Table 2: Alignment of WRC outcomes to the SDGs, MTSF priorities and outcomes

WRC outcomes	MTSF priorities	MTSF Outcomes	SDGs
Outcome 1: Efficient and engaged organisation	Priority 1: Capable, ethical and developmental state	Improved leadership, governance, and accountability	
Outcome 2: A financially sustainable organization		Professional, meritocratic, and ethical public administration	
Outcome 3: Innovation-driven water sector	Priority 1: Capable, ethical and developmental state	Functional, efficient, and integrated government	SDG3: Good health and well-being SDG6: Clean water and sanitation SDG11: Sustainable cities and communities SDG14: Life below water SDG15: Life on land
Outcome 4: Empowered and influenced stakeholder	Priority 1: Capable, ethical and developmental state	Social compact and engagement with key stakeholders	
Outcome 5: Water security – adaptation and resilience	Priority 5: Spatial integration, human settlements and local government	State of ecological infrastructure improved. Full access to water and sanitation services by all South Africans.	

6.4 ALIGNMENT WITH MINISTERIAL PRIORITIES

Further, the WRC outcomes align to those of the DWS as follows (Table 3):

Table 3: Alignment of WRC outcomes to DWS outcomes

WRC outcomes	DWS Outcomes
Outcome 1: Efficient and engaged organization	Efficient, effective and development-orientated department
Outcome 2: A financially sustainable organization	
Outcome 3: Innovation-driven water sector	Water and sanitation services effectively managed
Outcome 4: Empowered and influenced stakeholder	Efficient, effective and development-orientated department
Outcome 5: Water security – adaptation and resilience	Ecological infrastructure protected and restored Water demand reduced and supply increased

6.5 MEASURING THE OUTCOMES

Through alignment of the WRC outcomes to the MTSF and the DWS strategic outcomes, policies and implementation plans, standard operating procedures (SoPs) and manuals will be developed. The internal controls will be assessed through the internal audit processes within the framework of combined assurance. Monthly and quarterly (statutory) reporting will be effected and management actions will be parlayed for achievement of the outcomes and deliverables as set out in Table 4.

Table 4: Outcomes, indicators and targets

Outcome	Outcome indicator	Baseline	Five-year target
Outcome 1: Efficient and engaged organisation	Enhanced human capital capabilities	New indicator	85% of development programmes implemented
	Digitally transformed and technologically integrated organisation	New indicator	100% implemented ICT strategy
	Broad-based black economic empowerment score	New indicator	50 points of the BBBEE scorecard
Outcome 2: A financially sustainable organization	Percent of total revenue on human resources costs	40%	35%
	Percent of total revenue spent on research and innovation costs	56%	60%
	Current ratio	2:1	2:1
Outcome 3: Innovation-driven water Sector	Curated research and innovation data disseminated as knowledge	New indicator	95% of knowledge dissemination plan implemented
	Operational water research data observatory	New indicator	80% water research data observatory fully operational
	Implemented water and sanitation technologies demonstration	New indicator	80% demonstration platform used by all stakeholders
	Selected technologies transferred to the water sector	New indicator	50% technology transfers made (innovations-technology and processes)
Outcome 4: Empowered and influenced stakeholder	Impactful stakeholder engagement	New indicator	80% stakeholder satisfaction rating
	Research communication and engaged stakeholder	New indicator	80% communication plan implemented
	Capacitated and aware water sector stakeholder	New indicator	80% capacity building plan implemented
	Highly skilled water sector	New indicator	30% of trained PhDs (out of the 5-year project total)
Outcome 5: Adaptation and resilience	Research development and innovation for enhanced livelihoods resilience	New indicator	RDI programmes implemented (resilience)
	Research development and innovation for climate change adaptation	New indicator	RDI programmes implemented (adaptation)

6.6 EXPLANATION OF PLANNED PERFORMANCE OVER THE 5-YEAR PERIOD

In order to provide an outline of planned performance over the 5-year period, the strategic intents were organised in order to respond to the threats posed and opportunities created by the external environment within which the entity operates. Cognisance was also taken of the organisational key weaknesses and the strengths leveraged to enable effective strategic execution.

The following key areas of performance per outcome were thus identified:

OUTCOME 1: EFFICIENT AND ENGAGED ORGANISATION

ENHANCED HUMAN CAPITAL CAPABILITIES

The potential for excellence in delivery on its mandate by the WRC will be enhanced by how the organisation orchestrates its resources within the dimensions of strategic workforce planning. This will ensure that whilst consideration is given to the challenges of the current workforce, a future workforce is also built. The structures must be strengthened to enhance delivery in mission-critical areas aligned with other people related-systems as illustrated below:

- **Talent management:** organisational excellence should be created and sustained through proactive talent management practices. Employees should not only be attracted and recruited but trained and developed in all critical skills so that they possess the proficiencies that match those required for their positions. Employees should not only be trained and developed but retained to ensure that they play a role in attainment of the WRC strategic outcomes and impacts as they are a fundamental input in the strategic management process of the WRC.
- **High-performance management culture:** when the workforce with required proficiency levels, skills and knowledge are retained, this will improve the performance management system of the organisation. The improved performance management system will lead to attainment of the strategic outcomes and impacts through a robust performance management system.
- **Rewards and retention management:** through a robust performance management system, the workforce with suitable skills and proficiency levels achieving the desired outcomes and impacts are appropriately rewarded. When the performing workforce is appropriately rewarded, an extension will thus be made towards retention of those competencies.
- **Career and succession management:** an implemented workforce plan will not only identify critical positions and imminent retirement across the organisation – a clear understanding of available skills and where the workforce can be utilised within the organisation will also be obtained. This will lead to effective implementation of succession strategies during the strategic planning cycle.
- **Recruiting:** an integrated strategic workforce plan will not only inform the resourcing strategy in the short and long term but will ensure effective recruitment within a framework that ensures diversity and skills. The available talent that the organisation should urgently fill will be conspicuous and recruitment processes will be informed by the long-term outcomes and impacts that must be achieved.

In order to ensure that the right culture permeates throughout the WRC, within the context of integrated workforce planning, the observable behavioural competencies, which are knowledge, skills, competencies and other characteristics that contribute towards individual success within the WRC, will be observable. Generally, the behavioural competencies are linked to the values of the organisation and should be embedded within the organisational culture so that there is efficient and effective delivery of the mandate.

Key strategic initiatives:

- Conduct an organizational design review for a structure that is aligned to the strategy
- Create synergies that would enhance human capital productivity

- Reskill/ upskill employees to meet current and future needs of the WRC including digitization and technology use

A TECHNOLOGICALLY INTEGRATED AND DIGITALLY TRANSFORMED ORGANISATION

The rapidly changing business environment and the ever-increasing demands for service delivery make efficient, effective leverage of technology even more critical for business, with government institutions such as the WRC not being an exception. This leverage can only be achieved if the business environment is well understood and the technology solutions are clearly traceable to the business requirements. This means that the ICT strategy and digital transformation are no longer IT disciplines, but rather a joint business–technology endeavour. Business-driven frameworks should thus be employed as a method for organising the thinking around the business in a way that makes it possible to clearly drive technology solutions out of the business strategy.

The ICT strategy will be developed to include the following ICT governance and technology imperatives:

- **Business architecture:** which outline the strategic goals, imperatives and initiatives that the WRC is pursuing to realize its mandate
- **Technology architecture:** which outlines the strategic direction taken regarding information and communication technology (technology infrastructure, applications and data) needed to support and achieve the business strategy for the WRC to achieve its mandate
- **ICT governance and business area structure:** in addition to articulation of the business and technology architecture, an ICT governance structure for governance of ICT and placement of the IT business area within the WRC structure will be outlined.

Key strategic initiatives:

- An assessment and articulation of the vision for the technology architecture, ICT governance and the ICT business area;
- Development of a detailed roadmap with planned initiatives and a financial estimate for delivery over a 3-year period
- Development of a digital transformation strategy for the WRC

BROAD-BASED BLACK ECONOMIC EMPOWERMENT SCORE

The WRC is a corporate citizen and, as an entity of government, implements initiatives that enables it to play a developmental role. The WRC will continue to play a key role in the transformation trajectory of a democratic state. The processes of the WRC have always been designed to ensure economic transformation and redistribution to the benefit of historically disadvantaged individuals. Broad-based black economic empowerment (B-BBEE) is a central part of South Africa's transformation strategy. The WRC will therefore make a competitive assessment across all the elements of the scorecard to develop its B-BBEE position. The B-BBEE assessment and ultimate rating is not only a developmental imperative;, it is also a compliance imperative in terms of the Broad-Based Black Economic Empowerment Amendment Act (Act 53 of 2013).

Key strategic initiatives:

- An assessment to determine the B-BBEE position of the WRC

OUTCOME 2: A FINANCIALLY SUSTAINABLE ORGANISATION

The historical financial performance of the organisation is solid and this has enabled the WRC to boast a strong financial position. The sustainability of the revenue trajectory is however under constant threat. The Water Research Levy collected is affected by unsustainable water services as income is received by the DWS and the water boards as part of their overall revenue collection processes. There has been a consistent increase in the level of outstanding debt due by water users to the DWS and water boards and this has caused significant cashflow pressures.

The WRC has recognised this financial sustainability concern, and to augment its water research levy there have been efforts to also increase the leverage income base. Key business processes need to be strengthened to enhance the governance of the accounting environment in the management of leverage-funded RDI business, so that it supports the critical core levy-funded business of the WRC. Further, strategies will be developed to counter the risk of financial stress related to the Water Research Levy uncertainties, so that an adequate capital base is created for the WRC to continue with its sustainable delivery on its mandate.

Key strategic interventions:

- Develop a strategy to counter the risk of financial stress for the WRC related to Water Research Levy uncertainties
- Develop a financial plana to optimize revenue and resource allocation cycles of the WRC
- Improve cash management, including working capital management
- Ensure value for money in the acquisition of goods and services
- Create an adequate capital base that would enable a financially sustainable organization

OUTCOME 3: INNOVATION DRIVEN WATER SECTOR

CURATED RESEARCH AND INNOVATION DATA

Traditionally, the WRC curated research data and information through reports, CD-ROMs, executing institutions and transfer to DWS and other departments. Data and information were sourced from institutions mandated with monitoring and data curation. Curation will increase access to research data to enhance the impact and efficiency of scientific activities and funding.

Key strategic initiatives:

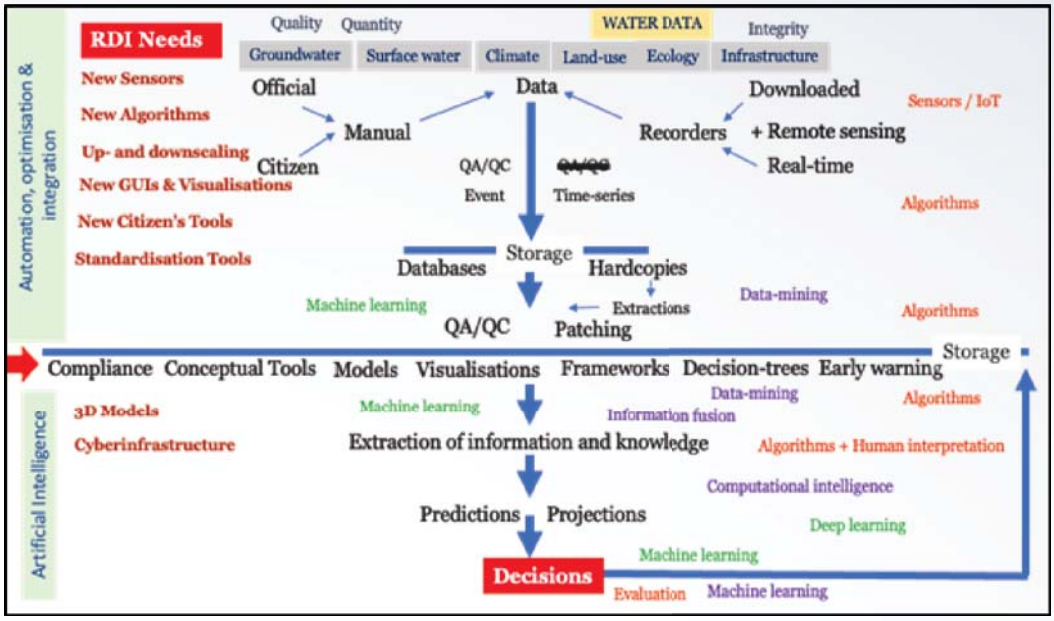
- Create better digital channels for access to research outputs, innovations and data
- Develop a new in-house knowledge portal supplemented by various applications and other video materials
- The hosting of microsites for specific project dissemination of research outputs and data access will be implemented during the planning period

WATER RESEARCH DATA OBSERVATORY

In addition to acquisition of appropriate resources such as data scientists, data and information processing applications and hardware, the water research data observatory (the observatory) is being built to serve as a knowledge hub. The observatory will bring together important water-related datasets and information which, among others, will include past research and monitoring data to enable big data analytics for sustainable management of water resources. Application of big data analytics will also be demonstrated for current challenges in three case studies, i.e., agricultural water, surface water and groundwater. Previous WRC-funded research projects will therefore be digitised with protocols suggested for digitally archiving future WRC research project data and information.

The architecture of the observatory is shown in Figure 4.

Figure 4: Water research data observatory



The observatory will lead to data democratization, meaning that even citizens who are not computer specialists will be able to access and visualize the data in a manner that will serve their particular interests. Third party applications can also be built into the observatory using a wide range of digital tools. Big data technology embedded into the observatory will empower researchers who have funding and hardware limitations.

WATER AND SANITATION TECHNOLOGIES DEMONSTRATION PLATFORM

The WRC created and implemented Wader (Water Technologies Demonstration Programme) in partnership with the DSI based on a 'technology accelerator' model, to scan, sort, and fund demonstrations. Through this programme, independent evaluations are performed and partnerships brokered. Support is also provided through analysis, support and advice to innovators, entrepreneurs and small, medium and micro enterprises (SMMEs).

Typical categories of innovations being evaluated for demonstration purposes are as follows:

- Technologies to explore alternative sources of water
- Smart water technologies
- Technologies promoting water use efficiency and conservation
- Water purification technologies
- Sanitation technologies
- Water quality innovations
- Groundwater technologies
- Social innovations
- Valorization innovations

The demonstration platform will be dependent on the assessment and agreements that were put in place for demonstration purposes.

TECHNOLOGIES TRANSFERRED TO THE WATER SECTOR

A tenet of the WRC is ensuring knowledge dissemination and transfer of technology products to the water sector, innovators, and entrepreneurs, including SMMEs. In this sense, platforms will be created to accelerate or ease the uptake of available knowledge and innovations, both locally and internationally. Further, platforms and vehicles for reaching out to rural and semi-urban stakeholders require improvements, and these will be performed during the planning cycle. Those technologies must be ready for uptake by the stakeholders.

Key strategic initiatives

- Partnerships will be created with community-based organizations (CBOs), non-governmental organisations, local government and academic institutions to accelerate uptake and use of RDI products
- Publications and presentations will be used to position the WRC on national and global platforms, and this will assist in showcasing the work of the WRC and South Africa. This may elevate the position of the WRC in mobilization of additional RDI funds from international funders and donors.

OUTCOME 4: EMPOWERED AND INFLUENCED STAKEHOLDER

IMPACTFUL STAKEHOLDER ENGAGEMENT

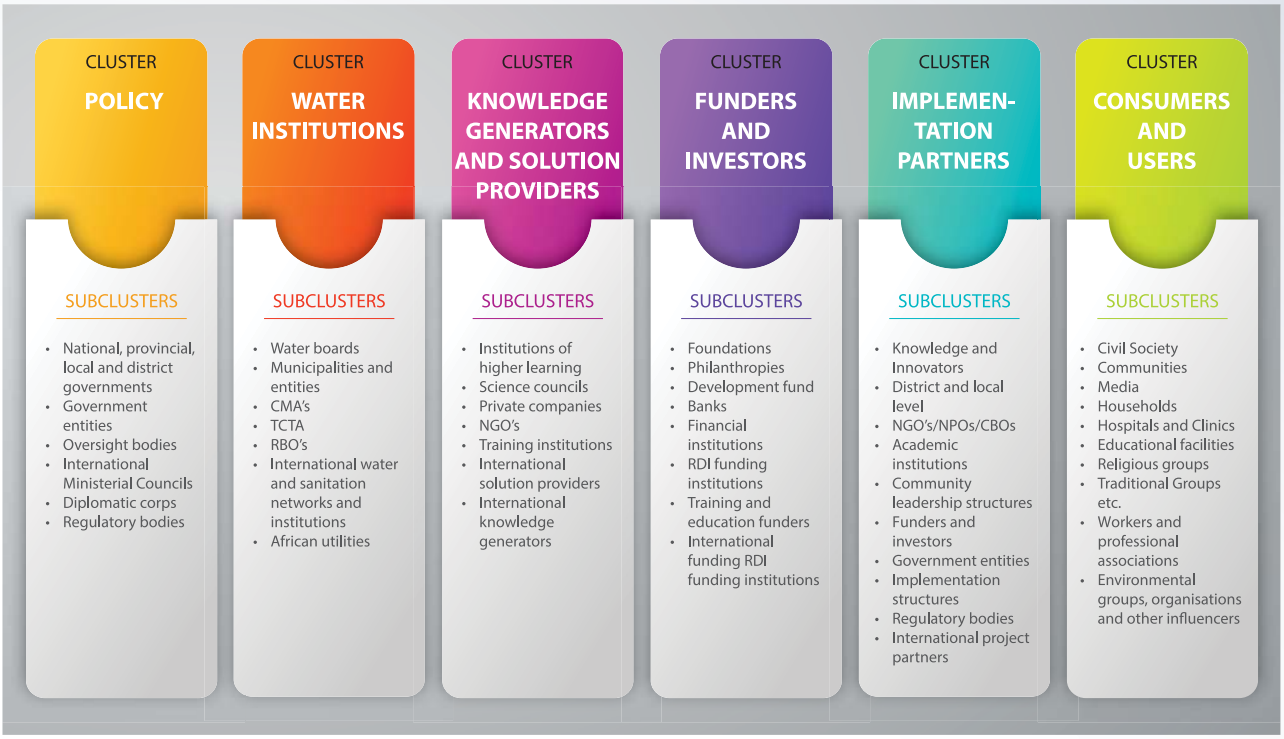
The WRC is accountable to stakeholders who have legitimate and reasonable expectations for the research that the WRC enables. A stakeholder who is empowered and influenced is a means for the WRC to close the gap between knowledge production, use of research and innovation products and influencing policy and broader water sector decision making. Thus having relevant and timeous stakeholder engagement is an important pathway to achieving the aspired research impact.

The WRC positions itself as a premier knowledge hub, with its knowledge generation partners on the upstream end contributing to the research master plan, and a range of partners to exchange the knowledge products and enable dissemination and use of knowledge, solutions and technologies to improve water security and water and sanitation management nationally. The hub is therefore surrounded by several partners and key stakeholders, which will include international partners, shareholders, internal and external stakeholders.

Strategy is a transformative process and understanding stakeholder's legitimate and reasonable needs will enable their inclusion in this transformative process. The developmental role that the WRC fulfils is primarily an ethical and an economic one, to contribute towards fulfilment of future societal needs without compromising current needs, within the context of three inter-dependent systems of economy, society and the natural environment. The 5-year stakeholder management strategy thus seeks to build an organisation where stakeholders, both internal and external, upstream and downstream, together with shareholders, will experience an effective and efficient WRC.

The stakeholder ecosystem of the WRC is depicted in Figure 5.

Figure 5: WRC stakeholder ecosystem

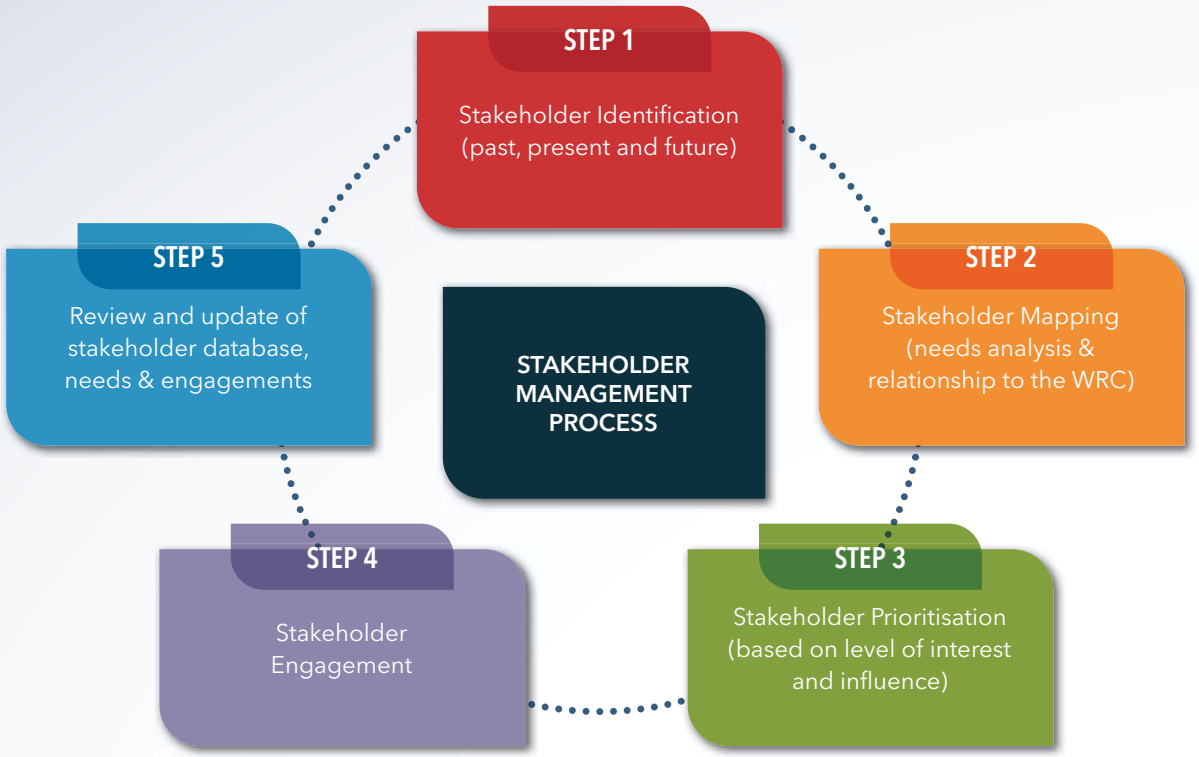


STAKEHOLDER MANAGEMENT PROCESS

The stakeholder management framework (Figure 5) is intended to guide and ensure meaningful stakeholder engagements and relations leading to win-win outcomes for the WRC and its priority stakeholders. Effective stakeholder management will not only position and open new business opportunities for the WRC, but will also contribute to building a capable water sector, trust, long-term relations and value-adding strategic partnerships. The success of stakeholder engagements is however dependent on the institutional culture, flexibility, behaviour, and structures embedding stakeholder engagement in all layers of the WRC hierarchy.

The stakeholder management process will thus be carried out to profile the stakeholders and understand the extent of their influence and interest in the WRC, ensuring that they are aware and well informed of the role of the WRC in the water sector.

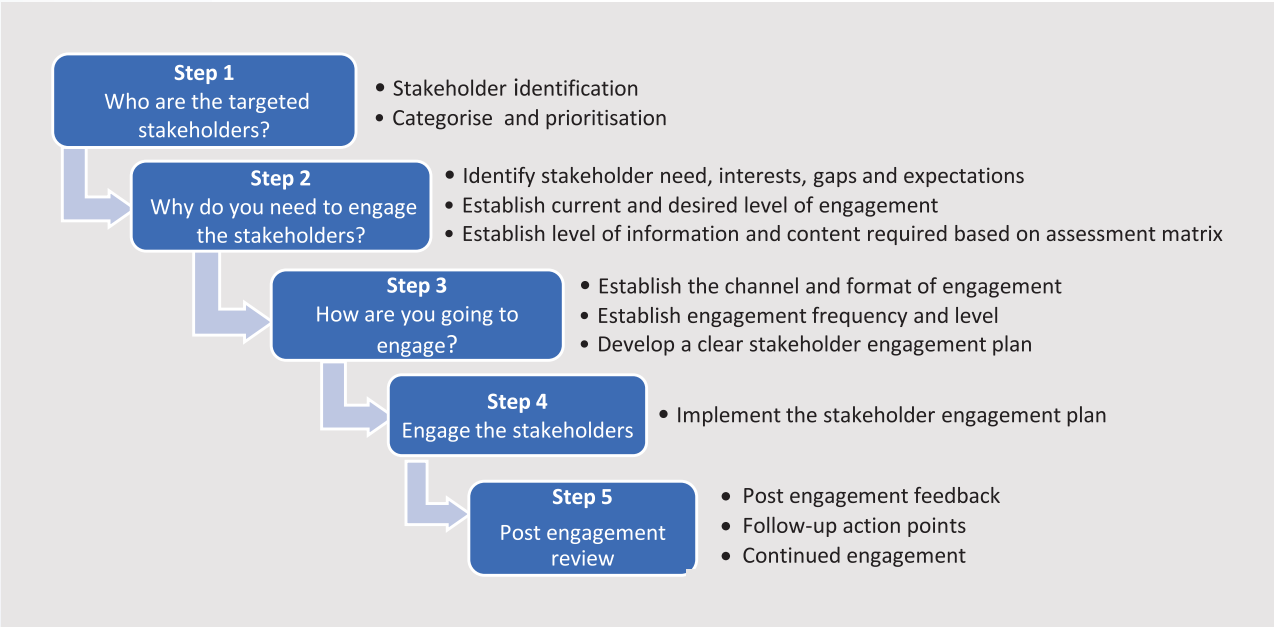
Figure 6: Stakeholder management framework



STAKEHOLDER ENGAGEMENT PROCESS

The WRC strategic stakeholder engagement process will be guided by five steps, providing clarity on the targeted stakeholders (who), reasons for each strategic engagement (why) and the engagement approach required (how) to engage with the specific stakeholders (Figure 7).

Figure 7: Stakeholder engagement process



The WRC will over the next 5 years continue to raise awareness and profile the WRC as a key knowledge partner, convene engagements to gain a better understanding of the priority stakeholders needs, and share, disseminate and showcase WRC knowledge and innovation products locally and internationally to potential adopters, users, funders, and investors. Each strategic engagement will be guided by a clear gameplan supported by tailor-made material aligned to each stakeholder's needs. Moreover, the WRC will align and support the Government's water and related agenda, strategies and plans, and strengthen links and partnerships with the relevant technical, stakeholder, communications, and international directorates within the departments.

Further, an important element of the stakeholder engagement process is to understand the material issues of engagement so that value propositions can be developed that will culminate in stakeholder value addition impacts. The biggest element is understanding the extent of interest and influence of stakeholders so that they are involved in planning and implementation of activities to facilitate uptake of knowledge and innovation products developed by the WRC.

The WRC is moving towards stakeholder engagement organised for socio-economic impact (to benefit society, the economy, and the nation), including striking an appropriate balance between academic impact (shifting understanding and advancement of scientific methods, theory and practise), instrumental impact (influencing the development of policy, practice, shaping legislation and changing behaviour) and conceptual impact (contribution towards understanding of policy issues and reframing debates).

Key strategic initiatives:

- In organising for greater impact, knowledge products developed by the WRC will be fast-tracked to where they can have influence and impact on policy development and practice, service provision, legislation and change in behaviour
- Further projects and services that could potentially introduce new or improved technologies to the market, promote job creation, stimulate economic development and ensure water security will be developed
- Increased awareness of national, provincial and local government authorities of the critical balance between development and water availability will be created. Capacity and awareness will not only be built nationally but will be enhanced through international collaborations.

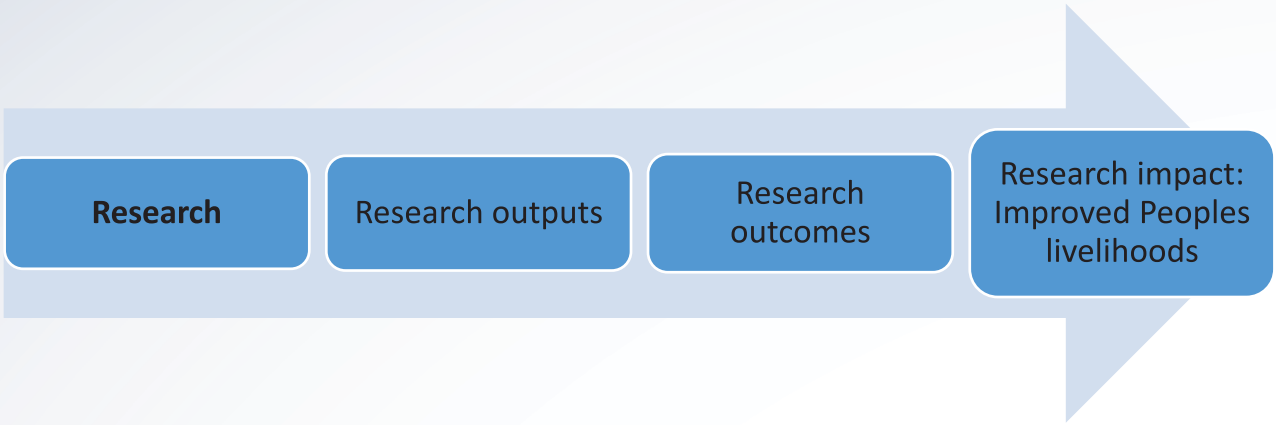
OUTCOME 5: WATER SECURITY – ADAPTATION AND RESILIENCE

ENHANCED LIVELIHOODS RESILIENCE

The WRC will continue to strive to increase the impact of its water and sanitation RDI work. The WRC research and innovation projects and programmes will have to show the intention or path towards making a difference in the lives of people while promoting a healthy environment. Through the research value chain, more effort will be placed on improving the relevance of research and innovation projects and their products (knowledge and innovations) for societal impact. The research process should be carried out such that the research outputs can culminate in outcomes that are achieved for improvement in livelihoods.

The research value chain is depicted in Figure 8.

Figure 8: Research value chain



CLIMATE CHANGE ADAPTATION

Adaptation and resilience to climate change as well as extreme weather events are critical in ensuring water security in South Africa. There are several parts of the country that receive very low annual rainfall (less than 400 mm per year) and the water deficit is increasing due to climate change and other global change factors. The WRC will produce knowledge and tools required to aid decision making in the water and sanitation, agriculture, environmental, municipality and other sectors. The WRC knowledge will assist in improvement of water use efficiency by all users, which results in saving more water that can be utilized (allocated) for other social and economic activities. This will be accompanied by tools and activities that support improvement of water quality. Water security is achieved by having sufficient and good quality water. The WRC will produce knowledge that enables South Africa to adapt and be resilient in the prevailing water-limiting environmental conditions.

Some of the programmes to be carried out are:

- Water reuse, recycling, and reducing
- Exploration and beneficial use (as water supply) of all water sources, such as groundwater
- Reducing (by all sectors) and optimizing water use in irrigation agriculture
- Implementation of non-sewered sanitation in areas with limited water supply
- Reducing water demands and improving water conservation water use efficiency by all users
- Enhancing and supporting early warning systems to prevent water and weather-related disasters will also be central to the WRC's RDI programmes

Implementation will be possible by strengthening collaborative partnerships with key sector stakeholders and enhancement of capacity building at individual, programmatic, and institutional levels.

7 KEY RISKS

The approach to risk management assumed an integrated enterprise-wide risk management which incorporates internal controls into the entire risk management process. The risk management process is premised on a notion that the WRC provides value to its stakeholders. Risks identified will enable the WRC to effectively mitigate against any matters that may impede achievement of the WRC strategy, effectively deal with uncertainty, and take advantage of emergent opportunities.

A risk assessment process was carried out, where material matters were identified, and assessment made at inherent and residual level, with identification of current controls. An assessment was also made as to whether, for each matter, the WRC is impacted over the long, medium or short term. Further, an assessment was made as to how the strategic outcomes are impacted by each matter that was identified.

The strategic risk profile of the WRC per outcome is as follows:

Table 5: Outcomes, risks and mitigation actions

Outcome	Risk name	Impacts	Key mitigating plans
Outcome 1: Efficient and engaged organisation	Misalignment between organizational strategy and people, processes and systems	Loss of productivity Non-compliance to legislation Low staff morale Loss of skills in key mandate areas	1. Review, update and optimize the organizational structure to match the skills and competencies required. 2. Review, refine or re-design the policies, processes and procedures for relevance, and monitoring of adherence thereto. 3. Conduct organizational ethics risk assessments. 4. Introduce change management programmes to make employees aware of the revived strategy. 5. Implement a communication strategy in collaboration with other branches. 6. Review and update the reporting system and processes across the organization and align them with stakeholders. 7. Conduct relevant training and capacity building programmes. 8. Development of the information, communication and technology (ICT) strategy. 9.Finalise the WRC strategy, APP and , monitor, report on quarterly basis. 10. Development and implement a of central document management system. 11. Develop and implement the WRC compliance universe.
Outcome 2: A financially sustainable organization	Possible reduction in revenue base and increase in operating costs	Limitations in resourcing the research and innovation portfolio. Negative Stakeholder reputational impacts	1. Determine the feasibility of engagement with National Treasury for funding prospects. 2. Regular interaction with the DWS and leverage stakeholders on the appropriate funding model and legislative framework. 3. Develop robust communication strategy to get the WRC value proposition known in the sector. 4. Develop and implement the cost containment strategy.
Outcome 3: Innovation-driven water Sector	Uncertainty and variability on the uptake of knowledge and innovative solutions	Reputational implications for the WRC Financial losses - decreased return on investment on technology to market due to incompleteness). 4. Water security efforts not realized. 5. Set economic and social benefits not met in South Africa.	1. Implement the dual strategy on current and future sector needs. 2. Review and update the research and innovation strategy to include other measures in closing the value chain gaps. 3. Develop the intellectual property (IP) policy to advance WRC strategy and to forge good workable relationships with IP owners to easy innovation use/uptake. 4. Implement the WRC communication strategy to target wider range of stakeholders and align to partners who need to adopt the WRC products.

Outcome	Risk name	Impacts	Key mitigating plans
Outcome 4: Empowered and influenced stakeholder	Failure to meet stakeholders' expectations	1. Reputational damage 2. Minimum returns/ impact on investment 4. Inability to effect sustainable knowledge transfer 5. Loss of influence to advance major shifts towards resilience and adaptation	1. Review and finalise the stakeholder management strategy. 2. Develop the stakeholder management implementation plan. 3. Conduct a WRC independent stakeholder satisfaction assessment. 4. Perform regular media monitoring. 5. Develop and/or repackage material targeting specific stakeholder clusters based on their identified needs. 6. Develop robust and digital communication platforms to improve the image of WRC. 7. Review and implement the communication and media strategy. 8. Develop educational materials and programmes to increase public understanding of water science. 9. Enhancement of knowledge dissemination in collaboration with various stakeholders.
Outcome 5: Adaptation and resilience	Failure of the portfolio to respond to adaptive and resilient knowledge solutions	2. Financial loss (or limited return on investment) 3. WRC not fulfilling its strategic mandate. 4,. Water security efforts not realized. 5. Stakeholder expectation not met. 6. Economic and social benefits not met in South Africa. 7. Lack of recognition of relevance by each group of stakeholders	1.Analyze the needs and align them to the current and future challenges relating to water security. 2.Tailor research, development, and innovation to respond to current and future climate change impacts. Fund demonstration and scale up until a decision can be made on appropriateness. 3. Develop smart internal processes for decision-making. 4.Strengthen collaboration with national system of innovation partners, other stakeholders (sector enablers) and sector uptake partners. 5.Transform and retain staff to drive strategy. 6. Increase participation of local stakeholders for research, development and innovation programmes that meet their needs. 7. Source additional funds to support key segments of the knowledge/innovation value chain. 8. Review and finalise the fit-for- purpose research, development and innovation (RDI) structure.

PART D

TECHNICAL INDICATOR DESCRIPTIONS

Outcome 1: An effective and engaged organisation

Indicator title	Enhanced human capital capabilities
Definition	The indicator measures the levels of employee capabilities by implementing training programmes
Source of data	Human capital capabilities – assessment and training provided
Method of calculation or assessment	The indicator will be assessed qualitatively
Assumptions	Reliable records of employee human capability assessment (organizational design) and Training and development programmes implemented
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Corporate Services

Indicator title	Digitally transformed and technologically integrated organisation
Definition	The indicator measures the implementation of the ICT strategy implementation plan
Source of data	Implementation reports
Method of calculation or assessment	The indicator will be assessed qualitatively
Assumptions	Reliable proof of ICT strategy implementation
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Corporate Services

Indicator title	Broad-Based Black Economic Empowerment Score
Definition	The indicator measures assessment of Broad Based Black Economic Empowerment position of the WRC
Source of data	Implementation reports
Method of calculation or assessment	The indicator will be assessed quantitatively through the elements of the empowerment scorecard
Assumptions	Reliable proof of B-BBEE assessment
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Office of the Chief Executive Officer

Outcome 2: A financially sustainable organisation

Indicator title	Percent of total revenue spent on human resources costs
Definition	The indicator measures the total research and innovation costs in relation to the total revenue generated by the organisation
Source of data	Financial records
Method of calculation or assessment	The indicator will be measured quantitively as follows: Human Resources costs / Water Research Levy
Assumptions	Reliable records available for measuring financial performance
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Chief Financial Officer

Indicator title	Percent of total revenue spent on research and innovation costs
Definition	The indicator measures the total research and innovation costs in relation to the total revenue generated by the organisation
Source of data	Financial records
Method of calculation or assessment	The indicator will be measured quantitively as follows: Total research and innovation costs incurred / total revenue generated
Assumptions	Reliable records available for measuring financial performance
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Chief Financial Officer

Indicator title	Current ratio
Definition	To measure ability of the organisation to meet its short-term obligations
Source of data	Finance reports from the accounting system
Method of calculation or assessment	Quantitative Current ratio = current assets/current liabilities
Means of verification	Approved finance reports
Assumptions	Availability of reliable records
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Quarterly
Desired performance	Performance more than the set target
Indicator responsibility	Chief Financial Officer

Outcome 3: Innovation-driven water sector

Indicator title	Curated research and innovation data
Definition	The indicator measures progress in curation of research and innovation data to enable knowledge dissemination
Source of data	Progress reports on curation of research and innovation data
Method of calculation or assessment	The indicator will be assessed qualitatively
Assumptions	Reliable records of showing that research and innovation data is curated
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Indicator title	Operational water research data observatory
Definition	The indicator measures progress in implementation of the water research data observatory
Source of data	Progress reports on implementation of the water research data observatory
Method of calculation or assessment	The indicator will be assessed qualitatively
Assumptions	Reliable records of showing that the water research data observatory is being implemented
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Indicator title	Implemented water and sanitation technologies demonstration platform
Definition	The indicator measures implementation of water and sanitation technologies demonstration platform
Source of data	Progress reports on implementation of technologies demonstration platform
Method of calculation or assessment	The indicator will be assessed qualitatively
Assumptions	Reliable records showing that the water and sanitation technologies demonstration platform is being implemented. The technologies should be those that are ready for implementation where partners have also done an implementation readiness sign-off. A catalogue of such technologies will be developed.
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Indicator title	Technologies transferred to the water sector
Definition	The indicator measures the number of technologies that are transferred to the water sector
Source of data	Progress reports on water technology transfers

Indicator title	Technologies transferred to the water sector
Method of calculation or assessment	The indicator will be assessed qualitatively
Assumptions	Reliable records of showing technology transfers to the water sector. An assessment of technologies and innovations by the WRC will be made and a catalogue of those that are ready for transfer made. Technologies that will be transferred will be selected from the catalogue.
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Outcome 4: Empowered and influenced stakeholder

Indicator title	Impactful stakeholder engagement
Definition	The indicator measures the levels of stakeholder perceptions about the research and development that the organisation enables
Source of data	Stakeholder satisfaction surveys
Method of calculation or assessment	Performance of this indicator will be assessed in a qualitative manner
Assumptions	Reliable records management of stakeholder perceptions
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Innovations and Impact

Indicator title	Capacitated and aware water sector stakeholder
Definition	The indicator measures the levels of capacity building within the water and sanitation sector
Source of data	Water sector capacity building reports
Method of calculation or assessment	Performance of this indicator will be assessed in a qualitative manner
Assumptions	Reliable records of capacity building within the water and sanitation sector
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Indicator title	Research communication and engaged stakeholder
Definition	The indicator measures the levels of research communication as an instrument to enable water research engagement
Source of data	Research communication reports
Method of calculation or assessment	Performance of this indicator will be assessed in a qualitative manner
Assumptions	Reliable records of research communication within the water and sanitation sector
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable

Indicator title	Research communication and engaged stakeholder
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Indicator title	Highly skilled water sector
Definition	The indicator measures human capacity development within the water sector
Source of data	Water sector skills development reports
Method of calculation or assessment	Performance of this indicator will be assessed in a qualitative manner
Assumptions	Reliable records of capacity building within the water and sanitation sector
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Knowledge and Impact

Outcome 5: Water Security - Adaptation and resilience

Indicator title	Water security: Enhanced livelihoods resilience
Definition	The indicator measures the development of research and products developed for livelihoods resilience against the climate change impacts
Source of data	Research and innovation products developed for enhanced livelihoods
Method of calculation or assessment	Performance of this indicator will be assessed in a qualitative manner
Assumptions	Reliable records showing reports published
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Research, Development and Innovation

Indicator title	Water security: Climate change adaptation
Definition	The indicator measures the development of research and products developed for adaptation to climate change
Source of data	Research and innovation products developed for climate change adaptation
Method of calculation or assessment	Performance of this indicator will be assessed in a qualitative manner
Assumptions	Reliable records showing reports published
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Desired performance	Performance higher than expectations is desirable
Indicator responsibility	Executive: Research, Development and Innovation

WATER RESEARCH COMMISSION (WRC)

Tel: +27 (0)12 761 9300
Email: info@wrc.org.za
Web: www.wrc.org.za

Physical address: Lynnwood Bridge Office Park, Bloukrans Building, 2nd Floor, 4 Daventry Street, Lynnwood Manor, Pretoria

Postal address: Private Bag X03, Gezina, 0031, Pretoria, South Africa