Water Research Commission

ANNUAL PERFORMANCE PLAN

For the 2024/25 financial year

FOREWORD BY THE MINISTER OF WATER AND SANITATION

In 2024, South Africa will celebrate 30 years of democracy and the great strides have made over the past three decades to protect the water resources and broaden access to water and sanitation for the South African citizens as espoused by the Bill of Rights in the Constitution of the Republic of South Africa, considering theclimate change challenges.

The Department of Water and Sanitation is aware of the existing challenges including the impacts of climate change as realised, the number of people that are still unserved and the high cost of upgrading the existing infrastructure. These challenges further give rise to the quality and quantity discourse that is implemented at different spheres while regulated at a policy level in the department.

In this regard, the growing demand for South Africa's water resources is increasing owing to drivers of change including, increasing population, rapid urbanisation, economic development, high allocation of water to agriculture and the human health demand for better quality of water. Amidst these challenges, the Ministry remains steadfast to the achievement of the NDP targets and SDG 6 by 2030. Our ambition is driven by the existence of- and Research Development and Innovation (RDI) contribution by the WRC towards solving short- to medium and long-term challenges facing the South African water sector. RDI products are focused on contributing towards adaptation and resilience for the sector from the areas of water quality and health, water availability, water use, climate change, water governance, skills development, and capacity building, notwithstanding the critical area of knowledge dissemination towards a water wise sector and broader South African community.

The challenge of sustainable service delivery must be addressed amidst a water landscape that is inherently semi-arid, has a low average annual rainfall and, per capita water availability which forces us to expand our thinking beyond traditional forms of water supply. South Africa is fast approaching physical water scarcity which is highly related to the sustainable management of the available resource. Thus, we continuously strive to expand our water mix with alternative water resources such as reclaimed and desalination water as well as adjunctive use of groundwater. At the same time, it is up to all water users to use water more efficiently and effectively. The WRC through its RDI further strives to innovate in the sanitation space through the South African Sanitation Technology Enterprise Program (SASTEP), where water efficient alternatives to the conventional toilets are being developed with research and commercial partners. The

commission is further highly active in addressing climate change impacts resulting from the extreme and erratic weather patterns, through the development of Early Warning Systems (EWS) and the ongoing review and update of planning and water use models, while continuously providing advisory services to the sector based on the observations of the global and regional climate change models and the announcements made by the South African Water Services (SAWS).

Thus, the role of RDI in responding to the water and sanitation challenges in South Africa, remains a key to enhance evidence-based-making. As such, the DWS supports water related RDI as set out in the Water Research Act (WRA) and the National Water and Sanitation Master Plan (NWSMP). This is with a view to ensuring that there is highly informed water decision-making through science and technology at all levels, in all stakeholder groups, and innovative water solutions through RDI for South Africa. The DWS will thus continue to support efforts that position the country and its institutions as a global water knowledge node across the whole water and sanitation innovation value chain. New ideas and innovations informed by research and development in partnership with the WRC is crucial in order that we can continue to break new ground informed by science and technology.

We require of the WRC continued assistance in strategic identification of needs in the water sector and continue to commit to investing in knowledge creation, transfer, and dissemination in strategic research areas.

Mr S Mchunu, MP
Minister of Water and Sanitation

ACCOUNTING AUTHORITY STATEMENT

The Annual Performance Plan is prepared in alignment with the Water Research Commission (WRC) Strategic Plan 2023/24 to 2027/28. The Annual Performance Plan translates the strategic focus areas of the organisation into a set of outputs for effective implementation of the mandate and to support the South African water sector through meaningful research, development and innovation (RDI). The WRC's outputs are rooted in the pursuit of scientific excellence, innovation, capacity development, societal engagement, and anchored in a conducive, diverse and impactful working environment.

Water security remains one of the biggest challenges facing South Africa and the world in the twenty-first century. Demand is currently outstripping supply and, as pointed out by the Department of Water and Sanitation (DWS), if no substantive action is taken, the country could face a deficit of at least 2.7 billion m3/year by 2030 (a gap of about 17% of available surface and groundwater).

This situation is exacerbated by climate change and associated extreme weather events, such as droughts and floods. Recent extreme weather events such as the 2023/24 floods in KwaZulu-Natal floods and the Western Cape have elevated the national conversation on water security and its centrality in the socio-economic imperatives of the country. Furthermore, persistent drought in the Northern Cape highlights the magnitude of challenges and vulnerabilities in South Africa's water system that require urgent interventions to ensure long-term water security for South Africa.

The WRC will therefore continue to support its stakeholders in the pursuit of long-term water security, including universal access to water for sustainable socio-economic development and aid other entities to deliver dignified sanitation to the underserviced. This year sees the introduction by the RDI programme of five thematic areas through which new knowledge creation, innovation development and capacity building will be pursued. They are water availability, water use, water quality and health, and water advisory support. A fifth programme, knowledge and impact, works to empower and inform targeted stakeholders of new water and sanitation related knowledge so that it may lead to positive change in the sector.

The WRC's RDI activities remain focused on the generation of new knowledge and innovations, continuously building human capital with skills required to support sustainable water management. Performance is specifically centred around technology demonstration and transfer, stakeholder engagement, and contributing to adaptation and resilience initiatives.

These activities will be undertaken with the current economic climate in mind. While the South African research enterprise has seen some growth in the past two decades, strategic research areas such as water, energy and food security 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 WRC remains one of the biggest funders of water research in South Africa and is mainly financed through the water research levy collected by water boards and the Department of Water and Sanitation through the sales of water to local municipalities. Growing municipal debt has placed this source of funding under pressure, requiring the WRC to follow austerity measures while seeking alternative sources of funding through strategic research partnerships. In 2024/25, the WRC will continue to implement key business processes to strengthen financial governance in all of the Commission's business areas.

Dr RB Melamu
Chairperson of the Governing Board

OFFICIAL SIGN-OFF

It is hereby certified that this Annual Performance Plan:

- Was developed by the management and the Governing Board of the Water Research Commission under the guidance of Mr S Mchunu MP, the Minister of Water and Sanitation.
- Considers all relevant policies, legislation, and other mandates for which the Water Research Commission is responsible.
- Accurately reflects the outputs which the WRC will endeavour to achieve over the 2024/25 planning period.

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LIST OF ACRONYMS

4IR	Fourth Industrial Revolution
Agenda 2063	African Union, Agenda 2063
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
WRA	Water Research Act
WRC	Water Research Commission
WRL	Water Research Levy
WSA	Water Services Act, 1997 (Act 108 of 1997)
WSDP	Water services development plan

TABLE OF CONTENTS

PART A: OUR MANDATE

1. LEGISLATIVE AND POLICY MANDATES

1.1. Legislative Mandate

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

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 have access to sufficient food and water.

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

Water Research Act (Act 34 of 1971)

The primary aim of the Water Research Act (Act 34 of 1971) is to provide for the promotion of research in connection with water affairs. The objective of the WRC is to co-ordinate, promote, encourage, or 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. Furthermore, the WRC includes mandate includes research on the use of water for agricultural, industrial, or urban purposes.

The Water Research Act (WRA) 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.

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.

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.

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 to water supply and sanitation needs with research and development that helps to address those needs.

Water Research Amendment Bill

Evolution of governance structures will address how the current and future water knowledge gaps 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 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

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, the DWS, and the water sector to determine research needs; and between the WRC, Department of Science, and Innovation (DSI) and National Research Foundation (NRF), to a consistent approach to 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.

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 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.

National Water and Sanitation Master Plan (NWSMP)

The National Water and Sanitation Masterplan (NW&SMP) intends to coalesce water users and all the water management institutions (WMIs) 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 atthe local government level and with other sector partners. The plan is directed towards implementation oftangible actions that have an impact on the management of South Africa's water resources and the supplyand use of water and sanitation in the country.

The NW&SM proposes three pillars for research development and innovation: research activities, skills development, 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 pillaron skills focuses on high-end skills to ensure that there are suitably qualified individuals to drive the systemof 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 several 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.

African Union, Agenda 2063

Agenda 2063 of the African Union (Agenda 2063) 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, 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.

United Nations Sustainable Development Goals (SDGs)

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 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.

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.

Economic Reconstruction and Recovery Plan

The Economic Reconstruction and Recovery Plan (ERRP), published by the National Treasury during 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.

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 this strategy over the 5-year planning period.

PART B: OUR STRATEGIC FOCUS

2. 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. Thesecond 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.

2.1 External environment

The outcome of an external environmental analysis provides the identification of strategic capabilities and external considerations that may affect delivery on the WRC's mandate. The impact of these external

factors on industry drivers and the sector is immense and is disruptive to current business models. The water sector and the WRC are no exception.

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

Climate Change

Climate change is one of the most powerful global forces inspiring a new business narrative, as it may destabilise markets, curb economic growth, and impact on human capabilities. Weather patterns are increasingly becoming extreme, and less favourable, with an increased frequency of occurrence including the increasing occurrence of high temperature events that are projected to continue rising, while climatic and rainfall patterns are expected to shift.

Climate change is a global issue and Africa suffers its deleterious effects to a disproportionate degree despite contributing the least amount of global greenhouse gas emissions. Its severe impacts are widely felt particularly in agricultural development due to varying rainfall which leads to flooding in some areas and drought in others. 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. It is estimated that about 4% of global annual economic output could be lost by 2050 due to climate change. With the currentclimate 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.

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 African 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

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 revenue 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 infrastructure. The WRC's role in developing tools and knowledge for supporting Early Warning Systems (EWS) for weather-related disasters has become critical at local, and national levels.

With the abundance of solar, wind and geothermal resources, African countries have a comparative advantage regarding 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 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 essential element of enhancing food security in South Africa.

Given the aforesaid, there is a need to leverage science for innovation to improve climate change adaptation and contribute towards resilience. 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, to facilitate responses that build resilience.

Fourth Industrial Revolution in the Water Sector

The Fourth Industrial Revolution (4IR) involves a range of innovative technologies and new forms of connection between various economic actors, with Information and Communication Technology (ICT) and digitisation being critical. 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 involve 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 provides opportunities to global and national economies by creating the potential to influence and address complex societal challenges. The adoption of 4IR can 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 economic 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 emerged societal sectors, including the water sector.

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 to transform 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 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.

A New Societal ‘Deal’

Cooperation amongst business, society and government is required for sustainable economic development’ thus a new societal ‘deal’ is required. This new deal will spur advancement of research impactacross 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 presents a policy intent to support a science-literate and science-aware society. A societythat is aware of the value and potential of science can evaluate the products of science and utilize them intheir daily lives. Greater awareness of science also enables stimulation of interest of young South Africansin 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.

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 RDI in South Africa have not substantially increased in comparison to the rest of the world, meaning that strategic research areas such as water, energy and food security 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 on 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. There is a need to explore other funding sources for water RDI, with the private sector being the most obvious partner. Countries that have business funding a major component of their research have recorded huge economic growth in comparison to those where funding is mostly from government.

The institutional landscape in water RDI comprises several research groups located within the Higher Education Institutions (HEIs) and in private sector consulting services. The institutional landscape governing water RDI 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 (NW&SMP), 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 and presents a challenge to attaining the NDP target and to being a real global player. The water sector will not perform at its optimum level 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.

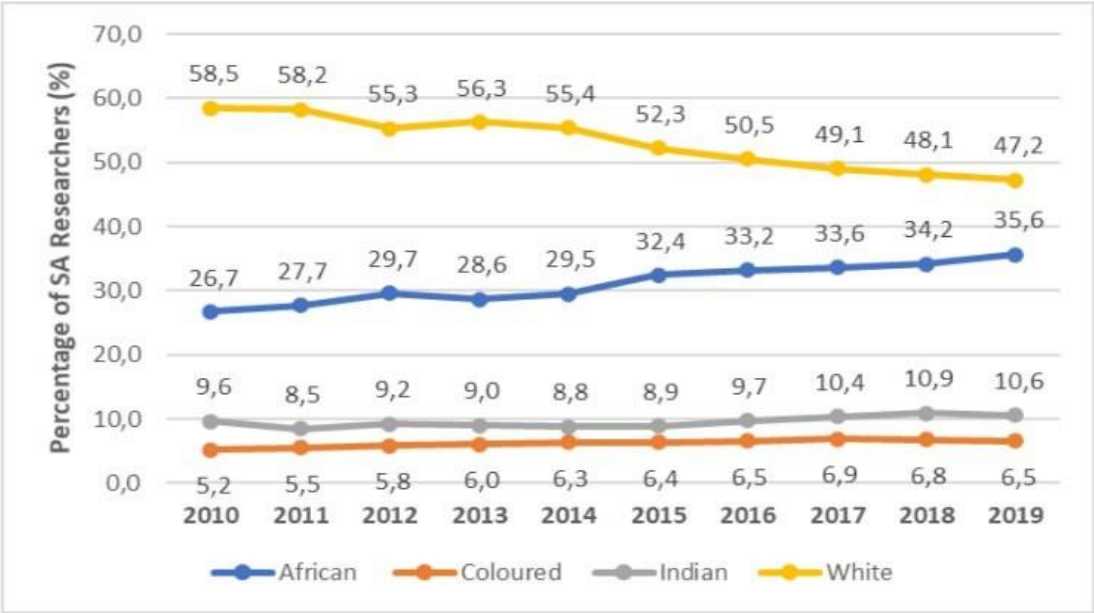

Figure 1: Racial profile of South African researchers

Therefore, support and funding of research and development by DWS and other government departments 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.

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 without exhausting all available means - 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 (WSP), 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, particularly where the procurement policy of government does not factor in RDI as part of/ options available to address water and sanitation challenges.

South Africa is generally well-endowed with water resources infrastructure (that is ageing in some cases, while there is still a significant society that is still unserved) and is highly dependent on it to maintain reliable water supply. 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, from industrial and domestic effluents as well as diffuse pollution from agriculture, 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.

The South African economic environment

Global economic growth has slowed at a rate that is greater than anticipated, the South Africa's GDP growth also was constrained and worsened in the second quarter of the 2022, with a steady recovery path commencing at the start of 2023. Adverse international developments contributed to the deterioration in economic growth with the outlook remaining weaker, with expected growth of approximately 1%. In South Africa, the high inflation that is persisting longer than expected (owing to the lingering impacts of the COVID-19 pandemic, the energy crisis, the high cost of basic food owing to the conflict between Russia and Ukraine), has resulted in a slow global expansion, with the South African inflation projected to decline further to 4.5% in 2024. 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.

The WRC is funded through the Water Research Levy (WRL), collected by water boards and the department of water and sanitation, from the sales of water volume to the local municipalities and metros. Due to the challenges including high interest rates and reduced disposable income to households, there has been observations of negative impacts where municipality debt to water the boards is growing, posing a high risk for the water boards' ability to consistently pay over the WRL to the WRC. Subsequently, the financial sustainability of the WRC is threatened.

The cabinet has resolved to advise government departments and entities including the WRC to exercise austerity measures owing the constrained fiscus and this poses a risk on the effective implementation of the water RDI mandate while products of research are critically important to influence policy making, planning and decision making. Furthermore, the inclusion of innovation and technology as solutions to improve service delivery is critical where water and sanitation service delivery, the old way seems to not yield positive outcomes in the achievement of the constitutional imperatives of water and sanitation provision as human rights. A key intervention in the procurement policy is required including stimulation of the investment in the water and sanitation economy which holds high prospects for economic growth and job creation.

2.2 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 detailed dimensions:

Resourcing of the Water RDI 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 from the primary mandate of the 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 volume of water sales, and pay it over to the WRC for implementing the water RDI mandate.

Leverage income arises when the WRC, in partnership with other organisations, undertakes water RDI projects where it may or may not 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 expand the water RDI impact by ensuring that the leverage-funded projects do not adversely impact on the primary mandate of the WRC but complements the fulfilment of the mandate.

The operating environment of the WRC is impacted by sluggish economic growth, reduced capacity of the fiscus and the ongoing uncertainty of undulating business cycles. Leverage 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 leverage funds may be attractive and useful to ensure water RDI impact that is visible, the associated overheads related to accommodation, HR and Finance resources is growing, making it necessary to grow the support structure at the 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.

Information and Communication Technology

The ICT environment within the WRC has been identified as an area that requires attention so that the organisation can digitally transform and is a governance imperative to ensure suitability to support the implementation of the water RDI. The WRC has developed an ICT governance strategy which will be implemented over a period of three years. The strategy will be used as a strategic base for the development of policies, processes and decision-making structures that guide the use of ICT within the organisation. Through digital transformation and ICT governance, the WRC will leverage technology to manage risk, ensure optimal use of resources, streamline operations, and enhance productivity.

Organisation and Culture

The WRC recognises the importance of shared values and practices to shape the behaviour of individuals within the organisation and to inculcate a people-centred culture which embraces diversity, execution-supportive attitudes, behaviour, integrity and ethics, and work practices, where a results-oriented work climate is encouraged and espoused. This type of culture will enable alignment of rewards and incentives directly to achievement of strategic outcomes.

Organisational Structure

The WRC structure (Figure 2) is organised into five key fit-for-purpose programmes to enable execution of the governance, strategic and operational imperatives of the organization. In 2023.24, the WRC embarked on the review and update of the structure, which sought to create an alignment of positions and create a cost-sensitive organization for the implementation of the mandate. The structure is organised into the Administration and Governance, Finance, Corporate Services, RDI and Stakeholder and Impact programmes and presented below. The Management of the WRC reports to the Accounting Authority (AA) appointed by the Minister of Water and Sanitation, and delegates day to day operational activities to the Chief Executive officer (CEO).

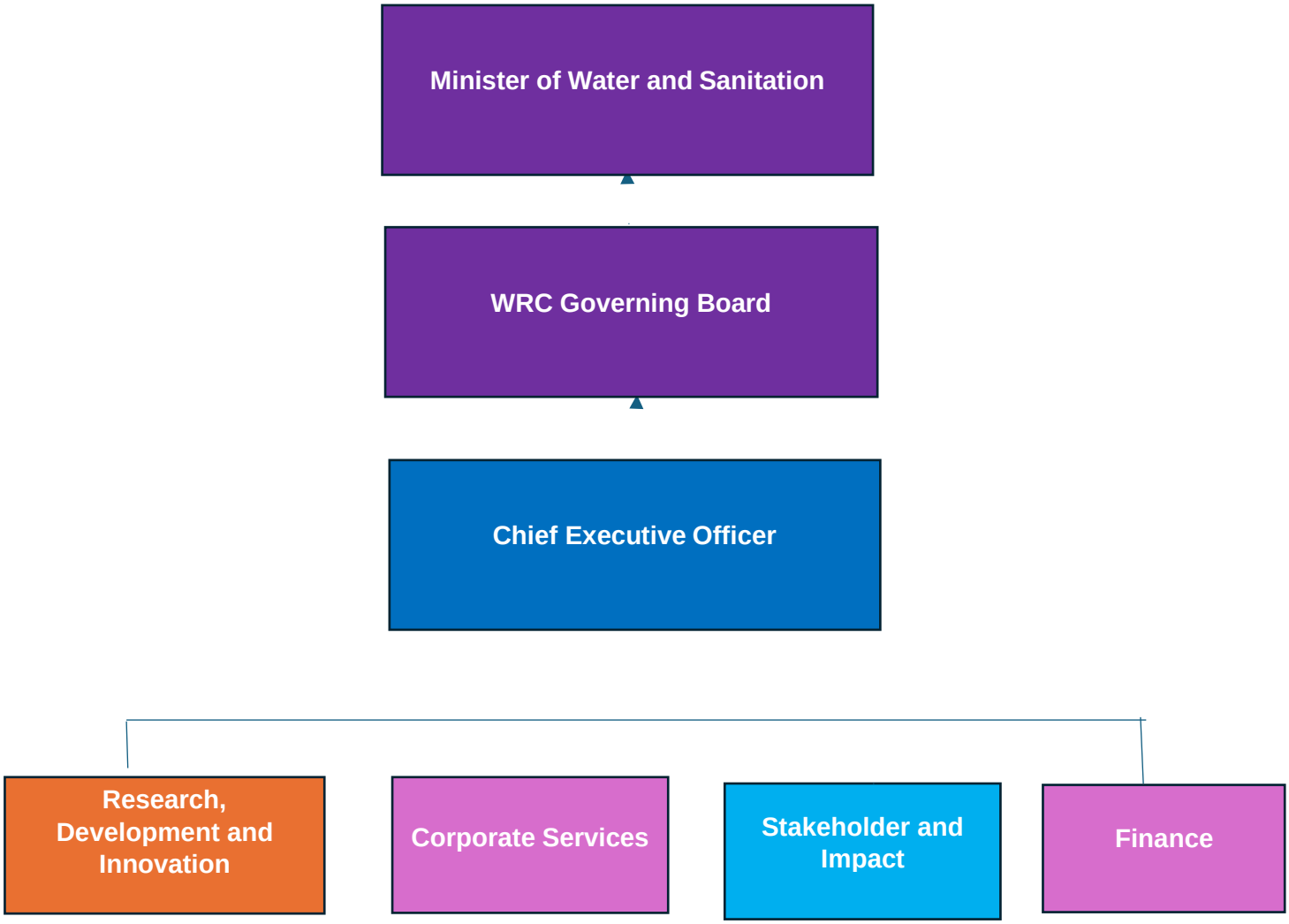

Figure 2: *High-level organisational structure*

PART C: MEASURING OUR PERFORMANCE

3. INSTITUTIONAL PROGRAMME PERFORMANCE INFORMATION

The optimal operating model design was utilized to arrange organizational capabilities into a programme structure to implement strategic outcomes as follows:

- Programme 1: Administration and Governance
- Programme 2: Corporate Services
- Programme 3: Finance
- Programme 4: Research, Development, and Innovation
- Programme 5: Stakeholder and Impact

3.1 Programme 1: Administration and Governance

The purpose of this programme is to provide strategic direction and leadership to the organization where the five-year strategy is operationalised through the Planning, Monitoring and Evaluation (PME), Risk and Compliance Management, ICT governance, and setting up appropriate parameters for organisational performance. The extent of the programme lies within the Office of the Chief Executive Officer (CEO). Assurance services are provided to the Governing board through the Board Governance and the Internal Audit services, which administratively report to the CEO.

3.2 Programme 2: Corporate Services

The Corporate Services function is responsible for providing an organization wide value proposition through Human Resources and Legal and Auxiliary Services programmes. Corporate Services aims to create a workplace that is centred around meaning and impact in line with the WRC strategy, through an agility to respond to the opportunities provided in the external and internal environment. The programme addresses organisational transformation and focuses on the enhancement of effective leadership, an improved level of staff performance, and legal services as well as records management and facilities services.

3.3 Programme 3: Finance

The current revenue trajectory of the organisation could be affected by external factors and the high cost of doing business, given the volatility within the water services sector including the growing municipal debt. The WRL as the WRC's primary source of revenue (80%) for the WRC, is currently at risk due to its dependency on the ability of water users to pay for the volume sold to municipalities. A strategy will be developed to optimise the revenue and resource allocation cycles to yield a financially sustainable WRC.

Furthermore, key business processes will be identified to strengthen financial governance in all the WRC's key business areas.

Key priorities over the medium term are as follows:

- Enhanced controls over major expenditure categories.
- Enhance Supply Chain Management to obtain cost-effective solutions.
- Management of partnerships for improvement of leverage funding.
- Monitoring of key financial trends and taking corrective actions where necessary.

3.4 Programme 4: Research, Development, and Innovation

Ensuring water security and continuous access to water for socio-economic activities in South Africa and the region is a key priority and core technical mandate of the WRC. The RDI programme focuses on the generation of new knowledge and innovation, and necessary enabling mechanisms including continuously building human capital with the requisite cohort of skills required to support water RDI. The outputs from the RDI interventions generate results in new or adapted technologies and innovations which the WRC provides to the water and related sectors to address specific needs, priorities, opportunities, and challenges. It supports, ensures, and facilitates innovations and technologies that enable uptake along the innovation value chain and ultimately have greater impact. The programme continues to support and encourage new RDI initiatives which adequately address these challenges and associated risks. Projects span the water value chain including sanitation. This is implemented through active engagement with stakeholders to contribute to the RDI agenda and associated prioritization and funding.

The co-funding through leverage projects from water and associated sector departments and entities, as well as private sector and donor organizations, provides a critical augmentation to the WRL, and provides opportunity for extending the water RDI impact. Through the RDI programme, there is significant progress made to inform policy and decision-making, pilot novel approaches and processes, provide skills and training development, improve community and citizen science ambassadors' involvement as well as significantly contributing to the global scientific endeavour. The programme continues to provide new tools and systems to enhance our ability to deal with environmental and economic shocks and to build the required resilience.

The programme executes its strategy through five (05) thematic areas as detailed.

Theme 4.1: Water Availability

Improving water availability through resource expansion and discovery is vital for tackling water stress and ensuring sustainable water resource management in South Africa. The Water Availability thematic area seeks to ensure sustainable water availability across all scales and contexts; and to produce innovations that resolve water challenges and improve water management practices.

Theme 4.2: Water Use

Water Use thematic area seeks to provide knowledge and innovation that ensures reliable, affordable, and efficient water use services in the domestic, industrial, agriculture and mining areas to enhance quality of life and contribute to economic growth and improved public and environmental health.

Theme 4.3: Water Quality and Health

The thematic area drives integrated research and innovation to generate new knowledge, insights and data to inform the establishment of appropriate health-based targets and thresholds for different water uses, development and deployment of appropriate and innovative water treatment and ecological infrastructure rehabilitation methods, inform adaptive strategies, and support the development of effective interventions to protect public/environmental health, build resilient communities and contributeto the attainment of water security.

Theme 4.4 Water Advisory Support

The water advisory support theme seeks to support extension services and strengthen capacity building instruments through support for centres of excellence, communities of practice, Research Chairs, and advisory panels in the areas of importance at local, district, provincial and national level. The theme will be accelerating development support for technologies ready for demonstration, transfer and advisory as well as to support grassroots innovators, startups and entrepreneurs while building resilience.

Theme 4.4 Knowledge Services

The water RDI products must reach the target audience and different level of expertise including the Academia, Students, Regulators and policy developers, Water Services and Resources entities, and other water and sanitation and other associated government departments. An unremitting challenge for the WRC is to improve the accessibility of WRC-generated knowledge to the stakeholders it is intended to reach in a format that is acceptable and understandable for each stakeholder type. Effective knowledgedissemination often requires the distribution of the same key messages in multiple formats and via multiplechannels to reach and inform different stakeholders. The WRC will work towards creating specific knowledge dissemination methods and strengthen existing tools to cater for the knowledge and information needs of its specific stakeholders.

3.5 Programme 5: Stakeholder and Impact

The WRC's five (05)-year strategy is premised on recognising the importance of the role played by the stakeholders to ensure that water RDI products taken up, used and contribute to adaptation and creation of a resilient water sector. The WRC developed a stakeholder management strategy focusing on partnerships, that contribute to the RDI agenda setting, while in some cases funding/ co-funding the water RDI projects. The RDI products will be promoted and displayed through a comprehensive communication and promotions strategy implementation plan where the broader water and associated sectors as well as the South Arican public will derive benefit. Critical to the monitoring of impact, will be the feedback from stakeholders and acquired through ongoing surveys and improvement of the services delivered by the WRC to the stakeholders.

Collaborative partnerships and stakeholder engagement (both local and international) are not only aimed at extending the WRC footprint and profile, but also to enhance the impact of WRC knowledge and innovation products through the multiplier effect. Awareness and access to credible research and innovation products and solutions relevant to the world's water challenges will lead to improved decision-making and uptake within the water sector.

4. OUTCOMES, OUTPUTS, PERFORMANCE INDICATORS AND TARGETS

The programme outputs, performance indicators and targets aligned to outcomes as tabled (Table 2):

Table 2: Outcomes, outputs, performance indicators and targets

Outcome	Output	Output indicators	Annual targets	
			Estimated performance	
			2024/25	2025/26
Outcome 1: Efficient and engaged organisation	1.1 Employee development	1.1.1 Percentage employee training and development budget spent	50% of training and development budget spent	60% of training and development budget spent
	1.2 ICT governance	1.2.1 Percentage implementation of the ICT strategy	40% of the ICT strategy implemented	60% of the ICT strategy implemented
	1.3 WRC transformation	1.3.1 Percentage implementation of the WRC transformation plan	40% of transformation plan implemented	60% of transformation plan implemented
Outcome 2: A financially sustainable organisation	2.1 Cost containment	2.1.1 % HR cost to total income	35% HR cost to total income	35% HR cost to total income
Outcome 3: Innovation driven water sector	3.1 innovation demonstration	3.1.1 Percent of innovations demonstrated	30% of innovations demonstrated	50% of innovations demonstrated
	3.2 Innovation transfer	3.2.1 Percent of innovations transferred to stakeholders	20% of innovations transferred to stakeholders	30% of innovations transferred to stakeholders
Outcome 4: Empowered and influenced stakeholders	4.1 Stakeholder management	4.1.1 Percent implementation of stakeholder management plan	50% implementation of stakeholder management plan	60% implementation of stakeholder management plan
		4.1.2 Percent implementation of partnerships plan	30% of partnerships plan implemented	50% of partnerships plan implemented

Outcome	Output	Output indicators	Annual targets	
			Estimated performance	
			2024/25	2025/26
	4.2 Knowledge dissemination	4.2.1 Percent implementation of knowledge dissemination plan	60% of knowledge dissemination plan implemented	70% of knowledge dissemination plan implemented
	4.3 Communication and promotion	4.3.1. Percent implementation of communication plan	40% of communication plan implemented	60% of communication plan implemented
	4.4 Human Capacity Development	4.4.1 Number of candidates supportedfor capacity enhancement (bursaries and other financial support)	250	300
Outcome 5: Adaptation and resilience	5.1 RDI products	5.1.1 Percent of resilience related projects per total number of completed RDI projects	30% resilience related projects	30% resilience related projects
		5.1.2 Percent of adaptation related projects per total number of completed RDI projects	50% adaptation related projects	50% adaptation related projects

Table 3: Quarterly Outcomes, outputs, performance indicators and targets

Indicator Number	Output indicators	Annual Target 2024/25	Quarterly Targets			
			Quarter 1	Quarter 2	Quarter 3	Quarter 4
1.1.1	1.1.1 Percentage employee training and development budget spent	50% of training and development budget spent	-	20% of training and development budget spent	-	30% of training and development budget spent
1.2.1	1.2.1 Percentage implementation of the ICT strategy	40% of the ICT strategy implemented	-	10% of the ICT strategy implemented	-	30% of the ICT strategy implemented
1.3.1	1.3.1 Percentage implementation of the WRC transformation plan	40% of transformation plan implemented	-	10% of transformation plan implemented	-	30% of transformation plan implemented
2.1.1	Percent of total revenue spent on Human Resources costs	35% HR costs in relation to the total revenue	-	-	-	35% HR costs in relation to the total revenue
3.1.1	3.1.1 Percent of innovations demonstrated	30% of innovations demonstrated	-	10% of innovations demonstrated	-	20% of innovations demonstrated
3.2.1	3.2.1 Percent of innovations transferred to stakeholders	20% of innovations transferred to stakeholders	-	5% of innovations transferred to stakeholders	-	15% of innovations transferred to stakeholders
4.1.1	4.1.1 Percent implementation of stakeholder management plan	50% implementation of stakeholder management plan	-	20% implementation of stakeholder management plan	20% implementation of stakeholder management plan	10% implementation of stakeholder management plan
4.1.2	4.1.2 Percent implementation of partnerships plan	30% of partnerships plan implemented	-	10% of partnerships plan implemented		20% of partnerships plan implemented

Indicator Number	Output indicators	Annual Target 2024/25	Quarterly Targets			
			Quarter 1	Quarter 2	Quarter 3	Quarter 4
4.2.1	4.2.1 Percent implementation of knowledge dissemination plan	60% of knowledge dissemination plan implemented	10% of knowledge dissemination plan implemented	20% of knowledge dissemination plan implemented	20% of knowledge dissemination plan implemented	10% of knowledge dissemination plan implemented
4.3.1	4.3.1. Percent implementation of communication plan	40% of communication plan implemented	10% of communication plan implemented	10% of communication plan implemented	10% of communication plan implemented	10% of communication plan implemented
4.4.1	Number of candidates supported for capacity enhancement (bursaries and other financial support)	250 candidates	-	-	100 candidates	150 candidates
5.1.1	Percent of resilience related projects per total number of completed RDI projects	30% resilience related projects	-	-	-	30% resilience related projects
5.1.2	Percent of adaptation related projects per total number of completed RDI projects	50% adaptation related projects	-	-	-	50% adaptation related projects

5. EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

To provide an outline of planned performance over the 2-year period, strategic intents were organised per programme for effective strategy execution. Key priorities over the medium term are as follows:

5.1 Programme 1: Administration and Governance

The programme seeks to ensure that the corporate compliance cycle and the governance framework of the WRC is implemented. This programme also gives effect to the assurance services of the WRC, which will be carried out through a combined assurance framework to ensure that performance and risk are linked, and that management also provides assurance in the key controls that they effect.

Implementation of a risk-based strategic internal audit and a rolling 3-year operational plan is also a key deliverable of this programme. This includes implementation of a risk management strategy that includes strategic risk and operational risk management processes, and risk appetite and tolerance levels, including business continuity management.

5.2 Programme 2: Corporate Services

The potential for excellence in delivery on the WRC mandate will be enhanced by how the organisation structures itself. The transformation of the workplace due to the COVID-19 pandemic and the Fourth Industrial Revolution and their consequences remain the reason the WRC has continued to be intentional in reinventing people, practices, and processes in alignment with shifts in infrastructure technology and spaces within the WRC. The hybrid work modality has become and continues to be a new way of working and will be pursued over the medium term. Technology has accelerated the implementation of remote working and digital enablers that encourage an agile environment. This will be achieved through the incremental implementation of the three (03)-year ICT strategy and the effective ICT governance structures. Our purpose is to facilitate a positive employee life experience by enabling personal and professional growth through inspirational leadership. The employee value proposition is entrenched to influence a meaningful working environment that enables the evolution and integration of technology, innovation, and people through strategic partnerships, leading to the WRC becoming a preferred employer. The new strategic approach to have an engaged organization is underpinned by a game-changing mentality to unlearn, relearn, and upskill while driving and implementing the 'employee value proposition' with the approach focusing on:

- Efficiency
- Innovation
- Connecting people

Further, an independent institutional assessment and an organisational review exercise will be finalised. These assignments seek to review the structure of the WRC, for its strategic-fit and alignment to the WRC mandate. Key positions may be created, wherein recruitment may take place to align with the mandate, impact, and outcomes of the WRC.

5.3 Programme 3: Finance

The medium-term focus of the program is to ensure there is strategic sound financial management and reporting and through strategic procurement increase the ability to spend less and buy more. This is linked to a pursue of leverage funding to augment and the WRL while increasing the impact. Through a partnership approach more projects will be implemented while valuable contribution to human capital and skills development is enhanced.

5.4 Programme 4: Research, Development, and Innovation

Opportunities to create value in all its RDI programmes, projects, and activities will continue to be sought. Global trends and a futuristic view will be incorporated to benefit the water and science, technology, and innovation (STI) sectors in South Africa, Africa, and beyond. The monitoring and evaluation outcomes will provide intelligence without bias regarding what should be discarded and what should continue, based on identified gaps.

The RDI programmes and approaches will address the water and sanitation sector needs and other knowledge users. Greenfields research areas will be introduced, especially those supporting the current and future water industry which, among others, will include the following:

- Hydrogen science & technology (to support the hydrogen economy)
- Artificial intelligence and robotics for water and sanitation management
- Water and sanitation outreach/extension
- Water and sanitation training and reskilling
- The economics and finance of water and sanitation

Every existing programme should plot a new direction that benefits the users and the sector. As a result, the identified RDI greenfield projects will be resourced internally and with funds from partners.
Further, the following initiatives will be implemented over the medium term:

- Establishment of impactful projects in a needy community or municipality to provide solutions and products required; these change-making programmes will be funded internally and by the private sector.
- Strengthen collaboration with users and in knowledge dissemination and demonstration programmes.
- Facilitate transformation of research and innovation community of practice by increasing participation of rural and semi-urban communities in water and sanitation knowledge creation

- Improve capacity building for continuation of impacts and outcomes of leverage projects and build institutional capacity to continue with some of the projects after they are handed over to funders.

Knowledge Management

Under knowledge management services the ley priorities will include:

- Strengthening knowledge editing and improvement of initiatives supporting public understanding of water science
- Development of state-of-the-art knowledge systems, providing superior web access, web services, interactive access, hosting of various services, apps, and mobile access
- Improved writing and sharing of our impact story.
- Superior content development and content amplification
- Developing knowledge products supporting learning and capacity building for various stakeholders

5.5 Programme 5: Stakeholder and Impact

The key priorities for this programme over the medium term are as follows:

Stakeholder management

- Development and finalization of a new stakeholder management strategy to include the entire WRC stakeholder ecosystem which included, among others, the shareholder, researchers, research funders, beneficiaries, and internal stakeholders.
- International stakeholder engagement and partnerships for knowledge sharing, joint programmes, and activities
- National stakeholder engagement coordination; partnerships for engagements, uptake, and implementation
- Internal stakeholders: internal staff act as ambassadors of WRC knowledge and innovations.

International Cooperation and partnerships

- Coordinates establishment and management of collaborative partnerships with partners beyond South Africa's borders
- Implements joint learning activities (implementation of knowledge-sharing activities and dissemination through partner communication platforms)
- Contribute to launch of joint R&I calls for multilateral projects and management of successful South African projects arising from joint calls.
- Establish and manage capacity building programmes targeting the African continent and developing countries.
- Establish technological and innovation cooperative partnerships to facilitate scaling up and uptake of WRC products.

Promotion of research outputs

- Promotion and marketing of WRC research outputs for uptake and application
- Water conversations through strategic engagements on an impact-focused theme
- Positioning and profiling the WRC as a premier knowledge and solutions partner.

Capacity building and policy impact

Capacity building will be an all-rounded strategic area of the WRC and is sought to impact all stakeholders including the employees of the WRC, students, water sector and associated government employees and the broader south African population.

- Improved policy engagements at the inter-governmental level in bi-lateral meetings and annual policy dialogues
- Capacity building through Young Water Professionals, graduates
- Re-establishment of Water Information Network and establishment of the Youth in Water, development, and support initiative

6. PROGRAMME RESOURCE CONSIDERATIONS

6.1 Overall considerations

In determining the budget over the planning cycle, the key drivers include inflation outlook and the WRC's operational requirements to meet its objectives as detailed in its Strategic Plan in terms of research and innovation planned and other resources to support its operations.

The inflation projections utilised for the period 2023/2024 to 2028/2029, were obtained from the latest MTEF Technical guidelines issued by National Treasury, which are as follows:

- 2024/25 financial year: 4.8 %
- 2025/26 financial year: 4.7 %
- 2026/27 financial year: 4.6 %

The National Treasury inflation estimate of 4.6 % for 2026/2027 has been carried through in the WRC budget estimates for the 2027/2028 and 2028/2029 financial years.

6.2 Revenue

The total revenue budgets, which is still subject to Minister approval, for the Water Research Commission ("WRC") over the planning cycle (2024/2025 – 2028/2029) is presented in Table 4 below:

Table 4: Total revenue budget

Description	Budget - 2024/2025	Budget - 2025/2026	Budget - 2026/2027	Budget - 2027/2028	Budget - 2028/2029
Levy income	316,007,232	326,650,785	341,284,740	356,885,508	373,302,241
Leverage income	100,097,938	82,177,435	85,957,597	89,911,647	94,047,582
Interest received	24,537,915	24,537,915	24,537,915	24,537,915	24,537,915
Other income	965,791	1,011,183	1,057,698	1,106,352	1,157,244
Total income	441,608,876	434,377,318	452,837,950	472,441,421	493,044,983

Levy Income

The WRC derives its primary income from the Water Research Levy ("WRL") payable by the Department of Water and Sanitation (DWS) and Water Boards.

The levy income budget over the five-year period includes increases as follow:

Description	Budget - 2024/2025	Budget - 2025/2026	Budget - 2026/2027	Budget - 2027/2028	Budget - 2028/2029
Levy income – annual budget	316,007,232	326,650,785	341,284,740	356,885,508	373,302,241
Increase (rand)	3,744,826	10,643,553	14,633,955	15,600,768	16,416,733

Increase (percentage)	1.2%	3.36%	4.48%	4.57%	4.60%

The key budget variables used in the determination of levy income, is the inflation rate as per National Treasury and the historical water sales volumes, adjusted downwards to accommodate for the possible impact of water restrictions, such as water shedding which were implemented during the current financial year, and the impact that drought and power loadshedding has on water sales volumes and therefore provides for a more conservative estimate.

Leverage Income

Leverage income is a secondary source of revenue for the WRC and is earned upon achievement of deliverables in line with business plans and agreements with funders.

The leverage income business process cycle is initiated by a significant amount of pre-work (engagements with possible funders to agree on strategic fit and outcomes) before contracts can be secured with partners and the timeframes for contract closure vary between 1 to 3 years and this leads to fluctuations in the leverage budget estimates. Based on the risks and uncertainty, there is some unpredictability in leverage forecasts for the 2025/26 financial year and beyond as there are no guaranteed funds from research partners and other research institutions. It is expected that leverage income amounting to 100 million rand will be earned during the 2024/25 financial year. Based on available information leverage income is expected to reduce to 82 million rand for the 2025/26 financial year and thereafter expected to show a steady increase at around inflation over the outer planning years. Leverage income remains important for the WRC as it provides an opportunity for the WRC to demonstrate impact of the research portfolio and assist the WRC to deliver on its mandate.

Investment Income

Investment income is earned on the cash holdings of the WRC and is secondary income. In the medium term this source of income is expected to increase in line with the outlook on WRC's cash holding and the level of interest rates during this period.

6.3 Expenditure

The total WRC expenditure over the medium term, which is still subject to Minister approval, is presented in Table 5 below:

Table 5: Total expenditure budget

Description	Budget - 2024/2025	Budget - 2025/2026	Budget - 2026/2027	Budget - 2027/2028	Budget - 2028/2029
Fixed costs	14,542,664	15,613,372	16,772,543	18,015,264	19,351,325
Running costs	21,942,241	19,304,991	20,031,724	20,310,216	19,948,186
Human resource costs	149,599,637	158,065,243	168,228,237	179,203,351	188,399,438

Description	Budget - 2024/2025	Budget - 2025/2026	Budget - 2026/2027	Budget - 2027/2028	Budget - 2028/2029
Research, development, and innovation costs	214,270,731	196,516,816	200,995,295	207,172,795	217,430,543
Knowledge and Impact	33,553,947	36,561,249	36,578,400	39,729,126	39,782,712
Corporate expenses	4,367,085	4,578,946	4,798,832	5,029,422	5,099,426
Capital expenditure	3,332,570	3,736,701	5,432,918	2,981,247	3,033,352
Total expenditure	441,608,876	434,377,318	452,837,950	472,441,421	493,044,983

The expenditure over the medium term is expected to increase in line with the inflation rate outlook as per National Treasury. The human resources budget has considered the cost-of-living adjustment which is linked to the inflation outlook and annual notch increases.

As a government entity established to coordinate, guide and fund water research, development, and innovation (RDI) programmes, projects and activities aimed at addressing the South African water challenges, the Water Research Commission's (WRC) vision is to have highly informed water decision-making through science and technology at all levels, in all stakeholder groups, and innovative water solutions through research and development for South Africa and the world at large. Thus, the WRC mandate places emphasis on prioritising water research as informed by the needs of the water sector and its related stakeholders.

Funding is allocated to the research, development, and innovation portfolio to cover research commitments already made by the WRC, including funding for new projects. Furthermore, funding is allocated for knowledge and impact, to ensure accessibility and uptake by all stakeholders. Table 5 above clearly shows that the bulk of the WRC funding is allocated towards Research, development, and innovation costs, as well as Knowledge and Impact as this continues to be our priority focus.

6.4 PROGRAMME RESOURCE ALLOCATION

PROGRAMME	EXPENDITURE		CURRENT BUDGET	EXPENDITURE ESTIMATES
	2021/22	2022/23	2023/24	2024/25
	R'000	R'000	R'000	R'000
Administration and Governance	6,141	3,702	9,806	9,330
Corporate services	132,570	126,957	177,852	182,660
Finance	2,769	3,054	3,102	1,793

Research development and innovation	226,822	187,561	210,630	214,271
Knowledge and impact	9,408	6,874	18,733	33,554

7. KEY RISKS AND MITIGATION

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 strategic risks to the implementation of the mandate were identified by the Accounting Authority and management. The inherent and residual risks were assessed resulting in the identification of treatment action plans that will be translated to new operational developments or projects implemented over the short- to medium- and long-term.

The strategic risk profile of the WRC per outcome is as tabulated.

Table 6: 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 organisational structure to match the skills and competencies required. 2. Review, refine or re-design the policies, processes, and procedures. 3. Conduct organizational ethics risk assessments. 4. Implement a communication strategy in collaboration. 5. Implement the ICT strategy.
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. Implement the revenue enhancement and cost-containment strategy 2. Improve the leverage funding from DWS and other stakeholders/ partners. 3. Improve the strategic procurement.
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. Water security efforts not realized. Set economic and social benefits not met in South Africa.	1. Demonstrate and transfer WRC water RDI products within the water and associated sectors. 2. Enhance the Intellectual Property (IP) policy to ensure WRC recognition and promotion by IP owners and Source IP internationally to fast-track development of water RDI to turnaround the water and associated sector challenges. 3. Implement the communication and promotions strategy. 4. Enhance knowledge dissemination to stakeholders.
Outcome 4: Empowered and influenced stakeholder	Failure to meet stakeholders' expectations	Reputational damage Minimum returns/impact on investment Inability to effect sustainable knowledge transfer. Loss of influence to advance major shifts towards resilience and adaptation	1. Implement the stakeholder management strategy and plan. 2. Perform regular media monitoring. 3. Implement the communication and promotions strategy. 4. Enhance knowledge dissemination to stakeholders.
Outcome 5: Adaptation and resilience	Failure of the portfolio to respond to adaptive and resilient knowledge solutions	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.	1. Tailor research, development, and innovation to respond to current and future climate change impacts. 2. Implement stakeholder-centric research needs. 3. Fund demonstration and transfer of water RDI products. 4.Strengthen collaboration with NSI partners and stakeholders. 3. Increase participation of local stakeholders for research, development and innovation programmes that meet their needs. Source additional funds to support key segments of the knowledge/innovation value chain.

OUTCOME	RISK NAME	IMPACTS	KEY MITIGATING PLANS
		Lack of recognition of relevance by each group of stakeholders	

PART D: TECHNICAL INDICATOR DESCRIPTIONS

Outcome 1: Efficient and engaged organisation

Programme: Corporate Services

INDICATOR TITLE	Percentage employee training and development budget spent
Definition	To measure percentage spend of employee training and development budget
Source of data	• Finance records
Method of calculation or assessment	Quantitative: training and development cost/ employee training and development budget
Means of verification	Approved Finanancial record
Assumptions	• Availability of approved development plans • Availability of funds
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Annually
Desired performance	50% of employee development plan implemented
Indicator responsibility	Group Executive: Corporate Services

INDICATOR TITLE	Percent implementation of ICT governance strategy
Definition	To measure implementation of the ICT governance strategy
Source of data	ICT governance strategy
Method of calculation or assessment	Quantitative: % implementation against strategy objectives (each objective carries a specific weight)
Means of verification	Implementation database
Assumptions	Availability of ICT skills competency
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Annually
Desired performance	40% of ICT governance strategy implemented
Indicator responsibility	Group Executive: Corporate Services

INDICATOR TITLE	Percent implementation of transformation plan

Definition	To measure the percent implementation of the WRC transformation plan Transformation objectives include: • Compliance with Employment Equity • Preferential procurement (Black, female, disabled, and youth) • Females leading RDI projects. • Youth leading RDI projects • BBB-EE score
Source of data	Supply chain records HR records RDI records
Method of calculation or assessment	Quantitative: some total of % achieved against overall transformation plan objectives (each objective carries a specific weight)
Means of verification	Transformation report with supporting evidence: • HR database • Supply chain database • RDI contracts database • RDI project leaders' database • BB-BEE scorecard
Assumptions	Availability of reliable records
Disaggregation of beneficiaries (where applicable)	• Target for women • Target for youth • Target for person with disabilities • Target for SMME
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Annually
Desired performance	40% of the WRC transformation plan implemented
Indicator responsibility	Group Executive: Corporate Services

Outcome 2: A financially sustainable organization

Programme: Finance

INDICATOR TITLE	Percent of total revenue spent on Human Resources costs
Definition	To measure the total HR costs in relation to the total revenue
Source of data	Financial records • Financial records • Accounting and payroll systems
Method of calculation or assessment	Quantitative: Human Resources costs / Total Revenue
Means of verification	Approved financial records
Assumptions	• Reliable records available for measuring financial performance. • Adequate accounting skills & competencies • Fully functional accounting and payroll system
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative YTD
Reporting cycle	Annually
Desired performance	35% of total revenue spent on HR costs
Indicator responsibility	Chief Financial Officer

Outcome 3: Innovation driven water sector

Programme: Research, Development, and Innovation

INDICATOR TITLE	Percent innovations demonstrated
Definition	To measure percent of innovations demonstrated
Source of data	Innovation reports
Method of calculation or assessment	Quantitative: innovations demonstrated / innovations produced x100
Means of verification	Innovation demonstration database
Assumptions	Availability of reliable records
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative YTD
Reporting cycle	Annually
Desired performance	30% innovations demonstrated
Indicator responsibility	Group Executive: RDI

INDICATOR TITLE	Percent of innovations transferred to stakeholders
Definition	To measure the percent of innovations transferred to stakeholders.
Source of data	MOAs
Method of calculation or assessment	Quantitative: innovations transferred / innovations produced x 100
Means of verification	Innovation transfer database with supporting evidence: • Record showing stakeholder acceptance of innovation. • Letter from innovator or commercialization partner • MOA
Assumptions	• Stakeholders buy-in of demonstrated innovation. • Availability of budget and resources from stakeholders
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative YTD
Reporting cycle	Annually
Desired performance	20% innovations transferred to stakeholders
Indicator responsibility	Group Executive: RDI

Outcome 4: Empowered and influenced stakeholders

Programme: Stakeholder and Impact

INDICATOR TITLE	Percent implementation of stakeholder management plan
Definition	To measure the percentage implementation of the WRC stakeholder management plan
Source of data	WRC stakeholder management strategy
Method of calculation or assessment	Quantitative: Percent count of implementation / stakeholder management plan objectives (each objective carries a specific weight)
Means of verification	• Approved stakeholder engagement report • Proof of stakeholder engagement
Assumptions	Availability of reliable records Stakeholder availability
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Biannually
Desired performance	50% of stakeholder engagement plan implemented
Indicator responsibility	Group Executive: Knowledge and Impact

INDICATOR TITLE	Percentage implementation of partnership plan
Definition	To measure the percentage implementation of the WRC partnership plan (Partnerships refers only to Memorandum of Agreement (MoA) with or without financial leverage to the WRC
Source of data	Partnerships plan
Method of calculation or assessment	Quantitative: some total of % achieved against overall partnership plan objectives (each objective carries a specific weight)
Means of verification	Approved partnership report with the following supporting evidence: • Signed MoA • Proof of projects and activities jointly implemented with partners.
Assumptions	Organisational reputation, value add and attractiveness to partners as a key knowledge partner
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Biannually
Desired performance	30 of the partnership plans implemented
Indicator responsibility	Group Executive: Knowledge and Impact

INDICATOR TITLE	Percentage implementation of communication plan
Definition	To measure the percentage implementation of the WRC communication plan communication plan includes: • Portfolio committee RDI report • Sector specific briefs • Public campaigns • Media • Exhibitions
Source of data	WRC communication strategy
Method of calculation or assessment	Quantitative: Sum of percentage achieved against overall communication plan objectives
Means of verification	• Record of publication in the public domain • communication reports
Assumptions	Stakeholder access to publications
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Biannually
Desired performance	40% of communication plan implemented

Indicator responsibility	Group Executive: Knowledge and Impact

INDICATOR TITLE	Percent implementation of knowledge dissemination plan
Definition	To measure percentage of knowledge dissemination plan implemented knowledge dissemination includes: • Workshops & events • Digital • Print • Policy briefs • Ministerial briefs • Trainings • Special publications
Source of data	RDI projects
Method of calculation or assessment	Quantitative: knowledge disseminated/ knowledge dissemination planned
Means of verification	Record or proof of knowledge dissemination
Assumptions	Availability of RDI knowledge products
Disaggregation of beneficiaries (where applicable)	Not applicable
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative
Reporting cycle	Biannually
Desired performance	60% of knowledge dissemination plan implemented
Indicator responsibility	Group Executive: RDI

INDICATOR TITLE	Number of candidates supported for capacity enhancement (bursaries and other financial support)
Definition	To measure support towards human capital development in water science and related fields
Source of data	WRC managed research projects Partnership agreements
Method of calculation or assessment	Quantitative: a simple count of candidates
Means of verification	Record of payment showing that support has been provided to the candidates, including ID copy and proof of registration
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	250 candidates supported
Indicator responsibility	Group Executive: Research Development and Innovation

Outcome 5: Adaptation and resilience

Programme Research Development and Innovation

INDICATOR TITLE	Percent of Resilience related projects per total number of completed projects
Definition	To measure the percentage resilience related projects per total number of completed RDI projects
Source of data	WRC managed RDI project contracts
Method of calculation or assessment	Quantitative: A percentage count of resilience related projects per total number of completed projects
Means of verification	Technical finalisation report
Assumptions	Availability of reliable records
Disaggregation of beneficiaries (where applicable)	Women, Youth, SMME
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative YTD
Reporting cycle	Annually
Desired performance	50% resilience related projects
Indicator responsibility	Group Executive: Research, Development, and Innovation

INDICATOR TITLE	Percent of Adaptation related projects per total number of completed projects
Definition	To measure the percentage adaptation related projects per total number of completed RDI projects
Source of data	WRC managed RDI project contracts
Method of calculation or assessment	Quantitative: A percentage count of adaptation related projects per total number of completed projects
Means of verification	Technical finalisation report
Assumptions	Availability of reliable records
Disaggregation of beneficiaries (where applicable)	Women, Youth, SMME
Spatial transformation (where applicable)	Not applicable
Calculation type	Cumulative YTD
Reporting cycle	Annually
Desired performance	30% adaptation related projects
Indicator responsibility	Group Executive: Research, Development, and Innovation