Department of Water and Sanitation

CHIEF DIRECTORATE: POLICY

Integrated Water Quality Management
POLICIES AND STRATEGIES FOR SOUTH AFRICA

DRAFT FOR PUBLIC COMMENT

WQM POLICY

WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

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Department of Water and Sanitation

WATER QUALITY MANAGEMENT POLICIES AND STRATEGIES FOR SOUTH AFRICA

INTEGRATED WATER QUALITY MANAGEMENT POLICY

Edition 2, Version 1

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POLICY SYNOPSIS

South Africa is facing a multi-faceted water challenge, which, if not addressed effectively, has the potential to significantly limit the economic growth potential of the country. The deterioration of water quality in rivers, streams, dams, wetlands, estuaries and aquifers impacts on the economy, on human health, and on the healthy functioning of aquatic ecosystems. It reduces the amount of water available for use as more water must be retained in our river systems to dilute polluted steams to acceptable standards. It increases the costs of doing business as many enterprises are forced to treat water before using it in their industrial processes. Municipalities also incur additional costs as the cost of municipal water treatment increases. The deterioration in water quality also impacts on human well-being with productivity falling as more work days are lost due to water-related illnesses and finally, it threatens several economic sectors by impacting on crop yields, making crops vulnerable to import restrictions in key trading partner countries. Some of the impacts of water quality deterioration are immediately visible, such as in the case of major fish kills, while others are more insidious and long term. Combined, however, they are having a significantly negative impact on socio-economic development in South Africa. **Water quality is, therefore, clearly an economic and developmental issue**.

The current picture is not encouraging and without a change in how water is managed, deteriorating water quality will continue to decrease the socio-economic benefits from and increase the costs associated with use of the country's water resources. Recognising these challenges, this **Policy is designed to enable government, as a whole, in partnership with civil society and the private sector, to address the issue of water quality across the country**. *It brings together the best elements of existing, but fragmented, water quality management* and the principles of the Second Edition of the National Water Resources Strategy. This Policy *draws upon international experience, to add new Policy positions to the foundation provided by existing national Policy, in order to craft a new way forward for water quality management in South Africa.*

Historically, water quality management has been the sole mandate of the Department of Water and Sanitation. However, there are other government departments whose mandates profoundly impact water quality, most critically those of the: Departments of Environmental Affairs, Mineral Resources, Agriculture, Health, Human Settlements, Education, Co-operative Government and Traditional Affairs, Health, National Treasury, Trade and Industry, together with provincial counterparts where relevant, and municipalities. Recognising these operational challenges, a fundamental and new framing permeating this Policy is that integrated water quality management is a government-wide task, to be implemented under the leadership of the Department of Water and Sanitation, with both the private sector and civil society playing a key role. Within this context, the 2017 Integrated Water Quality Management Policy calls for an inclusive approach to managing water quality in the country.

The Integrated Water Quality Management Policy recognises that managing water quality is a complex problem. Contrary to historical views that relatively simple command and control approaches could be used to manage water quality, it is now recognised that in the water quality domain, human and bio-physical systems interact, increasing the complexity of water

quality management. In dealing with complex systems, the pathway is often affected by unexpected events and developments, calling for course corrections and new approaches. This Policy, therefore, is firmly rooted in the recognition that **the only way to manage the complex challenge of water quality in South Africa is through the adoption of adaptive management, a process that calls for flexibility, and for structured learning throughout the process in order to inform and amend Policy and practice over time**. Adaptive management is also rooted in the understanding that there are many different sets of knowledge that must be brought together to address the challenge, including social, political, earth sciences and financial analysis. **The management of water quality requires the bringing together of a wide range of knowledge in a structured process that allows co-learning, co-creation, and co-adaptation in order to move forward.**

Aim of the IWQM Policy

This Integrated Water Quality Management Policy has been informed by insights from i) the current Policy and legislative environment governing water quality management in South Africa; ii) international approaches and lessons from water quality management; as well as iii) lessons from current water quality management practices in South Africa. Consequently, the Integrated Water Quality Management Policy that aims to:

- **Provide a coherent, consolidated, current and inclusive (i.e. government in partnership with the private sector and civil society) approach** to the way water quality is managed by building on the current strengths, addressing gaps/weaknesses and seizing opportunities identified in relation to water quality management;
- **Align water quality management Policy with current legislation** and relevant overarching policies and provide resolution on matters not adequately addressed in current Policy;
- **Guide the further development of legislative and regulatory instruments** and appropriate measures to manage water quality;
- **Inform the water resource management function** as well as the required framework for the development of related policies and sub-strategies related to water quality management;
- **Address key operational aspects** such as adopting an integrated approach, broadening finance mechanisms and improving knowledge and information in the execution of the water quality management function; and
- **Provide guidance on sustainable water use**, especially in as far as it relates to water quality management.

The Values, Principles, Vision, Goals and Pillars that underlie the Integrated Water Quality Management Policy are elaborated below.

Vision and Goals for Integrated Water Quality Management in South Africa

The Integrated Water Quality Management Policy Responses to the challenges are aligned to The Constitution of South Africa and aims to support the vision for water management, ***"Sustainable, equitable and secure water for a better life and environment for all."***

The country's vision for Integrated Water Quality Management is therefore that:

> ***"Government, in partnership with private sector and civil society, secures water that is fit for use, for all, forever!"***

Consequently, the goal for Integrated Water Quality Management for the country is to adopt a government-wide, adaptive and systems-based management approach, in alliance with the private sector and civil society, that will improve resource water quality in South Africa, prevent pollution and ecological degradation, support ecologically sustainable economic and social development as well as informed use of the nation's water resources.

Values underpinning Integrated Water Quality Management

This Integrated Water Quality Management Policy is underpinned by a set of core values which are key to successful implementation. These values support the vision, guide the principles, and reflect the ethos for managing water quality in South Africa. These values are presented below.

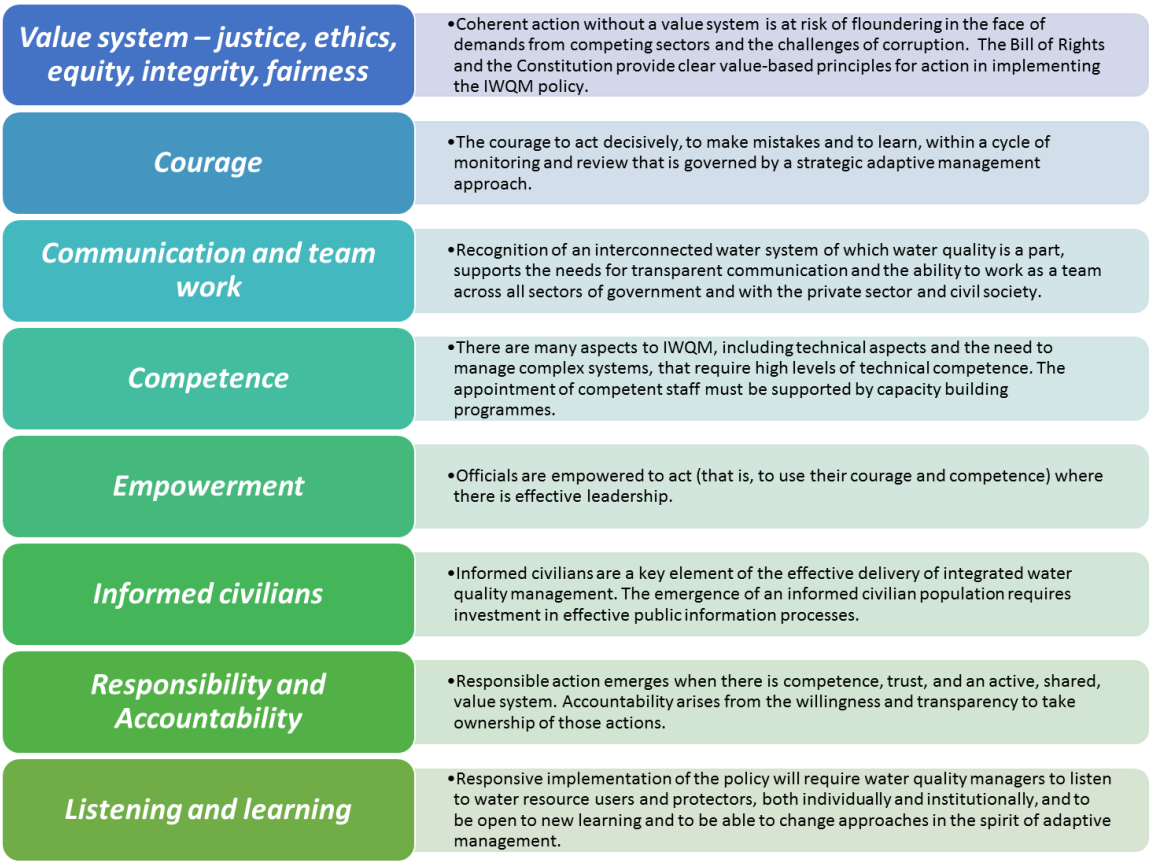

Figure E-1: Values underpinning the Integrated Water Quality Management Policy

Principles underpinning IWQM

The Integrated Water Quality Management Policy Principles i) elaborate on the existing Policy principles present in various primary Policy documents of government, and ii) respond to the gaps in Integrated Water Quality Management by proposing new principles. These seventeen Principles underpin the Integrated Water Quality Management Policy and ensures that the approach to water quality management is transparent and predictable. Internally, the Principles guide the development of Integrated Water Quality Management Policy positions and statements. Externally, these Principles substantiate the basis of Government's views to the general public.

These Principles are in addition to, and do not replace, the existing Policy principles in the many primary Policy documents and have been grouped into four clusters relating to governance, economics and finance, operational matters and data and information.

Table E-1 summarises the seventeen Integrated Water Quality Management Policy Principles. Principles 1, 5, 7, 10, 11, 13, and 16 are considered new principles, in that they are new in the way that they are applied to Integrated Water Quality Management.

Table E-1: Summary of Integrated Water Quality Management Policy Principles

- **Principle 1:** Government-Wide Integrated Water Quality Management
- **Principle 2:** People-Centric
- **Principle 3:** Subsidiarity and Accountability
- **Principle 4:** Transboundary Water Quality Management
- **Principle 5:** Partnerships
- **Principle 6:** Administrative Fairness and Implementability
- **Principle 7:** Adopt Administrative Penalties
- **Principle 8:** An Integrated and Adaptive Approach
- **Principle 9:** Hierarchies for Pollution Management
- **Principle 10:** Promotion of Green/Ecological Infrastructure Restoration and Rehabilitation
- **Principle 11:** Risk-Based Approach
- **Principle 12:** Water Quality is a Developmental Issue
- **Principle 13:** Broadened Funding Mechanisms
- **Principle 14:** Polluter Pays
- Principle 15: Informed Public
- **Principle 16:** Data is a Strategic Asset
- **Principle 17:** Publicly available information

Policy Pillars for IWQM

The Integrated Water Quality Management Policy, comprising the 17 Policy Principles, described in Section 3 of this document, is constructed around four pillars (E-2) which when implemented, will result in the attainment of the vison and goals as set out in this section.

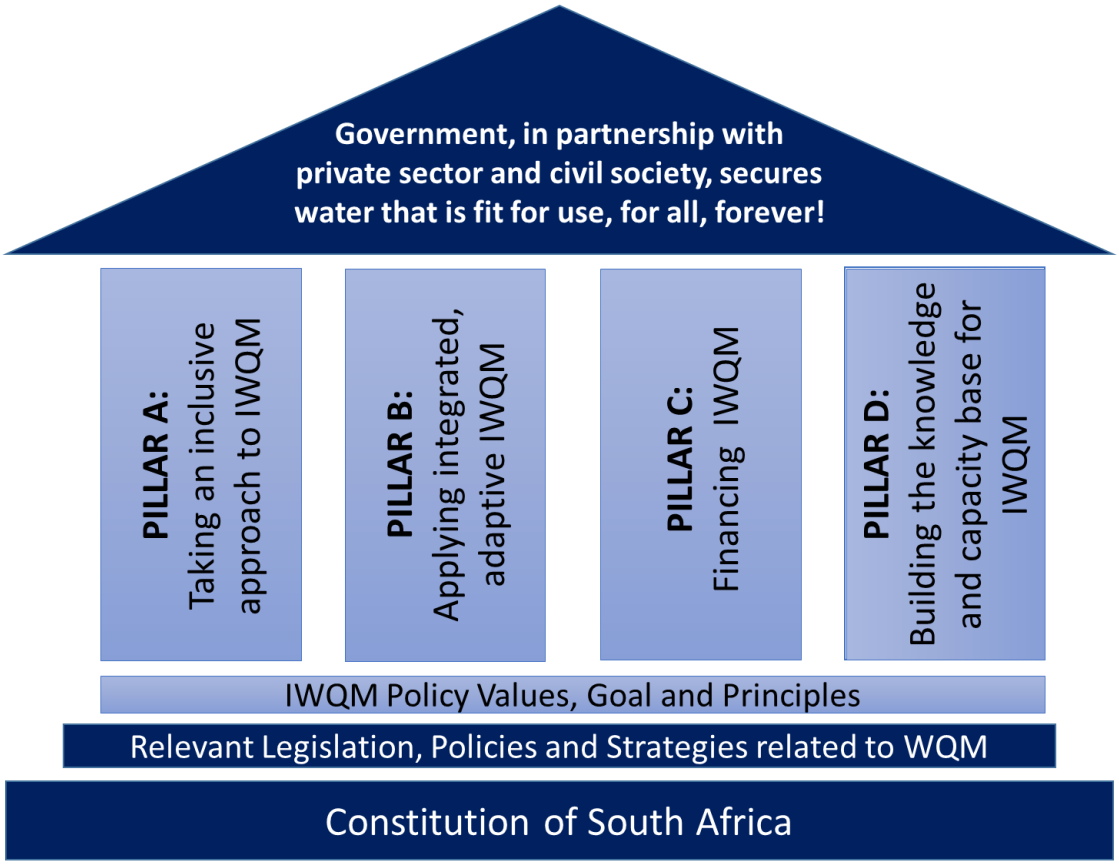

Figure E-2: The four pillars of the Integrated Water Quality Management Policy

Each pillar is elaborated in greater detail in the Policy and describes the:

- The problem/challenge that needs to be resolved through Policy;
- The response that is required to mitigate the challenge; and
- The summary statements for the Policy.

PILLAR A: Taking an inclusive approach to Integrated Water Quality Management

This pillar refers to:

- the need for a government-wide integrated, adaptive and systems-based response to water quality management challenges throughout country;
- key Policy aspects that must be addressed in achieving such an approach;
- the need to build partnerships between government, civil society, and the private sector to successfully address the challenges; and
- the need to gather input through public participation.

Table E-2: Summary Policy Statements for Pillar A

Government-wide IWQM	
A.1-1:	DWS will lead a drive to harmonise inter-sectoral policies, legislation and other instruments to support IWQM.
A.1-2:	DWS will establish appropriate inter-departmental and inter-governmental structures to ensure government-wide co-ordination of water quality management processes.
A.1-3:	DWS will ensure that challenges arising from the mandates of government departments are addressed through interdepartmental and intergovernmental co-ordinating structures.
A.1-4:	The management of water quality will be delegated to CMAs, with DWS providing the necessary oversight, national strategic guidance, and control of international matters.
A.1-5:	DWS will strengthen its internal water quality management function and identify a national champion.
A.1-6:	DWS will report annually on the status of water quality in South Africa.
Non-Government support to IWQM	
A.2-1:	DWS will forge highly-focused, fit-for-purpose, civil society and corporate business partnerships that are relevant to each primary water quality challenge.
A.2-2:	DWS will actively promote the concept of water stewardships.
A.2-3:	DWS will strengthen and further develop partnerships with civil society.

PILLAR B: Applying integrated, adaptive water quality regulation and management

The second pillar spells out:

- the integrated approach to adaptive, systems-based Integrated Water Quality Management;
- the hierarchy of decision-making; and
- key instruments for implementing the integrated, adaptive and systems-based approach.

Table E-3: Summary Policy Statements for Pillar B

Integrated and Adaptive Water Quality Management	
B.1-1:	Institutional coordination at the catchment level will be facilitated
B.1-2:	Integrated water resource planning will be strengthened at all scales
B.1-3:	Integrated planning approaches at the catchment scale will be developed
B.1-4:	A targeted, risk-based approach will be employed
Regulatory approaches	
B.2-1:	The hierarchy of pollution management decision-making will be employed
B.2-2:	Water Use Authorisations remains a key regulatory instrument

B.2-3:	Ongoing improvements in Water Use Authorisations and their administration will be important to support continuous and adaptive management
B.2-4:	Differentiated water use authorisations based on risk will be introduced
B.2-5:	Instruments for the protection of designated areas will be developed
B.2-6:	Compliance monitoring and enforcement will be strengthened
B.2-7:	Administrative penalties will be introduced
B.2-8:	Alternative instruments will be introduced to incentivise responsible behaviour
B.2-9:	Voluntary regulation will be supported

PILLAR C: Financing Integrated Water Quality Management

The third pillar examines the financial basis for Integrated Water Quality Management, looking at tools for financing the required actions, and the key role of the private sector.

Table E-4: Summary Policy Statements for Pillar C

Economic, Social and Ecological Costs of Poor Water Quality	
C.1-1:	DWS will lead the development of an IWQM investment framework.
Government Funding and Financing Mechanisms	
C.2-1:	DWS will develop an IWQM financing framework.
C.2-2:	Government will fund the rehabilitation and effective operation and maintenance of WWTWs.
C.2-3:	DWS, with National Treasury, DMR and DEA, will determine the costs of long-term water pollution from mines and develop a pragmatic funding model.
C.2-4:	DWS, with DEA, DTI and National Treasury, will develop a financial provisioning mechanism for high risk industries.
C.2-5	DWS will implement the Waste Discharge Charges Strategy in a phased and targeted manner, beginning with those catchments in which water quality is of highest concern.
C.2-6:	DWS will revise its *Administrative Fees for Water Use Authorisation applications.*
Partnerships	
C.3-1:	DWS will build funding partnerships with the private sector.
C.3-2:	DWS will build funding partnerships with relevant institutions.

PILLAR D: Building an appropriate knowledge and information management base

The fourth and final pillar describes the Policy elements that focus on the knowledge and human resource capacity base that is required to implement the Policy approaches described in the above three sections.

Table E-5: Summary Policy Statements for Pillar D

Monitoring and Information	
D.1-1:	DWS, with DEA, CMAs, international river basin commissions, and other relevant government entities, will strengthen the national water quality monitoring networks.
D.1-2:	DWS will lead the ongoing strengthening and improvement of information management systems.
D.1-3:	DWS, the WRC and other key partners will drive monitoring innovation.
D.1-4:	DWS, with the WRC and CMAs, will lead the development of citizen-based monitoring programmes.
D.1-5:	DWS will make water quality data available to the public.
Research and Innovation	
D.2-1:	The DWS and WRC will lead the sector in developing a national water quality research plan.
D.2-2:	DWS and WRC will promote the transfer of new and applied technologies and tools for the benefit of the water sector.
Capacity Building and Training	
D.3-1:	DWS will develop and drive capacity building programmes to develop sector capacity.
D.3-2:	DWS will drive the professionalization of staff in key positions.

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Abbreviation	Meaning
AMD	Acid Mine Drainage
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CMA	Catchment Management Agency
CMF	Catchment Management Forum
CMS	Catchment Management Strategy
COGTA	Department of Cooperative Governance and Traditional Affairs
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
IWQM	Integrated Water Quality Management
IWRM	Integrated Water Resource Management
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NWRS	National Water Resource Strategy
R&D	Research and Development
SADC	Southern African Development Community
SAQA	South African Qualification Authority
SDG	Sustainable Development Goals
SWPN	Strategic Water Partners Network
WDCS	Waste Discharge Charge System
WMA	Water Management Area
WRC	Water Research Commission
WWTW	Waste Water Treatment Works

1. INTRODUCTION

1.1 Rationale for the Integrated Water Quality Management Policy

"Water is worth it – Worth our respect and our effort. Water is life and clean water is health and prosperity"

South Africa faces a multi-faceted water challenge, which, if not addressed effectively, has the potential to drastically limit the growth potential of the country. Deteriorating water quality is a key element in this challenge, considering that South Africa is a water scarce country, with water scarcity compounded by frequent droughts, increasing water demands, and deteriorating resource water quality. Despite the considerable attention paid to water quality management over the years by the Department of Water and Sanitation (DWS), the current state of the country's water resources reflects several challenges confronting the water sector, resulting from key contributing factors and supports the need for an integrated approach to the management of the resource.

1.1.1 The Shifting Nature of Water Quality Challenges

Despite the work of DWS over many years, surface and ground water quality across the country is deteriorating. **Water quality challenges are still predominantly a result of the challenges the Country faces in managing the ever-expanding sources of pollution.** These sources may be point- or non-point (diffuse) in nature and are contributed to by rapid urbanisation, expansion of the mining industry, increasing use of chemicals in industries, inappropriate practices for surface soil tillage and fertiliser application, and the destruction of our natural/green infrastructure, including wetlands and riparian buffer zones. Further to this inadequate land-use planning, unsustainable development practices, and inadequate operation and maintenance of waste infrastructure (a predominantly urban challenge) have compounded these challenges. As a result, the quality of the country's water resources have been undermined and, in many cases, the fitness for use of water that is required for downstream water use has been hampered.

The changing social, economic and environmental landscape requires new and integrated approaches to water quality management.

Pollution challenges in South Africa have different scales and severity of impact, and some are more geographically specific than others. Salinisation, sedimentation, nutrient enrichment, and microbial pollution, for example, occur at a national scale, while acid mine drainage and agrochemical pollution occur at regional or site-specific scales.

The prevalence and/or severity of impact of particular water quality issues varies markedly from river system to river system and between Water Management Areas (WMA) (Figure 1).

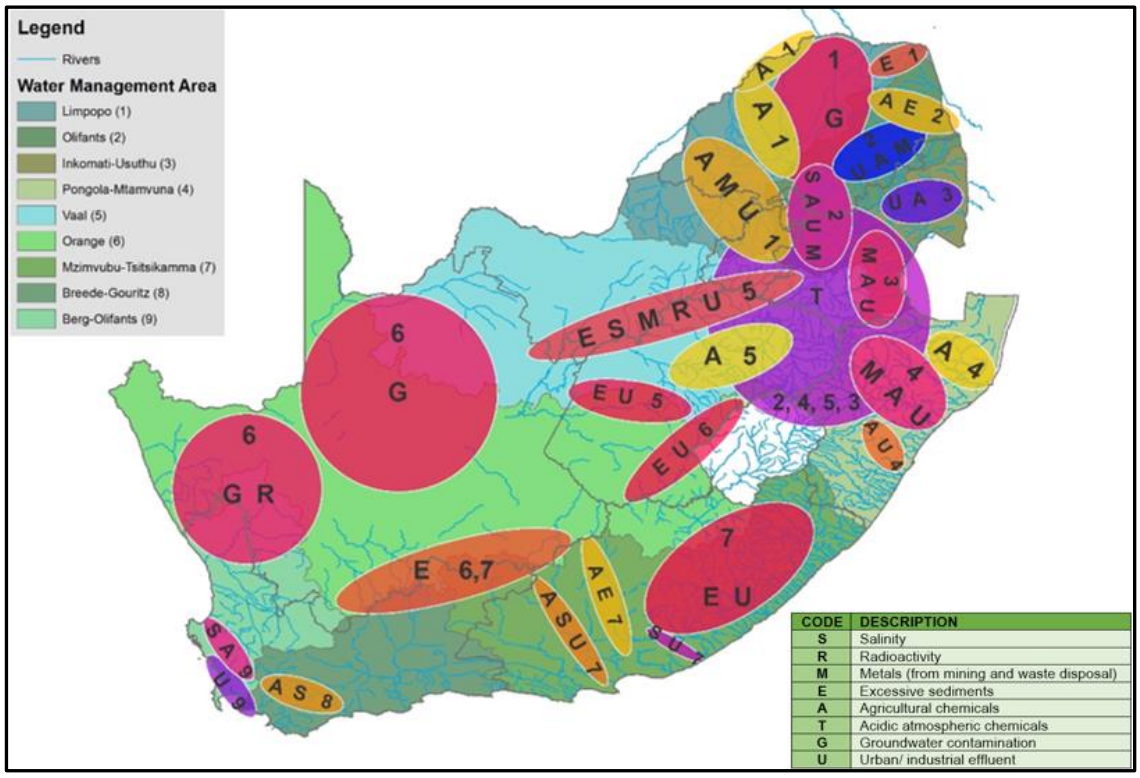


Figure 1: Map of the different types of water quality problems across in South Africa (adapted from Ashton, 2009)

Based on an analysis of the scale and severity of impact, five water quality issues stand out as priority issues of national importance (Figure 2). These are:

- Eutrophication;
- Salinisation;
- Acid mine drainage and acidification;
- Sedimentation; and
- Urban runoff pollution.

There are other pollution issues that must be addressed at regional or site-specific scales. Some are pollutants, such as industrial-and agro-chemicals, metals and nanoparticles, (reflected on the right-hand side of Figure 2) about which there **is insufficient information to understand the severity of impacts**, which may be significant, and about which **more research and investigation is needed to inform the actions to be taken**. Good research and accessing of knowledge from the international water sector must inform the approach to managing potential new pollutants. Critically however, precaution must be applied in relation to pollutants around which little is known, to avoid the introduction of potentially harmful new pollutants into our water resources.

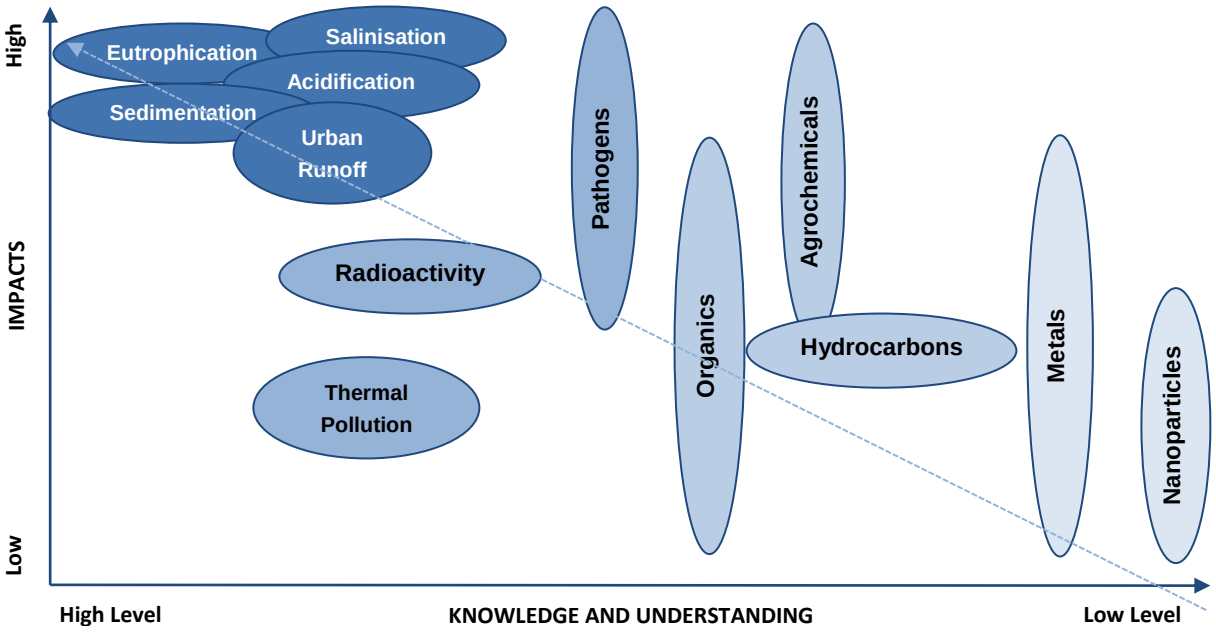


Figure 2: Water quality issues mapped against impacts and knowledge/understanding

In addition, there are several trends which are already of concern in South Africa:

- climate change which will change rainfall patterns, increased water demand due to higher temperatures, and change the rate of biogeochemical and ecological processes that determine water quality;
- unconventional oil and gas extraction using hydraulic fracturing;
- nanoparticles and pharmaceutical product disposal;
- increased coastal pollution;
- the growth of inadequately serviced densely populated settlements;
- population growth; and
- increasing industrialisation.

These may result in new or accelerated water quality impacts and need to be integrated into the management approaches. Internationally, the recognition of the importance of natural (green/ecological) infrastructure as a critical aspect of water resource and water quality management in both urban and rural settings is also a growing trend and must similarly be integrated into all management approaches.

1.1.2 Water Quality and Water Quantity

Water quality management **is a complex and confounding challenge** because of incomplete, contradictory, and changing requirements that are often difficult to recognise. Often, there are a multitude of interacting factors, including incomplete information, political interference, institutional instability, and changes outside the control of managers. Unfortunately, it is an operational reality, that

Water quantity and water quality are inextricably linked, especially in complex systems.

the water quality management approach used to date in South Africa has not managed to adequately address the challenge. The water quality challenges reflected above occur within already complex socio-economic and bio-physical systems and understanding the multiple potential impacts and changes in these systems provides a major challenge.

Within these complex systems, water quality and water quantity issues are inextricably linked. Water resources have a certain assimilative capacity which can manage pollution impacts to acceptable levels. Increased abstraction of water from water resources decreases the amount of water available in the resource, resulting in reduced assimilative capacity and increased concentrations of pollutants. While a portion of the abstracted water is usually returned to the water resource at the tail end of the use process, it is inevitably in a worse quality than when abstracted. In periods of drought, the assimilative capacity of water resources is significantly decreased, while floods have the potential to mobilise pollutants that have been trapped in sediment. Thus, the management of water quality cannot be done in isolation from the management of abstraction, storage and use, including water conservation and demand management.

1.1.3 Fragmented approaches to Water Quality Management

Water quality management increasingly requires catchment rehabilitation through a range of rural and urban measures, implying an integrated approach that requires cooperation with other sector regulators. While the **Department of Water and Sanitation is the department primarily responsible** for protecting water quality in South Africa, there are a number of **other government departments and spheres of government that have important roles** in this regard, in particular, national and provincial departments of Mineral Resources, Agriculture, Environmental Affairs, Health, Trade and Industry, Education (Basic and Higher), Rural Development and Land Reform, Human settlements, National Treasury, Catchment Management Agencies (CMAs) and Municipalities. Currently water quality management arrangements are hampered by disintegrated institutional structuring, poor co-ordination and conflicting approaches between government departments and spheres of government. It is also recognised that whilst there is a myriad of supporting operational policies, strategies and management instruments across Government; the fragmented nature of these have created a challenge for water quality management.

The fragmented nature of existing government policies and strategies and inadequate or incomplete institutional arrangements is a major contributor to inadequate cooperative governance and alignment between different government departments and sectors.

Therefore, this Integrated Water Quality Management (IWQM) Policy provides an initial Policy framework that aims to connect with wider national policies, provides the opportunity to align approaches towards managing water quality and ensures that water quality management becomes a **national imperative**, and not just the mandate of the Department of Water and Sanitation.

1.2 Water Quality and the Developmental Agenda

Sustainable development is critically dependent on assurances of good quality of the country's limited resources. The country's development must be balanced by an increased supply of water of an appropriate quality to satisfy the human needs. Demand for good water quality will continue to grow as the country's population increases as well as social and economic conditions improve in South Africa, hence placing increasing pressure on the country's already scarce water resources and concurrently, increasing potential threats to water quality. Poor water quality has significant and adverse impacts on South Africa and:

- **reduces the amount of water available for use** (more water must be retained in our river systems to dilute the pollution to acceptable standards);
- **increases the costs of doing business** (the cost of municipal water treatment increases and many enterprises are forced to treat water before being able to use it in their industrial processes,);
- **impacts on human health and reduces productivity** (an increased number of work days are lost due to water-related illnesses);
- **threatens several economic sectors** (poor water quality impacts on crop yields and makes crops vulnerable to import restrictions from countries with strict quality standards), and
- **threatens ecological goods and services** provided by our water resources.

Consequently, deteriorating water quality is a socio-economic and development challenge and the management of the country's water resources must to be undertaken within the realities of increasing water resource pressures whilst aiming to sustainably support socio-economic development and specific water use requirements.

The improved management of water quality and reduction of water pollution are critical elements of the sustainable socio-economic development path of South Africa as outlined in the National Framework for Sustainable Development (2008): *"South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration".* The National Development Plan (2012), in turn, states that from an environmental perspective, South Africa faces several related challenges and conflicting demands between resource utilisation and sustained socio-economic growth, that need to be managed carefully. The country needs to "*protect the natural environment in all respects, leaving subsequent generations with an endowment of at least equal value".*

In addition, this Policy will contribute to the country's ability to meet the global Sustainable Development Goals (SDGs), adopted in 2015. The SDGs are aimed at ending poverty, protecting the planet, and ensuring prosperity for all as part of anew sustainable development agenda. South Africa, as a signatory to the SDGs, must strive to meet the

targets under each of the SDGs. Water quality has a direct bearing on the ability of the county to meet the goals of ending poverty, ending hunger and achieving food security, ensuring healthy lives and promoting sustainable economic growth. In relation to Goal 6: Ensure availability and sustainable management of water and sanitation for all, water quality is particularly relevant. Under Goal 6, there are three targets that are particularly relevant to water quality as illustrated in Figure 3.

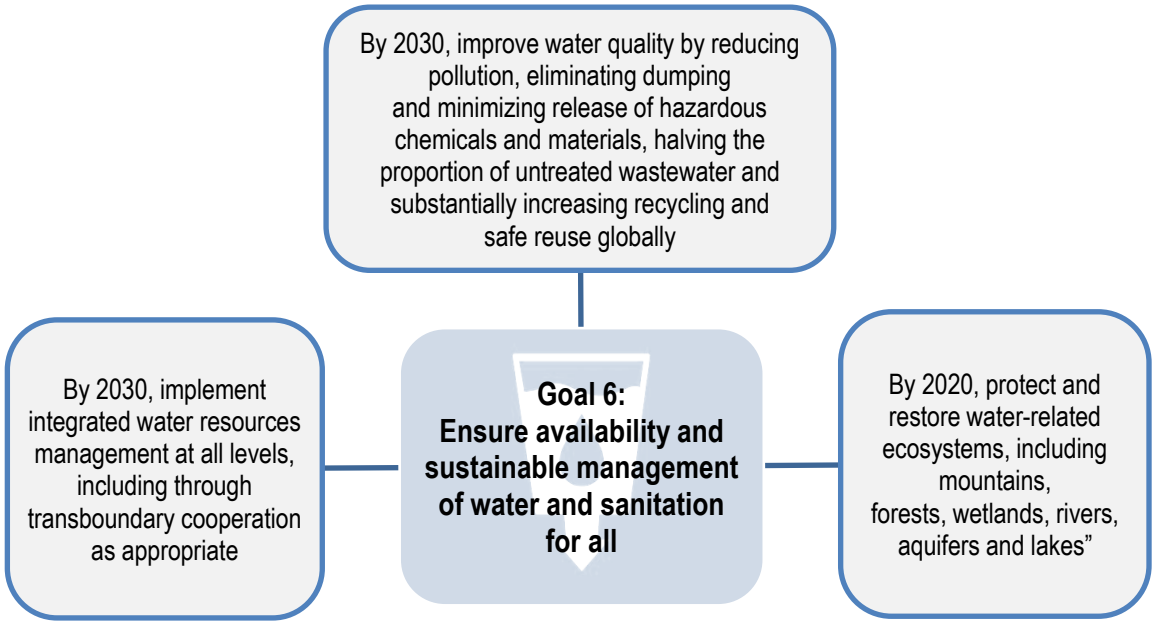


Figure 3: Water quality related SDG targets for Goal 6

Implementation of this IWQM Policy is critical if South Africa is to achieve Goal 6 of the Sustainable Development Goals and its own national sustainable development goals.

1.3 Considerations for Unlocking IWQM

1.3.1 Political Will

Addressing water quality challenges requires political will at all levels. Government needs to play a lead role in driving, coordinating and often financing the remediation of critical water quality problems in the public interest. ***Political will and supporting basin institutions have been illustrated as key to the successful rehabilitation of catchments*** such as in Western Australia and the Mersey Basin in the United Kingdom (Salman, 2007). As in India, political will has increased the willingness of international funding entities to be involved in funding the initiatives, and to also build the required institutional and regulatory mechanisms required to rehabilitate the basin (Sharma, 2015).

1.3.2 Realistic Timeframes supported by Sustained Financing

Integrated Water Quality Management is a long-term process that requires political will and attention to build the required institutional capacity and financial sustainability to enact change. The change must also be supported by sustained financing over the required period for improvement. Improving the resource water quality in a catchment can have short term economic impacts, however, the long-term socio-economic and environmental benefits of improved water quality often outweigh these.

There are various economic (and financial) approaches that can be implemented to fund the cost of water management, and the selection of the approach should be depend on the individual context. This can range from pollution charges for direct discharge of wastewater as applied in Germany, or financial compensation for environmental services as is the norm in France. The Ganga Basin initiative in India illustrates that government needs to drive efforts to remediate water resources, and also source funding (Ramachandran, 2014).

1.3.3 IWQM in Complex Social Ecological Systems

Integrated Water Quality Management adopts the overall philosophy that:

i. All natural water quality, polluting impacts on water quality, and remediation of water quality happen in the context of a catchment.
ii. All catchments comprise the landscape and the people who live there. The landscape is bio-physical and people exist as society.

Simply stated, people living in landscapes comprise of complex social ecological systems.

This implies that it is important to understand both the elements of the system and the interactions between these elements. The relevant elements include, among many others, water resource users and managers, water quality variables, water flow and quantity, and waste discharge. The relevant interactions and feedbacks include, among many others, licensing, waste discharge charges, the green drop programme, resource directed measures and source directed controls. Consequently, **integration and adaptive management are critical to the IWQM.**

1.3.4 Promoting Responsible Behaviour

Water is a basic human right, without which, life on earth would perish. Whilst economic development is important, without water, this development would cease. Recognition of this very simple concept should change the way we, as a society, behave, however, the state of the country's water resources proves that it does not effectively inform our behaviour. It is therefore critical to rethink the way in which water is being managed.

Government alone cannot ensure good water quality. As inhabitants of this country, everyone has the obligation to behave in a responsible and ethical manner and support Government in the management of the country's most precious resource, either through their own behaviour or by reporting unlawful behaviour.

The newly introduced "Carbon Tax" and the continued development of the Waste Discharge Charge System (WDCS) are initiatives to change behaviour to either reduce carbon emissions or reduce pollution load to the resource respectively, however, these rely on financial incentives. Water quality management requires a shift in behaviour in order to realise longer term improvements. These shifts in behaviour need to go beyond a response to economic incentives, towards a recognition that societies are part of the complex social ecological system.

Promoting joint custodian of the water resources through education from grass roots level, to ensuring that the public are informed and capacitated to care for the scarce water resources, and to actively participate in its protection and management, are steps in ensuring the much-needed behavioural change. The "Adopt a River" Health programme, and programmes of this nature promote this shift in philosophy.

1.3.5 Improved Regulatory Landscape

South Africa has a strong institutional and regulatory landscape; however, alignment and consistency is **an emerging challenge that requires cooperative governance and regulatory/strategic** approaches that aim for alignment. In addition, regulatory and strategic approaches are increasingly focusing on minimising pollution by being stringent on major polluting sectors and enterprises. This has been demonstrated by The People's Republic of China, by shifting regulatory approaches to improving monitoring and compliance (CEF, 2014), and enforcing the 'polluter pays' principle, forces polluters to minimise pollution and also provides finances to the regulating entity (through taxes or fines) for rehabilitation and restoration interventions (Falk, et al., 2014; Matthews, 2015). India is also showing intent to implement this strategy, although institutional challenges are delaying implementation. Innovative land-use planning approaches in Porto Alegre (Brazil) illustrate that all sectors have a role to play in minimising pollution (Tucci, 2002; Gersonius et al., 2008).

1.3.6 Innovative Thinking

Clean technology supported by green economy initiatives and financing mechanisms provide targeted ways of reducing pollution at source. The private sector has a crucial role to play in minimising its impacts on water resources. Collaborative efforts by the private sector and international funding organisations (such as the World Bank), CEO Mandate and/or NGOs (such as the World Wildlife Fund - WWF) illustrate that by sharing water risks, benefits can also be shared. ***There is therefore a recognition that business risk associated with physical, reputational and/or regulatory impacts has contributed to collective action initiatives associated with new emerging partnerships***. This, however, requires an enabling environment for research and development and the promotion of the clean technology industry.

Consequently, IWQM challenges are inherently institutional, financial, economic, and social/behavioural in nature rather than technical, and consideration of these dimensions is imperative for successful IWQM approaches.

1.4 Target Audience

This IWQM Policy is a national document, based on a set of Policy principles and values to guide decisions and improve the management and status of water quality in the water resources of the country. Whilst the DWS is the custodian of the country's water resources, this Policy is directed at all National and Provincial Government departments. It also speaks to South Africa as a whole, including the country's many sectoral institutions, provincial and local governments, as well as non-governmental entities including the private sector, the research community, and civil society.

Critically, **the IWQM Policy is meant for anyone in South Africa who is involved in socio-economic initiatives, from planning to implementation**. The IWQM Policy is not solely an "environmental sector" Policy. Instead, it is a document for every individual or institution or organization that plays a role in South Africa's socio-economic growth and development, that impacts or is impacted by water quality and has a stake in the country's future.

1.5 Window of Opportunity

Effective management of water quality in South Africa is a developmental issue, not simply an environmental issue, and must be addressed appropriately by government and its partners in civil society and the private sector as such. Without a radical improvement in IWQM, worsening water quality will continue to decrease socio-economic benefits that ought to accrue to the country and at the same time will continue to increase the costs associated with use of the country's water resources.

Water quality management in South Africa is at a turning point - Through leadership, commitment, co-operation and deliberate action South Africa's government, the private sector and civil society can ensure that water that is fit for use is maintained and where it is not, that the quality of that water be improved, for the benefit of all, now and in the future.

2. CURRENT POLICY AND LEGISLATIVE ENVIRONMENT

The legal and Policy framework for water quality management begins with relevant provisions in the *Constitution of South Africa,1996 (Act No. 108 of 1996),* and cascades down through national Policy to legislation supported by secondary legislation or regulations. This section reflects on the relevant Constitutional provisions, and a high-level framing of the Policy and legislative framework and the support required from Government for IWQM.

2.1 Evolution in Integrated Water Quality Management

South Africa has a long history of policies and programmes for managing water quality, ranging from the *Public Health Act, 1919 (Act No. 36 of 1919)* of the Union of South Africa, to the NWA that was promulgated in 1998. With the expansion of agriculture, industry and mining over many years, along with population growth and urbanisation, the impacts on water quality have increased and diversified, and the need for improved IWQM approaches has become increasingly imperative. A consistent evolution in approach can be seen over the last 100 years.

Until the early 1950s, the focus was on safe disposal of sewage through the 1919 Public Health Act that prevented the disposal of untreated sewage effluent into water resources. In the 1950s, increased mining and industrial activity resulted in a shift in focus, and the 1956 Water Act introduced controls on the industrial use of water and the treatment and disposal of industrial effluent. It required that all effluent be treated and returned to the body of water from which is was abstracted due to the recognition that South Africa was a water-scarce country and treated effluents were required to be discharged into the “water system of origin” so that the overall water supply could be sustained.

In 1962 the General Standard for Industrial Wastewaters and Effluents was gazetted. These standards were adequate for regulating industrial discharge up until the 1980s when these standards became insufficient for managing the pressures being placed on water resources, and hence were amended.

The 1970 Commission of Enquiry into Water Matters was important in that there was an increasing realisation of the pressures on the water resource and focused on the potential for water re-use and reclamation of effluents as a means of controlling pollution.

During the 1980s, the receiving water quality approach was adopted, which focused on managing cumulative impacts on a particular water resource, rather than focusing on individual discharges. The focus was thus on maintaining the quality of a particular water body. The *Water Amendment Act, 1984 (Act No. 96 of 1984),* responding to increasing impacts from mining and industry, provided for Uniform Effluent Standards, General and Special Standards, and Special Standards for Phosphate, to control pollution.

In 1991 the *Water Quality Management Policies and Strategies in the RSA* introduced the receiving water quality approach, which shifted the focus to managing cumulative impacts on

a particular water resource to protect downstream users and the environment, rather than focusing on individual discharges.

In 1996, the Constitution of South Africa, and, in particular, Section 24 (Bill of Rights) enabled a revision of national water Policy. The White Paper on a National Water Policy for South Africa (1997) was founded on 28 key principles which included:

- "*The objective of managing the quantity, quality and reliability of the nation's water resources is to achieve optimum, long-term, environmentally sustainable social and economic benefit for society from their use*" and
- "*The water and water-related services which people use are not dependent only on the physical and chemical characteristics of the water itself, but on the healthy functioning of whole ecosystems, such as rivers, lakes, dams, wetlands, estuaries or the coastal marine environment. … It is the healthy functioning of the whole ecosystem which gives a water resource its ability to recover from droughts, floods and the impacts of human use. Therefore, the most effective approach is to use receiving water quality objectives as the basis for water environmental quality management*."

The 1997 White Paper on a National Water Policy for South Africa, and the National Water Act, 1998 (Act No. 36 of 1998) (NWA), brought about an integrated resource, remediation and source directed approach, requiring the management of the water resource system as a whole. A further step in this approach was the adoption of an integrated approach to managing water quality and quantity, recognising the inter-linkages between pollution concentrations and the amount of water in a system.

At the same time, a decentralized approach to water resources management was introduced, with the Act enabling the establishment of CMAs, responsible for managing water resources at the catchment level.

The development of the *Water Services Act,1997 (Act No.108 of 1997)* that provided the legislative framework for the effective provision of water services, including for basic human needs. It highlighted the spirit of co-operative governance with the emphasis on building capacity at all levels of government.

In 2000, the first edition of the Policy and Strategy for Groundwater Quality Management in South Africa was developed to integrate the management of surface and groundwater. The need for improved groundwater management to ensure sustainable and efficient use of the resource was recognised in the first National Water Resource Strategy published in 2004. Subsequently, the Groundwater Strategy has undergone a number of iterations, with the latest revised version published in 2016.

The Strategic Framework for Water Services of 2003further addressed water supply and sanitation issues, serving as an umbrella framework for the entire water services sector, setting overall water supply and sanitation goals and outlining an institutional framework and operational frameworks (financial, planning and implementation) that need to be set or be in place to achieve these goals.

The NWA requires the preparation of a National Water Resources Strategy (NWRS) by the Minister of Water and Sanitation; this is now in its second edition. The report outlines some of the outstanding challenges in water resources management in the country as:

- strengthening of regulation of water resources and water quality;
- improvement of technical and management skills to implement developmental water management; and
- improvement in the integration of monitoring and information management.

All of these are relevant to IWQM in the current context.

Currently, the reincorporation of the sanitation function into the mandate of the DWS has catalysed a process to amalgamate the National Water Act and the Water Services Act. The National Sanitation Policy, published for stakeholder comment in 2016, is the first comprehensive Policy for sanitation provision in South Africa. The Policy includes positions on equity, institutions and sustainability, and commits the Minister to developing norms and standards for sanitation in informal settlements.

In addition to the primary Policy and legislation discussed above, water quality is managed by DWS through a number of operational policies and strategies. Thus, IWQM in South Africa has evolved over time from end-of-pipe pollution control focused on the enforcement of uniform effluent standards to the current approach of resource planning and management, complemented with appropriate source management controls and remedial efforts, within the context of Integrated Water Resource Management (IWRM) (Figure 4).

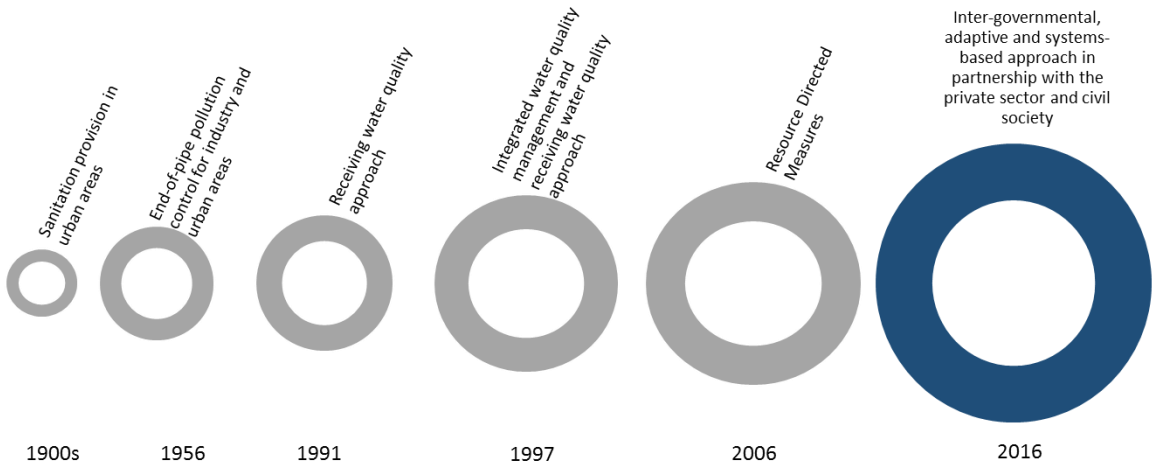


Figure 4: Evolution of IWQM in South Africa

However, the existing overarching IWQM policies (comprising the IWQM Policies and Strategies in the RSA of 1991 and the Resource Directed Management of Water Quality in 2006), whilst innovative at the time of publication, only provided for certain more technical

aspects of water quality management and required a more holistic Policy that not only speaks current realities, but also reflects the array of governance and enabling challenges that have hindered Policy implementation. This IWQM Policy is the revised and renewed overarching Policy that guides all other operational policies being developed by DWS.

In addition, throughout the evolution of IWQM, the burden of managing water quality has fallen largely on the shoulders of the DWS. It is clear, however, that **finding a solution to the problem requires an integrated approach across key government departments and the sector, utilising global best practice tools and mechanisms. This approach also informs the new Policy approach.**

2.1.1 Supporting Departments

Whilst the technical elements of water quality management have been sound for many years, it is realised that the shift in approach now has to be one of managing water quality with a sector-wide approach. With this in mind, there are a range of policies and pieces of legislation administered by other government departments that are also relevant to the management of water quality in South Africa. In effect, these show the important connectivity of land based activities to water quality. These are described below.

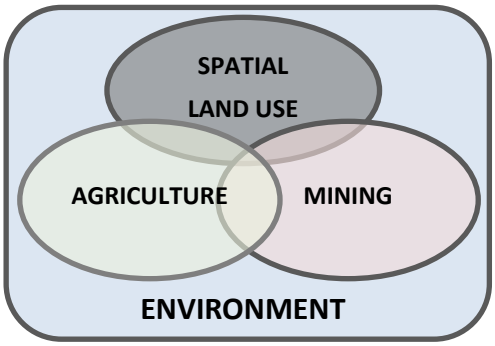


Figure 5: Relationship between sector activities and the environment

The *White Paper on Environmental Management* in South Africa of 1997 and the *National Environmental Management Act,1998 (Act No. 107 of 1998) (NEMA)* set out the overarching Policy and legislative framework for environmental management in South Africa. The White Paper outlines government's environmental vision, strategic goals and supporting objectives as well as the powers and responsibilities of different spheres of government and civil society. The primary instrument to ensure that natural resources are managed sustainably as far as new projects are concerned is Environmental Impact Assessment (EIA) (Brownlie, Coetzee, Morris, 2013).

The *White Paper on South African Land Policy (1997)* stipulates that “environmental issues” should inform the Policy and stipulates that one challenge of land reform is to relieve land pressure without extending environmental degradation. The *Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013),* administered by the Department of Rural Development and Land Reform, provides a framework for spatial planning and land use management and specifies the relationship between spatial planning, the land use management system and other kinds of planning. It provides for development principles and norms and standards; for the sustainable and efficient use of land; and provides for cooperative government and inter-departmental relations between national, provincial and

local spheres of government. The *Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013*) applies to the whole of South Africa (urban and rural areas) and governs informal and traditional land use development processes. However, there has been insufficient consideration of water quality impacts from land use and this aspect is not sufficiently taken into account in spatial planning and land use management initiatives.

The White Paper on Agriculture of 1995 and the *Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)* principally aim to build the agricultural sector in South Africa to reduce unemployment and poverty. One of the Policy objectives is "to preserve agricultural natural resources and to develop supporting policies and institutions". With this in mind, the Department of Agriculture, Forestry and Fisheries has developed a number of legislative and other tools which provide and contribute to the prevention of water pollution by agricultural activities. They include: -

- An Irrigation Strategy of South Africa, 2015;
- National Policy on organic production;
- National Aquaculture Policy Framework;
- Pesticide Management Policy for South Africa, 2010; and
- Research studies in relation to water quality developed in collaboration with the Water Research Commission (WRC) and the Agricultural Research Council.

In addition, there was the development of a discussion document on a *Policy on Agriculture in Sustainable Development* by the Department of Agriculture, which deals extensively with water issues, including impacts on water quality arising from agricultural practices. However, the Agricultural Policy Action Plan (2015 – 2019) itself does not make any reference to issues relating to the water quality impacts of agriculture, or of the impacts of agriculture on declining water quality. This reality reiterates a recognition of the fragmented nature of IWQM and underscores the observation that the issue of water quality is not being appropriately addressed.

From a mine water management perspective, there are additional challenges posed by current Policy and legislation under which the mining industry continues to benefit from a special regulatory regime implemented by the Department of Mineral Resources (DMR)unlike by the environmental authorities which is the case for other industries. **This results in a conflict of interest in the DMR's mandate, between the promotion of mining and the regulation of its environmental impacts; this fundamentally compromises effective regulation of the detrimental impacts of mining.** The authorisation of mining developments by DMR is not aligned with an assessment of sensitive, vulnerable, and important water resource areas, placing some of South Africa's strategic water source areas at risk. Despite the requirement by Cabinet of a one-stop authorisation process that involves Department of Environmental Affairs (DEA), DWS and DMR, too often mines are given authorisations to operate without due consideration of the long-term and often extremely significant water quality implications resulting from mining.

However, an agreement between the Ministers of Water and Sanitation, Environmental Affairs and Mineral Resources concluded through the *Water Amendment Act of 2014* has set

the basis for improved integration and alignment between the three departments. This agreement, titled One Environmental System, entails that all environment related aspects will be regulated through NEMA and that all environmental provisions will be repealed from the *Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)* ; that the Minister responsible for environmental affairs sets the regulatory framework and norms and standards, and that the Minister responsible for mineral resources will implement the provisions of NEMA and the subordinate legislation as far as it relates to prospecting, exploration, mining or operations; that the Minister responsible for mineral resources will issue environmental authorisations in terms of NEMA for prospecting, exploration, mining or operations, and that the Minister responsible for environmental affairs will be the appeal authority for these authorisations; and that the three Ministers agreed to align the time frames and processes for authorisation processes.

The Mining Charter provides that mines are expected to design and plan all operations so that adequate resources are available to meet the closure requirements of all operations. Section 28(2) (c) of the MPRDA requires mines to report on their compliance to the *Mining Charter on an annual basis. However, in instances where a mine is declared insolvent and subsequently closes, the responsibility is inherited by the State who then has to ensure the continuous rehabilitation of derelict and ownerless mines.* The rehabilitation fund provided prior by the mine is often not sufficient for continuous management and rehabilitation and the financial burden falls on the state. The challenge of providing sufficient funding for the on-going management of water pollution from closed mines has not yet been satisfactorily addressed. What becomes clear in looking at the relevant policies across government is that there is a lack of Policy and implementation alignment between the relevant government departments, and a lack of a common Policy imperative which balances the need for economic development with the protection of natural resources, including water. The DWS is in the process of developing a Mine Water Management Policy, that seeks to address the issues outlined above, particularly when it comes to issues around liability, funding and attribution.

2.2 Constitutional Imperative

With the advent of democracy in 1994, there was a paradigm shift in environmental management Policy, with environmental protection being included in the Constitution. Section 24 of the 1996 Constitution stipulates that everyone has the right to an environment that is not harmful to their health or well-being; and the right to have the environment protected, for the benefit of the present and future generations. This is to be achieved through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The state is required to protect, promote and fulfil these rights at all times.

To give effect to these constitutional rights, all three spheres of government are required to ensure that the environment, including water, does not cause harm to health or well-being, and the water that is supplied for domestic purposes is safe to drink. Various other constitutional provisions and human rights, which are also relevant to the effective administration of the environmental regulatory framework, environmental decision-making and integrated environmental management are as follows:

- Constitutional provisions dealing with and relating to **cooperative governance** (as articulated in chapter 3 of the Constitution)**,** including effective, transparent, accountable and coherent government that does not encroach on the geographic, functional and institutional integrity of other spheres of government;
- Constitutional provisions dealing with **legislative requirements at various tiers** of government (as articulated in chapter 6 and 7 of the Constitution);
- Constitutional provisions relating to **institutions created in support of democracy** (as articulated in Chapter 9 of the Constitution);
- Constitutional provisions relating to **effective issue of public administration** (as articulated in Chapter 10 of the Constitution); and
- Constitutional provisions relating to **access to information** (as articulated in Chapter 2 of the Constitution – the Bill of Rights)**.**

Bill of Rights and IWQM

CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996

CHAPTER 2: BILL OF RIGHTS

24. Environment. - Everyone has the right:
(a) to an environment that is not harmful to their health or well-being; and
(b) to have the environment protected, for the benefit of the present and future generations, through reasonable legislative and other measures that–
(i) prevent pollution and degradation;
(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

27. Health care, food, water and social security - (1) Everyone has the right to have access to–
(b) sufficient food and water.

32. Access to information. - (1) Everyone has the right of access to-
(a) any information held by the state; and
(b) any information that is held by another person and that is required for the exercise or protection of any rights.

The Constitution creates concurrent national and provincial competence in the realm of pollution control, allocates responsibility for storm-water management, water supply and sanitation to municipalities, and allocates accountability for water resources management (which includes management of water quality) to national government.

This constitutional allocation of legislative and administrative competence has important consequences for integrated pollution control. For example, raw and drinking water quality standards are imposed at the national level, and local government must put in place appropriate practices to meet these requirements. These practices include the treatment of potable water, treatment and management of sewage and waste water, management of storm water, and management of solid waste. Provincial departments of environment have a concurrent competence of pollution control, which includes water pollution. There is the potential for legislative conflict or overlap between the various players, as well as the possibility of gaps that are not being addressed. While co-operative governance is thus a critical element of IWQM, current practice suggests that water pollution control has not been dealt with in a sufficiently inclusive and integrated manner, and that improvements in this regard are required to secure improved impacts with limited state resources.

2.3 Roles and Responsibilties

Presented below are the ccurrent roles and responsibilities of Government Departments and Agencies supporting the management of water quality.

The Department of Water and Sanitation is the apex department in relation to water quality management, and will lead the co-ordination and alignment of Policy, legislation and implementation and put in place the necessary institutional arrangements under the Inter-*Governmental Relations Framework Act, 2005 (Act No. 13 of 2005)* to ensure a government-wide approach to integrated water quality management; DWS and DEA/Provincial Department of Environmental Affairs will develop a co-ordinated and joint water quality compliance monitoring and enforcement system to optimize the use of government resources and to achieve maximum impact;

The National and Provincial Departments of Environmental Affairs are responsible for the implementation of the NEMA and for conducting EIAs on development projects. The DEA must ensure, in consultation with DWS/CMAs, that water quality impacts are sufficiently dealt with in EIAs and through a co-ordinated approach with DWS to compliance monitoring and enforcement;

The National and Provincial Departments of Agriculture are responsible for the implementation of the CARA and for agricultural Policy; responsible for promoting agricultural practices that reduce water pollution. In reviewing the CARA, the Department of Agriculture, Forestry and Fisheries will take into account the need to reduce the water pollution arising from current agricultural practices. The Department will, in line with the approach outlined in the draft Policy on Sustainable Agriculture, promote sustainable agricultural practices that, amongst other things, will contribute to the reduction of water pollution arising from agricultural areas. The Department will also ensure improved enforcement.

The Department of Mineral Resources is responsible for approving Environmental Management Plans and for the regulation and control of mining waste. In exercising this responsibility, DMR is required to ensure that DWS/CMAs are involved throughout the process of mine authorisation, and that no authorisation for mining is given without a water use authorisation from DWS, which will include stringent water quality management conditions. In addition, DWS, DMR and DEA will develop a joint process for mine closure which effectively addresses the potential long-term water quality impacts of the mine. Work has already begun in this regard through the Inter-departmental Project Implementation Committee on integrating licencing for the mining sector. To ensure that the authorisation processes associated with mining are aligned, all four acts (NWA, NEMA, CARA and MPRDA) will be amended as required. DMR is also responsible for promoting mining practices that reduce pollution.

The Department of Energy is responsible for developing an integrated energy plan for South Africa, and in doing so, should engage closely with DWS to understand and take consideration of the water related implications of energy choices, including the water quality implications, such as, for example, acid mine drainage resulting from coal mining for thermal power generation, long-term radioactive pollution from nuclear power options or unconventional gas and oil sources.

The National and Provincial Departments of Health have a critical role to play in epidemiological studies to understand the impacts of poor water quality on human health, including the different impacts on women and men. These studies will be done in consultation with DWS and in partnership with the WRC and Minerals Research Council, and the resulting information will be used to inform water quality management actions.

Municipalities have a regulatory role in relation to ensuring that ***by-laws*** regarding solid waste management and storm water management systems reduce water pollution from municipal areas, and in this regard, they carry part of government's responsibilities for preventing and reducing water pollution, and must ensure that management and control of such forms of diffuse water pollution are clearly addressed in their Water Services Development Plans. At the same time, local governments are responsible for sanitation provision and Waste Water Treatment Works (WWTW), which are critical in the striving for improved water quality. In this regard, the DWS, working with the national and provincial departments of Cooperative Government, has a regulatory role to ensure that WWTWs are duly licensed under the NWA, that local governments ensure that their WWTWs meet discharge standards, and to take action to ensure compliance by municipalities. In this regard, DWS will implement its internal protocol on engagement with municipalities, including taking legal action where necessary

Catchment Management Agencies are agencies of DWS with delegated functions under the NWA. As such, they must act in alignment with the NWRS2 and the IWQM Policy of DWS, and must ensure that, at the catchment scale, effective co-ordination of planning and implementation takes place between the relevant government departments.

In line with the principles of subsidiarity enshrined in Agenda 21, and in the White Paper on a National Water Policy for South Africa, the management of water quality will be delegated to CMAs, with DWS providing the necessary oversight, national strategic guidance, and control of transboundary matters. The CMAs will also build the necessary capacity to take action under section 19 (3-6) of the NWA, which is a responsibility allocated to them by the NWA. The Catchment Management Committees, Catchment Management Forums (CMF) and Catchment Committees will be used as appropriate.

If South Africa's limited water resources are to provide a foundation for the development of a prosperous nation into the future, ***it is critical that there be a coherent, IWQM Policy for all government departments, and that strong inter-departmental arrangements enable the implementation of this Policy in line with the imperatives of the Bill of Rights.***

3. POLICY RESPONSE

3.1 Aim of the IWQM Policy

This IWQM Policy has been informed by insights from: i) the current Policy and legislative environment governing IWQM in South Africa; ii) international approaches and lessons from IWQM; as well as iii) lessons from current IWQM practices in South Africa. Consequently, the Policy aims to consolidate the existing water quality management regime as well as strengthen our approach by introducing new integrative dimensions that will support the realisation of IWQM. Core dimensions include:

- **Providing a coherent, consolidated, current and inclusive (i.e. government in partnership with the private sector and civil society) approach** to the way water quality is managed by building on the current strengths, addressing gaps/weaknesses and seizing opportunities identified in relation to IWQM;
- **Aligning with current legislation** and relevant overarching policies and provide resolution on matters not adequately addressed in current Policy;
- **Guiding the further development of legislative and regulatory instruments** and appropriate measures to manage water quality;
- **Informing the water resource management function** as well as the required framework for the development of related policies and sub-strategies related to IWQM;
- **Addressing key operational aspects** such as adopting an integrated approach, broadening finance mechanisms and improving knowledge and information in the execution of the IWQM function; and
- **Providing guidance on sustainable water use**, especially in as far as it relates to IWQM.

Water Quality and its Management

Water quality describes the chemical, physical, aesthetic and biological characteristics of water, that are influenced by either dissolved or suspended substances, in respect of the water's suitability for an intended purpose.

IWQM involves the maintenance of the fitness for use of water resources on a sustained basis, by achieving a balance between socio-economic development and water resources protection. From a regulatory point of view the "business" of IWQM entails the ongoing process of planning, development, implementation, and administration of IWQM Policy, the authorisation of water uses that impact on water quality, and the monitoring and auditing of the aforementioned.

The Vision, Goal, Values, Principles, and Pillars that underlie the IWQM Policy are elaborated in this Chapter.

3.2 Vision and Goal for IWQM

Noting that South Africa has progressively developed its approach to IWQM over the last century, the status of water resources is declining, and these resources will be placed under increasing levels of pressure as development progresses. In this context, The Constitution of South Africa indicates that we need to ensure a ***"Sustainable, equitable and secure water for a better life and environment for all."***

Towards this end, the country's vision for IWQM is therefore:

> ***"Government, in partnership with private sector and civil society, secures water that is fit-for-use, for all, forever!"***

Consequently, the goal for IWQM for the country is to adopt a government-wide, adaptive and systems-based management approach, in alliance with the private sector and civil society, that will improve resource water quality in South Africa, prevent pollution and ecological degradation, support ecologically sustainable economic and social development as well as informed use of the nation's water resources.

3.3 Values underpinning IWQM

This IWQM Policy is underpinned by a set of core values which are essential for enabling the successful implementation of the Policy. These values support the vision, guide the principles that are used to shape the Policy responses, and reflect the ethos for managing water quality in South Africa (Figure 6). These values are presented in Figure 7.

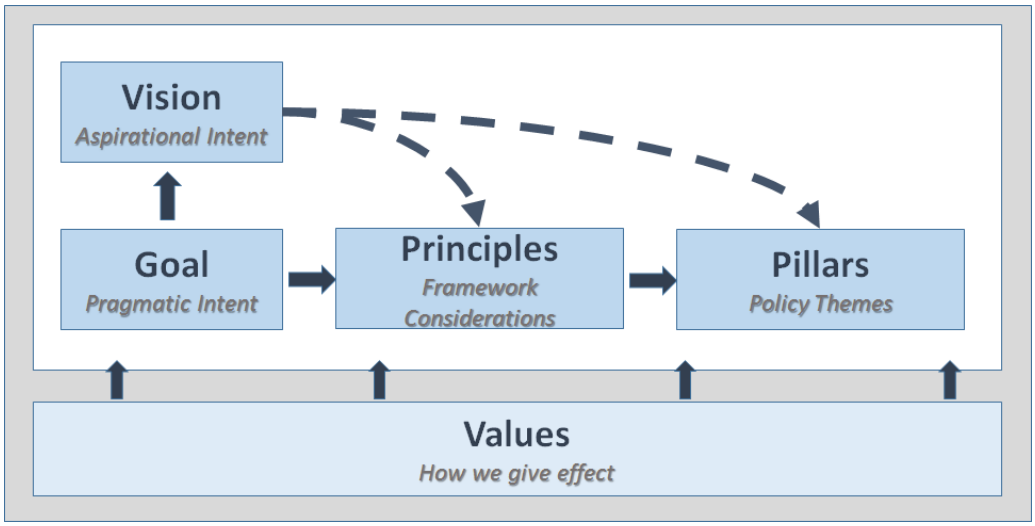


Figure 6: The link between the IWQM Policy Vision, Goal, Values, Principles, and Pillars

Figure 7: Values underpinning the IWQM Policy

3.4 Principles underpinning IWQM

The development of Policy needs to be constructed around a suite of principles that provides a core suite of objectives and as such a framework for the Policy. Noting that there is an increasing recognition of the need to introduce elements of change that will influence the ability to affect Policy, the principles for the IWQM Policy need i) elaborate on the existing Policy principles present in various primary Policy documents of government, and ii) respond to the gaps in IWQM by proposing new principles.

Seventeen Principles underpin the IWQM Policy and ensures that the approach to IWQM is structured, transparent and predictable. Internally, the Principles guide the development of IWQM Policy positions and statements. Externally, these Principles substantiate the basis of Government's views to the general public.

These Principles are in addition to, and do not replace, the existing Policy principles in the many primary Policy documents. Principles 1, 5, 7, 10, 11, 13, and 16 are considered new principles, in that they are new in the way that they are applied to IWQM.

Table 1: IWQM Policy Principles

POLICY PRINCIPLE	POLICY POSITION	POLICY AND LEGISLATIVE ENVIRONMENT
PRINCIPLE 1: GOVERNMENT-WIDE IWQM	It is the constitutional duty of all spheres of government to protect the quality of South Africa's water resources.	This principle is supported by the constitutional imperative for co-operative government.
PRINCIPLE 2: PEOPLE-CENTRIC	Public participation is a crucial element of IWQM must be promoted to ensure active and engaged citizenry.	This principle is supported by the Constitutional imperative and enshrined in the 1990 African Charter for Popular Participation in Development and Transformation.
PRINCIPLE 3: SUBSIDIARITY AND ACCOUNTABILITY	Water quality must be managed at the lowest appropriate level and the institutions responsible for managing water quality must be held accountable.	This principle is supported by the position on subsidiarity and the role of CMAs set out in the *White Paper on a National Water Policy for South Africa*.
PRINCIPLE 4: TRANSBOUNDARY IWQM	Water pollution has spatial dimensions that traverses an array of administrative and natural boundaries. International, national, provincial and local boundaries do not typically align with natural boundaries creating an array of planning, management and operational challenges that need consideration.	This Policy position is supported by Constitution in requiring cooperative government across the various spheres of government. The revised *SADC Protocol on Shared Watercourses* and the *White Paper on a National Water Policy for South Africa both recognise the importance of cooperative approaches to the management of shared watercourses.*
PRINCIPLE 5: PARTNERSHIPS	In order to manage water quality effectively, partnerships must be developed between government, the private sector and civil society.	This Policy position is based on the IWRM principle that water development and management must be based on a participatory approach, involving users, planners and Policy-makers at all levels, as well as the concept of type II partnerships developed at the World Summit on Sustainable Development held in Johannesburg in 2002.
PRINCIPLE 6: ADMINISTRATIVE FAIRNESS AND IMPLEMENTABILITY	Regulation must be administratively fair, and must also be effectively implementable within technical and financial resource constraints.	This Policy position is in line with the constitutional requirements of administrative justice, participatory governance, and a differential approach to achieve equity and redress historical racial and gender imbalances.

POLICY PRINCIPLE	POLICY POSITION	POLICY AND LEGISLATIVE ENVIRONMENT
PRINCIPLE 7: ADOPT ADMINISTRATIVE PENALTIES	A system of effective administrative penalties for water pollution offences must be adopted.	This is a new Policy position, but is supported by international best practice, and by local practice as enshrined, for example, in the Competition Act, 1998 (Act 89 of 1998).
PRINCIPLE 8: AN INTEGRATED AND ADAPTIVE APPROACH	An integrated and adaptive, systems-based resource, remediation and source directed approach which manages the water resource system as a whole at catchment or sub-catchment scale will be adopted, *e.g.* to include integration between *"quality"* and *"volume"*, integrated planning and integrated regulation. Emerging areas of concern further include unconventional gas development as well as carbon capture and storage development. Evidence has demonstrated an insufficient availability of water resources in the Central Karoo to supply the needs of shale gas exploration and production. As such existing, known water resources are prohibited from use. Use of any water found during any phases of the unconventional gas development shall be reviewed under the ambit of the hierarchy of water management principles in terms of sustainable use of water. No municipal water may be used or supplied for unconventional gas development, other than for human consumption. All water required for shale gas subject to approval, should be sourced in order of preference from: industrial sources, sea water and deep saline aquifers and treated to industry standards. No temporary or permanent trading of water for unconventional gas development will be permitted. Application for storage of industrial and process wastewater will be assessed in	This Policy position is supported by international best practice, as well as by the *White Paper on a National Water Policy for South Africa (2016)*, and the *Policy on Resource Directed Management of Water* (2006). Unconventional gas development is a declared controlled activity in terms of the National Water Act (Act 36 of 1998) and any water use (s) relating to these activities require a water use authorisation. The National Water Act (Act 36 of 1998) has concurrence with the National Environmental Management Act: Waste Act (Act 59 of 2008) in terms of Section 50 (3) of the Waste Act. Information is additionally informed by the Strategic Environmental Assessment on Shale Gas conducted by the Department of Environmental Affairs.

POLICY PRINCIPLE	POLICY POSITION	POLICY AND LEGISLATIVE ENVIRONMENT
	terms of the National Water Act (1998), the National Environmental Management Act: Waste Act (2008) and any other Act that may become relevant in the future. All waste streams emanating from unconventional gas development must be treated on site by the industry and at their expense for reuse in continued operations. Conventional landfills and treatment facilities cannot accept waste from unconventional gas exploration and production. These waste streams must be accommodated in purpose-built landfills.	
PRINCIPLE 9: HIERARCHIES OF POLLUTION MANAGEMENT	Pollution management will follow a hierarchy of decision-making permeated by: • Prevent, where possible. • Minimise, where possible or be subjected to specific licence conditions or minimum standards. • If the above options have been exhausted, then the Precautionary approach applies minimum standards. • For catchment specific responses, a differentiated approach is applied. This allows for continuous improvement and adaptive management approaches. Rehabilitation and reclassification will be applied catchment specific contexts as needed.	This approach is supported by the *White Paper on a National Environmental Policy*, and current water quality Policy documents in place in DWS. It is also an internationally accepted principle.
PRINCIPLE 10: PROMOTION OF GREEN/ECOLOGICAL INFRASTRUCTURE RESTORATION AND REHABILITATION	Rehabilitation and restoration of catchments will be pursued, including the use of green/ecological infrastructure	This is a new Policy position.
PRINCIPLE 11: RISK-BASED APPROACH	A risk-based approach to regulation will be adopted, based on the likely magnitude of potential impacts.	This is a new Policy position.

POLICY PRINCIPLE	POLICY POSITION	POLICY AND LEGISLATIVE ENVIRONMENT
PRINCIPLE 12: WATER QUALITY IS A DEVELOPMENTAL ISSUE	In addressing the management of water quality, the developmental, economic, social and environmental impacts of deteriorating water quality must be taken into account.	This Policy position builds on the internationally accepted IWRM principle that water is both a social and an economic good, extending this specifically to recognise the social, economic, and environmental costs associated with declining water quality. It also recognises the approach taken in the *White Paper on a National Water Policy for South Africa* of integrating economic, development and environmental goals.
PRINCIPLE 13: BROADENED FUNDING MECHANISMS	The mechanisms for funding integrated water quality management must be broadened, given that water quality has impacts on, and is impacted by, many different sectors, and recognising the negative developmental impact of declining water quality.	This is a new principle, developed from the Policy positions that declining water quality is an economic and developmental issue, and that the management of water quality is a concern of all spheres of government and several different departments, not just the Department of Water and Sanitation.
PRINCIPLE 14: POLLUTER PAYS	The costs of remedying pollution, degradation of resource quality and resulting adverse health effects, and of preventing, minimising or controlling pollutions is the responsibility of the polluter.	This is an internationally accepted principle in environmental and water Policy, and is also enshrined in the *White Paper on a National Water Policy for South Africa*.
PRINCIPLE 15: INFORMED PUBLIC	Efforts to ensure that broader societal awareness of the importance of resource water quality will prove increasingly important in catalysing more responsible behaviours.	The need to engage stakeholders and develop the capacity of broader civil society to participate are core concepts to Integrated Water Resource Management and as such the *National Water Policy for South Africa.* This Policy is in line with the Constitution, Promotion of Access to Information Act, 2000 (Act No. 2 of 2000), Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000) and in line with international best practice.

POLICY PRINCIPLE	POLICY POSITION	POLICY AND LEGISLATIVE ENVIRONMENT
PRINCIPLE 16: DATA IS A STRATEGIC ASSET	Data on water quality must be standardised, reliable and scientifically defensible and must be collected, managed and protected as a strategic asset for monitoring, management, legal actions and research purposes, while also being used to support co-learning and adaptive management.	This is a new Policy position.
PRINCIPLE 17: PUBLICLY AVAILABLE INFORMATION	Information and data on water quality and waste discharges must be available in the public domain[1] and should be used to enhance public awareness and education, and to support adaptive management approaches.	This Policy is in line with the Constitution, Promotion of Access to Information Act, 2000 (Act No. 2 of 2000), Promotion of Administrative Justice Act, 2000 (Act no. 3 of 2000) and in line with international best practice.

3.5 Policy Pillars for IWQM

The management of water resources is fundamentally structured around a number of key themes. These are often articulated as being governance and institutional aspects, technical and managerial approaches that are required on a day-to-day basis, financial instruments, information and data management that underpins decision making and the human resources and skill sets required to undertake activities. The NWRS typically would cover these dimensions, as would a Catchment Management Strategy (CMS).

These dimensions have then been refined for the purpose of the IWQM Policy into four key pillars around which the Policy is structured. These pillars (Figure 88) are underpinned by the 17 Policy principles in different ways, noting the interconnectivity and inter-dependencies between these pillars. However, when collectively implemented, the end result will be the attainment of the vison and goals of the Policy.

The naming of these pillars has been based upon the core issue that is required to shift the water quality management paradigm to one of integration and the realisation of impact.

[1] Legal opinion is required to support this principle.

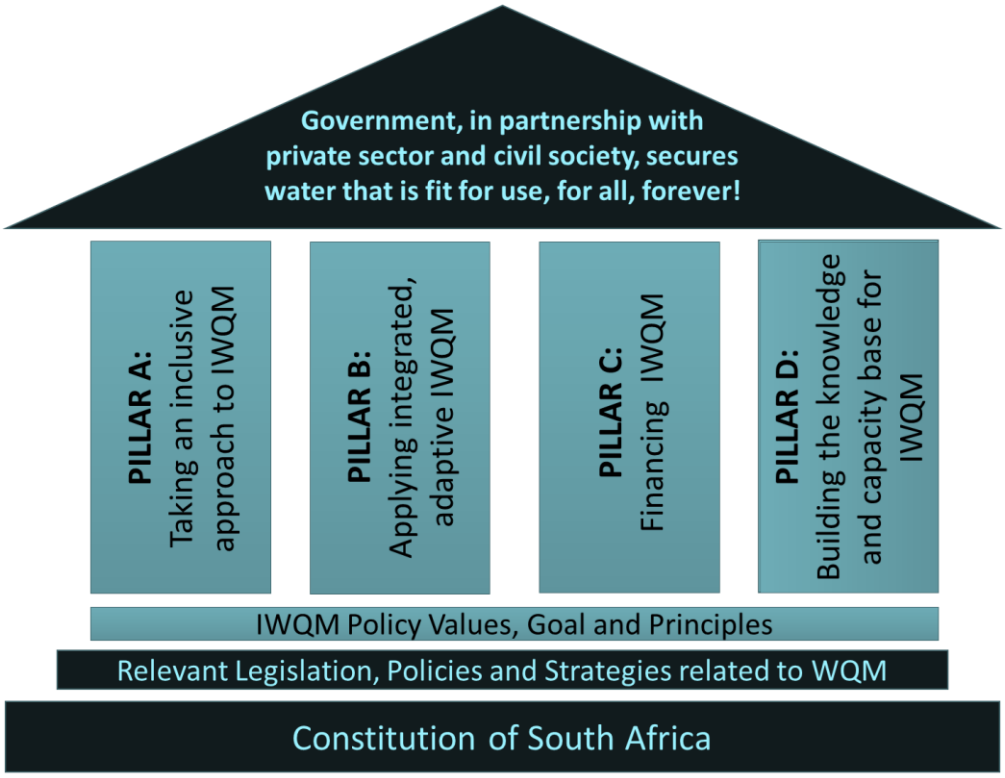


Figure 8: The four pillars of the IWQM Policy

PILLAR A: Taking an inclusive approach to integrated water quality management

This pillar refers to:

- the need for a government-wide integrated, adaptive and systems-based response to IWQM challenges throughout country;
- key Policy aspects that must be addressed in achieving such an approach;
- the need to build partnerships between government, civil society, and the private sector to successfully address the challenges; and
- the need to gather input through public participation.

The Principles that underlie this pillar are depicted in the figure below:

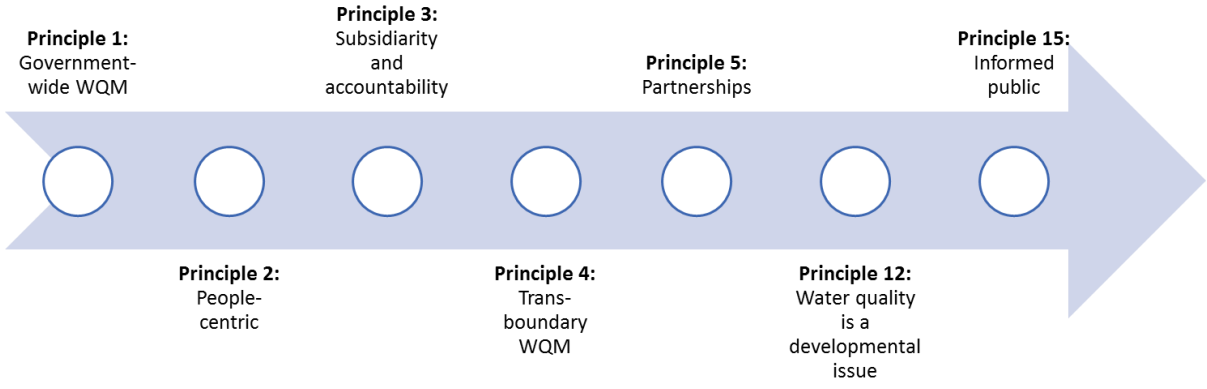


Figure 9: Principles that underlie Pillar A

PILLAR B: Applying integrated, adaptive water quality regulation and management

The second pillar spells out:

- the integrated approach to adaptive, systems-based IWQM;
- the hierarchy of decision-making; and
- key instruments for implementing the integrated, adaptive and systems-based approach.

The Principles that underlie this pillar are depicted in the figure below:

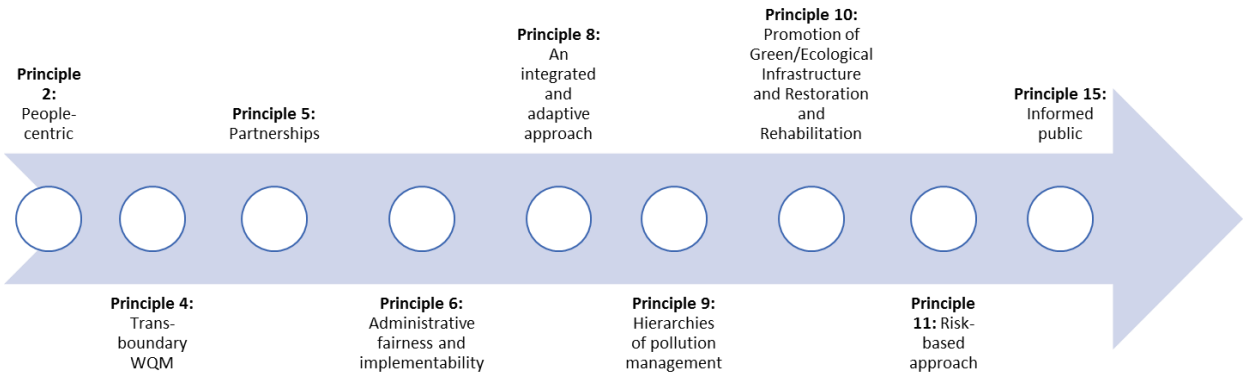


Figure 10: Principles that underlie Pillar B

PILLAR C: Financing Water Quality Management

The third pillar examines the financial basis for integrated IWQM, looking at tools for financing the required actions, and the key role of the private sector.

The Principles that underlie this pillar are depicted in the figure below:

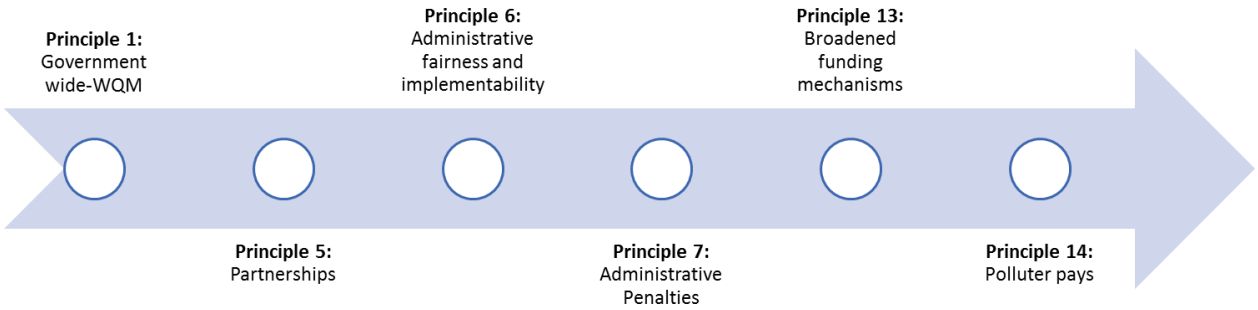


Figure 11: Principles that underlie Pillar C

PILLAR D: Building an appropriate knowledge and information management base

The fourth and final pillar describes the Policy elements that focus on the knowledge and human resource capacity base that is required to implement the Policy approaches described in the above three sections.

The Principles that underlie this pillar are depicted in the figure below:

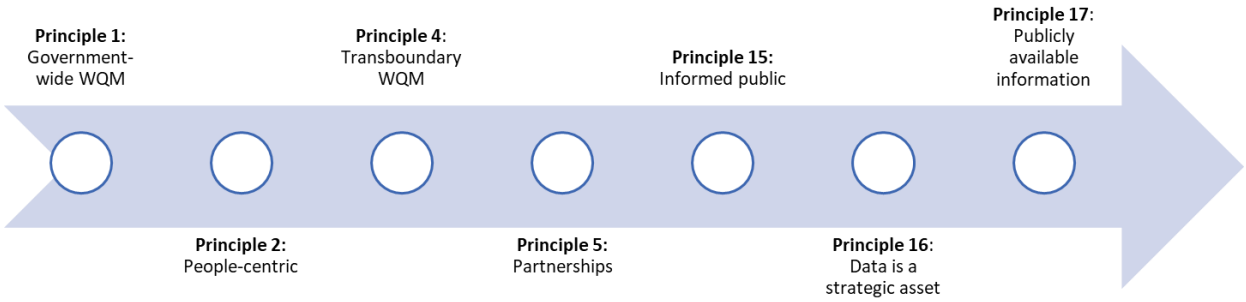
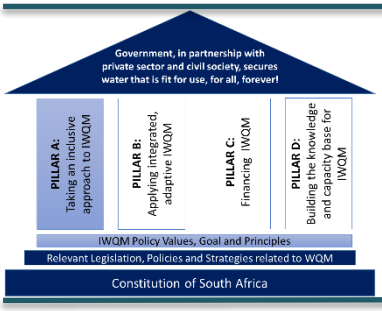


Figure 12: Principles that underlie Pillar D

Each pillar is elaborated in greater detail below and describes the:

- The problem/challenge that needs to be resolved through Policy;
- The response that is required to mitigate the challenge; and
- The summary statements for the Policy.



PILLAR A: AN INCLUSIVE APPROACH TO WATER QUALITY MANAGEMENT

A.1 Government-wide IWQM

A.1.1 Problem statement

Protection of water quality is a Constitutional imperative arising from the right to an environment that is not harmful to health or well-being and the right of access to sufficient water. Deteriorating water quality in the water resources of South Africa is a significant socio-economic and developmental challenge.

The economic impacts of poor water quality are insufficiently quantified in the South African context, but international and some anecdotal evidence reflects that the economic impacts of deteriorating water quality are significant. There are economic and financial implications to the agricultural, tourism, industrial, commercial and municipal sectors as a result of deteriorating water quality in that the costs of treating water to ensure fitness-for-use escalate with the decline in water quality. The requirements being placed upon exporters to use water that meets set standards has become significant and has anecdotally threatened the agricultural economies in several regions of the country.

At the same time, poor water quality has significant short and long-term impacts on human and animal health, particularly in poor communities where there is often a more direct exposure to the environment and relationship with water resources. The impacts of the discharge of water containing waste upon ecosystems that sustain South Africa's social and economic development can have very direct and significant impacts. It is therefore critical that water quality is recognised and addressed as being of economic, social, and environmental importance.

Managing water quality is a complex task as pollution arises from a range of sources, through direct discharge or diffuse sources, with a complex and increasing array of pollutants finding their way into water resources. The impacts of pollution are influenced by, amongst other things, rainfall, water temperature, ecological sensitivity, levels of water abstraction, and rates of flow in rivers. These complexities result in a multifaceted and intricate array of governance problems. Historically, the management of water quality has fallen solely to the **Department of Water and Sanitation, and its various institutions,** as custodian of the country's water resources. The fact that the status of water resources is often dependent upon how land is utilised and managed, means that the DWS has no, or limited, mandate to influence decisions that have significant impact upon water resources. Therefore, there are several **other government departments and spheres of government that have important**

roles in this regard, in particular, municipalities, the DMR, national and provincial departments of Agriculture, Cooperative Governance and Traditional Affairs (COGTA), Human Settlements, DEA, Health, and National Treasury.

Currently effective IWQM is being hampered by poor co-ordination, siloed planning and conflicting approaches between the various government departments and spheres of government.

Despite these challenges, some progress is being achieved towards improved co-ordination. For example, the proposed amendments to the NEMA strengthen the ability of the DEA to deal with non-compliant mines and this – together with the revised EIA Regulations – strengthen the understanding of what is required in terms of EIAs. Some progress has also been achieved in moving towards a more seamless one-stop shop for authorisations between DEA and DWS, and joint approaches to compliance monitoring and enforcement are being developed.

However, there remain challenges with regards to the responsibilities of DWS, DEA and DMR in relation to mines. While an agreement between the Ministers of Environmental Affairs, Water and Sanitation and Mineral Resources in 2014 through the Inter-departmental Project Implementation Committee has set the scene for an integrated and coherent approach to environmental management, including water resources protection, this has not yet been fully implemented, and challenges still remain.

At the highest level, there is a **need for improved inter-sectoral planning in support of the drive for national development, however the trade-offs need to be considered.** The National Development Plan highlights both the promotion of agriculture, as well as the development of mineral resources. The NDP similarly recognises the need for sustainable development and the need to develop our water resources. These goals imply competition for scarce resources (land and water) between agriculture and mining (BFAP, 2015). There is thus a need for more coherent integrated planning and direction for the benefit of the country. These do need to be considered within the context of international river basins and the impacts that the national actions have on other riparian states.

Whilst there are significant challenges at the international and national levels, potentially our most significant issues from a water quality perspective reside at the more local levels. The delays in establishing, capacitating and delegating powers and duties to CMAs has meant that there has not been sufficient on the on-the-ground management. This has also hindered some forum development processes. Municipalities are a major source of waste water containing pollution. There have been significant efforts to incentivise and support municipalities in improving the operations and maintenance of WWTW. Programmes such as the Green Drop programme has proved useful in this regard, however, noting that the water quality impacts arise from a number of sources in the municipal space, requires a more holistic engagement. CMAs and the use of forums are important institutional structures for engaging at the Municipal level, despite the challenges that exist due to misalignment of operational boundaries, differing planning cycles and an array of institutional complexities.

As part of the institutional reforms and realignment process, there is a need to explore ways in which the IWQM function can be strengthened within the DWS. This would include clarifying the role of CMAs. At this juncture, there is no lead for the IWQM function within the DWS as differing elements exist within different branches of the department. The lack of a champion for IWQM is of considerable concern.

A.1.2 Policy Responses

A.1-1: DWS will lead a drive to harmonise inter-sectoral policies, legislation and other instruments to support IWQM

In line with the Constitution, all relevant government role players are required to develop and implement appropriate legislative (and other) measures, and to operate in concert through formalised co-operative governance structures, to protect water resources from pollution. This requires inter-departmental harmonisation of policies, legislation, regulation, integrated planning compliance, monitoring and enforcement as well as other functions in accordance with the requirements of this water quality management Policy. To achieve an effective intra-governmental approach, DWS will lead a collaborative process to ensure alignment of NEMA, NWA, CARA and MPRDA to support integrated water quality management, and to formally address overlaps of or gaps between statutory/regulatory/oversight mandates of all government institutions relevant to IWQM.

A.1-2: DWS will establish appropriate inter-departmental and inter-governmental structures to ensure government-wide co-ordination of water quality management processes

Strategic management of the primary water quality challenges will require an intensification of cooperative governance and regulatory interventions led by DWS. Engagement with appropriate decision-making representatives of the affected government entities will be crucially important. Such inter-government engagements will require the approval of the Directors-General of DWS and the affected departments, and may require the establishment of an inter-ministerial committee in order to obtain the traction that is needed. Noting the socio-economic and financial impacts of declining water quality, intra-governmental engagement will include National Treasury in order to address special public financing arrangements. The DWS will take the responsibility for leadership and co-ordination of other departments and spheres of government in this regard. In achieving coordination between government departments, DWS will build on existing structures, rather than creating new structures.

To support these structures, DWS will develop and implement capacity building programmes to ensure that staff have the knowledge to enable informed discussion.

An adaptive and systems-based approach will be adopted to enable the various role-players to develop a common understanding of the challenge, to co-create a vision

managing the challenge, and to adapt management approaches based on a structured monitoring, evaluation and learning approach.

The critical departments and agencies that must form part of an integrated, government-wide approach to IWQM include:

- The Department of Water and Sanitation and its water management and research institutions (e.g. Catchment Management Agencies, the Water Research Commission);
- The Department of Environmental Affairs;
- The Department of Agriculture, Forestry and Fisheries;
- The Department of Mineral Resources;
- The National Nuclear Regulator;
- The Departments of Trade and Industry;
- The Departments of Human Settlements;
- The Department of Energy;
- The Department of Health;
- The Department of Rural Development and Land Reform;
- The Departments of Education (basic and higher);
- The Department of Planning, Monitoring and Evaluation; and
- Local Government (Municipalities).

A.1-3: DWS will ensure that challenges arising from the mandates of government departments are addressed through interdepartmental and intergovernmental co-ordinating structures

At present, the regulatory framework for IWQM faces the challenge of some government departments having both a mandate in terms of promotion of sectoral economic activity, and a role in terms of regulation of the same activity, which may or may not have environmental management implications. This does mean that there is a complex suite of accountabilities that needs to be addressed through the inter-governmental structures. These structures do need to ensure that economic development takes place within an environmentally sustainable framework.

A.1- 4: The management of water quality will be delegated to CMAs, with DWS providing the necessary oversight, national strategic guidance, and control of international matters

In line with the principles of subsidiarity enshrined in Agenda 21, and in the *White Paper on a National Water Policy for South Africa*, the management of water quality is best performed at a catchment and more localised scale, in order to support the concept of localised solutions for localised problems. In this regard, the CMAs will utilise CMFs and Catchment Committees in order to support participatory management. The CMAs will also build the necessary capacity to act under section 19 (3-6) of the NWA, which is a responsibility allocated to them by the NWA. The

CMAs and DWS will provide the necessary oversight, national strategic guidance, and leadership on transboundary matters.

A.1-5: DWS will strengthen its internal water quality management function and identify a national champion

Efforts will be undertaken to strengthen the water quality management function within the DWS. This will include organisational aspects, as well as those of systems and resources. In so doing, a national champion will be identified, and this person will have the responsibility to pull together the internal DWS functioning, as well as act as the anchor for facilitating the inter-governmental approach to IWQM.

A.1-6: DWS will report annually on the status of water quality in South Africa

All relevant departments and government agencies will be held accountable for their actions in relation to this Policy, and DWS will report annually, in its annual report, on the effective implementation of the government-wide approach towards IWQM.

A.2 Non-Government support for IWQM

A.2.1 Problem statement

The private sector is a significant player in generating pollution in South Africa, whether from large or small enterprises. While some enterprises have made considerable progress in cleaning up their processes, meeting water quality standards and participating in initiatives, there are still far too many enterprises that continue to contravene legislation and pollute water resources. This not only has significant impacts on other water users and aquatic ecosystems, but also places an additional burden on state resources through an increase in the number of staff members required to ensure compliance with legislation, and tying up resources in lengthy and time-consuming judicial processes.

Government, on its own, will not be able to successfully manage the water quality challenges, not least due to the current financial and human resource constraints. Human, financial and technical resources available in the private sector and civil society are required to support IWQM. This potential for collaboration, stewardships and partnerships between all stakeholders and beneficiaries is recognised as critical, including between all spheres of government, the private sector and civil society. International experience has shown that stewardships and partnerships can be established for dealing with water quality challenges in specific priority areas and be effective in managing specific water quality issues. Institutions like CMFs have a far greater role in ensuring accountability, but due to limited capacity, are often disempowered.

Education is an important first step as far as creating partnerships are concerned, as there should be a common understanding of the water quality issues and challenges.

Civil society, while active in some areas, must play a stronger role as a partner in the process of identifying pollution incidents and issues, supplementing the capacity of the state through having eyes and ears across the country.

A.2.2 Policy Responses

A.2-1: DWS will to forge highly-focused, fit-for-purpose, civil society and corporate business partnerships that are relevant to each primary water quality challenge

The private sector and civil society have a crucial role to play in minimising its impacts on water resources. The NWRS places emphasis on partnerships between DWS and the private sector in order to deal with water challenges. Some of the platforms to facilitate cooperation and dialogue between stakeholders are the Strategic Water Partnership Network, the National Business Initiative, and the Water Sector Leadership Group[2]. Collaborative efforts by the private sector and international funding organisations (such as the World Bank) and/or NGOs (such as World Wildlife Fund) illustrate that by sharing water risks, benefits can also be shared and joint custodianship of the resource is crucial.

Provincial water forums have been created to address water challenges, align plans and strengthen collaboration. Through mechanisms and forums like those mentioned above, effective stewardships and partnerships will be built to deal with water quality challenges in specific priority areas, and platforms like CMFs will be used to ensure stakeholder engagement. A strategic management approach to the primary water quality challenges requires that DWS will need to forge highly-focused, fit-for-purpose, civil society and corporate business partnerships that are respectively relevant to each primary water quality challenge.

The partnership approach dictates that polluters take cradle-to-grave responsibility for their products and improve self-regulatory processes to reduce the regulatory burden on the state.

A.2-2: DWS will actively promote the concept of water stewardships

DWS will actively promote the concept of water stewardship and encourage private enterprise to look beyond the factory fence to support IWQM at the local and catchment scale in line with the International Alliance for Water StewardshipStandard which is designed to achieve four water stewardship outcomes: (1) good water governance, (2) sustainable water balance, (3) good water quality status and (4) healthy status of important water-related areas.

A.2-3: DWS will strengthen and further develop partnerships with civil society

In managing water quality, it is crucially important that government forges strong partnerships with civil society, which has an important role to play both in compliance monitoring and enforcement and as partners in pollution prevention and rehabilitation programmes. At the national and catchment scale, Government/CMAs will work

[2]This is a sector-wide strategic engagement led by DWS.

closely with civil society organisations to build programmes of citizen-based monitoring, and education and awareness programmes to reduce pollution of water resources.

To ensure water quality is entrenched at grass-roots level, DWS/CMAs will work with the Department of Education and schools to develop school-based programmes of water quality monitoring which can benefit DWS/CMAs in terms of data, while also serving as educational programmes at school.

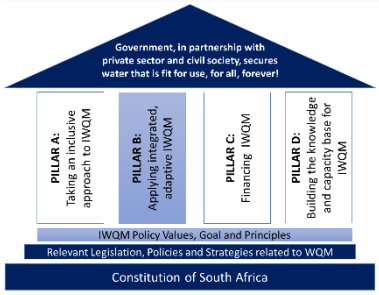
Active CMFs and catchment committees will be established and used as appropriate. These must be supported Government/CMAs to ensure an on-going platform for participation in IWQM processes by civil society, together with other stakeholders. These will provide an important conduit for Civil Society to raise issues and engage in debate with Government and Private Sector actors.

A.3 Summary Policy Statements for Pillar A

Presented in Table 2 are the summary IWQM Policy Statements for Pillar A.

Table 2: Summary Policy Statements for Pillar A

Government-wide IWQM	
A.1-1:	**DWS will lead a drive to harmonise inter-sectoral policies, legislation and other instruments to support IWQM.**
A.1-2:	**DWS will establish appropriate inter-departmental and inter-governmental structures to ensure government-wide co-ordination of water quality management processes.**
A.1-3:	**DWS will ensure that challenges arising from the mandates of government departments are addressed through interdepartmental and intergovernmental co-ordinating structures.**
A.1- 4:	**The management of water quality will be delegated to CMAs, with DWS providing the necessary oversight, national strategic guidance, and control of international matters.**
A.1-5:	**DWS will strengthen its internal water quality management function and identify a national champion.**
A.1-6:	**DWS will report annually on the status of water quality in South Africa.**
Non-Government support to IWQM	
A.2-1:	**DWS will forge highly-focused, fit-for-purpose, civil society and corporate business partnerships that are relevant to each primary water quality challenge.**
A.2-2:	**DWS will actively promote the concept of water stewardships.**
A.2-3:	**DWS will strengthen and further develop partnerships with civil society.**



PILLAR B: INTEGRATED, ADAPTIVE AND SYSTEMS BASED WATER QUALITY REGULATION AND MANAGEMENT

B.1 Integrated and Adaptive Water Quality Management

B.1.1 Problem statement

Water pollution arises from a number of sources in a catchment, whether direct discharge or diffuse pollution arising from run-off from land based activities. Water pollution affects both surface and ground water resources. Pollution is mobile, moving along the length of a water resource, with the potential for increased cumulative impacts from multiple sources.

Water quality is affected by: the nature, volume and concentration of pollutants entering the water resources; the volume of water abstracted from the water resource; the complex interaction of ground and surface water; rainfall (which can increase pollution through increased wash-off of pollutants into water resources, or decrease pollution concentrations through increasing the volume of water in a resource) and temperature which increases evapotranspiration from water resources and affects the spread and growth of pathogens.

Water quality management involves the maintenance of the fitness for use of water resources on a sustained basis, by achieving a balance between socio-economic development and environmental protection. Noting the concept of allocable water quality is important as this enables the authorisation of water use that changes the water quality from its present state, but maintains the resource within a desired future state which is defined by an RQO. This requires processes of planning, development, implementation and administration of water quality management Policy, the authorisation of water uses that may have, or may potentially have, an impact on water quality, as well as the monitoring and auditing of the aforementioned.

Equally important in the management of water quality are questions of the required water quality in a particular water resource, and the sensitivity of the resource to pollution loads. Water quality management at the catchment scale requires, amongst other things, recognition of the respective roles of the *concentration* (e.g. mg/l) and the *load* (e.g. kg/day; tonne/a; etc.) of a particular pollutant in streamflow or water supply. Unfavourable pollutant *concentrations* in streamflow or water supply generally have near-immediate impacts on the functional health of particular aquatic ecosystems as well as the crops, animals, humans or industrial processes that need to utilise the water resource. On the other hand, frequent high pollutant *loads* (e.g. sediments or nutrients) are generally of concern in catchment elements where such loads end up in storage, such as dams, wetlands, swamps, floodplains and

estuaries. Over time, the cumulative impacts of such inflowing loads ultimately lead to loss of function of and/or habitat in and around these water bodies.

High *concentration* impacts by pollutants must to be mitigated and managed through on-going short-term source-directed controls over pollutant inflows to receiving waters, such as on-going monitoring and enforcement of WWTW effluent quality/storm-water quality standards, or operationally through short-term dilution-water releases from upstream dams. On the other hand, the deleterious presence of high pollutant *loads* must be prevented by resource directed measures, such as land management interventions, in addition to the aforementioned source-directed controls.

Adding to the complexity of managing water quality is the fact that catchments are complex social ecological systems, subject to continual change arising from external influences and internal system changes. The changes in the catchment may be non-linear, and due to the interaction between different elements within the social ecological systems, cannot be predicted by understanding only one element of the system. A further complexity is that social values are not coherent across all groups in the catchment, and may change over time, changing the desired management outcomes within the catchment. These complexities can create uncertainties about what management strategies best meet societal goals, and call for on-going learning and for adaptive strategies to be developed.

South Africa is already experiencing significant pressure on its limited water resources, and climate change is expected to result in increasing water scarcity and more extreme hydrological events. The full impacts of climate change on water quality (pathogens, flooding, disaster management) are unclear, although an increase in the frequency and severity of droughts is likely. Drought conditions result in a loss of dilution, meaning that pollution affects water resources more severely, and that the management of water quality needs to be factored into future drought planning and preparation at the catchment scale.

In addition, most of South Africa's large watercourses are shared with neighbouring states, so that water quality is a trans-boundary issue, dependent on combined action between riparian states and governed by the *SADC Protocol on Shared Watercourses* (2000)[3] and various bilateral and basin-wide agreements. Management of water quality in South Africa must therefore be done in such a way as to not cause significant harm to another riparian state in accordance with international obligations.

These issues must be considered within a country where the creation of jobs and equitable economic development are critical. The complexity of managing landscape-wide sources of water pollution arising from a combination of direct and diffuse discharges is made more complex by the range of sectoral institutions that govern these activities. Weak cooperative

[3] The SADC Protocol states that: "10(a) State Parties shall, in utilising a shared watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other Watercourse States. "(b) Where significant harm is nevertheless caused to another Watercourse State, the State whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of paragraph (a) above in consultation with the affected States, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation."

governance between critical government departments is compounded by the limited resources (particularly human and financial) that are available for addressing these challenges.

B.1.2 Policy Responses

Responding to this complex challenge requires the adoption of an integrated, adaptive and systems-based approach at the catchment scale, and the adoption of practical tools and mechanisms that result in the greatest benefit with the use of limited state resources. Within the inter-departmental approach outlined in the previous section, therefore, the approaches outlined below will form the framework within which integrated water quality management will take place.

B.1-1: Institutional coordination at the catchment level will be facilitated

CMAs will co-ordinate with those institutions responsible for land use, economic development and water use planning at the catchment scale. DWS will expedite the establishment and capacitation of CMAs as well as the delegation of appropriate functions to CMAs, to support the up-take of integrated water resource management forward. IWRM is best affected through more localised, catchment based management. CMAs will establish and oversee CMFs as important platforms for interaction in support of integration.

B.1-2: Integrated water resource planning will be strengthened at all scales

Transboundary basin planning is by its nature complex and requires of sovereign states to consider their water quality impacts beyond international borders. DWS will actively support these planning interventions through the commissions and task teams, as well as through the participative planning processes themselves.

The need for improvements in integrated planning is recognised and will be strengthened. Whilst water quality dimensions are reflected in the reconciliation strategy studies, that underpin the key water supply systems, this is often presented at a very high level and will be improved.

The development of CMS, through an inclusive process, is an important tool in addressing integrated water quality management at the WMA and catchment scale. The water quality elements of the CMS (including strategies at sub-catchment scale, or at any other scale) will be developed through a process that enables key stakeholders and regulators to co-create a vision and systemic approach, and that enables co-learning to support adaptive management approaches to IWQM. DWS, with the CMAs, will drive the development of Water Quality Management Plans either at the WMA or catchment scale.

As part of the catchment-based approach to integrated water quality management, **joint consideration of issues of quantity and quality will be undertaken when**

developing CMSs, as will surface and ground water which are, in many cases, interconnected. The interaction with aquatic ecosystem functioning (including habitat and biota) will be considered through the concept of water resource quality.

B.1-3: Integrated planning approaches at the catchment scale will be developed

In managing the complex interaction of elements affecting water quality, an integrated, resource-based, systems approach will be adopted at the catchment scale. This will require integrated planning within catchments that considers water quality and quantity elements, and well as land-use plans, changing user and stakeholder requirements and expectations, and other elements, as necessary. DWS/CMAs will work with relevant departments and organs of state to align water, environmental, economic development and land use planning processes at the catchment scale. Water quality issues that cross administrative boundaries, be these national, provincial or local, will require approaches that bring together all of the relevant parties.

B.1-4: A targeted, risk-based approach will be employed

There are limited human and financial resources available within government. In order to use these resources most effectively and to achieve the greatest impact, a targeted risk-based approach will be adopted. Under this approach, the potential significance of the impact of water pollution will inform the level of response or intervention from the state. Thus, areas of particular sensitivity will receive heightened attention, as will activities from which the pollution potential is of a particularly hazardous nature and areas where pollution is already extremely high.

In support of the hierarchy of decision-making, which informs the level of regulatory response, there are three over-arching principles that will be applied in managing water quality.

Precautionary principle: This has four central components namely:

- take only risk-averse actions in the face of uncertainty;
- shift the burden of proof to the proponent of an activity[4] in the face of uncertainty;
- explore a wide range of alternatives to possibly harmful actions; and
- significantly increase public participation in decision making.

Continuous improvement: As a sector there will be a drive to minimise and, ultimately, to prevent pollution, within the context of justifiable socio-economic development imperatives, while yet cognisant of inevitable constraints on the availability of water supply and assimilative capacity of water resources.

[4]If an action has a suspected risk of causing significant harm to the public or the environment, in the absence of scientific evidence that it is ***not harmful*** the burden of proof that it is not harmful falls on whoever is wanting to take that action, and that the action should not be allowed until sufficient proof of non-harm has been provided.

Adaptive management: The management of water resources will utilise an evidence-based flexibility in decision-making in a situation of increasingly holistic scientific and socio-economic understanding of cause-and-effect dynamics in catchments.

The management of water quality takes place in a constantly changing and complex environment. Water quality changes in any catchment result from, *amongst other things* changes in abstraction volumes and patterns, changes in diffuse and point source discharges, the nature of pollutants being discharged, downstream water use requirements, seasonal rainfall and water availability, climate change, social expectations and economic conditions. Adaptive management, a systemic approach for improving resource management by learning from management outcomes (Error! eference source not found.) will be adopted to obtain the optimal results in this context of continual change. An adaptive management approach involves examining alternative ways to meet management objectives, considering the possible outcomes of these alternatives based on the current state of knowledge, and implementing one or more of these alternatives. Critically, it then involves monitoring and assessment of the impacts of the management actions, to inform any required adjustment or recalibration. Thus, an adaptive management approach contains a structured feedback loop of learning and adapting, done best through partnerships of managers, specialists, and other stakeholders. This will be done within the inter-departmental approach set out previously.

B.2 Regulatory approaches

B.2.1 Problem Statement

The water resource quality within South Africa is declining with assessments reflecting that some 83% of water resources having some form of implication for the fitness of use for one or other user group (DWA, 2011). This deterioration of water quailty will be one of the major threats to the country's ability to provide sufficient water of suitable quality that can support developmental needs, whilst at the same time ensuring the environmental sustainability of water use. The most significant issue in this regard will the ability to control sources of pollution and to manage pollution when it is necessary.

In the coming decades increasing levels of pressure will be placed upon water resources. Key drivers will be the growing population and the need to develop the social economy to support ongoing development objectives. Increasing urbanisation, the introduction of new contaminents and climate change will introduce new layers of complexity within water resources will need to be managed.

In order to achieve the desired resource quality objectives (RQOs) of any particular water resource, the state has at its disposal a range of regulatory and management instruments, including command and control instruments; economic and market instruments; information as regulation; and voluntary instruments such as negotiated agreements and community based monitoring. To affect IWQM there is a need to improve and strengthen the range of

regulatory approaches that are utilised as well as ensure that these approaches are then effectively and consistently applied.

Backlogs and delays in water use authorisation processes, combined with inappropriate authorisation conditions has serious implications for development and in effect can drive unlawful behaviour. The expectation of water use compliance does require the support of an effective administration. It is understood that the resources available for water resource management are limited, and therefore, the need for innovative systems supported by a more engaged sector creates an environment of shared responsibility for water resources.

B.2.2 Policy Responses

B.2-1: The hierarchy of pollution management decision-making will be employed

The exact nature of regulatory controls that will be applied to a catchment will depend on the management objectives that are set for local water resources. Overall, the DWS will apply an approach that ensures conservative decision making so as to minimise the risk of unacceptable ecological impacts that may influence sustainability. The DWS will balance the ecological necessities with that of supporting socio-economic development, and of current and proposed water use. A hierarchy of sequential steps of both water pollution management decision-making and water use management decision-making will be applied (**Error! Reference source not found.**).

Step 1: Pollution Prevention

The first step in decision-making on water quality will be to prevent pollution where possible, while recognising the need for equitable socio-economic development to take place. This is based on the premise that it is better to prevent harm than to manage it after the fact. Thus, irrespective of the amount of allocable water quality, users will be encouraged to prevent pollution where possible.

Prevention is specifically important for controlling the handling, discharge and disposal of hazardous substances, or substances that could present a major threat to the water resource quality. This is particularly important in the field of emerging contaminants, where understanding cumulative impacts is particularly complex, for pollutants of high toxicity, hazard or bio-accumulation, or in the context of uncertainty arising, for example, from climate change.

Step 2: Pollution Minimisation

Where prevention of pollution is not altogether possible, and is in the interests of promoting ecologically sustainable and justifiable economic and social development, the discharge of water containing waste (point source or diffuse source) will be minimised. Tools for the minimisation of pollution include detoxification, neutralisation, application of best practices, recycling and re-use of water that would

otherwise be discharged, and the capture for re-use of products in the water that would otherwise be discharged into water resources.

Since many land uses have a significant impact on water pollution, the regulation of land use, including the prohibition of polluting activities, will, where appropriate, be used as an instrument to minimise pollution.

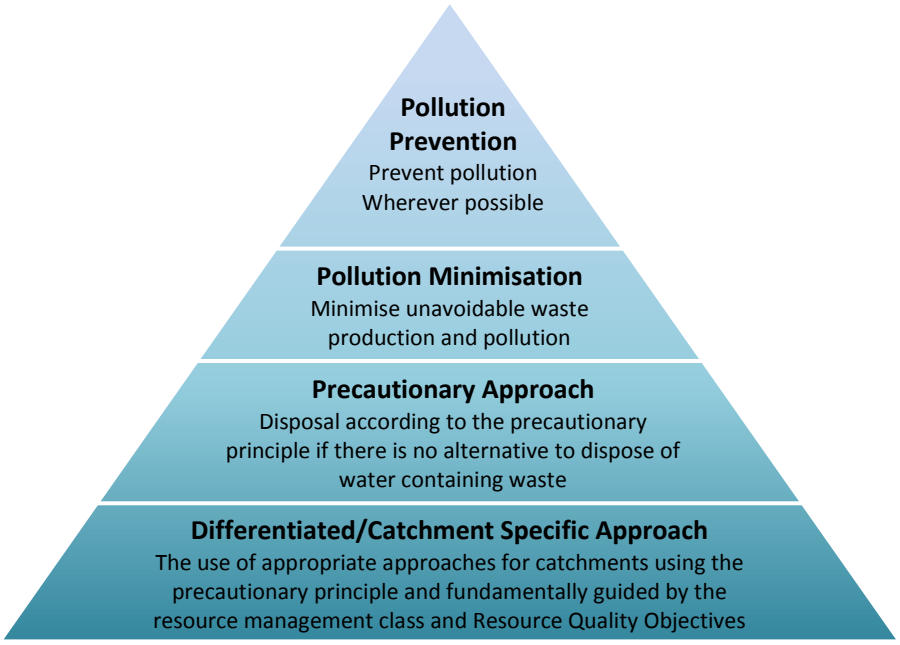


Figure 13: Hierarchy of decision-making

Step 3: *Precautionary Approach*

Where there is no alternative to discharging water containing waste or disposing of waste, water uses with a pollution potential will be regulated under minimum standards, general authorisations or licences with specific discharge conditions, or through prohibition of particular discharges or activities[5].

[5] *Activities that impact negatively on water quality may be prohibited under:*

Section 24(2A) of the NEMA, which provides the Minister of Environmental Affairs with the powers to prohibit or restrict the granting of environmental authorisations by the competent authority (such as the DMR) for a listed or specified activity like mining in a specified geographical area. These powers can be used to "ensure the protection of the environment, [or] the conservation of resources or sustainable development".

Section 49 of the MRPDA, which provides the Minister of Mineral Resources with the powers to prohibit or restrict the granting of any reconnaissance permission, prospecting right, mining right or mining permit in respect of land identified by the Minister for a period and terms and conditions that the Minister may determine.

Sections 12, 13 and 26 of the NWA which provide the Minister of Water and Sanitation with the powers to (i) determine for a particular class of resource those activities which must be regulated or prohibited in order to protect the water resource; (ii) determine for a particular water resource or stretch of water resource the regulation or prohibition of instream or land-based activities which may affect the quantity of water in or quality of the water resource; and (iii) to make regulations on the prohibition of certain activities.

Step 4: Differentiated / Catchment Specific Approach

As a basis, catchments differ in their hydrological and ecological functioning. Additionally, there are differences in the ways and extent to which they are used and this requires a differentiated and adaptive management response. This will be guided by the extent of water quality stress that is experienced with the catchment.

In order to protect water resources, the department will be guided by the level of protection determined by the resource class and associated RQOs (including the Reserve). In practical terms, for a river, for instance, this implies that collectively all source-directed controls (including licence conditions) applied upstream of each classified reach and each RQO site, must ensure that the water quality RQOs at all downstream sites are achieved and maintained. This Policy aims to put renewed focus on this systemic management obligation.

The resource class and RQOs vary between catchments and water resources, and decisions will be informed by the specific catchment or water resource related conditions. In catchments with no water quality stress, minimum standards and/ or requirements[6] for waste discharge, as determined by DWS or the CMA will be applied. These may be relaxed in special circumstances, but the resource class should be maintained.

In stressed water catchments or water catchments where application of the minimum standards and/ or requirements are not sufficient to maintain water quality objectives, standards stricter than the minimum effluent standards will be applied. These standards will be site-specific and will be based on the results of a waste allocation load investigation according to the Receiving Water Quality Objectives approach. In addition, and differentially, due consideration will be given to the need to rehabilitate specific resources or in some instances reclassify resources.

Rehabilitation

In considering, specific responses to catchments there will be the need to rehabilitate or remediate the impacts of heavily polluted water resources in order to improve water quality. The DWS will drive a programme to rehabilitate and remediate these impacts in identified, critical catchments.

In general, this will apply particularly, but not only, where a water resource has already been degraded to below the determined resource class. In this regard, a catchment-wide approach will be adopted to ensure that the most cost-effective solutions for addressing the rehabilitation at the catchment scale are identified and implemented.

[6]Minimum requirement: A regulation or standard set by the Department that specifies the very least that should be complied with. (DWAF, 2006)

Remediation or rehabilitation may include direct intervention on degraded land to minimise contamination risk to a water resource. In determining the approach to rehabilitation, the critical role of green infrastructure, such as wetlands, in IWQM will be recognised, and such infrastructure will be both protected and rehabilitated and sufficient investment will be made for this.

Rehabilitation will either require action and funding by government, or actions to be taken by those responsible for the pollution, depending on the nature of the polluting activity and the rehabilitation actions required. The rehabilitation of sources of pollution will also be addressed, such as rehabilitation of mine dumps and other contaminated sites. The implementation of the WDCS will increase the funding available for waste minimisation and rehabilitation activities.

The protection and restoration of wetlands and similar green infrastructure is an important part of integrated water quality management, which is being highlighted through the development of a specific Policy on wetlands by DWS.

Reclassification

As a last resort, if the receiving water body does not have enough allocable water quality to absorb the waste without exceeding the RQOs, and if there are major socio-economic drivers behind a proposed new waste discharge, there may be a case to be made for reclassification of a resource. In this case, it needs to be investigated whether a lower Resource Class, that might allow for socio-economic development opportunities to be implemented, may be more appropriate. In such a case, the full procedures required under the legislation for the determination of Resource Class, RQOs and Reserve, including stakeholder consultation, will be applied. The converse is also true, that is, if the Resource Class is found to be inadequate for any reason, a higher Class might be applied, after appropriate investigation and consultation. **Currently, however, the legislation does not allow for the classification of a resource to be changed, and a legislative amendment to the NWA is required for this purpose.**

B.2-2: Water Use Authorisations remains a key regulatory instrument

Whilst Water Use Authorisations are instruments that are used to support social and economic development, Government will continue to use these authorisations as the primary mechanism for the command and control relating to the authorisation of discharge of water containing waste. Other command and control mechanisms include the regulation of land use activities and the control of development activities through regulations, EIAs, prohibitions on certain activities (in line with the National Freshwater Ecosystem Priority Areas), setting of product or technical production standards, and setting of performance standards. While the mandate of different departments influences the instruments that can be used, the relevant regulatory instruments will be implemented within the IWQM system created.

The continued use of the General and Special Effluent standards remains an important part of the WQM tool box.

Unconventional gas activities were declared as a Section 21(e) controlled activity under Section 38(1) (d) in Government Notice 999 (Gazette no: 39299), of 16 October 2015. Supporting regulations aimed at regulation of unconventional gas activities in relation to water resource protection are to be developed as response. This sets the requirement for the need of a water use licence for the exploration and production phases of unconventional gas. Evidence as summarised in the Strategic Environmental Assessment for shale gas, of the Department of Environmental Affairs, has indicated that there is insufficient water supply in the Central Karoo. The all town studies portray limited water availability and therefore potable water supply is not to be used as a source of water for unconventional gas development and the trading of water is not supported. This is further expanded to known water supplies where the discovery and use of new water sources, albeit from the unconventional gas development phases, shall be regulated at the discretion of the Department in terms of the hierarchy of use. Saline aquifers form part of the water balance and are therefore considered as part of the water resource.

Industrial water, sea water and saline aquifer use, transport and storage are governed by the National Water Act and the National Environmental Management Act: Waste Act. Waste streams have the added requirement in that it may not be allowed for disposal at conventional/municipal landfills and treatment facilities. All waste streams emanating from unconventional gas development must be treated on site by the industry and at their expense for reuse in continued operations. Disposal is required to be at purpose built landfills.

In evaluating waste discharge applications, DWS/CMAs will look for innovative ways in which development can be supported without increasing the pollution load above acceptable levels in the receiving water body. Approaches such as offsetting may be of value, and will require further investigation. This may involve developing partnerships that facilitate, for example, the reduction of pollution load from one or more sources to enable further economic development in the catchment, while still meeting the RQOs.

B.2-3: Ongoing improvements in Water Use Authorisations and their administration will be important to support continuous and adaptive management

Continual improvement in the processes to authorise water use will be sought in order to support development, ensure sustainability and to fast-track adaptive management responses. Noting that the conditions of authorisation provide the conduit for the implementation of Policy on the ground, it will be critical that these conditions are also appropriate for the catchment conditions. This will mean that these conditions may be revisited, from time to time, in support of adaptive management requirements.

B.2-4: Differentiated water use authorisations based on risk will be introduced

The water use authorisation process will be differentiated according to the complexity of the application. For more complex applications, the water use authorisation process will be integrated into the environmental authorisation process. Furthermore, under the NWA, public participation in the consideration of water use authorisation applications is discretionary. DWS will, however, put in place a protocol ensuring that public participation is required for all water use authorisation applications determined as posing a high risk to water quality.

B.2-5: Instruments for the protection of designated areas will be developed

Noting the international and national importance of the strategic water source areas, the DWS will develop appropriate instruments to ensure that these areas are protected. Currently, the NWA only allows for only the prohibition of activities in a water source area. A legislative amendment would allow the Minister of DWS to declare the strategic water source area as protected. This would ensure certain areas receive full protection. This may be required for an area to recover and rehabilitate itself, or simply, it may be required for ecological protection.

B.2-6: Compliance monitoring and enforcement will be strengthened

A significant challenge in the management of water quality is weakness in enforcement of legislation and authorisation conditions, whether under the NWA or the MPRDA, resulting in the externalisation of costs to communities and society.

Government will enhance its capacity for controlling the discharges of water containing waste, and will take more stringent action against illegal discharge and ensuring compliance with authorisation conditions through combined actions, by DWS and DEA in particular. In this regard, the exchange of information, where necessary, will be facilitated and the use of combined compliance drives will be utilised.

In addition, greater regulatory attention will be paid to waste dischargers with a history of non-compliance than to those with a history of compliance. This will allow an appropriate allocation of state resources.

New mines will be subject to stricter regulatory requirements than in the past, with requirements for the application of Best Practicable Environmental Options to deal with mine water drainage. Mines will be categorised in relation to their potential water quality impact, and regulated accordingly. **Although current Policy does differentiate between the different categories of mines, such Policy needs to be strengthened. This will require an amendment of the legislation.**

B.2-7: Administrative penalties will be introduced

Currently South Africa relies on criminal prosecution for addressing water quality violations, but such processes are slow and difficult, particularly in an overburdened criminal justice system. Criminal prosecution is dependent on evidence that proves the case beyond reasonable doubt, and the support of the South African Police

Service and National Prosecuting Authority. Many of the players in the criminal justice system do not fully understand water legislation or the seriousness of environmental crimes, with the result that such violations do not draw serious penalties.

This is a common problem in many countries, and as a result, many countries are moving towards administrative or civil penalty systems for environmental violations, with a criminal enforcement option retained for the worst environmental crimes. DWS will work in coordination with DEA to create the relevant legislative framework and regulatory authority to impose administrative penalties that reflect the cost of water quality violations to society. **This intervention will enable the state to achieve greater compliance with water quality regulations amongst waste dischargers. This will require an amendment of the NWA**. In line with the inter-departmental approach to IWQM, this regulatory authority could serve both DWS and DEA in relation to administrative penalties for water and environmental non-compliance.

Certain activities that result in water pollution, however, will still follow the criminal prosecution route, such as acts of vandalism.

DWS will work with DEA on the training of inspectors, and in enforcement of legislation.

B.2-8: Alternative instruments will be introduced to incentivise responsible behaviour

Economic instruments will be introduced to complement other approaches such as information and communications measures. Economic instruments include water pricing, charges, penalties and to serve as an incentive to reduce the discharge of water containing waste. These are further explored under Pillar C.

The publication of information is a useful tool towards incentivising responsible behaviour. In the South African context, the Green Drop certification system for municipalities has proved the regulatory value of the reporting and disclosure of information, and it will continue to be used as a tool in IWQM in relation to municipalities. DWS will introduce a water pollution register to extend this reporting beyond municipalities to incentivize polluters to reduce their pollution. In this register, enterprises that are meeting best practice standards will be recognised, as will non-compliance by enterprises.

B.2-9: Voluntary regulation will be supported

The support and facilitation of voluntary regulation is an important addition to the suite of regulatory instruments that will be utilised across the sector. The water stewardship approach adopted by DWS supports the voluntary regulation approach. The types of voluntary regulation that will be introduced includes:

- environmental agreements negotiated between regulators and industry;

- public programs (administered by regulators or third parties) that individual firms are invited to join; public disclosure initiatives that collect and disseminate information on participants' environmental performance;
- unilateral commitments made by firms; and
- Citizen-based regulation where citizens, communities or residents play a critical, if non-statutory role, in monitoring and reporting on environmental compliance.

Legislative Amendments:

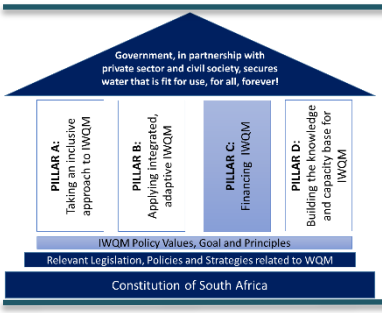
- Amendment to allow reclassification of the resource class;
- Amendment to allow for the declaration of protected water source areas;
- Amendment to allow for the categorisation of polluting industries, based on risk; and
- Amendment to publish a pollution register.

B.3 Summary Policy Statements for Pillar B

Presented in Table 3 are the summary IWQM Policy Statements for Pillar B.

Table 3: Summary Policy Statements for Pillar B

Integrated and Adaptive Water Quality Management
B.1-1: Institutional coordination at the catchment level will be facilitated.
B.1-2: Integrated water resource planning will be strengthened at all scales.
B.1-3: Integrated planning approaches at the catchment scale will be developed.
B.1-4: A targeted, risk-based approach will be employed.
Regulatory approaches
B.2-1: The hierarchy of pollution management decision-making will be employed.
B.2-2: Water Use Authorisations remains a key regulatory instrument.
B.2-3: Ongoing improvements in Water Use Authorisations and their administration will be important to support continuous and adaptive management.
B.2-4: Differentiated water use authorisations based on risk will be introduced.
B.2-5: Instruments for the protection of designated areas will be developed.
B.2-6: Compliance monitoring and enforcement will be strengthened.
B.2-7: Administrative penalties will be introduced.
B.2-8: Alternative instruments will be introduced to incentivise responsible behaviour.
B.2-9: Voluntary regulation will be supported.



PILLAR C: FINANCING INTEGRATED WATER QUALITY MANAGEMENT

C.1 Economic, Social and Ecological Costs of Poor Water Quality

C.1.1 Problem Statement

The financial resources currently available for managing water quality are insufficient for the task, and do not recognise the level of investment that is required to counteract the economic harm done by declining water quality. In some catchments, water quality challenges are exacerbated by low investment in maintenance of water quality infrastructure such as wastewater treatment works. As water quality challenges increase as a result of increasing population and economic development, the associated costs and funding requirements will also increase. Understanding these costs is critical. Table 4setsout a non-exhaustive list of economic costs associated with poor water quality (constructed from UNEP, 2010).

Table 4: Indicative Economic Consequences from Water Pollution

Type of Cost	Indicative Economic Impacts
Economic Impacts/Costs related to Industries, Livelihoods and Government	▪ Impacts on economic sectors including industry, agriculture, tourism[7] and fisheries[8] ▪ Loss of income due to impacts on livelihood activities (agriculture, industry, mining) ▪ Time and productivity costs of people, often women, having to walk further to access clean water ▪ Increased costs of water treatment by industry and water services providers ▪ Loss of reservoir storage capacity from sedimentation leading to reduced water availability or the need to construct further water storage infrastructure ▪ Costs of weed control ▪ Maintenance of monitoring and radiological protection activities ▪ Costs of reassuring the public about the safety of water ▪ Costs of preventative measures (costs of preventing further pollution) ▪ Costs of litigation (associated with pollution) ▪ Loss of property values (property market reaction to pollution close to water bodies)

[7] Costs include loss of wildlife sanctuaries; loss of protected areas; endangerment of species; increased costs of animal protection; displacement of valued species.

[8] Costs include costs of increased fisheries product processing; change in fisheries value; reduced options for aquaculture development.

Economic Impacts/Costs Related to Human Health	▪ Loss of productive working time and increased medical costs as a result of increases in water-related diseases ▪ Increased morbidity and mortality
Economic Impacts/Costs Related to Ecosystems	▪ Loss of ecosystem goods and services, including fish, recreational opportunities, tourism. ▪ Costs of remediation of degraded ecosystems

The qualitative economic analysis for the impacts from declining water quality is well understood, however, there is limited quantitative data for this economic analysis, especially for the South African context. To effectively and efficiently manage water quality, these water quality related costs must be quantified. Through the monitoring and reporting process, this framework needs to be updated and revised to reflect the status quo.

C.1.2 Policy Response

C.1-1: DWS will lead the development of an IWQM investment framework

Government, under the leadership of the DWS and WRC, will conduct an analysis of the financing required for effective IWQM, and develop a Water Quality Management Investment Framework. The analysis must include financial impact on socio-economic and environmental development from poor water quality. The Framework must be used as a prioritisation and decision-making tool for funding IWQM interventions into the future.

C.2 Government Funding and Financing Mechanisms

C.2.1. Problem Statement

Government-wide planning, funding and implementation

Water quality challenges have historically been viewed as “technical”, with the result that the funding required for IWQM has often been insufficient. The funding mechanisms for addressing water quality challenges need to be revised to recognise the significant economic and developmental impact of declining water quality resulting from institutional, sustainability and operational challenges. Financing of water quality management initiatives should thus not be limited to the Department of Water and Sanitation but should include other mechanisms, where appropriate. These could include funding through other government department streams such as funding for municipal infrastructure; special charges like the waste discharge charges proposed in the WDCS; and funding streams from outside of government through partnerships with private sector initiatives. The funding implications of mainstreaming water quality issues into the business of government needs to be considered and provided for, for example, conditions attached to national treasury funding for infrastructure.

Funding is required not only for regulatory activities such as water use authorisation, compliance monitoring and enforcement, but also for rehabilitation and in some cases, the construction and management of water and wastewater treatment facilities. Funding is required to:

- ensure sufficient staff in DWS, CMAs and other relevant departments for IWQM;
- effective water use authorisation and compliance monitoring and enforcement;
- monitoring of water quality (monitoring stations, data and information systems);
- research on emerging pollutants and the impacts of declining water quality;
- manage and maintain ecological infrastructure to secure goods and services;
- support awareness, information dissemination, and capacity building of the sector;
- the building, operation and maintenance of WWTW (including ecological WWTWs); and
- the rehabilitation of degraded areas.

The funding-related challenges are:

- inadequate funding raised through the administrative and regulatory mechanisms available to DWS due, for instance, to delayed implementation of the WDCS and the inadequate cost of a Water Use Licence Administration fee;
- continued culture of non-payment;
- lack of political will to hold major polluters accountable;
- the lack of sustainable financial models for local government, leading to inadequate funds to maintain WWTWs, such as ring-fencing of funds to appropriate solution
- inadequate implementation of environmental provisions related to mine rehabilitation;
- poor co-ordination and planning across the sector, and
- economic Policy uncertainties and anomalies as well as the generally uncertain political climate, which have resulted in inadequate investment by private sector companies, including in IWQM.

Three additional financial issues are of specific concern regarding the management of water quality.

Firstly, the **current funding models for municipalities create perverse incentives** for a build-degrade-rehabilitate/rebuild model of infrastructure. Substantial grants are available to municipalities for the construction of new infrastructure and the rehabilitation of dysfunctional infrastructure. Operation and maintenance costs, however, are expected to come from the equitable share and the municipal budget. In many municipalities, expenditure on preventative maintenance is limited, resulting in the rapid degradation of infrastructure. This leads to the need to rehabilitate or replace the infrastructure. Grants are available from national government for infrastructure rehabilitation, making this an obvious choice for Municipalities. **This is an unsustainable model**, and new conditions for such grants, or new grant models are required to ensure sustainable infrastructure models at local government level. Of further concern is the fact that water services revenue is, in many cases, not ring-

fenced, and tariffs are not reflective of actual costs. This results in municipal water services budgets that are too low to maintain and operate waste water and sanitation systems effectively.

Secondly**, in relation to mining activities, ensuring sufficient funding for IWQM after mine closure remains a significant challenge**. Section 41 of the MPRDA obligates an applicant for a prospecting right, mining right or mining permit to make a prescribed financial provision for the rehabilitation or management of negative environmental impacts. There are significant concerns that the financial provisions made are inadequate to deal with the on-going risk of water pollution from, specifically, closed mines and the burden for rehabilitation falls to the tax-payer and the State. The financial provision must be aligned to the classification and categorisation of the mine, and the risk posed to ensure funds for sufficient rehabilitation of the impacted water resources. Access to these funds are also problematic, with access being contingent on the issuance of a mine closure certificate. To date it is unknown if any mine has been issues with a mine-closure certificate.

Thirdly, **whilst the MPRDA allows for this financial provision, other industries are currently exempt,** and in line with the "polluter pays" principle, are only liable after the fact. Generally, the net benefit of an activity must outweigh the net cost, taking into account the needs for socio-economic and environmental development. Where water pollution takes place, the enterprise-related costs of preventing the water pollution are paid by the environment and by society, rather than by the specific enterprise causing the pollution. The polluter pays principle seeks to reverse this and to achieve accountability by ensuring that pollution costs are internalised to the enterprise and are carried by the polluter. It is an internationally accepted principle that those responsible for environmental damage should pay the costs to rehabilitate the environment and redress those impacts upon human health, as well as the costs of preventative measures to reduce or prevent further pollution and environmental damage. Downstream costs should be understood in an expanded form that covers direct costs to other water users, costs of environmental degradation over time, and indirect costs such as the costs to a community not being able to develop from a lack of available of clean water.

Economic Instruments

An economic instrument is "a Policy, tool or action which has the purpose of affecting the behaviour of economic agents by changing their financial incentives in order to improve the cost-effectiveness of environmental and natural resource management." Economic instruments often work best when they complement other approaches such as information and communications measures (see Pillar B). Economic instruments include water pricing, charges, penalties and incentives to be used to stimulate marketing mechanism, and serve as an incentive to reduce pollution of water sources.

The WDCS is the most important tool that will be implemented in this regard. It is based on the polluter-pays principle and aims to promote the sustainable development and efficient use of water resources; internalise the environmental and social costs of using water; create financial incentives for water users to reduce waste and use water resources more optimally, and recover costs associated with impacts of waste discharges. It consists of two charges: a

Waste Discharge Levy and a Waste Mitigation Charge. The Waste Mitigation Charge, provided for by the NWA, is intended to cover the quantifiable administrative costs of implementing measures to mitigate the negative impacts of waste related discharges. The Waste Discharge Levy provides a disincentive to the discharge of wastewater and will be based on the rate of water utilisation as a means of disposing of waste. **In order for the Waste Discharge Levy to be introduced, an amendment to the NWA is required to give the Minister permission to promulgate a Money Bill.**

The current penalties for non-compliance are not effectively implemented, but also not sufficiently priced to change behaviour and must be reviewed.

C.2.2 Policy Responses

C.2-1: DWS will develop an IWQM financing framework

Funding mechanisms for addressing water quality challenges will be revised to recognize the significant economic and developmental impacts of declining water quality and to ensure that sufficient funds are provided to address the problems. Financing of IWQM initiatives will not be limited to DWS but will include other government departments and public entities, where appropriate. In addition, co-operation between government departments in IWQM will ensure that greater positive impact is achieved with the available budget.

DWS will conduct an analysis of the financing required for effective IWQM, similar to the Water Investment Framework. DWS will examine current funding against realistic, current and future scenario needs and develop a IWQM Financing Framework. The intra-governmental forum established to align implementation activities for integrated water quality management will make recommendations on the financing requirements, Best Practical Environmental Option and the most effective use of existing state resources across the Water Sector. This must include financing of green/ecological infrastructure.

C.2-2: Government will fund the rehabilitation and effective operation and maintenance of WWTWs

Municipal discharge is a significant challenge for IWQM in South Africa and the sustained maintenance and rehabilitation of failing municipal WWTWs is a critical step in turning this around. DWS will work with National Treasury and COGTA to ensure sufficient funding through municipal grants and municipal budgets for the rehabilitation and effective operation and maintenance of WWTWs.

C.2-3: DWS, with National Treasury, DMR and DEA, will determine the costs of long-term water pollution from mines and develop a pragmatic funding model

This process will build on the work being done by the Mine Water Coordinating Body (created through the Strategic Water Partners Networkto deal with water quality

challenges in the Olifants catchment) which aims to determine the requirements to access the existing mine rehabilitation fund and facilitate its disbursement.

Existing and new mining ventureswill be required to prove that the long-term costs of dealing with the residual impacts associated with mining (e.g. AMD) are sufficiently catered for in the financing arrangements.

C.2-4: DWS, with DEA, DTI and National Treasury, will develop a financial provisioning mechanism for high risk industries

The financial provisioning for site rehabilitation should extend to all industries that are deemed "high-risk" polluters, so that provision is made whilst the industry is operational to avoid *post facto* actions, with the State carrying the risk.

C.2-5: DWS will implement the Waste Discharge Charges Strategy in a phased and targeted manner, beginning with those catchments in which water quality is of highest concern

The funding implications of mainstreaming water quality issues into the business of government must be included in all related planning and budgeting processes. The Waste Discharge Charges System, a primary mechanism for operationalizing the "polluter pays" principle will be implemented.

C.2-6: DWS will revise its Administrative Fees for Water Use Authorisation applications

Licence use application fees will be revised to reflect the risk level resulting from the proposed activity, and the resulting intensity of investigation required before authorisation can be granted/refused. Fees will reflect the cost of the time required to process a licence application. For simplicity of implementation, waste discharge authorisation applications will be divided into categories of complexity and level of risk, with appropriate fees allocated to each category.

Legislative Amendments:

- Amendment to allow for the financial provisioning clause to be extended to all "high-risk" polluting industries;
- Amendment to allow for the promulgation of a Money Bill for the Waste Discharge Levy; and
- Amendment to allow for administrative penalties.

C.3 Partnerships

C.3.1 Problem Statement

Noting that there is a requirement to fully understand the cost implications of effectively managing water quality in South Africa, the need to broaden and diversify the funding base

to support effective management will become prerequisite. To date, the burden of funding water quality management has broadly fallen to the state supported by revenue generated by water use charges or funds claimed for the rehabilitation of pollution incidents. Donors have historically provided support to assist in addressing issues that are close to their own agendas and have largely been to support the development of Policy and guidance on specific issues. The challenges that exist do range from the strategic through to the specific and localised. As such, the drive to diversify funding streams may look towards focused funding streams that are aimed at supporting and addressing such distinctive issues, as have some donor's funds.

C.3.2 Policy Responses

C.3-1: DWS will build funding partnerships with the private sector

Government will build partnerships with the private sector to mobilise private sector capacity, financing and funding to support water quality management and rehabilitation activities.

C.3-2: DWS will build funding partnerships with relevant institutions

Government will develop partnerships with a range of relevant institutions to support distinctive IWQM challenges. These may include more innovative or emergent funding streams as are the current Green Funds and the various climate funding options.

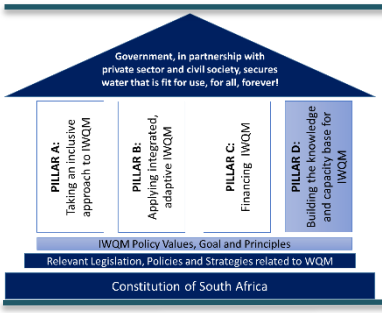
C.4 Summary Policy Statements for Pillar C

Presented in Table 5 are the summary IWQM Policy Statements for Pillar C.

Table 5: Summary Policy Statements for Pillar C

Economic, Social and Ecological Costs of Poor Water Quality
C.1-1: DWS will lead the development of an IWQM investment framework.
Government Funding and Financing Mechanisms
C.2-1: DWS will develop an IWQM financing framework.
C.2-2: Government will fund the rehabilitation and effective operation and maintenance of WWTWs.
C.2-3: DWS, with National Treasury, DMR and DEA, will determine the costs of long-term water pollution from mines and develop a pragmatic funding model.
C.2-4: DWS, with DEA, DTI and National Treasury, will develop a financial provisioning mechanism for high risk industries.
C.2-5: DWS will implement the Waste Discharge Charges Strategy in a phased and targeted manner, beginning with those catchments in which water quality is of highest concern.

C.2-6: DWS will revise its *Administrative Fees for Water Use Authorisation applications.*
Partnerships
C.3-1: DWS will build funding partnerships with the private sector.
C.3-2: DWS will build funding partnerships with relevant institutions.



PILLAR D: KNOWLEDGE AND INFORMATION MANAGEMENT

D.1 Monitoring and Data Management

D.1.1 Problem statement

Water quality monitoring programmes produce data or information that support appropriate water management decisions. The social, legal, ecological and financial implications of making incorrect decisions as a result of unreliable or non-existent data or information can be significant. Adaptive management approaches require data and information in order to inform Policy or process change

South African water quality monitoring programmes are constrained by limited financial resources, inadequate numbers of suitably skilled staff, uneven availability of access to accredited laboratories for testing of samples, and the complexity of monitoring the number and variety of pollutants entering water resources, including new and emerging pollutants.

Structured expansion of the monitoring networks is needed to enable an integrated approach that will ensure optimal evaluation of water quality across the country. This will require a more comprehensive collation of data from a range of sources that includes various institutions (including relevant or affected state departments, provincial governments, municipalities, water services authorities and providers, Water Boards, and the various water management institutions), water users and citizen based monitoring. This will need to reflect data and information collection from transboundary, national, catchment (WMA) and local levels to inform the much-needed adaptive management regime.

Currently, data and information sharing between stakeholders and across these spatial levels leaves room for much improvement. There is an urgent need for a well-designed, coordinated and managed programme for collecting, assessing and disseminating data and information on water quality.

The sharing of water quality data and information with neighbouring countries in shared river basins is becoming increasingly important. This is clearly articulated in the General Principles of the *Protocol on Shared Watercourses in the Southern African Development Community*, but is also an important part of the responsibility to prevent harmful impacts upon shared resources. In the South African Development Community (SADC), there are not yet common standards or systems for water quality monitoring and information management in transboundary river basins and aquifers, limiting the ability to effectively share information and jointly manage water quality challenges. However, the basin

commissions, through their Secretariats, play a key role in facilitating the exchange of data and information.

At the more local level, there has been global shift towards more engagement with citizen-scientists who can support data and information collection. There has been local success through such programmes as Mini-SASS and the lessons learned need to be up-scaled to support our drive for which is already in place to monitor aquatic ecosystem health.

There are also challenges in translating the raw data into appropriate information useful for decision-making around planning, water use authorisations, water quality management practices and rehabilitation actions. Whilst there are challenges in terms of systems and the need to improve these in order to support information management, there are also challenges in ensuring that staff are sufficiently skilled and experienced to utilise the systems and to effect decisions based upon the available data and information.

The exchange of data and information between differing Government Departments and agencies is becoming increasingly important, especially in terms of strengthening the combined regulatory response that is required. Whilst progress is being made, it will be an ongoing process of improvement.

Changes in behaviour cannot be expected if data and information are not communicated. The results of the water quality monitoring programmes are available from DWS, but are not always easy to interpret or understand. There is a shortfall in the way in which data is interpreted and transformed into information that can be communicated and utilised. Systems issues are being addressed and development regarding this will be ongoing.

D.1.2 Policy Responses

D.1-1: DWS, with DEA, CMAs, international river basin commissions, and other relevant government entities, will strengthen the national water quality monitoring networks

Current monitoring networks will be strengthened and expanded. The roles and responsibilities of different government departments and spheres of government in the collection of raw water quality data and the provision of requisite data in a standardised form to DWS will be clarified. DWS will be responsible for the national assessment of water quality based on this data and will report annually to Parliament on the state of water quality in the country, including the performance of local government management of waste water through the Green Drop reports. To achieve this, DWS with strengthen its role in the monitoring and evaluation of performance by local government.

D.1-2: DWS will lead the ongoing strengthening and improvement of information management systems

DWS will lead the ongoing strengthening and improvement of information management systems that enable the uploading of data, as well the extraction of data

and information to enable management decision-making and improved self-regulation. In this regard, DWS will update its data information systems such as the National Integrated Water Information System, Water Authorisation and Registration Management System and, ultimately the Electronic Water Use Licence Application and Authorisation System. This will enable the provision of up-to-date and correct information on all water use authorisations and on registered water use across the country. DWS will put in place the necessary mechanisms, through CMAs and DWS provincial offices, to ensure that the information is kept up to date.

The information provided by the monitoring and evaluation system will be used to support co-learning process amongst key stakeholders and decision-makers to inform amendments and improvements to management approaches.

D.1-3: DWS,the WRC and other key partners will drive monitoring innovation

DWS, with the WRC and CMAs, will investigate the options provided by recent technological developments to improve water quality monitoring as well as data storage and management across the country. Key supporting actors such as SAEON, CSIR, Water Institute of South Africa (WISA), SALGA and SACN will be important partners from the perspectives of practice and implementation. South Africa's Universities and various research institutes will be invaluable platforms for further research and innovation.

D.1-4: DWS, with the WRC and CMAs, will lead the development of citizen-based monitoring programmes

DWS, with the WRC and CMAs, will lead the development of a programme to create and support citizen-based monitoring programmes to augment the government monitoring systems. This is in line with the SADC Regional Strategic Action Plan IV for water, which promotes the use of citizen science to monitor river water quality status in selected river basins/reaches.Partnerships with the private sector will be important to support these programmes.

D.1-5: DWS will make water quality data available to the public

Water quality data collected by public sector institutions will be made available to the public in line with the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights.

D.2 Research and innovation

D.2.1 Problem Statement

The context in which water quality must be managed is continually changing, not least due to the introduction of new contaminants and the potential impacts of climate change. With the growing suite of emergent water quality issues, as well as the need for innovation in resolving more pervasive issues, ongoing R&D becomes essential.

The NWRS identifies key strategic issues requiring attention related to research and development:

- Lack of alignment of water research objectives, thrusts and programmes with the broader national policies and strategies relating to water resources management and water use;
- Limited participation of sector-wide stakeholders in the setting and execution of the water-related research and innovation agenda for the country;
- Availability of skills and expertise in water research; and
- Insufficient allocation of financial resources for water sector research and innovation.

The Water Research Commission (WRC), in partnership with DWS, ensures that the strategic direction of water research in South Africa is attuned to the country's needs. However, the funding needs are significant and existing funds are becoming increasingly stretched.

The South African Bureau of Standards produces various South African National Standards. Some address water quality, but these are not sufficient, and the budget is limited for further work in this regard.

Both the WRC and the South African Bureau of Standards are key partners of the water sector to ensure on-going research into relevant topics, knowledge and information sharing, uptake of new and appropriate technologies and continuous revision of national standards and benchmarks. The role of sector organisations such as the WISA, the South African Local Government Association (SALGA) and South African Cities Network (SACN) and others, are important in terms of raising the awareness of issues that require further R&D, as well as being a conduit for channelling research and development findings through to the sector.

D.2.2 Policy Responses

D.2-1: DWS and WRC will lead the sector in developing a national water quality research plan

To develop and encourage water quality research and innovation in South Africa and our shared river basins, the DWS and WRC will lead the sector in developing a national water quality research plan that aligns applied research priorities throughout the water value chain to ensure that water research directly contributes to the resolution of water sector challenge and addresses emergent areas like emerging

pollutants and the different impacts of pollution upon women and men. The role of South Africa's academic institutions, and independent research organisations, will be critical in the development of this plan.

DWS and WRC will investigate and improve funding for water quality research.

D.2-2: DWS and WRC will promote the transfer of new and applied technologies and tools for the benefit of the water sector

DWS and WRC, together with sector organisations such as WISA, SALGA, SACN, academic institutions and others, will promote innovation and knowledge sharing to support new and appropriate technology uptake. There will be a specific focus on supporting municipalities to use appropriate and new technology; and designing, developing and marketing new technology and approaches in partnerships with the private sector, civil society and the research community. In this regard, the WRC, the Department of Science and Technology will continue to develop and enhance the impact of the Water Technologies Demonstration Programme which aims to pull together the applied R&D and commercialisation stages of the water innovation continuum and to bridge the gap between water research and the market to achieve a connected water innovation system that delivers socio-economic benefits for South Africa.

D.3 Capacity building and training

D.3.1 Problem Statement

The existence of a highly trained and competent cohort of officials across the water sector, particularly in Government Departments and institutions, is going to be essential for the management of water quality. There is indeed existent capacity, but it is understood that this is stretched and more needs to be done to establish the necessary staffing compliments with the necessary skills to manage water quality.

Historically, DWS ran regular training programmes for water quality officials, resulting in a highly-trained cadre of officials. However, over the past decade, these training programmes have fallen away leaving a shortfall in the opportunities for staff to develop their understanding of IWQM. This has resulted in ineffective implementation of IWQM programmes and inadequate regulation of water use.

Noting the need for strengthened inter-governmental approaches, the shortfall in capacity across and between Government Departments is being realised. Therefore, the ongoing interaction between DEA and DWS with regards to the training programmes for Environmental Management Inspectors (EMIs) is the type of initiative that will be needed for the ongoing development of capacity.

There are concerns that the competencies of staff within some key technical positions do not have the necessary training and qualifications to perform the functions required of them. This has been particularly emphasised with regards to the more technical skills required of

municipal staff operating WWTW. There is currently training that is being developed under the South African Qualifications Authority banner and this will need to be implemented nationally.

The need to improve the broader awareness of the private sector and civil society so that can behaviours can be influenced is important, and currently lacking. There is a need to improve the capacity of civil society as they play a very significant role in terms of monitoring and reporting upon local water quality management issues. The strengthening of CMFs, that bring together Government, the private sector and civil society, will prove increasingly essential as these forums play an important role in localised monitoring of water resource management issues and provide a platform for more cooperative and adaptive management. However, these forums are not always appraised of technical issues and insufficient effort is being applied to build this capacity.

D.3.2 Policy Responses

D.3-1: DWS will develop and drive capacity building programmes to develop sector capacity

DWS will lead the development of appropriate on-the-job and technical training programmes for officials from all relevant state institutions to improve the capacity of government to adequately manage water quality.

DWS will, in close cooperation with other Government Departments, continue to strengthen the capacity across the sector with regards to regulating activities that impact upon water quality. This will include interventions to strengthen the inter-governmental capacity to ensure and enforce compliance with regulations.

DWS will continue to provide bursaries for students to study water quality-related subjects at universities to provide a pool of qualified recruits for the state.

DWS, in partnership with DEA, will also make training available to civil society organisations active in the water sector to enable their informed participation in IWQM processes, particularly in areas where water quality is under severe threat. This will be supported by broader awareness campaigns to encourage societal action towards improved water quality.

DWS, in partnership with CMAs, will strengthen the capacity of CMFs to provide local capacity for water quality management.

D.3-2: DWS will drive the professionalization of staff in key positions

DWS, in collaboration with COGTA, will develop the necessary regulations to ensure the professionalization of key water services positions in Water Services Authorities to ensure that the staff responsible for the management of water and waste water systems at municipal level have the necessary training and competencies.

D.4 Summary Policy Statements for Pillar D

Presented in the table below are the summary IWQM Policy Statements for Pillar D.

Table 6: Summary Policy Statements for Pillar D

Monitoring and Information
D.1-1: DWS, with DEA, CMAs, international river basin commissions, and other relevant government entities, will strengthen the national water quality monitoring networks.
D.1-2: DWS will lead the ongoing strengthening and improvement of information management systems.
D.1-3: DWS, the WRC and other key partners will drive monitoring innovation.
D.1-4: DWS, with the WRC and CMAs, will lead the development of citizen-based monitoring programmes.
D.1-5: DWS will make water quality data available to the public.
Research and Innovation
D.2-1: The DWS and WRC will lead the sector in developing a national water quality research plan.
D.2-2: DWS and WRC will promote the transfer of new and applied technologies and tools for the benefit of the water sector.
Capacity Building and Training
D.3-1: DWS will develop and drive capacity building programmes to develop sector capacity.
D.3-2: DWS will drive the professionalization of staff in key positions.

4. CONCLUSION

This draft policy is based on the recognition that integrated water quality management is crucial if we are to achieve equitable and environmentally sustainable social and economic development in South Africa. This will enable us to achieve our social and economic goals, and will give strength to the right to water and the right to an environment that is not harmful to health or wellbeing, as enshrined in the Bill of Rights in the Constitution. The Policy outlined in this document is therefore vital for the future of all of South Africa's inhabitants. It provides government, at all levels, with the necessary tools required to fulfil its role as custodian of our valuable and limited water resources.

Whilst some of the elements of the Policy are implementable within the current legislative framework, other elements will need amendments to the NWA, and possibly to the NEMA and the CARA. Such legislative amendments are a critical part of protecting and restoring water quality in South Africa, and include:

- Amendment to allow reclassification of the resource class;
- Amendment to allow for the declaration of protected water source areas;
- Amendment to allow for the categorisation of polluting industries, based on risk;
- Amendment to extend the financial provisioning clause to all high-risk polluting sectors;
- Amendment to allow for the publication of a pollution register;
- Amendment to allow for the promulgation of a Money Bill for the Waste Discharge Levy; and
- Amendment to allow for administrative penalties.

In addition to the above, the successful implementation of this Policy will require high-level political commitment to inter- and intra-governmental cooperation, integration and co-operative governance, the establishment of effective intra-governmental structures, systems and processes as well as possibly the development of Memoranda of Understanding between key government departments and entities. Within the Department of Water and Sanitation, as the sector lead, policy implementation will be facilitated and driven through the implementation of an Integrated Water Quality Management Strategy, which translates the Policy imperatives into strategic goals and actions and sets out the fundamentals for strategic implementation. An Implementation Plan, which follows on from the Strategy describes how the prioritised strategic actions will be implemented, by whom they will be implemented, over what time frames and how the actions will be monitored and reported on for continuous and improved resource water quality.

Together, the Policy and its accompanying strategy aim to ensure that Government, in partnership with private sector and civil society, secures water that is fit-for-use, for all, forever.