Report Number 4.3

Discussion Document

Note on the Monitoring and Evaluation Framework

Water Quality Management Policies and Strategies for South Africa

WATER IS LIFE - SANITATION IS DIGNITY





800 200 200 🛛 🛛 w

www.dws.gov.za



Water Resource Planning Systems Series Water Quality Planning

WATER QUALITY MANAGEMENT POLICIES AND STRATEGIES FOR SOUTH AFRICA

NOTE ON THE MONITORING AND EVALUATION FRAMEWORK

Report Number 4.3 P RSA 000/00/21715/20

May 2017





Department: Water and Sanitation REPUBLIC OF SOUTH AFRICA This report has been designed for double-sided printing

Published by

The Department of Water and Sanitation Private Bag X313 PRETORIA, 0001 Republic of South Africa

Tel: (012) 336 7500/ +27 12 336 7500 Fax: (012) 336 6731/ +27 12 336 6731

Copyright reserved

No part of this publication may be reproduced in any manner without full acknowledgement of the source

This report should be cited as: Department of Water and Sanitation (DWS). 2017. *Water Quality Management Policies and Strategies for South Africa.Report No. 4.3.* Note on the Monitoring and Evaluation Framework. Water Resource Planning Systems Series, DWS Report No.: 000/00/21715/20. Pretoria, South Africa

PREFACE

Background

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, especially considering the levels of water scarcity, with frequent droughts, increasing water demands, and deteriorating resource water quality.

The deterioration in water quality is a factor of growing concern. Importantly, **deteriorating water quality is an economic and developmental issue**, and should be addressed as such. Without a change in how water resources are managed, worsening resource water quality will continue to erode the socio-economic benefits from, and increase the costs associated with, the use of the country's water resources.

In light of the above, the Department of Water and Sanitation (DWS) embarked on a journey to revise, update and consolidate its policies and strategies for managing the quality of the water in the Country's water resources and to develop a pragmatic plan for the conversion of the Integrated Water Quality Management (IWQM) Policy and Strategy into practice.

Integrated Water Quality Management Policy and Strategy

Since the inception of this initiative, several supporting documents were developed that aimed to establish the status quo with respect to water quality, its management practices and instruments, the challenges in South Africa and the institutional arrangements. A review of existing policies, strategies, and other relevant documents, both locally and internationally was used to i) analyse the root cause of the water quality issues; ii) determine the gaps in the IWQM approaches that have been used; iii) understand impacts that emerging trends may have on water quality (e.g. climate change, unconventional gas exploration, amongst others) and iv) look for innovative practices for IWQM.

Based on these learning's, the **IWQM Policy** sought to amalgamate and describe an integrated, inclusive and adaptive approach to IWQM, that built on the tenets of sustainable development coupled with addressing the identified gaps in the policy framework. The IWQM Policy sets out the vision, goal, values, underlying principles and policy responses for managing the quality of our water in our surface and underground water resources.

The **IWQM Strategy** sets out those strategic actions which are required to be undertaken in order to realise the vision and goals for water quality in South Africa. It articulates the broader process of Integrated Water Quality Management and provides the prioritised strategic actions that need to take place over a short to medium term.

The Implementation Plan outlines the pragmatic approach to strategic implementation and clearly articulates roles and responsibilities, resource (financial and human capacity) requirements and linkages and dependencies between key activities.

The Monitoring and Evaluation Framework articulates the indicators to be monitored to determine the progress of the actions to be implemented and provide the foundation required to manage water quality adaptively. It also outlines the reporting structures and processes to be followed.





Stakeholder Engagement

Given that the management of water quality constitutes an effort that is serviced and maintained by various role-players, a key element of the development of the IWQM Policy, Strategy and Implementation Plan is the involvement of relevant role-players, at a level where they may provide strategic and operational direction in the conceptualisation and finalisation of key areas and outputs. Consequently, a Stakeholder Consultation and Communication Strategy was developed to inform, consult, involve, collaborate and where possible empower the relevant key players by providing a strategic framework to: -

- Engage in policy and strategy development processes of the key issues, priorities, guiding principles, and approaches regarding the IWQM Policy and Strategy.
- Enhance the product through inputs from stakeholders;

- **Establish Ownership and buy-in** of both the process and outcomes to ensure that stakeholders can relate and identify with the IWQM Policy and Strategy;
- **Facilitate Implementation:** a key result under this objective is the implementation of the Policy and Strategy. This will involve iterative process of learning-by-doing approach so that the implementation of the Policy and Strategy can serve as both a refining process and a learning curve;
- Provide capacity development and support through strategic collaborative efforts. This
 ensures that the necessary skills and capacities are shared between and among
 stakeholders;
- **Create awareness** and enhance the level of understanding on issues about the IWQM Policy and Strategy, in order to improve and strengthen active stakeholders' participation in WQM;
- Consider appropriate mechanisms for communication and publicising of the IWQM Policy and Strategy.

Based on the fact that IWQM has environmental and social impacts, among others, it was imperative that consultation not be a single conversation but a series of opportunities to create an understanding about WQM amongst those it will likely affect or interest, and to learn how these internal and external parties view the initiative and its associated risks, impacts, opportunities, and mitigation measures. Listening to and incorporating stakeholder concerns and feedback is highly considered as a valuable source of information that can improve the design and outcomes of policy and strategy and help identify and control external risks. It is envisaged that the consultations done during this initiative form the basis for future collaboration and partnerships.

The Stakeholder Consultation and Communication Strategy focussed internally to relevant Government Departments and externally to targeted stakeholders.

- Internal to Government The purpose of targeting members within the Government Departments and its institutions (CMAs, Water Boards and other water management institutions) was to ensure that there was holistic preparation of staff at all levels. These staff have a range of interests that function at differing strategic levels within the Government and as such have different capacity building requirements.
- External to Government There are a range of stakeholders that are interested and affected by the IWQM Policy, Strategy and Implementation Plan. These include the private sector, research and academia, civil society including NGOs, other national and provincial government departments, umbrella organisations such as the South African Local Government Association (SALGA), the South African Cities Network (SACN), the Chemical and Allied Industries Association (CAIA), Business Unity South Africa (BUSA), AgriSA, the Chamber of Mines, amongst others. The purpose of targeting these stakeholders was to solicit their input, create awareness and guide external stakeholders on water quality management issues, strengthen the understanding of the policy, and strategy and their implications, and strengthen collaborative systems. Moreover, it is important for the successful implementation of the policy and strategy that external stakeholders become more engaged in both developing the policy and strategy as well as through the implementation of the policy and strategy.

Way Forward

As sector lead, the Department understands that the management of water resources requires a sector-wide approach and this is a central theme to the implementation of the National Water Resources Strategy. Similarly, the management of water quality requires that a broader engagement that moves roles and relationships beyond that of user, stakeholder, Policy-maker and regulator, but towards one of cooperation, partnership and stewardship. This necessitates the development of robust and pragmatic management instruments, supported by effective communication and capacity building, both internally to the Department and externally to the larger sector.

DOCUMENT INDEX

Reports as part of this project:

| WATER QUALITY MANAGEMENT POLICIES AND STRATEGIES FOR SOUTH AFRICA | | | | | |
|---|---|-----------------------|--|--|--|
| REPORT SERIES | REPORT TITLE | DWS REPORT NUMBER | | | |
| 1. PROJECT REP | 1. PROJECT REPORTS/SUPPORTING DOCUMENTS | | | | |
| 1.1 | Inception Report | P RSA 000/00/21715/1 | | | |
| 1.2 | Literature Review | | | | |
| 1.2.1 | A Review of the Water Quality Management Policies and Strategies for South Africa | P RSA 000/00/21715/2 | | | |
| 1.2.2 | A Review of the Water Quality Management Institutional Arrangements for South Africa | P RSA 000/00/21715/3 | | | |
| 1.2.3 | A Review of the Water Quality Management Instruments for South Africa | P RSA 000/00/21715/4 | | | |
| 1.3 | Water Quality and Water Quality Management Challenges for South Africa | P RSA 000/00/21715/5 | | | |
| 1.4 | Water Quality Glossary | P RSA 000/00/21715/6 | | | |
| 1.5 | Stakeholder Consultation and Communication Strategy | P RSA 000/00/21715/7 | | | |
| 1.6 | Stakeholder Consultation and Communication Audit Report | P RSA 000/00/21715/8 | | | |
| 1.7 | Capacity Building Strategy | P RSA 000/00/21715/9 | | | |
| 1.8 | Capacity Building Audit Report | P RSA 000/00/21715/10 | | | |
| 1.9 | Technical Close-out Report | P RSA 000/00/21715/11 | | | |
| 2. POLICY REPO | RTS | | | | |
| 2.1 | Integrated Water Quality Management Policy - Edition 1 | P RSA 000/00/21715/12 | | | |
| 2.2 | Integrated Water Quality Management Policy - Edition 2 | P RSA 000/00/21715/13 | | | |
| 2.3 | Summary of Integrated Water Quality Management Policy | P RSA 000/00/21715/14 | | | |
| 3. STRATEGY RE | PORTS | | | | |
| 3.1 | Integrated Water Quality Management Strategy - Edition 1 | P RSA 000/00/21715/15 | | | |
| 3.2 | Integrated Water Quality Management Strategy - Edition 2 | P RSA 000/00/21715/16 | | | |
| 3.3 | Summary of Integrated Water Quality Management Strategy | P RSA 000/00/21715/17 | | | |
| 4. POLICY INTO PRACTICE REPORTS | | | | | |
| 4.1 | Implementation Plan - Edition 1 | P RSA 000/00/21715/18 | | | |
| 4.2 | Implementation Plan - Edition 2 | P RSA 000/00/21715/19 | | | |
| * 4.3 | Monitoring and Evaluation Framework - Edition 1 (Note) | P RSA 000/00/21715/20 | | | |
| 4.4 | Water Quality Management in the Department of Water and Sanitation: Organisational Design | P RSA 000/00/21715/21 | | | |

* This note has been developed for discussion purposes towards the development of Edition 1 of the Monitoring and Evaluation Framework.

APPROVAL

| TITLE | : | Note on the Monitoring and Evaluation Framework |
|-----------------|---|---|
| DATE | : | May 2017 |
| AUTHOR | : | Mr Derek Weston, Dr Pinnie Sithole and Ms Traci Reddy |
| LEAD CONSULTANT | : | Pegasys Strategy and Development |
| DWS FILE NO. | : | 14/15/21/3 |
| DWS REPORT NO. | : | P RSA 000/00/21715/20 |
| FORMAT | : | MS Word and PDF |
| WEB ADDRESS | : | www.dws.gov.za |

Approved for Pegasys by:

Mr Derek Weston Project Leader

Ms Traci Redo Project Manage

Approved for the Department of Water and Sanitation by:

n

Mr Pieter Viljoen Scientist Manager: Water Quality Planning

ACKNOWLEDGEMENTS

The reports developed in this project are the culmination of various contributions from a wide range of groups representing a wide range of representatives from the water sector. The following government departments and stakeholders from the private sector and civil society are thanked for their interest and contributions:

| Department of Agriculture, Forestry and Fisheries | Afri Forum |
|--|--|
| Department of Cooperative Governance and Traditional Affairs | AgriSA |
| Department of Energy | Alliance for Water Stewardship |
| Department of Environmental Affairs | Anglo American Platinum |
| Department of Health | Agricultural Research Council |
| Department of Higher Education and Training | Armour |
| Department of Human Settlement | ASA Metals |
| Department of Mineral Resources | Association of Cementitious Material Producers |
| Department of National Treasury | Bosch Capital |
| Department of Planning, Monitoring and Evaluation | Centre for Environmental Management |
| Department of Public Enterprises | Chamber of Mines |
| Department of Science and Technology | Cleanstream |
| Department of Tourism | Council for Scientific and Industrial Research |
| Department of Water and Sanitation | De Beers |
| Free State Department of Agriculture and Rural Development | Eco-Owl Consulting |
| Limpopo Department of Agriculture and Rural Development | Environment Legal Consultant |
| Limpopo Department of Economic Development, Environment | EOH Coastal and Environmental Services |
| Western Cape Department of Agriculture | Eskom |
| Breede-Gouritz Catchment Management Agency | EXXARO |
| Inkomati Usuthu Catchment Management Agency | Federation for a Sustainable Environment |
| Berg-Olifants Proto-Catchment Management Agency | Galeyo Environmental CC |
| Limpopo Proto-Catchment Management Agency | GIBB Engineering |
| Mzimvubu-Tsitsikamma Proto-Catchment Management Agency | Glencore |
| Olifants Proto-Catchment Management Agency | Goldfields |
| Orange Proto-Catchment Management Agency | Green Cape |
| Pongolo-Umzimkhulu Proto-Catchment Management Agency | Ikamva |
| Vaal Catchment Management Agency | Iliso Consulting |
| Bitou Local Municipality | IM Systems & Exova BmTRADA |
| Buffalo City Metropolitan Municipality | Impala Platinum |
| Chris Hani District Municipality | International Water Management Institute |
| City of Cape Town Metropolitan Municipality | Isiqalo Cooperative |
| City of Johannesburg Metropolitan Municipality | IVA Plats |
| Ethekwini Metropolitan Municipality | Jaco K Consulting |
| Fezile Dabi District Municipality | Jantech CC |
| Frances Baard District Municipality | Joint Water Forum |

Joe Gqabi District Municipality KwaDukuza Local Municipality Lephalale Local Municipality LIM 368 Local Municipality Makane Local Municipality Mangaung Metropolitan Municipality Masilonyana Municipality Mogalakwena Local Municipality Nala Local Municipality **OR Tambo District Municipality** Phumelela Local Municipality Polokwane Local Municipality Stellenbosch Local Municipality Swartland Municipality Tlokwe City Municipality Umzinyathi District Municipality Amatole Water Bloem Water Gamtoos Irrigation Board Kaap River Irrigation Board Kakamas Water User Association Komati Basin Water Authority Komati River Irrigation Board & LRIB Lehalelo Water User Association Lepelle Northern Water Letaba Water User Association Luvhuvhu Catchment Management Forum Modder-Riet Catchment Management Forum Mutale Catchment Management Forum Nzheleke/Nwandi Catchment Management Forum Oranje-Riet Water User Association Sand Catchment Management Forum Sedibeng Water Umgeni Water Umsunduzi Catchment Management Forum Vhembe Water User Associations Water Research Commission South African National Biodiversity Institute Municipal Infrastructure Support Agency SANParks

Jones & Wagener Kumkani FM Kwanalu La Bri Land Bank Liberty NPO Living Lands Maluti GSM Marico River Conservation Association Midvaal Water Company **MISA Renosterberg** Mogalakwena Mine Naledzi Environmental Consulting Naledzi Water Works National African Farmers Union Ntuzuma Enviro Cooperative Palabora Copper Petra Diamonds (Cullinan) Pilanesberg Platinum Mines **Re-Solve** Rhodes University Institute for Water Research **Rockwell Diamonds** Rowing SA & Usapho Consulting Royal Bofokeng Platinum Sapienza University Sasol Group Technology SEMBCORP Silulumanzi Sephaka Cement Source Point South African Sugar Association Transnet National Ports Authority Union Mine Anglo American University of Limpopo University of Pretoria University of the Witwatersrand Vele Colliery Vin Pro Wildlands Winetech Xylem

TABLE OF CONTENTS

Page No

| PREFA | ACE | |
|--------|---------|---|
| DOCU | MENT II | NDEXV |
| APPRO | DVAL | VII |
| ACKNO | OWLED | GEMENTSIX |
| LIST O | F FIGU | RESXIII |
| LIST O | F TABL | ESXIII |
| LIST O | F ACRO | DNYMSXV |
| | | |
| 1. | INTRO | DUCTION |
| | 1.1 | Background1 |
| | 1.2 | Policy and Strategy in Uncertainty2 |
| | 1.3 | Developmental State and Government-wide M&E3 |
| | 1.4 | Sustainable Development Goals5 |
| | 1.5 | Purpose of this Document5 |
| 2. | FUND | AMENTALS OF MONITORING AND EVALUATION |
| | 2.1 | Key Terminology and Concepts8 |
| | | 2.1.1 Monitoring, reporting and evaluation |
| | | 2.1.2 Key Indicators |
| | | 2.1.3 Performance Targets |
| | | 2.1.4 Results Chain |
| | | 2.1.5 Theory of Change and Logic Models |
| | 2.2 | Common Challenges |
| | 2.3 | Defining the Type of Evaluation |
| | | 2.3.1 What Should Evaluation Focus on? |
| 2 | DDING | |
| э. | | Outlining the Key Drineinlee |
| | 3.1 | Outlining the Key Principles |
| 4. | SEEIN | G MONITORING AND EVALUATION AS A SYSTEM |
| | 4.1 | Monitoring the Risk and Vulnerability Context |
| 5. | TOWA | RDS A FRAMEWORK |
| | 5.1 | Why an M&E framework27 |
| | 5.2 | Structuring the M&E Framework |
| | 5.3 | Applying the M&E Framework |
| | 5.4 | Key Stakeholders and their M&E Role |
| | 5.5 | Developing Capacity for Implementation of the M&E Framework |
| | 5.6 | Endnote |
| 6. | REFEF | RENCES |

LIST OF FIGURES

| Figure 1: The Policy Life Cycle | 2 |
|--|----|
| Figure 2: Governmental Planning and Review Cycle | 4 |
| Figure 3: Monitoring and evaluation framework in support of IWQM | 6 |
| Figure 4: Components of the Logic Model | 14 |
| Figure 5: Relationship between the CAP cycle and the different types of evaluation | 18 |
| Figure 6: IWQMS and the Placing of M&E | 25 |
| Figure 7: Set-up and Start-up Phase | 29 |
| Figure 8: Implementation and Mid-term Review Phase | 29 |
| Figure 9: Close-out Phase | 29 |

LIST OF TABLES

| Table 1: Types of Indicators | 10 |
|---|----|
| Table 2: Types of Results Chain | 12 |
| Table 3: Defining the type of evaluation required | 19 |
| Table 4: Common considerations in determining evaluation type | 20 |
| Table 5: Key Principles to Consider for M&E | 21 |

LIST OF ACRONYMS

| Abbreviation | Meaning | | |
|--------------|--|--|--|
| ALCP | Alliance Lesser Caucasus Programme | | |
| СМА | Catchment Management Agency | | |
| CMS | Catchment Management Strategy | | |
| DCEC | Department of Climate and Environmental Change (Australia) | | |
| DPLG | Department of Provincial and Local Government | | |
| DPME | Department of Planning, Monitoring and Evaluation | | |
| DWS | Department of Water and Sanitation | | |
| IFAD | International Fund for Agricultural Development | | |
| IWQM | Integrated Water Quality Management | | |
| IWRM | Integrated Water Resource Management | | |
| M&E | Monitoring and Evaluation | | |
| MTR | Mid-Term Review | | |
| NWA | National Water Act [Act 36 of 1998, as amended] | | |
| NWRS | National Water Resource Strategy | | |
| OECD | Organisation for Economic Co-operation and Development | | |
| PFMA | Public Finance Management Act [Act 1 of 1999, as amended] | | |
| PSC | Public Service Commission | | |
| RC | Results Chain | | |
| SDG | Sustainable Development Goals | | |
| ToC | Theory of Change | | |
| WQM | Water Quality Management | | |
| WRM | Water Resource Management | | |
| UNSD | United Nations Statistical Division | | |

1. INTRODUCTION

1.1 Background

South Africa faces a complex water resource management challenge, which, if not addressed effectively or efficiently, has the potential to limit the growth potential of the country. Considering that South Africa is a water scarce country, compounded by frequent droughts and intermittent flooding, increasing water demands will result in increasing abstractive water use as well as discharge of effluent into water resources. These extreme events can have varying water quality impacts, that can result in the significant deterioration of water resource quality as well providing threats to the health of people and animals. Hence, deteriorating water quality is a key element of the water resource management and development challenge. Despite considerable attention paid to Water Quality Management (WQM) over the years by the Department of Water and Sanitation (DWS), the current state of the country's water resources illuminates a number of challenges confronting the water sector.

Whilst, there is only limited and anecdotal evidence of the levels of impact that water quality degradation has upon economic development, the National Water Resource Strategy (NWRS) provides a clear direction for the country in the need for strengthened WQM.

Nonetheless, **WQM** is a complex and confounding challenge to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognise. Often, there are a multitude of interacting factors, including incomplete information, and changes outside the control of managers. The multi-sectoral nature of WQM requires an understanding of complex water use requirements that underpin economic growth and development. As such, the requirement to support national (and indeed regional) growth is a core thematic of the NWRS and requires not only strengthened polices and strategies, but also improved monitoring and information systems, adaptive management and regulation, all driven by innovative institutions.

Unfortunately, it is an operational reality, that the WQM approach used to date in South Africa has not managed to address this 'wicked problem' effectively. Insufficient data and monitoring has been central to this challenge. Knowing that "you cannot manage what you don't measure", means that generating an understanding of whether water quality is improving or deteriorating is difficult.

In addition, to the most significant water quality challenges, there are also concerning trends that will have increasing levels of impact upon water resources. These include issues such as climate change, population growth, rapid urbanisation and increased and changing industrialisation. There are also emergent issues that will require improved monitoring and research to better understand the brevity and spatial importance of these new issues. These include such issues as unconventional oil and gas exploration, as well as the presence of constituents such as nanoparticles, hormone disrupting chemicals, persistent organic pesticides and various metals. The pressures being placed upon our water resources will increasingly require adaptive management approaches that will ensure sustainable development. Noting that adaptive responses need to be based upon a series of indicators, thresholds and triggers, a robust monitoring and evaluation (M&E) system is required to underpin and guide decision making processes.

1.2 Policy and Strategy in Uncertainty

Noting that we live in a rapidly changing world, as a result of significant technological developments, the pressure upon our natural resources will only increase. This will require more adaptive policy approaches and an increasing awareness of the uncertainties involved in policy making and long-term planning. This also means that our perceptions of policy success will need to shift and accept the fact that policy failure, in some instances will provide the guidance for the next iteration of policy development.

Within this context, adaptive approaches enable us to manage these uncertainties and dynamics in a complex and changing world. Adaptation should therefore be triggered in part by on-going learning through the systematic M&E of the performance of policy and strategy under implementation. Such M&E enables the development of causal connections between policy priorities, the resourcing of these policy objectives, the programmes designed to implement these, the services delivered and the ultimate impacts (See Figure 1). Notably, M&E provides an evidence base for public resource allocation decisions, helps to identify how challenges should be addressed and how success can be replicated.



Figure 1: The Policy Life Cycle (adapted from Public Service Commission (PSC), 2008)

In the face of uncertainties and dynamics, the design of a tailor-made and future-proof monitoring programme is complicated and must be anchored in policies and strategies, whilst getting the support and buy-in of the key stakeholders. The reality is that implementation requires passive or active support from various actors, with different actors having different views, perceptions and opinions, and indeed interests. In a multi-actor situation M&E can present challenges. So, for example, when different actors are involved in policy processes and implementation, it is not always clear who should take the lead in M&E. Hence, the focus of M&E could be different as diverse actors are interested in different impacts, systems components and may assume different causal links within the policy cycle.

From the depiction of the cycle in Figure 1 the evaluation of the success of policy and the reasons for success or failure, are critical parts of the process (PSC, 2008). Often the assumed causal links between policy interventions and impacts are not straightforward and understanding cause and effect is not necessarily easy.

Besides deliberate interventions contained in the strategy and implementation plan, policy implementation will in effect be influenced by an array of processes. Having located M&E in the policy cycle, it is also necessary to explain where it fits into the more formal planning and implementation processes of government departments.

1.3 Developmental State and Government-wide M&E

In 2007, Cabinet mandated the Governance and Administration Cluster of the Forum of South Africa's Directors-General to construct an overarching Government-wide Monitoring and Evaluation System (Presidency, 2007). This was consolidated over time via the "Policy Framework on Performance Monitoring and Evaluation - Our Approach" document and the "Revised Green Paper: National Planning Commission", which were tabled in Parliament.

Whilst all Government Departments have a clear responsibility to monitor and report on their progress in delivering upon their mandate, there is equally a need for an oversight function that monitors and evaluates the overall performance of Government. The Department of Planning, Monitoring and Evaluation (DPME) has the following key mandates:

- Facilitate the development of plans or delivery agreements for the strategic cross cutting priorities or outcomes of government
- Monitor the implementation of these plans
- Assess departmental strategic plans and Annual Performance Plans to ensure alignment with long term and short-term plans
- Monitor the performance of individual national and provincial government departments and municipalities
- Monitor frontline service delivery
- Carry out evaluations
- Promote good planning and M&E practices in government.

Moreover, National Treasury has delegated the PFMA function of regulating strategic and annual performance planning to DPME (DPME, 2015). During the current planning cycle,

the department will embark on a review of the current Framework for Strategic and Annual Performance Plans (see Figure 2), as utilised by all Government Departments, and issued by National Treasury in terms of the Treasury Regulations under the Public Finance Management Act (Act 1 of 1999) (PFMA). This process has started with the commissioning of an evaluation that will determine the effectiveness of the current frameworks and recommendations for changes that could be made. The review is envisaged to take approximately 2 years with extensive consultation with both internal and external stakeholders. It is envisaged that the reviewed framework for planning will be piloted in year 4 and year 5 of 2015 to 2020 DPME planning cycle.

Noting that the IWQM Policy and Strategy call for an inter-sectoral approach to the management of water quality, these revised approaches will provide an opportunity for improved M&E approaches in support of IWQM, over time.



Figure 2: Governmental Planning and Review Cycle (Adapted from Public Service Commission, 2008)

In the meantime, the development of the M&E framework for IWQM will need to consider the existing monitoring and reporting frameworks, and explore modalities for this across the various sectors (horizontally) as well as between different spheres of Government and spatial scales (vertically).

1.4 Sustainable Development Goals

The Sustainable Development Goals (SDGs) provide an ambitious and transformational agenda for a common growth-future up to 2030. To provide a suite of targets and milestones to monitor and evaluate progress, the SDG indicator set has been developed by national statistical agencies with the coordination of the United Nations Statistical Division (UNSD).

The framework has been developed so that countries will customize this indicator set in their reports to appropriately contextualize the SDGs to their national contexts. This will also assist countries in aligning with national monitoring and reporting capacities. Countries will then choose subsets of the official SDG indicators, as well as modify and complement them to capture issues that are too country-specific to be fully reflected in global indicators. This then supports a bottom-up approach in enabling countries to develop a suite of indicators to monitor SDGs that are more appropriate than a suite of top-down indicators identified globally.

In order to meet reporting requirements, countries will have to build up their SDG reporting capacities and practices based on their existing systems of measurement, whilst also taking into account the guidance developed by UNSD. A range of challenges exist to countries in ensuring that they meet reporting requirements when considering that improvements in the systematics that are needed to underpin the reporting are quite conceivably needed. In addition, difficulties may emerge where information and data are needed in conflicted areas, where entrenched interests may actually work against the transparency or change that is sought. As such, this lies at the very core of the SDG challenge and will require countries to unlock difficult discourse in this regard.

However, the SDG framework has been developed to provide a more pragmatic mechanism that enables countries to effectively and efficiently monitor and report. Countries will, themselves, need to construct the necessary systems and techniques to support this. Noting the importance of water (and water quality), monitoring and reporting within the water sector and across water use sectors will require strengthening.

1.5 Purpose of this Document

M&E is not a neutral process and is also inherently political in nature. When considering the strategic importance of water as a necessity for life and in underpinning national development, against a highly variable spatial and temporal distribution, the requirements to ensure sustainable development becomes imperative. The recent droughts across the country have emphasised for many the absolute importance of water. Poor water quality not only renders water supplies potentially damaging or harmful, but can cost the economy excessively by requiring expensive water treatment techniques prior to water use.

Noting that we "*cannot manage, what we do not measure*" it will become increasingly important, as pressures upon our water resources increase, to strengthen, and where necessary develop, M&E systems to enable more adaptive Water Resource Management (WRM) and development responses.

In the context of this project, an M&E tool will be required in order to ensure that the IWQM Strategy and the actions that are taken forward into the Implementation plan truly lead to action. The format of reporting on progress and outcomes should satisfy the needs of various target audiences and the system should include the use of indicators that not only measure progress but also meaningfully measure the success of the strategy. The development of an M&E framework will thus strengthen the development of the IWQM implementation plan (see Figure 3) by specifying and describing the indictors that should be used in the plan in order to evaluate, monitor and report on progress and success.

The M&E framework will, amongst others, provide the procedures and approaches for ongoing M&E, will describe the various roles and responsibilities, will articulate the various systems requirements as well as provide guidance for the development of appropriate M&E skills and capacity. The importance of organisational design and institutional development should not be underscored in providing an effective basis for implementation. As such, the development of the M&E framework needs to be completed in conjunction with the implementation plan and the recommendations for an organisational design for WQM.



Figure 3: Monitoring and evaluation framework in support of IWQM

This M&E note provides some initial thoughts for consideration in the development of the M&E framework. As such, this note explores key concepts and considerations, reflects upon core principles, examines how M&E needs to be considered as a system, and provides an initial structuring of the M&E framework itself.

2. FUNDAMENTALS OF MONITORING AND EVALUATION

This chapter focuses on unpacking the key fundamentals of M&E and their placement in support of policy and strategy implementation. Water resource management (WRM) has changed over time, where focus has moved from large infrastructure developments aimed at servicing core water demands to far more integrated approaches recognising the need to sustainably utilise water resources. At the same time, we have seen an increasing level of stakeholder participation and there is a realisation that we need to move beyond consultation to far more collaborative approaches. Therefore, attention has moved towards more participative approaches of engaging primary stakeholders in WRM and towards strategies that build capacity and empower people to direct and manage their local resources (DWA, 2013).

This will require that all stakeholders **accept the consequences** of participation, including uncertainty, politicisation and shared decision-making. Furthermore, the idea of structured and rigid planning is giving way to more **flexible**, **process-oriented and adaptive approaches** (Biggs and Rogers, 2003; Biggs, Breen and Palmer, 2008; Pollard, Du Toit and Biggs, 2011). Ideally, the M&E requirements in support of adaptive policy and strategy development (supported by ongoing implementation) would be determined as policy and strategy are developed and established. This would enable the setting of baselines and the design of an appropriate and robust M&E framework. The difficulty arises in that it is often challenging to predict what indicators need to be included for the short term and long-term analyses, due to the dynamic nature of systems.

Therefore, ongoing shifts in approach are required supported by more interaction and engagement. This will require more decentralised approaches, with the establishment of platforms at more localised levels to support the necessary discourse and a more adaptive approach. This has a direct bearing on our approach towards M&E.

It does need to be understood that M&E is a technical field like any other field such as engineering, planning, hydrology and water quality management. Yet it is usually and unfairly expected that anyone with minimal support should be able to effectively undertake M&E. Fundamentally, and when done properly, M&E can **empower** local people to manage localised water resources, with critical self-evaluations of collective experiences reinforcing their capacity for self-management. M&E can thus direct information not only upward, to guide strategic decision making, but also downward towards citizens making day-to-day resource management decisions.

Adaptive and flexible approaches to water resource management will require better M&E systems, as the whole model is based on being responsive to feedback from primary stakeholders and to changing circumstances. However, M&E capacity development and empowerment-oriented initiatives will require different approaches. In a decentralised context, attention needs to be given to building M&E capacity within more localised institutions and implementing partners, rather than just focusing on M&E in a typical project management unit, thus making questions of governance critical in shaping the way that M&E supports improved resource management. The importance of downward

accountability and stakeholder participation in developing, implementing and improving the M&E process becomes essential.

It is important to note that as different stakeholders are engaged in M&E, that their views of different impacts, system components and different causal linkages can create challenges in undertaking management actions that cut across various sectors. This then requires a more fluid and open discourse to avoid misalignment in objectives. As a result, when working in inter-sectoral, multi-stakeholder environments there is a need to ensure that the M&E frameworks and strategies are designed appropriately.

2.1 Key Terminology and Concepts

An effective M&E framework is fuelled by a robust measurement system that provides accurate data, supported by efficient and effective entry methods. Monitoring and reporting then provides the data and information needed to undertake evaluations so that improved practices and outcomes can be achieved (DCEC, 2009).

However, these concepts are often misunderstood and are used interchangeably, creating confusion. In effect, this can result in poor or non-responsive management decision making.

2.1.1 Monitoring, reporting and evaluation

Monitoring involves the ongoing observation of a range of criteria that provides data and information regarding progress in terms of policy and strategy implementation. The information gathered during monitoring may be qualitative and quantitative in nature, generated from formal or informal collection processes. Examples of formal processes include specifically designed water resource monitoring programmes or designed survey questionnaires. Informal processes include general observations about process, interactions or information gathered through informal project team discussions or discussion with stakeholders. Information gathered from informal processes needs to be tested to determine if it is suitable as evaluation evidence. Monitoring is, therefore, a continuing function that uses systematic collection of data on specified indicators to provide management and key stakeholders, of an ongoing development intervention, with indications of the extent of progress and achievement of objectives and progress (DCEC, 2009; PSC, 2008).

Reporting involves the regular communication, within defined intervals, of results and findings, and the facilitation of their use. Reporting often follows pre-determined and structured formats to ensure that information gathered is more easily collated and synthesised. Whilst reporting is essential for informing adaptive management that improves implementation methods and the achievement of outcomes, it is equally important in demonstrating commitment and accountability. DPME (2012) note that monitoring data should arise from normal business processes and be captured in administrative data systems, such that both monitoring and reporting is based on the extraction of key information points from these systems.

Evaluation is a periodic, systematic, and objective analysis to assess matters of relevance or appropriateness, performance in terms of efficiency or effectiveness, as well as value for

money. Evaluations typically provide recommendations as to the way forward to address specific challenges and strengthen programme delivery. Hence, evaluation requires a questioning attitude for it to lead to continual improvement. Moreover, the complexity and stage of the programme or activity will determine the type of evaluation. For example, an evaluation that considers whether a programme's outcomes have been achieved will occur towards the end of a programme as well as at the mid-term if it is a long programme.

The mid-term Review is important because if performance is poor, corrective action can still turn things around and the 'Evaluation' is equally important in that it serves as evidence of what was achieved by the programme or project.

The other essential key components of M&E are briefly discussed in the following subsections given the important role they play in enabling and facilitating M&E.

2.1.2 Key Indicators

Indicators are developed for two key reasons, namely a) to measure attainment of inputs, activities, outputs, effects/outcomes and impacts related to the project design hierarchy; and b) to evaluate key questions in the evaluation of projects and programs.

Whilst this section does not aim at providing specific indicators, it is important to outline the essential characteristics of what these indicators might entail at a higher level. These indicators can be expressed in quantitative terms - where numbers are used to measure changes for example, percentage, rate, ratio and in qualitative terms- where words are used to describe changes for example, perception on well-being and quality of life.

The indicators are quantitative and qualitative criteria that provide a simple and reliable means to measure achievement, to reflect the changes connected to an intervention or to help assess performance.

Indicators may also be disaggregated for "people-level indicators" to clarify the intended beneficiary groups. For example, projects want to measure indicators separately for men and women to conduct gender analysis for the project. The importance of getting the right balance between qualitative and quantitative indicators cannot be over-emphasised. This is further compounded by the fact that quantitative indicators are often favoured as they are easier to monitor and report against, yet the qualitative indicators provide a richness that is often lost when only focused upon numbers. Hence, the need to ensure a balance and good mix of quantitative and qualitative indicators.

The types of indicators at the higher-level entail four types of indicators ranging from input to impact indicators as outlined in Table 1 below. It is worthwhile to note that indicators should be selected to fit the program objectives, interventions and operational context.

To avoid collecting unnecessary data to analyse all aspects of a project or intervention, M&E systems need to identify the set of indicators that will help track its most critical activities.

Table 1: Types of Indicators

| Types of Indicators | Purpose | | |
|---------------------|--|--|--|
| Impact indicators | Measure the extent to which the overall project goals are being achieved | | |
| Outcome indicators | Measure the extent to which the project objectives are being met | | |
| Output indicators | Measure project deliverables | | |
| Input indicators | Measure the extent to which the planned resources are being utilised | | |

Other criteria influencing the choice of indicators include:

- Time, resources and capacity required for data collection;
- Timeliness of data collection and analysis (temporal and seasonal factors);
- Usefulness to programmers for tracking risk and vulnerability;
- Comparability across programs.

Being adaptive means the ability to act and adjust as implementation proceeds, giving the managers and line-staff the ability to reflect upon and adjust activities towards attainment of the set targets.

Adaptiveness is therefore the ability to respond in a timely manner without the fear of change, and is done in the best interest towards achieving the broader goals and intended impact.

There are two key pointers that drive action and response to the M&E system, they are:

- **Signposts** are the indicators that should be monitored to check if critical assumptions remain valid and if implementation proceeds on schedule.
- **Triggers** are the threshold values of these indicators. When these thresholds are crossed then adaptive responses should be activated.

2.1.3 **Performance Targets**

Unlike indicators, performance targets represent commitments made about the level and timing of results to be achieved by a programme. It is considered good practice that for each outcome indicator or indicator selected for strategic objectives or intermediate results, a performance target should be established.

Although performance targets are usually quantitative, they can be qualitative, depending on their indicators. Sometimes is it necessary to develop *baselines* or *benchmarks* in order to track planned progress. These baselines or benchmarks are essential to understand the rate of change over time of an indicator. Final targets are the planned value of a performance indicator at the end of the planning period whilst interim targets are set for years in between the baseline and final target year.

- **Targets** bring the purpose for undertaking a project into a real, defined view. Targets further justify a project by describing in concrete terms what the programme or project investment will achieve by a certain deadline. Targets help to keep track of progress, provide a timeline that programme management can understand, add specificity to indicators, and (with the help of benchmarks) they break down long-term goals into incremental "tasks".
- **Benchmarks** are becoming main stream and are simply intermediary points for targets. It is also possible to use standard benchmarks set forth by donors, various agencies, high performing development organizations, Government Departments and others. Benchmarks serve as the guideposts for tracking progress and targets mark the envisioned levels of accomplishment. It is important to set realistic and motivational target levels that can be achieved in the life of the programme.

SDG Targets and Indicators for Water Quality

There are 17 SDGs and 169 Targets. Each target has a number of indictors that need to be monitored in order to determine whether the target is being reached.

Goal 6, which aims to ensure availability and sustainable management of water and sanitation for all, includes a target (Target 6.3) which specifically aims to improve ambient water quality, by eliminating, minimizing and significantly reducing different streams of pollution into water bodies.

There are number of other targets such as those relating to ecosystem health (target 6.6 and SDGs 14 and 15), human health (recreational waters and drinking water sources, target 6.1) and water use efficiency (water re-use, target 6.4) that link to Target 6.3. The interpretation of each indictor, the method to be used for reporting and the linkages between indicators is described in the UN Water 2016, Integrated Monitoring Guide for Goal 6 as well as various step-by-step guidelines produced as part of the SDG initiative.

Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

Indicator 6.3.1: Proportion of wastewater safely treated

Definition: Percentage of wastewater generated by households (sewage and faecal sludge) and economic activities (based on ISIC categories) that is safely treated

Indicator 6.3.2: Proportion of bodies of water with good ambient water quality

Definition: Percentage of water bodies (area) in a country with good ambient water quality. "Good" indicates an ambient water quality that does not damage ecosystem function and human health according to core ambient water quality parameters. Overall water quality is estimated based on a core set of five parameters that inform on major water quality impairments present in many parts of the world: electric conductivity/total dissolved solids; percentage dissolved oxygen; dissolved inorganic nitrogen/total nitrogen; dissolved inorganic phosphorus/total phosphorus; and faecal coliform/Escherichia coli bacteria.

This indicator gives an overall picture of all pollution (including from diffuse sources not captured in indicator 6.3.1) and pollution reduction activities, and is essential to describe the environmental status of freshwater systems (feeding into indicator 6.6.1). It allows for an assessment of the impact of human development on ambient water quality, as well as the potential to obtain future ecosystem services from the water body (for example, drinking water production and biodiversity).

2.1.4 Results Chain

Result Chains (RC's) are the causal sequence for a development intervention that stipulates the necessary sequence to achieve desired objectives beginning with inputs, moving through activities and outputs, and culminating in outcomes, impacts and feedback. RC's are the key strategic documents which form the basis for the rest of the monitoring system and through which intervention logic is built (ALCP, 2015). It is important to note that RCs epitomize the interdependence of management and monitoring and as such provide invaluable descriptors of the key programmatic interventions and their causality. RC's are diagrammatic representations of the logical progression of the changes/impact that the programme (policies and strategies) expects to instigate in the IWQM system at the intervention and outcome level through programme activities undertaken through programme interventions.

RCs, therefore, represent an expansion of areas of the programme strategy as represented in the programme implementation plan and allow the programme to capture the multiple, parallel activities of complex issues as well as the more complex sequencing of interdependent activities. The RC's are designed within the context of the current strategy environment and dynamics and thus represent a realistic chain of results where programme activities lead to impact and ultimately contribute to the Strategy intent.

RCs can be developed as differing types within the fuller scope of a programme (see Table 2). These RCs as such provide for a fuller understanding of the broader array of programmatic interconnectivities. RCs can then provide a suite of core, strategic interventions around which a programme is developed and implementation is affected towards an outcome, yet equally RCs can be developed to understand the more detailed dimensions of specific interventions. Increasingly recognised as a key part of our more integrated world, sector RCs start to develop the linkages across different interventions so that causality between these interventions is better understood and managed.

| Type of Results Chain (RC) | Description |
|-------------------------------|---|
| Outcome Results Chains | Outcome Level RCs allow for an elaboration of the programme strategy and are usually constructed at the end of the inception phase when WRM analysis and stakeholder analysis have enabled the formation of an initial strategy with opening interventions, which will lead to the outputs and outcomes, purpose and goal. They describe higher level outcomes and the longer-term goals generally beyond the scope of a project, intervention or strategy (ALCP, 2015). They give the programme a broad view of the value chain and allow the programme to check the logic of these initial entry points for facilitation in line with the higher programme logic. They are reviewed on an annual basis. |

Table 2: Types of Results Chain

| Type of Results Chain (RC) | Description | | |
|--------------------------------------|---|--|--|
| Intervention Level Results Chains | Intervention level RCs offer more flexibility to the programme in capturing the dynamic elements in a complex social and economic environment. They allow the programme to capture deeper layers of complexity and sequencing and are the key tool used by the programme staff for planning, analysis and decision making. They enable programme staff to depict the logical progression of an intervention and to see whether and <i>how</i> certain activities lead to desired changes (ALCP, 2015; DCEC, 2009). Each intervention has a separate Results Chain (including pilot and inception phase interventions). The Intervention Level Results Chains critically form the foundation of the monitoring system. | | |
| Sectoral Results Chains | Sectoral RCs are increasingly being constructed as programmes develop. They combine the proposed activities and intended results from several interventions often from different outcomes. They are primarily a strategic programmatic tool which can be used alongside measurements of systemic change and do not replace the intervention level RCs, but start to draw connectivity between the intervention level RCs. | | |

2.1.5 Theory of Change and Logic Models

In the last decade, there has been an increasing awareness of the need to understand, in a more structured manner, the route towards ensuring programmatic outcomes. As such the notion of a Theory of Change has become important when developing policy, strategy and implementation plans.

A Theory of Change provides a more analytical description and illustration of how and why a desired change can be expected as a result of a suite of inputs and activities. In effect, this then provides the "missing middle" between what a programme or change initiative does (activities or interventions) and how these result in the attainment of desired goals being achieved (outcomes and impacts) (see Figure 4). Through this approach, key concepts can be further unpacked and constructed to establish causal linkages that provides the relations and connection between and among the inputs, activities, outputs, outcomes and impact known as the logic model.



Figure 4: Components of the Logic Model (adapted from DCEC, 2009)

The development of a Theory of Change can lead to better planning, in that activities are linked to a detailed understanding of how change happens. It also leads to better programmatic evaluation, as this enables the detailed measurement of progress towards the achievement of longer-term goals.

The various pieces of the logic model are described briefly below.

- **Inputs:** all the resources that contribute to the production of service delivery outputs. Inputs are "what we use to do the work". They include finances, personnel, equipment and buildings.
- Activities: the processes or actions that use a range of inputs to produce the desired outputs and ultimately outcomes. Activities basically describe "what we do".
- **Outputs:** the final products, goods and services produced for delivery. Outputs may be defined as "what we produce or deliver".
- Outcomes: the medium-term results for specific beneficiaries which are the consequence of achieving specific outputs. Outcomes should relate clearly to an institution's strategic goals and objectives set out in its plans. Outcomes are "what we wish to achieve". Outcomes are often further categorized into immediate/direct outcomes and intermediate outcomes.
- Impacts: the results of achieving specific outcomes, such as reducing poverty and creating jobs. Impacts are "how we have actually influenced communities and target groups".

A Theory of Change is best used when there is need to:

- Design a complex initiative and want to have a rigorous plan for success,
- Evaluate appropriate outcomes at the right time and the right sequence,
- Provide transparency regarding the various initiatives and enable agreement among stakeholders about what defines success and what it takes to get there, and
- Explain why an initiative worked or did not work, and what exactly went wrong.

It is of importance to note that a Theory of Change can provide a valuable unifying framework for strategic decision-making, communicating and reporting. As such, this can be of significant value in contexts where discord has halted progress.

As a minimum, theory of change is considered to encompass a discussion of the following elements:

- **Context** for the initiative, including social, political and environmental conditions, the current state of the problem the project is seeking to influence and other actors able to influence change
- Long-term change that the initiative seeks to support and for whose ultimate benefit
- Process/sequence of change anticipated to lead to the desired long-term outcome
- **Assumptions** about how these changes might happen, as a check on whether the activities and outputs are appropriate for influencing change in the desired direction in this context.
- **Diagram and narrative** summary that captures the outcomes of the discussion

2.2 Common Challenges

The water sector is complex and management of water resources does require an engaged multi-sectoral approach that spans different spheres of Government, the private sector and civil society. M&E in these complex contexts face a number of challenges.

- Lack of baseline data and information cripples the utility and impact of M&E. Without baseline information, change *i.e. the difference in the key indicators described in the monitoring pre- and post- intervention*, cannot be measured. Baseline information is essential for developing robust *attribution*. The baseline describes the intervention before programme activities and will allow for the measurement of changes/impact *attributable to the programme;*
- Inadequate understanding of and attention to M&E in project design and subsequently inadequate resource allocation and hierarchical organisation of decision-making and analysis;

- Lack of commitment to monitoring by project staff and implementing partners leads to delays in implementing monitoring systems and to lack of information use by project management;
- Monitoring seen as an obligation imposed from outside, with project staff mechanically filling in forms for managers and the project managers seeing monitoring only as a form of data collection in the process of writing reports for donors;
- **Irrelevant and poor-quality information** produced through monitoring that focused on physical and financial aspects and ignores project outreach, effect and impact;
- Little or no attention to M&E needs and potentials of other stakeholders and other local cooperating institutions;
- Very few internal project reviews or ongoing evaluations, with adjustments triggered mainly by external evaluations or supervisions;
- Widespread lack of integration and cooperation between project M&E and project management with no clear, mutually agreed-upon guidelines;
- **M&E** documentation that does not address or resolve identified problems leaving a disjuncture between the programme, its overall intent, and the need to effectively monitor progress;
- **Over-ambitious monitoring systems**, with too much being asked in terms of information and methods;
- **Poor use of participatory and qualitative M&E methods**, due to limited capacity and inability to see the need for such information;
- **M&E staff with insufficient relevant skills and experiences**, and making little effort to fill the capacity gap;
- Lack of accountability of staff for delivery means that the M&E activities may not result in directed actions to address issues; and
- **Differentiation of monitoring from evaluation activities**, with evaluation being contracted out. This leads to M&E not being an integrated system for improvement-oriented critical reflection.

2.3 Defining the Type of Evaluation

Whilst it is good practice to conduct M&E, it is very important to define the type of evaluation from the outset (DCEC, 2009).

This is especially so given that it is important to define the type of evaluation that can reasonably be undertaken as this will help to focus the evaluation by:

- ensuring that the essential elements of the evaluation have been considered, structured and agreed upon;
- managing expectations about what the evaluation can reasonably deliver;
- providing a basis from which the evaluation design and information needs can be defined and implemented; and
- ensuring reporting requirements can and will be met.

As the M&E Note builds the discussion base for the 'M&E Framework' for the IWQMS, it is critical at this point to already envision the types of evaluation that will be useful in articulating the framework. The DCEC (2009) argue that there are three key types of evaluations that suit and are fit-for-purpose for the M&E Framework. These entail appropriateness, efficiency and effectiveness as detailed below.

- **Appropriateness** evaluations An evaluation that assists in deciding the need for, and nature of, a proposed programme or course of action. Whilst this may be critical at the planning stage, it is equally a key consideration over the life of a longer term programme, particularly if the political, economic, environmental or social context changes.
- Efficiency evaluations Evaluates the inputs and processes used to produce the outputs of a programme. This is undertaken to identify whether implementation is occurring appropriately, i.e. using the best available methods in priority locations with consideration of scale and recognising climatic and timing requirements. This will be undertaken throughout the life cycle of the programme.
- Effectiveness evaluations Examines extent to which programme objectives or desired outcomes have been achieved. This will also measure factors that affect achievement and establish relationships between programme implementation and measured outcomes. These evaluations are usually conducted when a programme is well established as it often takes time, and possibly iterative processes (including M&E) to reach the point where effectiveness can be truly considered.

In effect, these types of evaluation are used together if we are to truly evaluate a programme. This then means that one can use these types of evaluation intermittently or interchangeably throughout the course of a programme (see Figure 5).



Figure 5: Relationship between the CAP cycle and the different types of evaluation (adapted from DCEC, 2009)

In utilising these differing types of evaluation, the consideration of both quantitative and qualitative indicators becomes important. Inherently, one can understand that in most instances assessments of appropriateness would tend to engage more qualitative indicators, whereas efficiency evaluations may tend more strongly towards quantitative indicators. The evaluation of effectiveness would involve a more balanced the use of both qualitative and quantitative indicators. Questioning key stakeholders, particularly those that will use the information or those that have commissioned the evaluation, can help evaluators decide the type of evaluation they should use. Hence, it is critical to always engage and consult with key stakeholders so that they provide input to the M&E process from the beginning rather than retrofitting their contributions to an already existing system.

2.3.1 What Should Evaluation Focus on?

In order to appropriately shape the evaluation required, there are a series of useful questions that assist in the design. These provide the purpose for the evaluation (what do we want to get out?), understanding the stage of programme implementation (how far have we progressed?), the focus of the evaluation (what do we need to pay attention to?) and the timing of the evaluation (Is there a stage when evaluation is most appropriate?) (see Table 3).

This suite of questions then also provides guidance as to the nature of research needed, the review of background material and the approach to stakeholder engagement.

| Question | Consideration | |
|--|--|--|
| Purpose of evaluation: What is the purpose of the evaluation? | The following possible reasons for an evaluation should be considered: improvement: refining an existing program accountability: regular monitoring to report to 'investors' or | |
| | managers | |
| | measuring progress towards objectives/outcomes: meeting reporting requirements or determining the continuation of a program or adoption of the program into other programs | |
| | program development: information to help design a program. | |
| Extent of implementation: What stage of implementation has the project or program | Projects or programmes under evaluation will vary in implementation from conceptual stage to having been in place for a while with no modifications. It is important to understand what stage the program in question has reached. | |
| reached? | For example, a programme that has only just been implemented cannot legitimately be evaluated against its long-term outcomes but an evaluation that recommends what needs to be implemented to enable this to happen could be undertaken. | |
| Focus of evaluation: What aspect of the project or | Determine whether the people commissioning the evaluation want to focus on one or more elements of a program, such as: | |
| program should the evaluation focus on? | environmental, social, economic or political needs under which a program is being developed | |
| | adequacy of design | |
| | method of program delivery | |
| | outcomes (or targets). | |
| Timing of evaluation: At what stage during the project or program should the evaluation occur? | Consider the temporal links between the evaluation and program delivery, i.e. should the evaluation occur before/during/after/towards the completion of the program? | |

Table 3: Defining the type of evaluation required (from DCEC, 2009)

The four evaluation framing questions can then influence the type of evaluation required (see Table 4). Of course, in some instances, and for larger programmes, an evaluation could conceivably consider all evaluation types for different programme dimensions.

Table 4: Common considerations in determining evaluation type (DCEC, 2009; PSC, 2008;Owen 1993)

| | Appropriateness | Efficiency | Effectiveness |
|--------------------------|--|---|---|
| Purpose of evaluation | Program planning Ongoing relevance for longer term program | Accountability Program improvement | Progress towards outcomes (targets) |
| Extent of implementation | None Long-term program with no change | Program in place/ established | Program well established |
| Focus of evaluation | Context | Adequacy of design Methods of delivery | Outcomes and delivery |
| Timing of evaluation | Before program implemented or approved | During implementation | Program end or after completion Mid-term if long program |

Whilst it is essential to design robust M&E systems and frameworks, it is equally important to recognise the need for continuous learning and adaptation so that the systems and frameworks remain relevant and fit-for-purpose as the programmes, policies and strategies change. This calls for the need to plan for learning and adaptation. Some useful pointers to plan for learning and adaptation include:

- Design the process, as well as objectives, at the higher levels: Identify the forums and processes that will be used in project review and adaptation and build in flexibility to respond to unplanned opportunities.
- Focus on impacts and outcomes: Don't over specify activities and outputs and skim over the purposes and outcomes as these are the most important towards achieving clear goals.
- **Be explicit about uncertainty**: Instead of trying to force specificity, rather be clear about what is not known and how and when these will be addressed. So, some targets should be approximate.
- **Build in research**: Not all issues can be anticipated, so research can assist in answering key problems.

Linked to the core issue and need to plan for learning and adaptation as detailed above is the notion of '**responsiveness**'. Responsiveness entails the ability to anticipate and adapt to changed circumstances, or, from the perspective of citizens, whether people's (changing) needs are met. It means that stakeholders' unique circumstances in their constituencies are taken into account in the design and implementation of programmes and strategies. It implies a demand driven approach to service delivery that really studies and responds to the needs of specific stakeholder groups in varied locations and with unique needs, values, abilities and experiences and have unique problems to contend with. The M&E system and resultant framework should meet this need

3. PRINCIPLES AND VALUES FOR MONITORING AND EVALUATION

Since evaluation is the determination of merit or shortcoming, a standard of good performance or merit, with which to compare, needs to be defined. Values help to define what is regarded as a good standard of public administration or a good standard of performance (PSC, 2008). Values include the concepts of effectiveness, efficiency, responsiveness to needs and development orientation. These values also align with international good practices as promoted by the Organisation for Economic Cooperation and Development (OECD) Development Assistance Committee's principles of effectiveness, efficiency, relevance, impact and sustainability. In addition, Section 195 (1) of the South African Constitution (Act 108 of 1996) states that "public administration must be governed by the democratic values and principles enshrined in the Constitution" and then lists nine values (PSC, 2008:26).

It is within this broad understanding that M&E should be rooted into some core principles and values that must be adhered to. This then not only informs the nature of the evaluation to be undertaken, but also guides matters of process.

Some of these principles can be related to the Theory of Change, as discussed earlier, and influence how the evaluation is undertaken at each level of the Theory of Change. The assumptions, as outlined in the Theory of Change, also require scrutiny in this regard to assess alignment with core values and principles.

3.1 Outlining the Key Principles

Having described and briefly detailed the importance of values and principles, it is important to outline the principles upon which the M&E framework for the IWQM Policy and Strategies will be based. There are 12 essential principles as detailed in the Table 5 below.

| Principle | Description |
|--|---|
| Principle 1: Link the performance information to other planning scales | There is a hierarchy of links between sub-catchment, catchment and national resource planning scales. Indicators are selected and measured to ensure that they satisfy the requirements of the scales against which they are primarily evaluated. Ideally, the information provided by these indicators can be aggregated or disaggregated and used at other scales of evaluation. It is important, however, to ensure that the data is technically relevant for use at these other scales. |
| Principle 2: Complement and consolidate relevant existing systems | An evaluation system should, where feasible, integrate and complement relevant existing evaluation requirements. This ensures a consistent approach that not only helps build capacity but also enables more efficient use of evaluation information. This principle does not deny the importance of considering the appropriate method |

Table 5: Key Principles to Consider for M&E

| Principle | Description |
|--|--|
| | of evaluation on a case-by-case basis. |
| Principle 3: Be cost-effective | The benefits of the information obtained from the M&E system must outweigh the costs of developing and implementing the system. Existing monitoring programmes, for example, should be reviewed and, where relevant, incorporated to reduce duplication and increase cost-effectiveness. The principle can also be applied to reporting processes which can be aligned to meet different stakeholder needs. |
| Principle 4: Ensure the evaluation system is relevant to the Catchment planning targets | Evaluation design and the selection of performance measures must be relevant to the targets of the plan and the type of evaluation to be undertaken. If the design is not relevant, it will be difficult for DWS/CMA to make judgements on the performance of action plans. |
| Principle 5: Apply ethical practices to evaluation | Ethics is about right and wrong. In the context of evaluation, ethics covers issues such as informed consent, appropriate behaviour, and storage and retrieval of study data. Ethical issues should be considered at the beginning of an evaluation and throughout all its phases, no matter what role is being played: commissioning the evaluation, undertaking it, or participating in it. |
| Principle 6: Make evaluations manageable | The complexity of IWQM issues, action plans and their targets, and the practical constraints of the operational environment can make developing and implementing an evaluation system seem overwhelming. It is therefore important to ensure that evaluations are manageable. |
| Principle 7: Ensure indicators are flexible | IWQM is an evolving discipline and is based on current best practice. Issues that need to be addressed to ensure appropriate management of water resources will change over time and it will be likely that some of the indicators chosen for long-term projects may also change. |
| Principle 8: Develop evaluation in partnership | Partnership approaches will greatly benefit in building capacity and managing expectations of evaluation. In addition, the sources of data to meet the evaluation needs are likely to come from a variety of collaborators. As evaluation and the action plans are both short to medium-term projects, it is essential that the partnerships are long-term to support ongoing M&E. |
| Principle 9: Use practical and objective verification | An evaluation system must be based on sound information and processes so that there is confidence in its findings, it is practical to apply, and its approach transparent. |

| Principle | Description |
|---|--|
| Principle 10: Link evaluation to the adaptive management cycle | Evaluation systems are primarily implemented to provide feedback on IWQM. They should be used as part of a continuous improvement or adaptive management process and focus on the use of information from the evaluation, not just the collection of the information. |
| Principle 11: Be consistent with national/ Governmental Standards | DWS/CMAs should conform with national or governmental standards for M&E. Some elements may be more relevant to IWQMS evaluations than others, but following the elements of the standard will contribute to consistent project management and evaluation. |
| Principle 12: Participation in policy making | This principle requires that ordinary people be consulted and involved in all phases of government programmes, from design through to implementation and evaluation, so that their needs will be properly articulated and addressed. |

The principles herein are useful in guiding the development of the M&E framework as well as providing insights as to matters of modality. An M&E framework so conceived provides for more rigour in terms of the ability to provide a useful assessment of programme progress, as well as enabling adaptation to both foreseeable and non-foreseeable shifts in the operating environment.

4. SEEING MONITORING AND EVALUATION AS A SYSTEM

A good M&E system manages to integrate the formal data orientated M&E approaches together with the more informal monitoring and communication. The exercise should therefore not be seen as a tedious statistical task or an external obligation. It is common to see the M&E functions split which can cause disjunctures in project learning processes. This calls for the need to see M&E as an integrated support to implementation and this can be achieved by creating M&E processes that lead to clear and regular learning; understanding the links between M&E and the management functions; using existing processes of learning, communication and decision making amongst stakeholders (internal and external) as the basis for project oriented M&E; and putting in place the necessary conditions and capacities.

A well-developed project design document will include an indicative M&E framework that provides detailed information about the above-mentioned steps to facilitate budgeting and allocation of technical expertise, to give an overview of how M&E will be undertaken, and to guide project and partner staff during start up. However, it is important to understand that this will only be indicative and needs to be adjusted and detailed further during the start-up phase.

There are some essential steps involved in designing an M&E system, including:

- Setting up the purpose and scope,
- Identifying information needs and indicators,
- Planning information gathering and organization (SDGs, National Development Plan etc),
- Planning for data processing,
- Planning for quality communication and reporting, and
- Planning critical reflection processes and events.

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 utilisations 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".

The IWQM Policy and Strategy have been developed to support the national development agenda, and as such aligns with the NWRS. The implementation of the IWQM Policy and

Strategy will be outlined in an implementation plan that will detail how outputs, outcomes and impacts will be attained (see Figure 6).

This does require the support of an operational M&E system that enables the gathering of data and information, supported by routine reporting. It must be understood that a process of refinement and improvement in the M&E system will be required, as will our adaptive response to WRM be a necessity (Figure 6).



Figure 6: IWQMS and the Placing of M&E

There are international reporting obligations that this system will need to support. The IWQM Policy and Strategy provides a number of interventions that will contribute to the country's ability to meet the global Sustainable Development Goals, adopted in 2015. The SDGs are aimed at ending poverty, protecting the planet, and ensuring prosperity for all as part of a new 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 (DWS, 2016). *During the development of the SDGs and how this will be monitored and reported upon, will need to be explored.*

The M&E framework that supports the implementation of the IWQM Policy and Strategy does then need to reflect the various governance layers, from international levels through to local level, and provide the M&E connections that run through these differing governance levels. This is indeed complex, but a core principle of pragmatism does need to guide how this is structured.

4.1 Monitoring the Risk and Vulnerability Context

It is worth noting that tracking risk and vulnerability represents a critical shift in project M&E. It involves monitoring contextual trends, risks, shifts in coping capacity and the factors that cause assets and coping capabilities to deteriorate (ALCP, 2015; PSC, 2008). This includes monitoring trends at three levels.

To start with, programmes should monitor shifts in the occurrence of hazards or risks that affect the context such as the health environment, the natural environment, governance and conflict, socio-economic factors, and shifts in the policy and institutional environment at the regional, national and local levels. The next level is ensuring that the indicators used to monitor these contextual changes are referred to as "signpost" indicators. These indicators help to direct programme priorities in dynamic and often unpredictable operating environments. For example, these indicators help determine the thresholds at which programmes need to shift between relief and development situations. They also help programmes refine and adjust interventions depending on changes in context and the factors that influence vulnerability.

5. TOWARDS A FRAMEWORK

If there is no method for tracking activities and the impact of these activities, then it is difficult to understand how programmes are being effective, efficient or are even appropriate. As such, the understanding of the importance of M&E has developed very significantly in recent years. Of course, the development of M&E frameworks in a complex world, is inherently complex.

Inadequate M&E has two consequences, namely: a) **limited learning** by implementers about the project's progress, opportunities and problems; consequently, the limited ability of those involved to correct operations and strategy, leading to sub-optimal impact on the water resource; and b) **unclear impact performance**, so limited accountability to primary stakeholders of projects in terms of their stated goals.

Addressing these critical issues is important and hence the design of an M&E framework in support of the IWQM Implementation Plan.

5.1 Why an M&E framework

The aim of the framework would be to provide guidance and tools that (DWS/ CMAs) could be used to develop specific evaluation plans. Ongoing implementation of the evaluation plans would meet several objectives. It would enable DWS/CMAs to meet their evaluation obligations, including legislative responsibilities, at both national and water management area levels. Importantly, it would also enable adaptive management to:

- **improve and strengthen the design** of new or revised implementation activities using lessons learnt from evaluation
- **improve implementation** to enhance the efficiency and effectiveness of new or revised implementation activities, again from lessons learnt
- **report change resulting from implementation** and so demonstrate returns for natural resource management investment
- **help empower primary stakeholders** by creating opportunities for critical reflection on the policy direction
- **demonstrate the benefits of sustainable resource management**, thereby promoting current best practice.

It would be difficult for DWS/CMAs to meet its responsibilities without revising internal processes where necessary to adaptively manage the implementation action plans. As described earlier, the M&E framework will provide processes to guide the three types of evaluation (appropriateness, efficiency and effectiveness) but must be pragmatic in enabling institutions to make the necessary shifts to achieve improved delivery.

5.2 Structuring the M&E Framework

Considerable thought will need to be applied in designing the structure of the M&E framework. As such, this framework will need to be applicable across an array of stakeholders and role-players (see section 5.4). It is clear that this framework must provide, in a clear and concise manner, the modalities that will enable these various stakeholders and role-players to provide the data, information and reports that will be required to evaluate progress with regards to the implementation of the IWQM Policy and Strategy.

At this early stage, an initial table of contents for the M&E framework would include:

- 1. Introduction
- 2. Project context and features
- 3. M&E Purpose and Scope
- 4. Key performance questions, indicators, plus information gathering and organising methods
- 5. Internal self-evaluation processes
- 6. External evaluation processes
- 7. Intended stakeholder participation
- 8. Structures and staffing for M&E
- 9. Capacity building for M&E
- 10. Information management
- 11. Process for detailed planning of M&E
- 12. Communication strategy
- 13. Budgets

A consideration in the structuring of the M&E framework will be the various reporting requirements (such as the SDGs, national reporting etc) and to find ways in which alignment can be supported.

5.3 Applying the M&E Framework

Applying the M&E framework entails a step-wise process from the start-up phase through implementation, up to end of phase (close-out). As with any other "project" the development of the approach to M&E needs to be managed thoroughly, and is not just some form of administrative add-on (see Figure 7-9). This then requires a series of progressive project management steps that need to be managed and overseen, preferably by a co-ordinating body for the M&E of the IWQM Implementation Plan.

| Set-up Phase | Establish scope and purpose Indicate key performance questions, indicators and associated mechanisms Identify organisational arrangements Develop ToR for staff Provide process for establishing M&E Develop budgets Document this in the M&E Framework |
|-----------------|---|
| Start up | Revise performance questions, indicators and monitoring mechanisms Organise training of staff Establish baselines Put in place capacities |

Figure 7: Set-up and Start-up Phase

| Set-up Phase | Establish scope and purpose Indicate key performance questions, indicators and associated mechanisms Identify organisational arrangements Develop ToR for staff Provide process for establishing M&E Develop budgets Document this in the M&E Framework |
|-----------------|---|
| Start up | Revise performance questions, indicators and monitoring mechanisms Organise training of staff Establish baselines Put in place capacities |

Figure 8: Implementation and Mid-term Review Phase

| End of phase closeout | Assess what the implementers can do to sustain impact and continue M&E Hold workshops and undertake field studies with key stakeholders to assess impacts Identify lessons learned for the next phase (and for other projects) |
|--------------------------|--|
|--------------------------|--|

Figure 9: Close-out Phase

5.4 Key Stakeholders and their M&E Role

Co-operative Governance and participative management is central to the Department of Water and Sanitation's water quality management approach, and provides for integration across a number of spatial and governance dimensions. This aligns with the principle of participative management by involving other government departments and local interested and affected parties in decisions affecting the use, development and protection of water resources. The IWQM Policy and Strategy is located in a web of relationships between many different stakeholders. It is therefore, important to understand who the key stakeholders are and the role that they play in M&E. During the development of the implementation plan and the M&E framework a thorough stakeholder analysis, with a specific focus on roles and responsibilities each stakeholder would play in M&E. At a high level this analysis should reflect upon:

- DWS and its institutions,
- Other government departments (including, in particular DMR, DAFF, DEA, DPME and the DPLG),
- Public enterprises,
- Private sector,
- Civil society and NGOs,
- Academia and research institutions, and
- Consultants.

Initial considerations on how these stakeholder groups may contribute to the process is briefly detailed below.

DWS and its institutions – The role of the DWS should be project management and oversight by ensuring that the M&E of the implementation plan is co-ordinated, reviewing and reporting on the progress of work, and ensuring financial flows and adaptive management. With support and oversight from a co-ordinating body at the DWS, it is anticipated that the line functions will become the cohesive group that delivers the much-needed roll-out and operationalisation of the IWQM Implementation plan and M&E systems.

Other Government Departments -

- The DPLG develops policy on the structure and functioning of provincial and local government and as such monitors and evaluates the performance of provincial and local government. Since local government is a critical institution for the delivery of basic services, the DPLG's role in monitoring, and evaluating, the financial health and the service delivery of local government, is a very important role.
- **DPME** has the mandate to facilitate, influence and support effective planning, monitoring and evaluation of government programmes aimed at improving service delivery, outcomes and impact on society.

- **DMR** has the mandate over mineral resources. However, given that mine environmental management forms an integral part of the management of mineral resources in South Africa, the Department has to undertake research, develop mine environmental policies (legislation, strategies), provide strategic guidance on mine environmental management, mine rehabilitation, water ingress, mine environmental legacies and sustainable development. DMR closely collaborates with the DWS to address these issues especially water quality monitoring and compliance standards from Mines.
- DEA is mandated to give effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. To this end, the department provides leadership in environmental management, conservation and protection towards sustainability for the benefit of South Africans and the global community. With water being a central ingredient in environmental management, the DEA and DWS are bound to cooperate and share experiences and lessons on M&E. This collaboration can be manifested through for example, partnerships between the CM&E operations of DWS and their counterparts in DEA.
- **DAFF** has the mandate for agriculture which impacts and benefits from water use. They are a key stakeholder in terms of IWQMS implementation and M&E.

Academia and Research Institutions – Researchers and academics provide thought leadership and technical support to both government, private and civil society groups by asking the key questions and investigating, often with some level of neutrality, the challenges facing society. More so in the water sector, the role of this cluster is critical in assisting with for example, the development of tools and methods to enable effective M&E of water quality trends in South Africa.

Civil Society and Communities - The local communities and general citizenry are the primary stakeholders as their needs are the focus of the IWQMS and their views on impact count. Most M&E best practices aim to strengthen self-reliant development and monitoring, hence, seeking local participation in the design and implementation of policies and strategies. To this end, grassroots organisations such as Community-Based Organisations (CBOs) and local non-governmental organisations are important in that they provide invaluable insights on priorities and appropriate processes during the design phase, implementation and M&E processes.

Consultants – Most government programmes and projects use externally contracted consultants or technical advisors. Consultants assist in designing the programmes and projects, and thus greatly influence its focus and mode of operation including laying down the basis for M&E and capacity building where it is needed.

5.5 Developing Capacity for Implementation of the M&E Framework

Capacity development is required at different levels and should be targeted in order to ensure that M&E is both supported and managed. However, developing the appropriate

capacity is not just about sending staff on training courses. A more holistic approach is required and needs to consider:

- Capacities of people and organisations;
- Incentivising M&E;
- Getting the optimal structure for M&E responsibilities;
- Determining the information needs and ensuring system requirements are in place; and
- Financing and resourcing.

Noting that this dies indeed require significant coordination and due diligence, the need to have an identified champion who will lead and promote this, will be imperative.

In line with the Organisational Design, it is anticipated that the M&E functions, roles and responsibilities within the DWS need to be manned by M&E competent and qualified staff. Where such skills and competencies do not exist, it is advisable for continuous M&E capacity building to be conducted. This might also entail requirements for registration and participation in professional associations such as the South African Monitoring and Evaluation Association, where members share and exchange experiences and ideas on current thinking and reflections on M&E.

5.6 Endnote

Whilst this note has outlined the needed steps, processes and key concepts towards the M&E framing, it is worthwhile noting the complexity of WRM. This is especially so given the dynamic and complex nature of managing as scarce a resource as water. Realising these key pointers, it therefore becomes imperative to manage, develop, use and protect water resources within acceptable norms and standards. Adaptive management responses will require significant improvements in the current modalities for M&E.

The complexities of the M&E needed in operationalising the IWQM Policies and Strategies are profound and will require a structured and diligent process. The development of capacity to support this becomes imperative and the identification of a champion to lead this becomes critical.

The next steps towards the development of the M&E Framework will be to apply the concepts herein (such as the analysis of results chains and the application of logic models), and through discussion with relevant stakeholders, determine the key indicators and targets that should be monitored, evaluated and reported on in order to determine the progress, success and outcomes of the Implementation of the actions described the IWQM Implementation Plan.

It is the aim that through this process the M&E Framework will not only specify the key indicators and targets but it will also describe the method that should be used to monitor, evaluate and report on these targets and that, together with this discussion document, it will

provide guidance on how to apply the framework to the selection, monitoring and evaluation of any future targets and indictors.

6. **REFERENCES**

- Alliance Lesser Caucasus Programme (ALCP). (2015). Guidelines for Designing Monitoring and Evaluation Guidelines. Mercy Corps, Georgia.
- Biggs, H. & Rogers, K.H. (2003). An adaptive system to link science, monitoring and management in practice. In J.T. du Toit, K.H. Rogers & H.C. Biggs, *The Kruger Experience: Ecology and management of savanna heterogeneity*, pp. 59–80, Island Press, Washington DC.
- Biggs, H.C., Breen, C.M. & Palmer, C.G. (2008). Engaging a window of opportunity: Synchronicity between a regional river conservation initiative and broader water law reform in South Africa. *International Journal of Water Resources Development*, 24(3), 329–343.
- Department of Climate and Environmental Change (DCEC). (2009). Evaluation Framework for CMA Natural Resource Management. NSW, Australia.
- Department of Planning, Monitoring and Evaluation (DPME). (2012). Functions of an M&E Component in National Government Departments. Guideline No. 3.1.5
- Department of Water Affairs (DWS) (2013). National Water Resource Strategy. Second Edition 2: Water for an Equitable and Sustainable Future.
- Department of Water and Sanitation (DWS) (2016a). Water Quality Management Policies and Strategies for South Africa. A Review of the Water Quality Management Institutional Arrangements for South Africa. Report No 1.2.2. Inaugural Report. Water Resource Planning Systems Series, DWS Report No.: 000/00/21715/2. Pretoria, South Africa.
- Department of Water and Sanitation (DWS) (2016b). Water Quality Management Policies and Strategies for South Africa. Report No. 1.2.3: A Review of Water Quality Management Instruments for South Africa. Inaugural Report. Water Resource Planning Systems Series, DWS Report No.: 000/00/21715/4. Pretoria, South Africa.
- Department of Water and Sanitation (DWS) (2016c). Water Quality Management Policies and Strategies for South Africa. Report No. 3.2. Integrated Water Quality Management Strategy. Edition 2. Water Resource Planning Systems Series, DWS Report No.: 000/00/21715/16. Pretoria, South Africa.
- International Fund for Agricultural Development (IFAD). (2011). Managing for Impact in Rural Development. A Guide for Project M&E.
- Pollard, S., Du Toit, D. & Biggs, H. (2011). River management under transformation: The emergence of strategic adaptive management of river systems in the Kruger National Park, *Koedoe* 53(2), Art. #1011, 14 pages.
- Presidency. (2007). Policy Framework for the Government-wide Monitoring and Evaluation System. Page 5.

Public Service Commission (PSC). (2008). Basic Concepts in Monitoring and Evaluation. February 2008. RP: 14/2008.