



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



Development of the National Water Resources Strategy Third Edition (NWRS-3)

Enabling Chapter: Enhancing Research, Development and Innovation

CONSULTATION WORKSHOP

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CH17: Enhancing Research, Development and Innovation

The aim of this chapter is:

To ensure that research, development and innovation are undertaken in order to provide effective and efficient water and sanitation management solutions that respond to the needs for water security and sustainable sanitation for communities, productive use, and strategic water use and ecosystem services.

This chapter consists of the following 4 sections:

- Context and Current Challenges
- Guiding Principles
- Baseline and Status Quo
- Strategic Objectives and Strategic Actions for implementation

Context and Current Challenges

- R&I is crucial to achieving both national and international imperatives of WCWDM, water security and the public health benefits of sanitation.
- R&I - major contributor to meeting increasing demands / challenges in water and sanitation in South Africa.
- Skills development in the sector and high-level knowledge is crucial in ensuring that equity in water use and sanitation services is achieved.
- Key focus area:
 - developing tools to improve skills / capacity required to address current and future water and sanitation sector's needs.
- Close collaboration between:
 - WRC / DWS: needs are known and dealt with.
 - WRC / DSI / NRF: approaches to research are consistent with SA's broad policy on science and innovation.
 - CSIR / HSRC / Universities and other research bodies which play a significant role in researching, developing and disseminating information on various technologies.



Context and Current Challenges

- DWS – as sector leader responsible for:
 - Consultation with sector
 - Drafting of a sector R&I strategy
 - Dovetails with the national R&D policy and strategy.
- Collective need to contribute to effective decision-making in water use and management and sanitation services
- Made possible when supported by coherent and consistent policies and the coordinated dissemination of new knowledge, new technologies and skills.
- Consolidation of collective intelligence, enabling the development of a comprehensive inventory of all water-related research nationally, is of strategic priority:
 - Government,
 - research institutions,
 - academic institutions,
 - non-profit organisations,
 - and all water users
 - A number of water role players make significant and independent input into water research activities, such as Eskom, Sasol, mining and agricultural companies.



Guiding Principles

- R&I in the water and sanitation sector:
 - Should be focussed / aligned to achieve an agreed vision.
 - Must be well coordinated within the sector.
 - Roles of stakeholders are well established within the sector.
 - Cut across traditional research boundaries to meet agreed high-level objectives.
 - Are geared towards aligning products, services & knowledge
 - able to contribute to practical solutions - at various levels.
 - needs to promote sustainable development within the sector.
 - Design should inform transformation, equity and empowerment of marginalised groups
- Knowledge derived informs policy development and strategic decision-making at all levels of government and across the water value chain.



Baseline and Status Quo

- The RDI Community is diverse and made up of many role players, institutions and activities.
- Tracking and monitoring all water RDI related activities is complex.
- Broadly 3 areas that must be taken into account to understand the outputs of the system – these are as follows:
 - WRC Corporate Plan and associated Annual Report:
 - In 2015 - WRC investment constituted 62% of all public funding in the water innovation system.
 - WRC investments and associated outputs an anchor to tracking RDI outputs in South Africa.
 - Corporate plan targets are approved by the Minister annually
 - Bibliometric water RDI ecosystem mapping studies:
 - Independently assess the outputs of the Water RDI system.
 - Water RDI Roadmap Portfolio Management Unit funded a baseline study to understand the 2015 baselines for water RDI which can be updated.
 - Narrative of the major water RDI initiatives, shifts and projects needs to be captured.
 - Water RDI Roadmap Implementation Unit tracks this narrative in its annual report.

Baseline and Status Quo

Progress has been made with regard to research since the promulgation of the Water Research Act (Act 34 of 1971).

Following key strategic issues still require attention:

- Sustainable utilisation of groundwater resources.
- Degradation of water quality and water ecosystems
- Increased health risks to humans and animals
- Uncertain impacts of climate change
- Insufficient provision of basic water supply and sanitation to some rural areas.
- In-equitable access to water for productive use.
- Faecal sludge management.
- Successful implementation of innovative technologies.
- Lack of uptake in the alignment of water research objectives, thrusts and programmes.
- Limited participation of sector-wide stakeholders.
- Insufficient allocation of financial resources
- The ability of the sector to quickly adapt to change
- Enabling factors such as ICT, support structures and resources.
- The Blue-Green Economy must be embraced so that water and sanitation sector challenges can become entrepreneurial opportunities.



Strategic Objectives and Strategic Actions

Strategic Objective 1

To increase the ability to make use of more sources of water, including alternatives.

Actions needed:

- Continue to invest in understanding emerging contaminants (detection and treatment)
- Improve raw water quality through investing in communities of practise
- Undertake research on land use impacts on water linked ecosystems.
- Undertake ongoing research and planning around climate change and its impacts
- Initiate a hydrological monitoring centre for South Africa
- Resources planning and climate change forecasting in future.
- Link test bed partners with key water sector institutions
- Expand knowledge of the social barriers in the uptake.
- Identify health and environmental risks.
- Develop, pilot and test a suite of alt sources in a relevant location.

Strategic Objectives and Strategic Actions

Strategic Objective 2:

To improve governance, planning, management of supply and delivery, and management of demand and use.

Actions required:

- Implement and regularly review and / or revise RDI Policies, Plans and Roadmaps
- Strengthen partnerships with key water sector institutions to accelerate research and solutions into practice.
- Review all relevant guidelines and R&D products to understand where training modules need to be developed around new knowledge.
- Understand the political economy of water.
- Establish a professional service centre for water resources and for water and sanitation services.
- Increase research into accountability (technical and political).
- Implement rural innovation pilots.
- Advise on the implementation of water smart cities.

Strategic Objectives and Strategic Actions

Strategic Objective 3:

To improve adequacy and performance of supply infrastructure.

Actions required:

- Embrace the UN Decade of Ecosystem Restoration (2021–2030) and implement ecological infrastructure in key resource areas and ensure the restoration of degraded infrastructure including green infrastructure (i.e. the blue-green / circular economy).
- Develop, demonstrate and validate appropriate alternative, water-less and off grid sanitation solutions.
- Develop and demonstrate appropriate domestic and industrial waste water technologies for cost effectiveness, energy efficiency and beneficiation.
- Develop and demonstrate solutions that allow for the use of alternative sources of treating water for safe human consumption and water security.
- Develop technology options for small-scale water infrastructure and management.
- Increase the uptake of effective infrastructure asset management.
- Implement climate resilient infrastructure planning.
- Recognize the role of ecological infrastructure in effective water management.
- Ensure sanitation and water treatment optimisation.

Strategic Objectives and Strategic Actions

Strategic Objective 4:

To improve operational performance and run water as a sustainable “business”.

Actions required:

- Coordinate, and where needed establish new platforms, to enable a synergised set of institutions to enable the shifting of innovations into the market (including business development and SME support).
- Apply the concepts of water sensitive urban design to a robust city-wide case study to demonstrate and learn how a city can transition to a sustainable city.
- Develop, and test at scale, early warning systems and tools for agriculture.
- Scan and sort the innovation sector for solutions that are ready for application and invest in their implementation.
- Link the Global Environment Fund 6 project on Water Pricing and Ecosystems to Water Master Plan implementation and position DWS to be closely involved in this process.
- Partner with institutions to fund training of water sector practitioners in the curation, management and use of data as well as the associated technologies.
- Develop a financial model for charges and tariffs in the water sector.
- Conduct a water resources assessment to gauge planning and investment.
- Enhance the role of the private sector in the water sector.
- Implement professional resource centre for municipalities.
- Establish the value of water in the economy.

Strategic Objectives and Strategic Actions

Strategic Objective 5:

To reduce unintended losses and increase efficiency of productive use.

Actions required:

- Fund research into new models to better understand implementation approaches for water allocation reform and equity issues.
- Develop technologies, guidelines and implementation support tools that enable SA to use alternative and appropriate sources as part of water supply.
- Implement water conservation and demand management.
- Develop technology and systems for improved water productivity.



Strategic Objectives and Strategic Actions

Strategic Objective 6:

To improve performance of pricing, monitoring, billing, metering and collection

Actions required:

- Unlock investment, procurement and other localisation barriers to reposition the sector to implement new/niche solutions and approaches and roadmap the NMIU.
- Test a suit of ICT and citizen science tools for data sourcing.
- Develop a citizen science monitoring paradigm.
- Develop a partnership model for disruptive technology and monitoring.
- Monitor and evaluate socio economic rights.
- Identify emerging contaminants.
- Link monitoring data to Strategic Adaptive management.



Chapter 17

