Exploring the challenges and opportunities for compliance monitoring and enforcement within the South African water sector

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PREFACE AND ACKNOWLEDGMENTS

Firstly, I want to thank my saviour Jesus Christ for giving me the opportunity, ability and wisdom to pursue my studies. This was once a dream but now a reality that even a young woman like me can say all things are possible through Christ who gives me the strength and ability.

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ABSTRACT

In the pursuit to realise sustainable management and supply of water to all citizens, the government of South Africa is guided among others by Chapter 2 of the Constitution of South Africa, the National Water Act of 1998 (NWA) and the National Water Resource Strategy-3 (NWRS-3). The NWRS-3 is a legal instrument that is responsible to enact the NWA providing a framework to ensure the responsible utilisation of the country's water resources (DWS, 2023; Mamokhere, 2022; Molobela & Sinha, 2011). The NWRS-3 also provides measures to ensure that the Department of Water and Sanitation (DWS) fulfils its legal mandate of protecting, using, developing, managing and controlling these water resources in the best interest of the public (DWS, 2023). The strategy further makes provision for objectives, actions and measures of the Minister which must be implemented to regulate the water sector in the country to achieve the purpose of the NWA. One such example is the administrative system for the authorisation of water use, which aims to regulate the sustainable use and distribution of water within the sector. These water use authorisations (WUAs) are supported by compliance monitoring and enforcement (CME) which is a mechanism to ensure compliance through the monitoring of performance in line with prescribed WUA conditions. Ultimately, the goal of CME is to restrain any unlawful practices which may compromise the quality and quantity of our water resources in the country (DWS, 2023; Schreiner *et al*., 2011). For this reason, the DWS relies on CME which forms an integral part of the environmental management framework in South Africa by strengthening the regulatory functions to improve compliance and enforcement related to WUAs (DWS, 2023).

However, international literature suggests that several challenges exist when it comes to CME (Edo *et al.*, 2022; Wilson *et al*., 2011). The challenges range from the duplication or overlapping of functions between government departments; the lack of political will to make good decisions as well as insufficient funding and resources that impact negatively on the regulatory sector (Ambituuni *et al*., 2014; Belal *et al*., 2015; Prasetyaningsih *et al*., 2022). Within the South African context, similar challenges have been observed in the broader environmental management sector and are related to the insufficient capacity and training; shortcoming in the quality of environmental authorisations and ineffective regulation (Carden & Armitage, 2013; Kotzé, 2006; Weston & Goga, 2016;). With this in mind, the aim of this research was to explore the challenges and opportunities for compliance monitoring and enforcement in the South African water sector, with specific reference to the WUAs.

To achieve the aim of the research, a qualitative research approach was adopted and supported by semi-structured interviews of 20 participants within the field of CME within DWS (head office

in Pretoria). Three open-ended questions were directed to the participants to distil the challenges, opportunities and how the challenges related to CME within the water sector may be overcome. A thematic analysis method was applied to identify and analyse patterns of meaning from the responses. A summary of the key challenges includes insufficient skills, knowledge and interpretation inconsistencies of the NWA and related environmental legislation by CME officials and affected stakeholders, communication barriers between CME officials and relevant stakeholders and undefined roles and responsibilities between the CME units at head office and regional offices. A summary of the opportunities includes stakeholder engagements through forums and workshops; conducting inspections/investigations creates a regulatory awareness among water users and the Environmental Management Inspectors (EMIs) power to carry a criminal docket enabling EMIs to investigate a potential environmental crime and gather evidence to present to the National Prosecuting Authority (NAP), speeds up the process and number of cases handed over for prosecution.

These challenges may be overcome by promoting capacity building and training awareness in the water sector; consistent communication between CME units and relevant stakeholders and improving inspections/investigations through collaborations with relevant stakeholders to increase CME awareness and actions. With some context-specific differences, it is evident that the results related to CME challenges and opportunities experienced in the South African water sector are similar to those of international case examples.

Based on the research results, the following key recommendations are proposed which may assist the DWS to improve the overall effectiveness of CME within South African water sector in relation to WUAs. The first recommendation is that the DWS includes the promotion of continuous training and awareness within the CME units and the water sector. Secondly, to ensure consistent communication between the relevant officials and affected stakeholders. Thirdly, to clearly define roles and responsibilities within the CME head office and regional offices and finally, to direct budget and resources to CME.

Keywords: compliance monitoring, enforcement, challenges, opportunities, water sector

ABBREVIATIONS AND ACRONYMS

CD	Chief Directorate
CME	Compliance Monitoring and Enforcement
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
ECMS	Enforcement Compliance Management System
ELUs	Existing Lawful Uses
EMIs	Environmental Management Inspectors
EMP	Environmental Management Plan
GAs	General Authorisations
HDI	Historically Disadvantaged Individual
IFRA	Intergovernmental Framework Relations Act
MoU	Memorandum of Understanding
NCIMS	National Compliance Information Management System
NDP	National Development Plan
NEMA	National Environmental Management Act
NWA	National Water Act
NWRS-3	National Water Resource Strategy - 3
PAJA	Promotion of Administration of Justice Act
PPE	Personal Protective Equipment
SAPS	South African Police Service
SDGs	Sustainable Development Goals

SEMAs	Specific Environmental Management Acts
SFRA	Streamflow Reduction and Afforestation
SMEs	Small and medium enterprises
SOPs	Standard Operating Procedures
TA	Thematic Analysis
WUAs	Water Use Authorisations
WUCME	Water Use Compliance Monitoring and Enforcement
WWTWs	Wastewater Treatment Works

KEY DEFINITIONS

Compliance monitoring: a way of conserving natural resources to manage and regulate human development and its impacts thereby protecting the environment, support socio-economic development, and promote environmental justice (Prasetyaningsih, 2022; Root, 2009). This may be achieved by complying to the legal and regulatory requirements, practices and internal policies, norms, and standards.

Enforcement: a tool to promote compliance to environmental laws and legislations such as regulations, norms and standards and ensures that preventative or remedial actions is taken to protect the environment or to secure compliance with a regulatory system (Shimshack & Ward, 2008; Tosun, 2012).

Sustainable development: development that ensures the needs of the current generation are met without jeopardising the future generations to meet their own needs with the expectation to promote accountability, transparency and efficiency while preserving humankind and the natural environment (Harris, 2000; Van Vuuren *et al*., 2022).

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CHAPTER 1 INTRODUCTION

1.1 Background

Environmental degradation has led to negative impacts and severe pressure on the environment threatening its survival (Pederson, 2018; Prakash & Verma, 2022). To ensure the survival of our natural resources are not exploited, the concept of sustainable development was introduced. The concept of sustainable development entails that the current generation's needs are met without jeopardising the future generations to meet their needs (Harris, 2000; Lele, 2013; Van Vuuren *et al*., 2022). Sustainable development is expected to promote accountability, transparency, and efficiency while preserving humankind and sustaining our environment (Hariram *et al*., 2023; Kardos, 2012).

Sustainable development is based on development, needs and future generations (Tomislav, 2019). It focuses on the environmental aspect to influence economic activities and people's quality of life, social aspect that promotes human rights, cultural diversity or race and religion and economic aspect to maintain the social and human capital for income and standards (Tomislav, 2019). The integration of these three aspects provides for a steady and overarching approach so that issues such as natural resources for energy, employment, food security and basic health are addressed in future developments (Du Plessis, 2008, Harris, 2003; Purvis *et al*., 2019; Redclift, 2005; Theil, 2019).

In advancing a sustainable future, the United Nations General Assembly adopted 17 Sustainable Development Goals (SDGs) in September 2015 (Liszbinski *et al*., 2023). The intension of these goals was to promote environmental management and developments that were responsible and sustainable in an environmental and socio-economical way (Liszbinski *et al*., 2023; Fonseca *et al*., 2020). A total of 193 UN member states committed to adopt and implement these goals at a national level that guides specific focus areas, policies, regulations, financing, programs, awareness campaigns and activities with the aim of achieving its deliverables (Huan *et al*., 2021; Pederson, 2018). Targets and indicators support these goals to promote integrated national planning and reporting until 2030 with continuous reviews of progress at a regional, national, and global levels being performed (Glass & Newig, 2019; UN, 2015). Countries that are performing well in achieving its SDGs are Sweden, Denmark and Norway, while African countries are struggling with poverty, malnutrition and limited opportunities to an adequate living condition and are unable to meet these goals due to the socio-economic impacts it faces (Bali Swain & Yang-Wallentin, 2020).

South Africa as a member state in the United Nations Assembly, has adopted the SDGs and closely aligned and addressed at least 74% of its SDG targets to the National Development Plan (NDP) (Stats SA, 2019). The NDP is the fundamental policy to ensure that the government fulfils its obligations related to the planning, implementation, identifying and monitoring of these goals under the ambit of focus areas, policies, regulations, financing, programs, awareness campaigns and activities to be executed (Commission, 2013; UN, 2015). The NDP is further committed in achieving a minimum standard of living for all citizens of the country through the progressive implementation of key elements for a decent living standard and include amongst others, water and sanitation (Commission, 2013). These two elements are directly linked to SDG 6 which promotes the sustainable management and supply of water and sanitation to all human beings. In pursuit to realise the SDG 6, the NWA give effects to Section 24 of the Constitution of South African thereby enacting Chapter 2 of the NWA to promote the development of the National Water Resource Strategy to ensure effective management of the water resources for our future generations, the protection of the water resources and to meet international obligations and socio-economic development. The NWRS-1 was published in 2004 followed by the NWRS-2 (2013) and the latest NWRS-3 (2023) sets out the objectives, actions and measures of the Minister which must be implemented to regulate the water sector in country to achieve the purpose of the NWA as well as the national government's development objectives. (DWS, 2023; Molobela & Sinha, 2011; UN, 2015).

The strategy provides the Department of Water and Sanitation (DWS) the opportunity to protect, use, develop, manage and control these water resources in a sustainable and equitably manner (DWS, 2022/2023). It indicates that strategic objectives and actions must be implemented for the regulation of the water and sanitation sector in the country. In doing so several administrative systems in the form of water use authorisations (WUAs), have been implemented to ensure and regulate the sustainable distribution of water within the sector and may include water use in terms of Schedule 1 of the National Water Act of 1998 (NWA); general authorisations (GAs); existing lawful water use (ELUs) and water use licences (WULs). These WUAs are supported by compliance monitoring and enforcement (CME) of the approximately 55 000 registered water users which include the monitoring of performance in line with prescribed licence conditions, standards and norms and the undertaking of enforcement actions (penalties, fines) to restrain unlawful practices which may compromise the quality and quantity of our water resources (DWS, 2023). For this reason, the DWS relies on CME which essentially forms an integral part of the environmental management framework in South Africa by strengthening the regulatory functions to improve compliance and enforcement related to WUAs (DWS, 2023).

1.2 Problem statement

Compliance monitoring and enforcement are seen as mechanisms used to conserve, manage and regulate human development on the natural environment, ensuring minimal environmental impact (Kotzé, 2009; Prasetyaningsih, 2022). It may be described as the implementation of processes and procedures to achieve a status of compliance to environmental laws to ensure the state of conformity with legally enforceable documentation, such as acts, regulations, and authorisations (Brown, 2017; Brown, 2022; Fitzmaurice, 2018; Friesen, 2003). Evidence suggests that as early as the 1970s, the concept of CME was seen as an effective policy-based instrument that resulted in increased compliance and has also improved environmental performance (Cohen, 2000; Epple & Visscher, 1984).

Within environmental management practices, conducting post-decision activities such as monitoring, auditing, follow-up and enforcement actions are vital in the achievement of sustainable development (George *et al*., 2020; Marshall *et al*., 2005). However, international literature suggests that several challenges exist related to post-decision CME, especially with the implementation thereof, which ultimately leads to negative impacts on the environment (Ambituuni *et al*., 2014; Belal *et al*., 2015; Prasetyaningsih *et al*., 2022). Some of these challenges include duplication or overlapping of functions between government departments; lack of political will to make good decisions and insufficient funding and resources that impact negatively on the regulatory sector (Ambituuni *et al*., 2014).

Within the South African context, similar challenges have been observed in the broader environmental management sector and are related to insufficient capacity and training, shortcomings in the quality of environmental authorisations and ineffective regulation (Carden & Armitage, 2013; Kotzé, 2006; Weston & Goga, 2016). Similarly, anecdotal evidence suggests that CME challenges are present within the water sector, specifically related to WUAs (CER, 2012; Schreiner, 2013). This being said, limited empirical research has been conducted to understand these challenges as well as the associated opportunities for CME within the water sector with reference to WUAs. Therefore, this research aims to explore those challenges and opportunities for CME within the South African water sector in relation to WUAs, including how these challenges maybe overcome.

1.3 Research aim and objectives

In view of the problem statement, the aim of this research is:

- To explore the challenges and opportunities for compliance monitoring and enforcement of within the South African water sector in relation to WUAs.

1.4 Scope of the research

The scope of the research only includes the challenges and opportunities as well as how to overcome these challenges for CME within the South African water sector. This research will specifically focus on the main implementors of CME as required by the NWA within the water sector, namely the DWS. The research only includes information obtained from relevant officials that perform CME functions within the Directorate Compliance Monitoring and Enforcement situated at the national offices in Pretoria, Gauteng Province. More information and the reason for selection regarding the number of participants is discussed under the methodology section in Chapter 3. Officials fulfilling CME functions at a regional level or catchment level (i.e. Proto or Catchment Management Agency) were not participants in the research. The research excludes any other form of CME functions related to the Water Services Act, 1997 and environmental authorisations under any of the remaining specific environmental management acts (SEMAs).

1.5 Assumptions and limitations

Limitations in research are potential weaknesses that cannot be controlled by the researcher and may include for example, financial constraints and access to human participants (Theofanidis & Fountouki, 2018). Ultimately, limitations can impact on the end results and conclusion of the research and therefore should be acknowledged by the researcher (Theofanidis & Fountouki, 2018). The limitations in this research included the unavailability of certain stakeholders invited to participate in the semi-structure interviews due to prior commitments or unwillingness to comment on potential sensitive information. In order to overcome these limitations, the researcher made appointments with willing participants well in advance and assured anonymity of stakeholders involved.

1.6 Potential contribution of the research

The research contributes to the broader discussion on CME within the environmental management sector in South Africa. Moreover, it specifically contributes to the discussion on CME within the South African water sector by providing new and up-to-date insights on the challenges faced by the DWS in CME as they relate to WUAs. Finally, the researcher believes that the proposed recommendations may improve and promote a more effective CME regime within the South African water sector.

1.7 Structure and outline of the dissertation

Chapter 1: Introduction

Chapter 1 provides an introduction to the research. It describes the background to the research the problem statement and the research aim to be achieved. It further indicates the scope of the research and outlines the potential contribution to existing literature. The chapter concludes with the limitations experienced during the research and provides for the structure and outline of the dissertation.

Chapter 2: Research Methodology

Chapter 2 provides an overview of the methodology applied to the research. It describes the research approach, data collection, selection of participants, data analysis and ethical considerations associated with the research.

Chapter 3: Literature Review

Chapter 3 focuses on the existing literature with reference to the research aim. It includes a discussion on CME within an international and national context and provides an overview of the legal framework for CME within South Africa. The chapter also outlines the CME structure within DWS and reflects on CME in the South African water sector.

Chapter 4: Results and Discussion

Chapter 4 provides for the interpretation, analyses, and discussion of the research results obtained from implementing the described methodology.

Chapter 5: Conclusion and Recommendations

Chapter 5 concludes the dissertation and provides the main conclusions and recommendations deducted from the results.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

In line with the aim of the research, Chapter 2 provides an overview of the concepts of CME, including an overview of CME on an international and national level, the legal framework for CME and the institutional structures for CME within the DWS. In doing so, Chapter 2 aims to assist in highlighting the challenges and opportunities experienced on an international level to CME in the broader context simultaneously providing an overall view on a national level. The literature review provides examples of developed and developing countries from different sectors of the challenges and opportunities are experienced within compliance monitoring and enforcement functions. Chapter 2 further explains the overarching environmental framework relating to CME within the South African water sector with reference to WUAs then focusing on the responsible authority to enact the CME functions in the country. Finally, the literature review shows how the examples in the broader context associates to exploring the challenges and opportunities within the South African water sector in relation to the WUAs.

2.2 Defining the concepts of compliance monitoring and enforcement

Prior to discussing compliance monitoring and enforcement within an international context, it is vital to understand the different components which the concept consist of that being; (i) compliance monitoring and (ii) enforcement. In chapter 1, the concept of CME is provided as an overview within environmental management in South Africa, however, the CME concepts defined within this section provides for a more detailed understanding of its functions and operations. e following sections provide an overview of the challenges and opportunities CME has experienced on both international and national levels.

- **Compliance monitoring** is understood as efforts to ensure and adhere to the legal and regulatory requirements, practices and internal policies, norms, and standards (Prasetyaningsih, 2022; Root, 2009).

- **Enforcement** is regarded as an instrument to implement actions in the form of a fine or imprisonment, or directives, notices or court order to ensure preventative or remedial action is taken to protect the environment or to secure compliance with a regulatory system (Shimshack & Ward, 2008; Tosun, 2012).

The following section will provide an overview of the challenges and opportunities from both an international and national perspective in developing and developed countries within the CME regulatory regime.

2.3 Compliance monitoring and enforcement within an international context

The following sections provide an overview of the challenges and opportunities observed within the CME practices from an international perspective and provides an insight to the experiences from seven different countries around the world.

2.3.1 Challenges observed in compliance monitoring and enforcement

The following section will provide an overview of challenges experienced in the regulatory regime and practices in relation to compliance monitoring and enforcement, commencing with examples from developed countries and then moving on to developing countries. The intent of the examples provides an overarching insight to the challenges being experienced among the different countries and sectors within regulatory regime. In doing so, these examples give an overview of the challenges to CME where similar findings have also been identified within South African regulatory regime.

A summary of the challenges related to CME is provided in Table 2.1 below.

- *Australia*: Non-compliance to environmental legislation can increase harm to the environment and weaken sustainable resources such as depleting water resources. This is evident in the study conducted in two water management areas in different catchments in Queensland Australia where water users were not complying to regulations within the irrigation sector (Greiner *et al*., 2015). The findings showed there was insufficient knowledge and understanding of the WUA; there was unequal distribution of water rights among historically disadvantaged individuals (HDIs) which resulted in access water being taken; government officials did not conduct frequent and follow-up inspections which was attributed to a high staff turnover and penalties and fines were not high enough to deter transgressors (Greiner *et al*., 2015).

- *United States of America*: The planting of cannabis plants is transitioning from an illegal to regulated drug. In doing so, regulations must be implemented to control the production and environmental impacts (Bodwitch *et al*., 2021). During the regulating process non-compliant farmers faced barriers to being compliant. Many farmers felt the incentives from government were too weak to motivate compliance; the cost of acquiring a permit was too high and unaffordable for smaller farmers; some farmers complained that the government did not provide clear and accurate information on the regulations which contributed to the lack of compliance. Respondents felt there were insufficient communication between

government agencies which contributed to inconsistencies to implement the regulations among the farmers.

- *United Kingdom:* Small and medium sized enterprises (SMEs) have the potential to induce collective impacts on the environment (Wilson *et al*., 2011). A study investigating the effectiveness of environmental legislation and compliance to it on United Kingdom SMEs showed SMEs had poor understanding of environmental legislation as it was not easy to understand; there were insufficient compliance promotion by regulators increasing the lack of awareness to compliance; inspections were inconsistent and uncoordinated with limited reference to the previous visits; a lack of engagement with the regulator; significant amount of environmental legislations by several government departments creates administrative burdens and insufficient engagement with the regulator contributed to lack of awareness of how environmental legislation was enforced (Wilson *et al*., 2011).

- *Peru*: Environmental regulations have failed in the artisanal and small-scale gold mine sector to deter the illegal practices of gold mining in Madre de Dios in the Peru region. In doing so, the following challenges were identified to provide an ineffective CME as there were limited human resource allocation on the ground dedicated to taking enforcement actions against transgressors; insufficient resources (such as vehicles and equipment) to carry out the CME actions from one area to the next; deficient budgets for logistics leading to insufficient availability of resources (such as boats, cell phones and vehicles) to conduct monitoring and the lack of collaboration among other environmental agencies since multiple sectors and levels of government had different mandates to enforce CME functions which prevented the them from achieving the desired goal of enforcement of actions (Espin & Perz, 2021).

- *Nigeria*: The petroleum sector in Nigeria is known to be one of the leading sectors in the country contributing to the foreign exchange and government revenue yet in the same instance has become the most threatening to the environment (Edo *et al*., 2022). This industry has failed to consider responsible business behaviour and adopt environmental regulations leading to the exploitation of legal constraints; conflicts on how the constitution and environmental legislations should be applied to environmental issues and which officials are responsible to enforce compliance enforcement (Edo *et al*., 2022). The wording in legislation has led to different interpretations creating ambiguity making it difficult to apply, overlapping of functions between different government institutions have created many institutions dealing with the same issue while environmental laws are not stringent enough to prosecute offenders. Institutional officials have limited skills, training, resources and technology to perform their duties contributing to the inadequacies of CME

practices. Furthermore, political will to make the right decisions, lack of community involvement to participate in decision-making, inadequate funding to acquire resources and the lack of good governance to enforce legislation exacerbates the weaknesses in compliance monitoring and enforcement.

- *Kenya*: The Kenya government has faced many challenges within the water sector. The study examines the literature, reports and previous studies on Kenya's water sector to show these challenges to include the interrelationships between the environmental, social and economic aspects. These challenges reflected on the operational and maintenance of the water supply facilities. The following challenges were highlighted: limited skills and shortage of equipment that hindered the functioning of the facility; inadequate funding of water conservation measures leading to slow decline in water quality and quantity of the water resources resulting in the failure to maintaining facilities and reservoirs which increased operating and maintenance costs and treatment of water; low social acceptance of projects and interventions of the facilities as communities were not initially involved in the stakeholder engagements of these projects; and conflicts between upstream and downstream water users led to rivalries for water uses such as irrigation, livestock and hydropower (Chepyegon & Kamiya, 2018).

- *Sudan*: The study focused on reviewing and examining the existing legal and institutional framework in Sudan relating to its sustainable management in the oil and gas industry to determine if the regulatory framework is environmentally and socially responsible (Abdalla *et al*., 2013). In terms of the regulatory framework short comings in this area showed regulations are incomplete, unclear, unprecise and not updated with recent environmental issues. Confusion of responsibilities and mandates between government agencies have led to inefficient coordination and corporation between institutions. The inadequate human and financial capacity have led to insufficiently skilled officials to conduct monitoring and enforcement of legislation. Limited public participation and awareness among local communities have discouraged their decision-making in the sector and reduced the awareness of their environmental rights.

- *Bangladesh*: Increased globalisation and industrialisation in Bangladesh have impacted negatively on the natural environment by exploiting environmental regulations in the pursuit of economic growth (Belal *et al*., 2015). The high demand of products has resulted in high level of ground water extraction, water pollution of untreated wastewater into major rivers poisoning of fish stock in the city of Dhaka (Hoque, 2011; Matin 1995). Unfortunately challenges in the sector has led to a weak compliance and enforcement to regulate these industries. The challenges included the lack of concern by the corporate sector in

improving the environment; the cost of an effluent plant is too high to operate and therefore not feasible to the sector; the government sector has limited officials with skills and knowledge to conduct compliance monitoring inspections; the presence of high levels of corruption and lack of political will in government to implement legislation; the lack of an integrated approach and weak institutional arrangements between government departments to enforce regulations; there is limited public awareness to regulations which leads to inadequate compliance by affected stakeholders and a resistance to reform and change towards responsible environmental practices (Belal *et al*., 2015).

- *Ghana*: The impact of gold mining in Ghana has increasing environmental degradation. A study was conducted to understand the challenges in the mining sector from the perspectives of stakeholders (Tuokuu *et al*., 2018). The implementation of environmental policies is facing many challenges in the sector. These challenges include the lack of community participation being part of the decision-making process of policies increases the lack of knowledge and awareness of community members; insufficient coordination among government departments resulting in overlapping of regulations and conflicting roles in the sector creating inconsistencies and duplication of work; inadequate skilled staff and resources (motorbikes and vehicles) to monitor and enforce the law on the ground and lack of political will to enforce environmental policies (Tuokuu *et al*., 2018).

Table 2.1: A summary of challenges in CME from an international perspective

Country	Sector	Challenges in relation to CME	Reference
Developed countries			
Australia	Irrigation sector	• Insufficient knowledge and understanding of the WUA. • Unequal distribution of water rights among HDIs. • Lack of inspectors to conduct follow-up inspections. • Ineffective penalties for contraventions.	Greiner *et al*. (2015)
United States	Agricultural sector	• Insufficient, unclear and inaccurate information from the government. • Unfair treatment by government officials. • Limited engagements with regulatory officials. • Weak incentives and high costs to comply to legislation.	Bodwitch *et al*. (2021)
United Kingdom	Small and medium enterprises	• Poor understanding of environmental legislation as it was not easy to grasp. • Insufficient compliance promotion by regulators. • Inspections were inconsistent and uncoordinated with limited reference to the previous visits. • Lack of engagement with the regulator. • Significant amount of legislations created administrative burdens. • Insufficient engagement with the regulator contributed to lack of awareness of legislation.	Wilson *et al*. 2011
Developing countries			
Peru	Small scale mining sector	• Limited human capacity and resources. • Deficient budgets for logistics. • Lack of collaboration among other environmental agencies.	Espin and Perz (2021)
Nigeria	Petroleum sector	• Overlapping and duplication of functions. • Lack of cooperation and incapacitation between environmental agencies. • Lack of human capacity and budget. • Bureaucratic nuances. • Lack of political will and interferences. • Limited community engagement on regulatory processes.	Edo *et al*. (2022)

Country	Sector	Challenges in relation to CME	Reference
Kenya	Water supply facilities	• Limited skills and resources. • Inadequate budget for water conservation. • Lack of stakeholder engagements to understanding the projects. • Conflicts between water users.	Chepyegon and Kamiya (2018)
Sudan	Oil and gas sector	• Confusion with the roles, responsibilities and mandates in government departments. • Ineffective follow-up inspections, poor coordination and cooperation between the departments. • Unclear, incomplete and not up-to-date regulation. • Lack of coordination and corporation between institutions. • Insufficient human and financial resources. • Lack of public participation.	Abdalla *et al*. (2013)
Bangladesh	Manufacturing sector	• Lack of concern by the corporate sector in improving the environment. • High cost towards compliance. • Limited skilled officials. • High level of corruption between government and private sectors to implement legislation. • Lack of an integrated approach and weak institutional arrangements. • Resistance to reform and change towards responsible environmental practices.	Belal *et al*. (2015)
Ghana	Mining sector	• Lack of community participation in decision-making. • Inadequate knowledge and awareness of community members. • Insufficient coordination among government departments. • Overlapping of regulations and duplication of work. • Inadequate skilled staff and resources to monitor and enforce the law. • Lack of political will to enforce environmental policies.	Tuokuu *et al*. (2018).

2.3.2 Opportunities observed in compliance monitoring and enforcement

The following section provides an overview of the CME practices applied to strengthen the regulatory regime. Over the years, environmental management has moved from a reactive to a proactive approach by putting measures not just to cope with environmental crises but also to anticipate and implement measures to reduce its negative impacts to the environment (Rondinelli & Berry, 1997).

The following are examples of approaches and practices that have enhanced the CME regime in both developed and developing countries. A summary of the opportunities in relation to CME is provided in Table 2.2 below.

- *United States of America*: Air pollutants have a serious impact on health conditions. Monitoring and enforcement of regulations ensures regulatory actions are implemented to control air emissions. The implementation of regulatory actions provides for a progressive and efficient CME behaviour that is contributing to the improving the status of compliance to environmental laws. Regulatory actions in the form of inspections include conducting site visits, interviews, taking samples and verifying reports while enforcement include warning letters, penalties and criminal prosecutions against transgressors (Gray & Shimshack, 2011). A study investigating how CME practices impacted on air pollutants in California showed specific deterrence (inspections, penalties or fines) had a direct impact of a regulatory action on a regulated facility while general deterrence had an indirect spillover impact of a regulatory action on other facilities that was not subjected to regulatory actions (Lim, 2016). In other words, facilities that underwent direct CME actions had a ripple effect on other facilities, reducing the impact of air pollutants.

- *Canada*: Small non-community drinking water systems in Ontario, Canada provide water to the public for recreational use or restaurants that are not supplied by the municipality (Pons *et al*., 2019). These operators undergo inspections to ensure compliance with legal requirements. The study shows that public health inspectors found that maintaining good relationships between operators and regulators through educating and explaining the legal requirements to operators increased compliance. Furthermore, formal and informal training through workshops, forums and meetings between inspectors and operators promoted information sharing on experiences and difficulties within the sector providing confidence to inspectors when carrying out their duties. Inspectors also felt conducting frequent inspections would be beneficial through the appointments of more officials.

- *China*: Urbanisation and industrialisation have increased environmental issues in China affecting human health and surrounding environments (Lyu & Yang, 2024). China has initiated solutions to strengthen environmental governance and responsibility. Establishing a monitoring institution to ensure transparent environmental monitoring. Inspection teams to conduct on-site inspections with the involvement of the public to enforce regulations. New types of technology to improve monitoring and availability of data for an effective enforcement to regulations and assist government capacity. Improving public engagement in environmental awareness on different platforms will increase their role in CME. Improving future research (such as climate change) has the potential to advance the public and private sectors in environmental governance.

- *Mexico*: In Mexico, an analysis was conducted in the manufacturing sector to understand why environmental performances varied when regulations were weak and how effects of a strong regulatory performance can achieve better environmental performance. Some of the results concluded implementing environmental procedures increased environmental performances, environmental training to staff effective in developing environmental specialists and managers, compliance inspections and enforcement ensured cleaner facilities and facilities with skilled workers had better environmental management and performances (Dasgupta *et al*., 2000).

- *India*: Stakeholder engagements is regarded an effective tool to identify conflicts, root causes and constraints while contributing to policy making and influencing future conflicts within the regulatory regime. This is evident in the rural community of Punjab whereby partnerships of the multi-stakeholder and community engagements were crucial in implementing high compliance with a tobacco control programme or smoke free law in public areas (Ravindar *et al*., 2016). The collaboration between the stakeholders promoted public awareness through workshops, rallies, seminars, and mass media, which created successful relationships between administration and non-profit organisations that worked together towards compliance.

- *Malaysia*: Industrial pollution is fast rising due to the activities within the manufacturing sector. While the sector contributes significantly to the country's economy, wastewater from industry, domestic and commercial activities are polluting the rivers (bin Nawawi *et al*., 2022). The study examined the effectiveness of formal and informal regulations of compliance behaviour in the sector. Results of the study concluded formal regulations through inspections, fines and penalties influenced the compliance behaviour of facilities while those that failed to comply with regulations expected more visits from the regulatory authorities. Informal regulation such as the market pressure, community engagement,

competitors and investors have the potential to impact on the sector's compliance level and behaviour contributing to an effective CME practice (bin Nawawi *et al*., 2022).

Table 2.2: A summary of opportunities in CME from an international perspective

Country	Sector	Opportunities in relation to CME	Reference
Developed countries			
USA	Industry/Manufacturing sector	• Compliance inspections promote a general deterrence improving compliance performance. • Specific deterrence (penalties and fines) reduces air pollution emissions. • Specific deterrence has a direct impact of regulatory action on a regulated facility. • General deterrence has an indirect impact on regulatory action on facilities not subjected to regulatory actions.	Gray and Shimshack (2011) Lim (2016)
Canada	Manufacturing sector	• Good relationships between operator and regulator increases compliance. • Promoting training through workshops, forums and meetings increases information sharing on experiences and difficulties. • Capacity building provides confidence to inspectors when carrying out their duties.	Pons *et al*. (2019)
Developing countries			
China	Industry sector	• Establishing monitoring institutions can ensure transparent environmental monitoring. • Conducting inspections with public involvement can enforce regulations. • New types of technology can improve monitoring and availability of data. • Improving public engagement through environmental awareness will increase their role in CME. • Improving in future research can advance environmental governance.	Lyu and Yang (2024)
Mexico	Manufacturing sector	• Training personnel in CME were effective. • Adapting internal environmental procedures increased performances. • Inspections and enforcement actions achieved cleaner facilities. • High-educated personnel increased environmental performances.	Dasgupta *et al*. (2000).
India	Industry sector	• Collaboration promotes public awareness through workshops, rallies, seminars and mass media creating successful relationships between stakeholders.	Ravindar *et al*. (2016).
Malaysia	Manufacturing sector	• Implementing CME actions (inspections, fines and penalties) influences compliance behaviour. • Market pressure, community engagement, competitors and investors can impact on the sectors compliance level and behaviour.	bin Nawawi *et al*. (2022).

2.4 Compliance monitoring and enforcement within a national context

The following section will provide an overview of CME highlighting the challenges and opportunities within a national environmental context. It will further explain the legal framework, institutional structures and overview of the annual CME reporting from 2020/2021 to 2022/2023 within the South African water sector in relation to the Department of Water and Sanitation as the custodian of the country's water resources.

2.4.1 Challenges observed in compliance monitoring and enforcement

The following section will provide an overview of challenges experienced with the South African regulatory regime.

Strategic review of the current emerging governance system relating to water in the environment of South Africa highlights fundamental challenges to improving good water governance in South Africa (Pegram *et al*., 2006). These include the lack of stakeholder involvement in the participation of the water resource management has potential to irrupt tensions between the various institutions and contribute to inefficiencies in the planning and management of the water sector. Changes with the institution coupled with high staff turnover has resulted in negative impacts on service delivery. Poor communication and sharing of information between managers and officials contribute to inadequate decision-making and poor relationships between the officials concerning similar situations. Limited financial resources to carry out goals within the government.

Compliance monitoring and enforcement is an important component to ensure an effective, successful and sustainable management of the environment. However, there are challenges to the regulatory regime such as fragmentation, over-bureaucracy and capacity constraints that hampers an efficient CME practise (Kotzé, 2009). Legislative, institutional and inter-sectoral fragmentation has led to government departments performing a regulatory function with different laws for a similar issue creating confusion of roles and responsibilities and duplication of functions (Kotzé, 2009). Over-bureaucracy or over burden of administration procedures and red tape have contributed to excessive government spending, abuse of power, lack of accountability, irrational decision-making and inefficiencies within CME. Capacity constraints due to the inadequate human and financial capacity resources has escalated the need for skilled and experienced officials. Officials leaving the department either resigning or through promotion has created gaps in skills transfer and the inability to identify the relevant officials within the department due to new staff turnover. This has promoted the lack of communication, corporation and coordination between departments resulting in officials working in silos.

The need to address water security is increasing and discussions among various stakeholders, namely civil society, academia and government, have identified several challenges (Naidoo *et al*., 2016). There is a lack of communication and involvement of stakeholders and communities to ensure the good management of water resources, including the establishment of transparency and trust. Inadequate skills and technical capacity as officials are leaving the sector coupled with officials working in silos as officials prevents information sharing and limited knowledge and awareness around sustainable water use. Gaps in expanding scientific and technical knowledge causes delays in updated and new water security interventions. Insufficient engagement and regulation of larger water users such as industries weakens the CME sector.

The practice of corporative government among municipalities within intergovernmental relations and procedures to settle disputes has become a challenge (Malan, 2005). These challenges included the lack of compliance by municipalities for reasons such as ignorance; insufficient capacity of experienced staff and data systems has negatively impacted on the performance of CME functions and increased corruption in service delivery resulting in escalating job losses, unavailability of drinking water and polluted rivers (Haigh *et al*., 2010; Thornhill, 2014). This coupled with litigation between governments, has placed detrimental impacts on the water sector and impacted negatively on compliance and enforcement practices.

The redistribution and inequitable allocation of water among the HDIs is believed to have contributed to a lack of compliance to water legislation. Historical disadvantaged individuals do not have the resources to comply to a WUA, experience limited mobility in rural areas with high transport costs, illiteracy and limited legal literacy increases challenges to CME (Denby *et al*., 2016; Koppen & Schreiner, 2014). Therefore, the proposal to issue small-scale farmers with a general authorisation is expected to alleviate administrative burdens, especially in areas with sufficient water resources for low impact water uses (Koppen & Schreiner, 2014). However, deficiencies such as human resources and administrative burdens to issue the WUA are challenges to the process (Anderson *et al*., 2007; Denby *et al*., 2016; DWS, 2023).

The Existing Lawful Use was implemented to prevent negative impacts on the economy through a transition period of the Water Act, 1956 to the NWA, 1998 when water users were able to continue with their water use lawfully two years before the enactment of the NWA, 1998 (Anderson *et al*., 2007). This being said, compulsory licensing was regarded as a management tool to provide sustainable water use and improve water access to those who did not have sufficient access (Kidd, 2016). Therefore, the process of compulsory licensing (provided for in section 43 of the NWA) sought to monitor the current availability of water quantity and quality to give the existing and potential water users opportunities to apply for a WUA as regulated water user (Anderson, 2007). However, flaws such as the administrative burdens to issue and monitor

the WUA with limited human, skilled and resource capacity were seen as challenges to the process (Anderson, 2007; Denby *et al*., 2016; DWS, 2023).

South Africa is regarded has having an efficient legal environmental legislation (Chauhan, 2020; Davids, 2020). This being said, the prosecution of environmental crimes faces challenges to compliance and enforcement due to insufficient resources, human capacity, and skills to enforce environmental law (Chauhan, 2020; Davids, 2020). It is explained that these inefficiencies may be the result of limited education, training and awareness of prosecutors, judiciary and agencies to ensure the effective prosecution of offenders. Furthermore, the overburden of proving reasonable doubt in criminal convictions to environmental crimes takes years and becomes extremely costly to imprison transgressors (Chauhan, 2020).

2.4.2 Opportunities observed in compliance monitoring and enforcement

The following section will provide an overview of opportunities experienced with the South African regulatory regime.

Establishing compliance and enforcement is important to ensure effective and sustainable regulatory regime and successful environmental governance (Kotzé, 2009). It is necessary to strengthen communication (such as staff updates, meetings); ensure continuous capacity building and awareness training among the public and private sectors and improve public participation initiatives within the environmental sector.

The fishing industry in South Africa has been struggling with non-compliances, such as illegal fishing and to improve CME key strategies were implemented (Hauck & Kroese, 2006). Establishing an investigation unit for specific marine crimes in collaboration with other government agencies is an example of one of these key strategies. Promoting joint investigations between public and private sectors increased network of expertise for communication, information and resource sharing (boats, vehicles, capacity). With the establishment of the first environmental court in South Africa in February 2003 offenders were prosecuted and punished to raise support to law enforcement agencies and create deterrence for future offenders. The corporation between regional and international stakeholders as a result of joint operations increased capacity ensured CME actions were effective through multi-lateral partnerships.

To improve biodiversity offsets with the regulatory regime in South Africa the potential solutions have been identified. These includes promoting capacity building among the public and private sectors; increase in human and financial resources in relevant government agencies for monitoring and enforcement of offset conditions; acquiring skilled officials in understanding

offsets; ensuring offsets are practical, enforceable and auditable and promoting good communication and transparency between relevant stakeholders (Brownlie *et al*., 2017).

Anecdotal evidence within the water sector provides civil society with the opportunity to contribute to enhancing the regulatory regime in South Africa. Some the recommendations include increasing human and resource capacity to perform CME functions effectively; employing officials with expertise and skills in compliance and enforcement; improve information sharing between government agencies in the environmental sector and increase compliance promotion among relevant stakeholders to understand the water sector (CER, 2011).

2.5 The legal framework for compliance monitoring and enforcement in the South African water sector

The following sections provide an overview of the legal framework for CME within South Africa (see Figure 2.1). It will specifically focus on the legal obligations applicable to the DWS and CME activities within the South African water sector as the DWS is obligated to develop policies, regulations, monitor, enforce and administrator legislation to fulfil its roles and responsibilities as the custodian of water resources in the country (Rawlins, 2019).

2.5.1 The Constitution of the Republic of South Africa

The Constitution of South Africa (1996) (herein after the Constitution) is recognised as the superior law of the county. It contains the Bill of Rights (Chapter 2) and makes provision for, amongst other things the rights of individuals to an environment that is not harmful and access to sufficient water (Tewari, 2009). It is internationally recognised as a respected law contributing to the development of legislations within the broader environmental management sector in South Africa (Du Plessis, 2018; Klare, 2008). The following sections from the Constitution are deemed to be relevant and effective as it relates to CME.

- Section 24 of the Constitution recognises environmental protection and sustainable development by establishing environmental laws by incorporating the social and environmental concerns for the protection of the human health and wellbeing and the natural reserve base (Du Plessis, 2008; Theil, 2019). Section 24 of the Constitution states that "*Everyone has the right (a) to an environment that is not harmful to their health or wellbeing; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."

- Section 27 of the Constitution provides the right to access safe and adequate basic supply of water as one the fundamental human rights (Edokpayi *et al*., 2020). In essence, the state has the obligation to enact laws and policies to give access to the provision of clean water as it is available and must continue to improve in its supply to the people (Klare, 2008). Section 27 of the Constitution states "(1*) Everyone has the right to have access to (a) healthcare services, including reproductive health care, (b) sufficient food and water; (c) social security, including, if they are unable to support themselves and their developments, appropriated social assistance; (2) The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights".*

- Section 33 of the Constitution provides that every person has the right to administrative actions that promote reasonable, lawful and procedurally fair outcomes (Brynard, 2013; Govender, 2013). It provides for the opportunity for a person to ask for the purpose of the administrative actions that has a negative impact and provides for an inquiry of actions by government and how it has gone against a person's right holding government accountable ultimately promoting an efficient and objective administration (Klare, 2008). Section 33 of the Constitution states "(1) *Everyone has the right to administrative action that is lawful, reasonable and procedurally fair. (2) Everyone whose rights have been adversely affected by administrative action has the right to be given written reasons. (3) National legislation must be enacted to give effect to these rights and must- (a) provide for the review of administrative action by a court or, where appropriate, an independent and impartial tribunal; (b) impose a duty on the state to give effect to the rights in subsections (1) and (2); and (c) promote an efficient administration*".

- Chapter 3 of the Constitution promotes a co-operate government. In doing so, it supports interactions and co-operations among the spheres of government (on national, provincial and local levels). The reason for establishing this government system, is to promote the spheres of government to respects each other's powers, functions and institutions and to inform each other of new polices (Malan, 2005). For this reason, disputes must be approached in a way that considers all possible avenues to find the best solution before handing it over to the courts (Pegram *et al*., 2006). It is set on the fundamental principles such as loyalty, transparency, accountability and coherent governance, respect of each sphere of government and being loyal to the Constitution for a unified South Africa (Malan, 2005).

It is within this Constitution that provisions are made for reasonable legislative measures to realise all these human rights. The most relevant within the context of CME include the Promotion of

Administrative Justice Act of 2000 (PAJA); Intergovernmental Relations Framework Act of 2005 (IRFA); National Environmental Management Act of 1998 (NEMA) and National Water Act of 1998 (NWA) and will be discussed below.

2.5.2 The Promotion of Administrative Justice Act

The Promotion of Administrative Justice Act of 2000 (PAJA) was enacted to give effect to Section 33 to ensure the lawful, reasonable and procedural fairness and efficiency of administrative actions (Govender, 2013; Muller 2011). Within the context of the South African water sector, the PAJA gives effect to administrative rights to everyone, it also provides for the Department of Water and Sanitation to exercise the right of an administrator. Hence the administrator is referred to as the organ of state or any natural or juristic person taking administrative action. Within the DWS, the CME unit has the obligation to consider PAJA when enforcing regulations and enforcing enforcement actions against transgressors. These actions include the issuance of notices, directives or suspension of WULs that must be lawful, reasonable and fair. Therefore, DWS as the administrator is compelled to consider the PAJA when exercising its mandate with the South African water sector.

One such an example is the case before the Water Tribunal of South Africa heard on 16-17 May 2022 in the appeal between David Gace (Appellant) and the DWS (Respondent) (CER, 2022). The information before the Water Tribunal showed the Respondent did not act unlawfully or unreasonably in issuing the Directive and that the Appellant was given sufficient notice and opportunity to make representations to the Respondent before the Directive was issued, and upon its issuance was clear and unambiguous on what was required of the Appellant (CER, 2022).

2.5.3 The Intergovernmental Relations Framework Act

The Intergovernmental Relations Framework Act of 2005 (IRFA) recognises the spheres of government of which is inter-related, inter-dependant and provides an effective, efficient, transparent, accountable and coherent governance for the well of the people and promoting their constitutional rights (Kotzé, 2009; Malan, 2005). Working cooperatively among the spheres of government encourages discussions to prioritise the requirements of the people by applying the resources that are available within their specific roles (Malan, 2005). Within the South African water sector, the IRFA plays a vital role in executing regulatory actions against organs of state that are non-compliant to applicable legislation of which must be adhered to, such as the DWS, when embarking on enforcement actions. When organs of states fail to remedy their non-compliance, the DWS is obligated to take action and follow due process when pursing enforcement actions as per the IRFA.

Once such example of intergovernmental relations is reflected in the case of the DWS against Msukwaligwa Local Municipality who was taken to task for the pollution of the water resources (SAG, 2019). The case related to the non-compliance by the municipality, since 2016, to several notices and directives issued by the department in terms of sections 19 (3) and 53 (1) of the NWA for failure to take reasonable measures to prevent pollution of water resources and engaging in water uses without authorisation in Ermelo Wastewater Treatment Works (SAG, 2019). Judge Bruce Langa ordered the municipality to conduct specific actions to rectify the contraventions and commended the DWS CME Unit for making many reasonable efforts to ensure the municipality takes reasonable actions to comply.

2.5.4 The National Environmental Management Act

The NEMA of 1998 is the overarching legislation for the environmental sector in South Africa. The NEMA advocates for a co-operative environmental governance between different governmental spheres and departments while setting out principles, establishing procedures to coordinate between government sectors and provides environmental tools to enforce legislation (DWS, 2018; Rossouw & Wiseman, 2004).

The fundamental purpose of the NEMA is to promote regulation of the environment in a co-operative manner between the spheres of government and provide for the implementation of SEMAs to administer and ensure compliance and enforcement of other legislation. This includes preventative and remedial measures enforced by the Environmental Management Inspectorate and adherence to international agreements to empower relevant stakeholders. (King *et al*., 2018).

Chapter 7 of the NEMA provides for the application and enforcement of the NWA whereby section 31B makes provision for the designation of environmental management inspectors (EMI) by the Minister; section 31D provides for the EMIs mandates and section 31K makes provision for an EMI to carry out routine inspections and cease anything that may be used as evidence in the prosecution of any person for an offence in terms of NEMA or any of the SEMAs.

2.5.5 The National Water Act

The NWA is the foundation for governing the South African water sector and is built on the fundamental principles of equity, sustainability and efficiency (Edokpayi *et al*., 2020; Pollard & Du Toit, 2008). The international water sector recognises it as one of the most progressive water legislations in the world (Schreiner, 2013). The NWA promotes socio-economic development whilst protecting the environment, providing equal access to water to individuals and ensuring it is not wasted using it in the most efficient way (Edokpayi *et al*., 2020). The NWA also provides for a set of instruments expected to contribute to achieving the strategic adaptive management of

the country's water resources working co-operatively with other environmental legislation to monitor and enforce relevant legislation across all spheres of government (Mackay *et al*., 2003).

Through the NWA, the DWS is responsible to regulate the allocation, use, flow, and control of all water in the country and establish appropriate institutions to achieve its mandate (DWS, 2023). Chapter 4, section 21 of the NWA provides for the permissible uses of water through the equitable allocation of water resources by national government which is the DWS. Chapter 13, section 125(1) of the NWA makes provision for compliance inspections to be carried out to determine the status of compliance against a WUA (DWS, 2023). Additionally, Chapter 14, section 141(a) & (b) and Chapter 16, section 151(1)(b) & (c) ensures that the water user, with a WUA, must provide constant reporting as per the WUA or as and when required to do so to the department (DWS, 2023). Overall, these sections in the NWA make provision for the CME functions to be carried out effectively and efficiently.

2.5.6 The National Water Resource Strategy-3

Chapter 2 of the NWA of 1998 provides for the administration and implementation of the National Water Resource Strategy the Minister at a national level. The NWRS-1 was first published in 2004 followed by the NWRS-2 published in 2013 with the latest NWRS-3 published in 2023 reflects the NWA's essential principles and objectives associated with sustainability, equity, and efficient and effective use of water resources. The NWRS-3 makes provision for strategies, objectives, plans, guidelines, and procedures within existing legislation for the implementation of the NWA (DWS, 2023). Chapter 8 of the NWRS-3 provides for the regulation of water and sanitation in the country. The scope of compliance monitoring and enforcement is to ensure authorised water users comply with their authorisation, bring water users into compliance through enforcement actions and restrict unlawful water uses which undermine the availability of the water resource (DWS, 2023). Some of the strategic objectives to be achieved is to identify and prosecute major non-compliant water users, promote stakeholder partnerships, designate EMIs, provide awareness and training of CME to various stakeholders in the water sector, build and strengthen CME capacity, compile regulatory reports on the status of compliance of the water user through compliance inspections, ensure protection of the water resource through the applicable legislation.

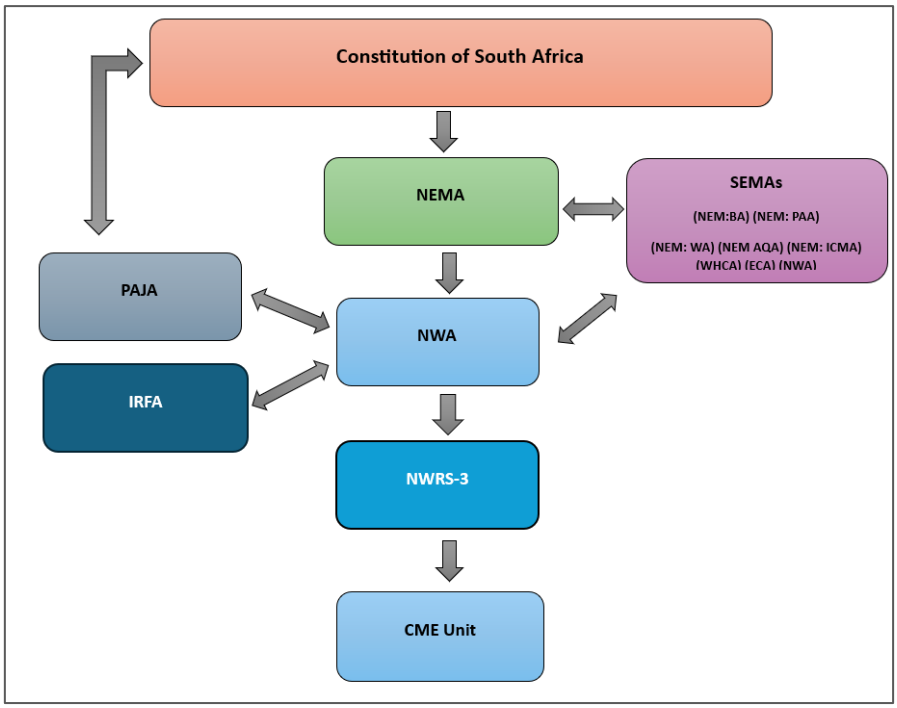


Figure 2.1:Compliance monitoring and enforcement legal framework

The following section will provide an overview of the institutional structures of the DWS as the regulator for the South African water sector.

2.6 Overview of the institutional structures for compliance monitoring and enforcement within Department of Water and Sanitation

Compliance monitoring and enforcement forms an integral part of strengthening the environmental framework within the South African water sector by increasing regulatory functions to improve compliance and enforcement and ensure conditions of the WUAs are complied with (DWS, 2023). In providing the legal framework concerned with CME in the South African water sector, the following section will discuss the overview of the institutional structures of CME within DWS from a national perspective and provides for a basis for the CME activities.

2.6.1 Chief Directorate: Water Use Compliance Monitoring and Enforcement

Chapter 4, section 42 and Chapter 5, section 83 of the Constitution provide for the establishment of a national government to include the DWS that is responsible for the management and implementation of water legislation including policies, regulation, norms and standards. On a national level, the Chief Directorate: Water Use Compliance Monitoring and Enforcement (CD: WUCME) has the responsibility of regulating water uses, to prevent pollution and ensure the sustainability of water resources. The scope of the regulation as defined in this chapter refers to ensuring regulating the water use authorisation processes (licensing, existing lawful uses, general

authorisations) through compliance monitoring and enforcement, among others, procedures within the DWS.

Within the Chief Directorate: Water Use Compliance Monitoring and Enforcement there are two directorates responsible for the coordination and implementation of CME functions. The Directorate: Compliance Monitoring which is responsible for capacity development, training, compliance promotion together with planning and reporting on compliance inspections to relevant stakeholders. The Directorate: Enforcement, which is responsible for enforcing compliance to relevant legislation, ensures prosecution through investigation, develop tools for effective compliance procedures and share information to relevant stakeholders and reporting structures which contributes to the Compliance Monitoring and Enforcement Strategy (DWS, 2023).

In addition to the NWA, the CME unit is guided by the Compliance and Enforcement Strategy, which was approved in 2018 (DWS, 2018). The purpose of the strategy provides the roles and responsibilities of the CME unit guided by a regulatory cycle (see figure 2.2) to deliver effective CME practices through legislation and authorisation, compliance promotion, compliance monitoring, enforcement, information management and research and institutional arrangements within the different water sectors (namely irrigation, agro-processing, government wastewater treatment works (WWTWs), landfills, mining, streamflow reduction, and afforestation (SFRA) and industry (DWS, 2018).

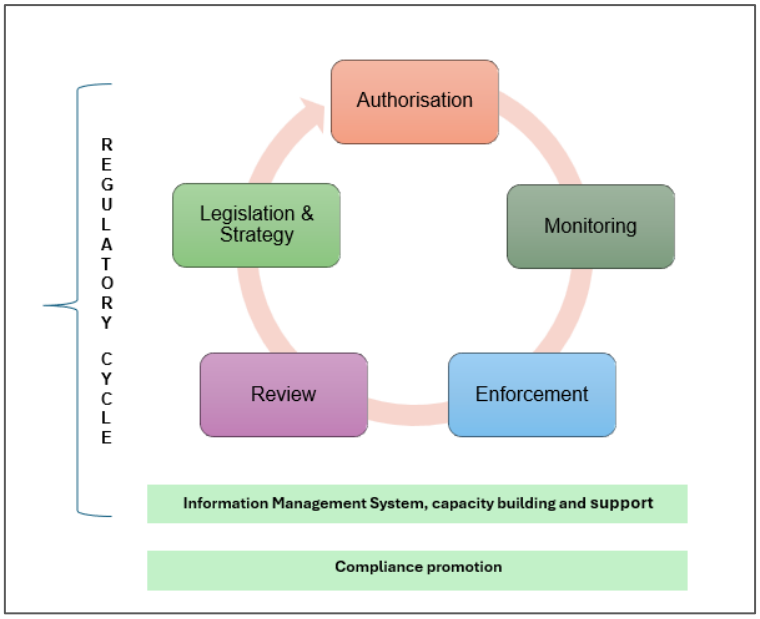


Figure 2.2: Regulatory cycle for compliance monitoring and enforcement

2.6.2 Environmental Management Inspectorate

The amendment of NEMA in 2003 saw the establishment of the Environmental Management Inspectorate which came into operation in 2005 (DWS, 2018). In doing so, the appointment of Environmental Management Inspectors (EMIs) plays a significant role to ensure the monitoring of relevant environmental legislation bringing to task everyone who are failing to comply through enforcement actions (Baloyi & Masinga, 2011).

Environmental Management Inspectors are designated and trained in terms of section 31B, 31BA or 31C of NEMA to ensure compliance and enforcement of specific environmental legislation and national legislation to make informed decisions concerning the regulatory requirements to the WUAs (DWS, 2018). The EMIs appointments, functions and powers are regulated by sections 31A-31Q of NEMA and the regulations relating to qualifications criteria, training and identification of and form to use by the EMIs (DWS, 2018). Examples of such powers and functions include investigate (question witnesses, inspect and remove articles, take photographs and audiovisual recordings, take samples and remove waste); inspect (enter premises to ascertain whether legislation is being followed and seize evidence of criminal activity); enforce (search premises, containers, vessels, vehicles, aircraft and pack animals, seize evidence and contraband, establish road blocks and make arrests) and administrate (issue compliance notices and admission of guilt fines) (DFFE, 2024). Moreover, EMIs have a large working network collaborating with other organs of state to include the South African Police Services; National Prosecuting Attorney; judiciary and other government departments to corporate with by adding significant information to CME activities.

In 2008, the NEMA was amended, which allowed the Minister of Water Affairs (now the DWS) to designate officials as EMIs. The first seven EMIs were designated in DWS in 2016/2017 followed by a project to train DWS and Catchment Management Agency (CMA) officials until 2019 within the department and thereafter reverted to Department of Forestry, Fisheries and the Environment (DFFE) for the biannual EMI basic training sessions. There are currently 124 designated EMIs of which 65 are in the regional offices, 15 in the CMAs and 44 at national office (DWS, 2023).

2.6.3 Compliance monitoring and enforcement standard operating procedures

For Environmental Management Inspectors to be effective knowledge of environmental laws and legal requirements is required to exercise their powers, duties, and mandates. For this reason, the Chief Directorate: Water Use Compliance Monitoring and Enforcement developed the DWS CME (EMI) Manual in July 2023 containing Standard Operating Procedures (SOPs) to ensure

EMIs, and CME officials perform their functions and duties effectively and efficiently in a way that is legally acceptable and just, following the chain of custody (DWS, 2023).

These SOPs provide for a gradual and consistent way of implementing procedures to include instructions and information to be followed in a specific way which are clear, sufficient and beneficial ensuring compliance to specific functions (Mofokeng *et al*., 2019; Alers & Ferreira, 2019). Environmental Management Inspectors are obligated to adhere to these SOPs, ensuring that DWS and CME functions are carried out uniformly and effectively according to specified procedures and processes. Therefore, the Standard Operating Procedures provides guidance to officials on the code of conduct; CME guidelines; corporation with other organisations; general operating procedures; inspection and enforcement SOPs and reporting and information management systems procedures (DWS, 2023).

2.6.4 Compliance monitoring and enforcement monitoring systems

Information systems can be seen as a tool that supports the functions of government in monitoring its national functions (Rivett *et al*., 2013). These systems are responsible to gather information as well as to track information on different levels of government to verify progress (Rivett *et al*., 2013). It further promotes transparency, knowledge and distribution of information to all relevant stakeholders to be informed as well as providing accountability of the system.

Information systems promote scientific information between water resources and human activities and how to manage the outcomes in an effective manner within the sector (Nomquphu *et al*., 2007). For this reason, Chapter 14 of the NWA mandates the creation and implementation of National Monitoring Systems. These systems play a crucial role in collecting, storing, and disseminating data and information necessary for the safeguarding, sustainable utilization, and effective management of water resources. Within the CME, there are two systems that are responsible for compliance monitoring and enforcement namely the National Compliance Information Management System (NCIMS) and the Enforcement Case Management System (ECMS). The NCIMS and ECMS are tools that prioritise the monitoring of about 55 000 water users and reporting of non-compliance cases to include storing and capturing of information (DWS, 2023).

2.6.4.1 National Compliance Information Management System

The NCMS is a web-based system that seeks to monitor water users against their WUAs, automate report writing, routing and approval of reports. It provides a secure and centralized document control repository that makes reporting and retrieval easy for follow-up inspections and

audits and statistical analysis of information captured on the system. The system has been rolled out to the national office, regional offices, and CMAs and integrated with the ECMS.

2.6.4.2 Enforcement Case Management System

The ECMS is a tool that enables the systematic recording of details pertaining to cases of non-compliance. The primary objective is to effectively monitor the progression of such non-compliant cases until their resolution. Additionally, the system's capabilities extend to the provision of visual data, which aids in the identification of key areas requiring attention. This is accomplished through tools such as incident mapping and registering, which contribute to informed analytical insights.

2.7 Compliance monitoring and enforcement performance

The following sections provide an overview of the status of CME as of 2022/2023 within the South African water sector reflects on planned deliverables and the challenges related to the deliverables.

2.7.1 Overview of the annual compliance monitoring and enforcement report

2.7.1.1 Compliance monitoring inspection performances

In the financial year 2022/2023 a total of 379 water users were a target to be monitored (DWS, 2023). A total of 422 compliance inspections were conducted, exceeding the target by 43 additional inspections. The statistics show an increase in the number of water users that were inspected over the last three years.

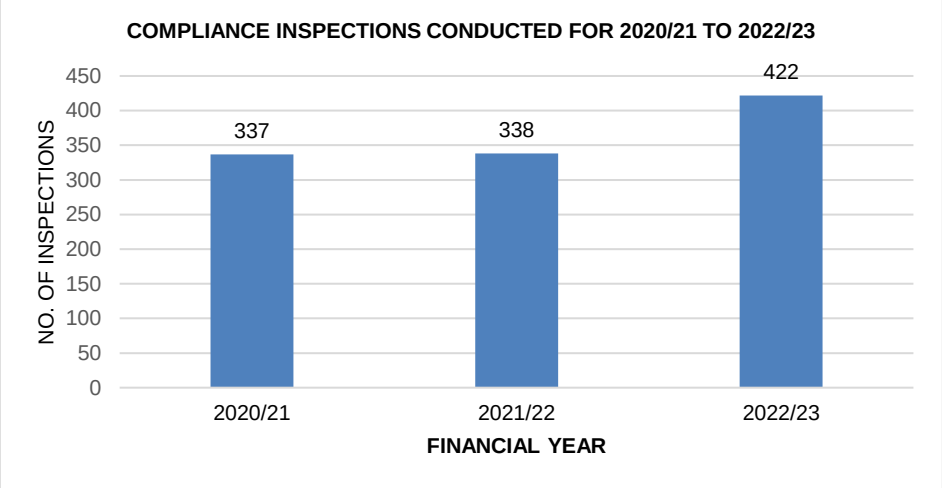


Figure 2-3: Overview of the number of compliance inspections conducted from 2020/21-2022/23 (adopted from the DWS Compliance Monitoring and Enforcement Annual Report 2022/2023)

2.7.1.2 Enforcement investigation performances

Furthermore, a total of 460 cases were reported for non-compliances of which 385 were investigated showing 84% achievement from the initial committed target of 80%. The statistics showed a 14% increase in investigated cases over the last three years.

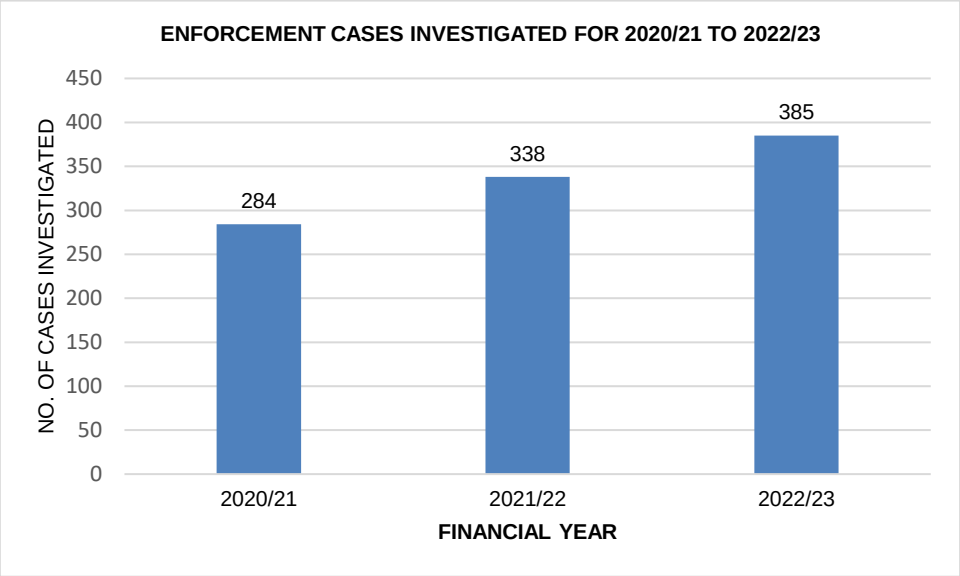


Figure 2-4: Overview of the number of enforcement cases conducted from 2020/21-2022/23 (adopted from DWS Compliance Monitoring and Enforcement Annual Report 2022/2023)

2.7.2 Level of compliance monitoring and enforcement performance within the water sector

According to the DWS Compliance Monitoring and Enforcement Annual Report 2022/2023 a target percentage level of 65% was set for the level of compliance to the water use authorisations per sector that is irrigation, agro-processing, government (WWTWs), landfills, mining, SFRA (plantation), SFRA (paper and pulp mills) and industry. Streamflow reduction and afforestation (paper and pulp mills) achieved a compliance percentage score above 65% while mining and landfill sectors achieved less than 50% compliance level. These statistics show a less desirable performance level and a need to improve on the follow-up compliance inspections that should be conducted to rectify the non-compliances or follow through with enforcement actions (DWS, 2023).

Further to this the overall challenges experienced by the sectors showed (i) human resource capacity impacted on the monitoring of the large water users in sector; (ii) unenforceable and unclear WUL conditions were difficult to monitor; (iii) WUL conditions were difficult to understand

and ambiguous especially conditions with the technical aspects; (iv) ELUs are dependent on best practices by the water users which are not legally binding and (v) municipalities have limited budget and resources increasing its non-compliances to the WUAs (DWS, 2023).

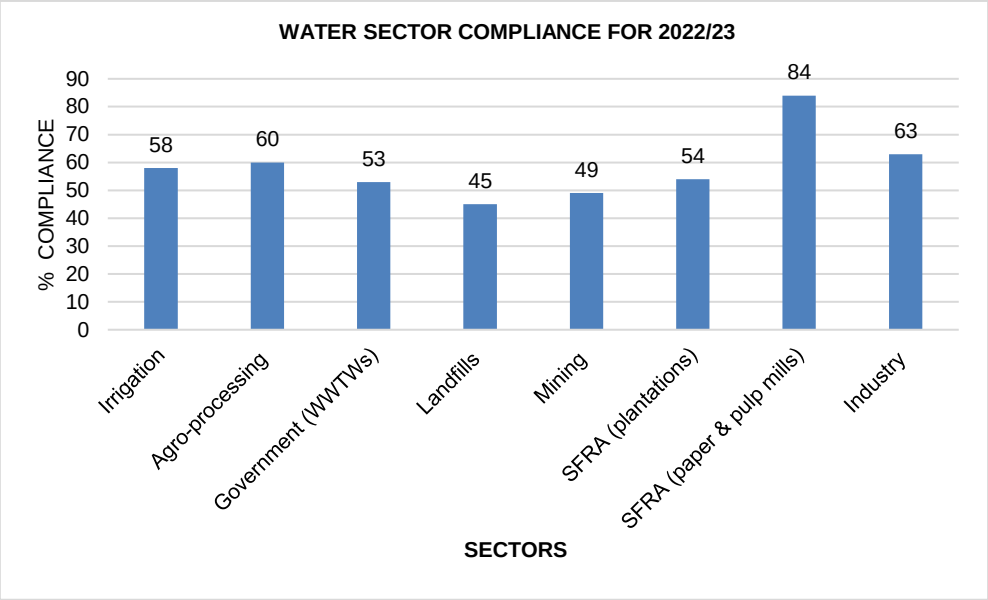


Figure 2-5: Overview of water sectors percentage of compliance level performances (adopted from DWS Compliance Monitoring and Enforcement Annual Report 2022/2023)

2.8 Chapter summary

The following chapter has presented and overarching perspective of the challenges and opportunities to compliance monitoring and enforcement in both international and national levels within the regulatory regime. In doing so, different sectors from developed and developing countries were highlighted to show the effects of the challenges and opportunities being experienced within compliance monitoring and enforcement. This literature review shows these challenges and opportunities are selected or specific to a particular environment and therefore by exploring evidence from a worldwide perspective provides evidence that similar challenges and opportunities are being experienced within the South African regulatory regime as well as in the water sector specifically relating to WUAs. This being said, the chapter then provided an understanding of the CME legal framework and institutional structure within DWS to include roles, responsibilities, and functions who are required to implement compliancy monitoring and enforcement with the water sector specifically related to the WUAs. Furthermore, it reflected on the progress of the CME activities performed in the 2022/2023 financial year to show its effectiveness and challenges among the different sectors within the regulatory regime specifically to the WUAs within the water sector.

CHAPTER 3 METHODOLOGY

3.1 Introduction

Chapter 3 provides an overview of the research approach adopted and the methodology implemented to achieve the research aim in exploring the challenges and opportunities within the South African water sector in relation to the WUAs. It will discuss how data was collected through applying a qualitative research approach supported by semi-structured interviews with a small sample size of twenty (20) voluntary participants to provide a personal, humanistic experience within their area of responsibilities in the DWS CME unit. The selection of participants were chosen from DWS Pretoria head office due to their responsibilities to ensure the implementation and oversight of CME within regional offices and Catchment Management Agencies with regards to the WUAs. Upon completion of the interview process, a thematic analysis will be conducted to identify how often certain responses are mentioned relating to the challenges and opportunities within the DWS CME unit at the head office. This being said, the chapter aims to explore the challenges and opportunities within South African water sector in relation to WUAs and showing how similar international examples are relating to the national level of CME within the different sectors of the regulatory regime.

3.2 Research approach

A qualitative research approach was adopted to achieve the aim of this research. Qualitative research is defined as a flexible approach implemented on a small sample that can project a personal, humanistic experience uncovering the thoughts and actions of human beings (Renjith *et al*., 2021). It allows the participants to be transparent and open when presenting their own experiences, understanding, and perspectives on a topic (Hammarberg *et al*., 2016; Hsieh & Shannon, 2005).

The qualitative research approach was supported by semi-structured interviews which have been applied effectively in different scientific disciplines (Dias & Teixeiria, 2017 Mclnnes *et al*., 2015). The implementation of such an interview technique provides the opportunity to collect data by means of understanding the participants' opinions, frustrations, and concerns on a one-on-one basis (Roberts, 2020).

3.3 Data collection

According to Sandelowski (2000), data collection is discovering the who, what, and where of events or experiences, and it may include observations and examination of documents. Data

collection may be obtained through various techniques, including interviews. (Sutton & Austin, 2015).

3.3.1 Semi-structured interviews

In this research the qualitative methodology enabled the researcher to apply semi-structured interviews which provided the opportunity to discover new insights, encourage further questions and assess the topic from different point of views (Naz *et al.*, 2022). The responses from the semi-structured interviews were discussed in line with relevant literature obtained from academic books, peer reviewed articles, dissertations and theses to contribute to a credible research study (Ruslin *et al*., 2022).

3.3.2 Interview design sheet

An interview design sheet was developed to guide the researcher and participants through the semi-structured interviews. The interview design sheet was developed to include the interview date, person interviewed and the interview questions (see Annexure A). The researcher developed three open-ended questions which were directed to all the participants. The main reason for developing open-ended questions were to allow the participants the freedom to express their own opinions, experiences, and thoughts on questions posed to them. The open-ended questions that were asked to the participants included:

- What are the challenges related to CME within the water sector?
- What are the opportunities related to CME within the water sector?
- How can the identified CME challenges be overcome within the water sector?

3.3.3 Interview process

The interview process was constructed on the preferred option of face-to-face interviews. If the preferred option was not viable, other means were explored such as online platforms including Microsoft Teams or Zoom meetings. Interviews were conducted based on the availability of the participants. The duration of the interviews was between 45 minutes to 1 hour. The responses of participants were recorded using handwritten notes and where permission was granted by the participants, recordings of the interview session were taken.

3.4 Selection of participants

A sample size should be a sufficient number of participants not too large to extract information (Onwuegbuzi & Leech, 2007). It is recommended that qualitative research should include 20 and 30 participants to yield a significant impact and produce new insights to the research (Marshall *et*

al., 2013). For this research a total of 20 participants were selected from the Directorates Compliance Monitoring and Enforcement at the national office in DWS. The participation selection applied in this research was based on a purposive sampling technique. This technique may be applied within qualitative research approaches (Tongco, 2007). Purposive sampling allows the researcher to choose the participants with experience and knowledge to be able to provide the information required (Tongco, 2007). The selection of participants was based on their functions, experience, and knowledge to work within CME. The participant's functions focused on the development of policies, strategies and protocols and tools; development of training material, provide training on compliance monitoring and enforcement responsibilities; conduct compliance inspections against the conditions of the WUAs, prosecute transgressors through investigations, participate in joint inspections with other governmental departments and report to the CME Annual Report (DWS, 2018).

3.4.1 Voluntary participation and confidentiality

Furthermore, a consent form was prepared and submitted to each participant. The participants had the option of remaining anonymous or declaring their name for consent of the interview. The participants were informed of the level of confidentiality of the interview process and that sharing their perspectives, opinions, and thoughts to the interview questions were kept secure and confidential.

It was necessary to communicate the concept of voluntary participation to the participants so that they would be well informed and that they had the right to withdraw from the research at any time they chose to do so (Marshall & Adebamowo, 2006). The concept of voluntary participation was indicated on the consent form and verbally communicated to the participants to ensure the process and purpose of the research was fully explained.

Confidentiality was communicated to the participants by ensuring that their names, position, and responses would remain confidential and respected with the assurance that the responses they provided would not be exploited or misused in the research (McGraw *et al*., 2015).

3.5 Data analysis

According to Kelley *et al*., (2003), the intent of analysing data is to provide a synopsis of the responses of the participants based on the open-ended questions.

The research opted for a thematic analysis method for identifying and analysing patterns of meaning within the qualitative dataset. This allowed the researcher to identify reoccurring responses from the participants and illustrated the themes important in the research description

(Braun & Clarke, 2006; Kiger & Varpio, 2020). Responses were captured on the interview design sheet and transferred to an MS-Excel spreadsheet. Themes were identified from the responses and codes were allocated to these identified themes. Upon completion of the spreadsheet, the results were represented in a frequency table (see Table 4.1). The frequency table represents a summary of the responses including the allocated codes, and frequency of how often the theme was mentioned as per the responses of the participants (Manikanda, 2011, Gries, 2014).

3.6 Ethical considerations

Ethical consideration in research plays an important role in ensuring values and principles of ethical conduct are carefully considered before the research is undertaken (Menih, 2013). It is the responsibility of the researcher to comply to codes of ethics whereby both the participants and researcher demonstrate standards of practice (Davies *et al.*, 2009). Therefore, to fulfil the ethical considerations for this research the following procedures were adhered too. Approval was obtained from the Scientific Committee of the Environmental Management Research Group (EMRG) at the Faculty of Natural and Agricultural Sciences Research Ethics Committee (FNASREC) to exempt this research from a full ethical review as this research posed minimal risk to the human participants. This research was conducted under the following ethics number: NWU-01214-24-A9.

3.7 Chapter conclusion

This chapter provided an overview of the research approach and methodology implemented to achieve the aim of the research. It provided a detailed explanation of the steps taken for data collection, selection of participants, data analysis and representation as well as the ethical considerations related to the research undertaken.

CHAPTER 4 RESULTS AND DISCUSSION

4.1 Introduction

Chapter 4 provides a detailed result and discussion on the different recurring responses from the participants outlining the findings between international and national literature of the challenges and opportunities within the regulatory regime and how it relates to the South African water sector relating to WUAs. The aim of the chapter is to provide evidence that indeed similar challenges and opportunities do exist and are being experienced in the broader context of the regulatory regime. It further proves that the findings of this research are also observed in developed and developing countries within the different sectors which are similar to what was identified in the South African water sector by the DWS CME unit. These findings conclude that the South African regulatory regime even though well equipped with various environmental legislations experience similar challenges and opportunities within compliance monitoring and enforcement.

Additionally, chapter 4 provides an overview of the results in accordance with the implemented methodology as outlined in Chapter 3 above. It was based on a qualitative research approach supported by semi-structured interviews with 20 participants. A thematic analysis method was applied for identifying and analysing patterns and themes of meaning in the qualitative dataset (Braun & Clarke, 2006; Kiger & Varpio, 2020). A frequency table (see Table 4.1) was compiled to include the different themes that were recurring within the different responses.

Questions were developed to understand the challenges related to CME, the opportunities related to CME, and how the CME challenges can be overcome within the water sector. These three open-ended questions were posed to purposively selected participants within the Directorate: CME (see Annexure A):

- Q1: What are the challenges related to CME within the water sector?
- Q2: What are the opportunities related to CME within the water sector?
- Q3: How can the identified CME challenges be overcome within the water sector?

Responses to the open-ended questions are then discussed in line with relevant literature and presented in sections 4.2-4.3 below.

Table 4.1: Frequency table with themes, codes, responses, and number of responses

Themes	Responses	Number of Responses
What are the challenges related to CME within the water sector?		
Theme A: Budget and capacity		
(C1.1) Budget	"budget is a challenge to buy personal protective equipment (PPE)", "budget constraints on travelling and accommodation makes it difficult to conduct investigations", "we do not have the right vehicles to drive on difficult terrains", "we do not have cameras, we use our cell phones to take photos", "we need bullet proof jackets especially during investigations for illegal sand mining", "we buy our own PPE when have to", "safety and security is a challenge we also fear for our lives" , "no correct PPE hinders performing the CME functions"	9/20 (45%)
(C1.2) Human capacity resources	"limited officials to do inspections at head office and regional office" "not enough officials at HO Enforcement unit to do the work", "due to capacity issues at the regional office producing poor reports as there are not enough officials to do inspections and write the reports within specific time frames", "not enough work force", "not enough officials in regional office to conduct inspections", "CME officials at head office and Regional is not enough"	7/20 (35%)
Theme B: Operational challenges		
(C.2.1) Knowledge/awareness/skills and interpretation of legislation	"lack of knowledge and understanding of the NWA by Regional/CMAs officials to conduct inspections for specific sectors", "lack of skills, knowledge and experience to conduct inspections in specific sectors", "lack of interpreting the WUL conditions", "WUL conditions are not site specific or measurable", "conditions are poorly written", "lack of understanding the other governmental mandates", "lack of skills as officials are leaving the dept and not transferring their skills", "Regional officials are unable to interpret legislation which leads to delays", "the water users do not understand the NWA, they feel intimidated especially the communities", "the general public have a lack of awareness to compliance inspections", "there is a lack of skills and knowledge within the sector landfills that is why few inspections are done", "CME officials do not know legislation well enough to engage the South African Police Service SAPS and other stakeholders", "not enough specialists within water sectors", "lack of skills, experience and knowledge in terms mining sector inspections", "lack of interpreting legislation", "lack of understanding of the water legislation by the courts and SAPS hinders the enforcement actions", "Judiciary do not fully understand water laws and legislation", "Judiciary lacks prioritisation and knowledge of the NWA", "water users do not understand the enforcement process", "local government disregard the laws yet they receive a lot of direction"	17/20 (85%)
(C2.2) Communication	"there is a lack of communication between the CME units, enforcement do not provide timely feedback to the sectors during investigations", "regional office do not always communicate to the water user regarding the	12/20 (60%)

Themes	Responses	Number of Responses
	feedback of the inspection", "poor communication between head office and regional office makes the dept look incompetent to the water users", "line managers do not communicate information to officials", "lack of communication between head office and regional office not knowing who are the relevant official for specific functions and feedback/responses to the water users", "when new officials are appointed in CME in the regional office the head office is not aware, it becomes frustrating as we are uninformed", "poor communication from the regional office to provide feedback and responses after an inspection to head office", "there is poor communication in terms of the mandates of the relevant depts on a strategic level which confuses the water users", "there is a poor communication between government depts as well which breaks down partnerships" , "breakdown in communication between head office and regional i.e. when regional office issues a directive head office WUA unit will issue a water use authorisation to the same transgressor", "Regional office can attend a ministerial and do not provide feedback to the relevant sector at head office", "lack of communication between CME head office and WUA unit in terms of enforcement actions being processed and water use licence (WUL) being issued to the same transgressor makes us to loose cases, how do we charge the transgressor if they have a WUL", "we need to have communication skills to talk to the water users without making them angry", "CME head office and regional office with WUA units are not working together to communicate with each other and the water users can see this", "officials from different depts work in silos"	
(C2.3) Functions and delegation of powers	"there needs to be separation of CME functions in regional office one person inspects all the water sectors and they do not understand all the sectors", "Regional office do not have to report to head office therefore inspection reports are not verified by head office", "lack of proper administrative process in the regional office is delaying the work", "Regional office do not have separation of functions which causes a conflict of interest", "no clear definition of roles and responsibilities of head office", "Head office must do oversight, define oversight" "Regional office and head office are not aligned when it comes to inspections", "fragmented administrative procedures are hindering reporting to water users", "no clear administrative procedures between head office and regional office", "duplication of duties head office supposed to develop procedures, however is doing what the regional office is supposed to do i.e. inspections", "Regional office should allocate different officials for each water sector", "new delegation of powers is an administrative burden and will delay enforcement actions", "delegation of power should remain at head office for a central reporting", "the delegation of powers are always changing it becomes challenging", "Head office is restricted in performing functions due to delegation of powers", "there is an uncertainty of the new structure, regional office is not happy when head office gets involved, it's stepping on toes", "restructuring has hampered the skills level", "restructuring is creating an uncertainty of the functions of officials"	11/20 (55%)
(C2.4) Preplanning and collaboration	"regional office is not following up on time with the water users in terms administrative actions", "doing follow-ups on inspections will make sure the non-compliant technical and administrative conditions are reviewed", "follow-ups must be done to ensure effective and efficient compliance", "there is a lack of follow-up on inspections for action plans", "Regional officials are not preplanning to conduct investigations which causes	8/20 (40%)

Themes	Responses	Number of Responses
	delays", "Head office and regional office lack the administration preparation before conducting inspections", "poor administrative processes due to poor planning for inspections", "Head office is restricted to do follow-ups in terms of delegation of powers" , "during joint inspections there are not clear roles and responsibilities defined in terms of administrative reporting", "lack of collaboration between units to acquire information", "lack of collaboration between DMRE, DFEE and DWS for the issuing of WULs for sand mining is a challenge for potential enforcement actions", "large teams at joint inspections overwhelms the water user", "unavailability of WUAs hinders the inspection process", "lack of compliance due to lack of corporation with municipalities" , "Regional office should do proper planning of annual targets considering limited capacity", "no formal communication as to how many follow-ups should be done"	
(C.2.5) Standardisation and quality of reporting	"Lack of confidence and understanding to conduct inspections therefore reports are poorly drafted", "quality of reports are not on point from the regional office", "quality of information captured on site is not good", "Regional office do not apply the CME SOPs" "unstandardised procedures in providing feedback to water users", "fragmented administrative processes in reporting to water users"	7/20 (35%)
(C.2.6) Training and compliance promotion	"Even though water users are trained they still don't comply", "there is a lack of training in each water sector for CM at regional office", "CMAs need training in the mining sector to know what to look for during inspections", "water users do not understand legislation", "Regional office must be trained on CME SOPs", "CME SOPs is not being implemented at regional office"	3/20 (15%)
Theme C: Attitude, support, behaviour		
(C3.1) "Buy-in" and support	"Communities and traditional leaders are not accepting of the legislation especially for illegal sand mining", "resistance from water users to change from ELU they need to be regulated", "HDI communities do not understand legislation and are unable to comply to the requirements", water users must understand the value of water they misunderstanding the water is available"	8/20 (40%)
(C3.2) Existing behaviour and attitudes	"there is a lack of interest among officials, we need capacity building", "build stronger relations within the dept to strengthen the water sector", "get rid of hearsay and powerplay at head office"	3/20 (15%)
Theme D: Administrative process/procedures		
(C4.1) Political interferences and will power	"political interferences and corruption is effecting service delivery in local government", "political interferences is influencing decision-making", "political interferences changes the decision, corporate governance is not working", "lack of political will power to follow through", "lack of political will causes the scope of work not to succeed", "municipality have successes due to political interferences"	8/20 (40%)

Themes	Responses	Number of Responses
(C4.2) Legislation and processes	“the Intergovernmental Relations Framework Act must be amended as taking action against the municipalities is difficult resulting in poor WWTWs”, “DWS is funding the municipalities but it’s not refurbishing the plant”, “wording of the NWA must be amended to stand up in court”, “municipal funding must be monitored”, “NWA must be amended to include on-the-spot charges to transgressors”, “gaps in the NWA do not allow the water user to pay for transgression before issued a WUA”, “compulsory licensing should be more effective”, “WULs are being issued to water users while investigations are being conducted”, “gap in NWA to authorize all quarries”	6/20 (30%)
(C4.3) Research and technology	“water users have new technologies that officials are unaware off”, “new research can lead to effective compliance in the water sector”, “improve technology to do effective monitoring”, “improve technology to 4th industrial revolution”	4/20 (20%)
What are the opportunities related to CME within the water sector?		
Theme A: Capacity and budget		
(O1.1) Human resources	“improve on capacity for enforcement actions at head office. It will make us less frustrated to do our work as the work load will not be that much”	1/20 (5%)
Theme B: Stakeholder engagement		
(O2.1) Meetings and forums	“engagements with private sector on how they manage use of water and their understanding of the NWA”, “engaging with internal officials helps get the work done quicker”, “conducting research with external stakeholders provides new interventions”, “Catchment management forum helps to discuss issues with water users and provide compliance promotion”, “some water users request engagement with the dept this helps them understand the enforcement process”	8/20 (40%)
Theme C: Operational opportunities (O3)		
(O3.1) Inspections and investigations	“separation of sectors at head office allows for innovative guidelines, policies and standards”, “compliance inspections creates awareness among the water users”, “conducting audits with the regional office helps build relationships”, “with inspections you can see who is complying or not”, “inspections show water users over time what’s going on with their activity and improve compliance”, “separation of sectors at head office help us to focus on specific sectors rather than all at once”, “if the directive is issued to the transgressor, do not issue the WUL”, “issuance of pre-directives/directives are working”, “Joint inspections involves all units which makes the process more effective and move faster”, “Head office needs to be pro-active in planning in finding information of the water user, the regional office have a lot of work”, “going on-site with regional office helps	8/20 (40%)

Themes	Responses	Number of Responses
	officials to learn from head office" "preplanning is important and should be done before the investigation process begins"	
(O3.2) EMI designation	"EMIs can now carry a docket under enforcement", "designation of EMIs and carry a docket to the NPA we don't have to rely on the SAPS", "EMIs can do their investigation with collaboration of SAPS", "EMIs are peace officers", "EMIs are able to tighten the criminal investigation and carry their docket"	8/20 (40%)
(O3.3) Training and awareness	"training sessions to judges", "conducting research with stakeholders", "sector specific training helps the regional officials to conduct inspections", training to communities assist them to understand legislation", "awareness campaigns shows progress", "liaison meetings with the regional office helps to keep on track for enforcement issues", "training is needed at the regional office and CMAs", "create enforcement awareness campaigns to local communities on water legislation", "training of the systems helps new and old officials", "the EMI training is equipping us to be more effective in all sectors to do enforcement", "training to the NPA and SAPS is helping to educate them on water legislation"	7/20 (35%)
(O3.4) CME systems	"the national compliance information system (NCIMS) provides for standardisation conducting inspections", "NCIMS and Enforcement Case Management tool (ECMS) systems keeps track of transgressors", "these systems help us to get information of the water user quicker", "it help us capture information at a central place", "NCIMS has standardised reporting", "metering regulation tool and Integrated Regulatory Information System (IRIS) are good tools"	6/20 (30%)
(O3.5) CME procedures	"CME SOP manual provide structure to the CME processes and procedures"	3/20 (15%)
Theme D: Attitude, support, behaviour		
(O4.1) Working relationships	"we need to support each other to have successes", "willingness of the officials is what is needed", "we need to maintain relationships between head office and regional office to make CME more effective", "strengthen relationships with schools, communities and the private sector", "we need to create relationships with other depts to share skills and time efficiency"	3/20 (15%)
How can the identified CME challenges be overcome within the water sector?		
Theme A: Capacity & budget		
(OC1.1) Budget	"allocate more budget to perform functions", "engage the officials on the needs of resources", "budget plays in important role to overcoming our resources challenges as projects will be completed on time"	5/20 (25%)
(OC1.2) Human resources	"we need to employ more skilled officials", "appoint more technical staff for enforcement"	3/20 (15%)

Themes	Responses	Number of Responses
Theme B: Operational processes/procedures		
(OC2.1) Training and awareness	"promote training within the sectors to regional office and CMAs", "training is needed to capacitate the new officials at the regional office especially on the legislation", "promote awareness campaigns to the communities and traditional leaders on illegal sand mining and the legislation", "promote awareness campaigns and compliance promotions to the municipalities" , "promote more training to the judiciary and SAPS on the NWA", "we need to train the water users on what the WUL conditions mean", "create enforcement awareness in the rural areas for illegal sand mining", "we need refresher courses", "more workshops is needed between WUA and CME", "have more training to improve knowledge of EMIs and sector specific training", "training of the CME SOPs must be rolled out to the regional office and CMAs"	15/20 (75%)
(OC2.2) Inspections and investigations	"exercise the compulsory licensing", "Joint inspections will lessen the burden of disrupting the work flow of the water users", "conducting strategic hot-spot inspections with other depts are very effective", "WUA unit must rectify the licence conditions to be site specific and enforceable", "WUA must not issue a WUL to a transgressor during an investigation", "WUA must analyse the conditions to sector specific no copy and paste"	7/20 (35%)
(OC2.3) Communication	"implement a MOU between units so each unit understands each other's functions, expectations and objectives", "improve decision-making and communication from line function", "regular engagements with regional office help understand the overall needs of CME", "we need to improve intergovemental communications", "better planning in advance is needed", "continuous communication should be done between the CM and Enforcement units regarding cases", "we must be able to communicate between WUA and CME units when it comes to enforcement actions", "have quarterly liaison meetings with head office and regional office on pressing issues"	7/20 (35%)
(OC2.4) Functions and delegation of powers	"align the roles and responsibilities of head office and regional offices", "we need to review the delegation of powers to alleviate administrative burden", "create a dedicated unit for forensic investigation", "nominate the Chief Director/Director for delegation of powers for enforcement actions to alleviate delays", "appoint a dedicated unit for prosecution solely responsible for criminal actions for a quicker response time", "Regional office must have separation of functions", "enforcement unit must be centralised to head office to have effective management", "we need more consultation process on the restructuring process"	7/20 (35%)
(OC2.5) Preplanning and collaboration	"preplanning is needed to identify the priority sectors polluting as regional office do not have capacity", "give head office mandate to conduct follow-up inspections", "we must do better planning in terms of knowing the history of the water user by using the CME systems", "conduct more follow-up inspections", "collaborate with other law enforcement agencies or joint operations such as DMRE, SAPS, Home Affairs on illegal sand mining will be more effective", "we need focused training and competence for effective enforcement"	7/20 (35%)

Themes	Responses	Number of Responses
(OC2.6) Standardisation and quality of reporting	“standardise the timelines to submit the inspection report to the water user”, “we need to clearly define follow-up inspection timelines”, “we must standardise the compliance monitoring procedures between head office and regional office”	2/20 (10%)
Theme C: Attitude, support, behaviour		
(OC3.1) Existing behaviour and attitudes	“promote incentive-based approach to officials on performances”, “retain skills of officials to do effective compliance”	1/20 (1%)
(OC3.2) “Buy-in” and support	“have team buildings to build the morale of officials”	1/20 (5%)
Theme D: Administrative processes/procedures		
(OC4.1) Legislations and processes	“amend the Intergovernmental Relations Framework if we are going to succeed against the municipalities who are polluting”, “propose General Authorisations to the HDI communities for low impact activities and write the authorisation in the native language to be understood”, “municipal funding must be monitored regularly to stop them from polluting”, “amend the legislation to include all quarries”, “the legislation must include charges for specific contraventions on the spot i.e. on-the-spot-fines”, “amend the wording of the NWA”	7/20 (35%)
(OC4.2) Research and technology	“improve the CME tools with international technology to risk becoming obsolete as DWS is not familiar with the technology the water users are implementing”, “update on new technologies”	3/20 (15%)

4.2 Discussion on the challenges related to CME within the water sector

The following themes were identified for Q1 under the themes to include Theme A budget and capacity; Theme B operational challenges; Theme C attitude, support, behaviour and Theme D administrative processes/procedures. The challenges associated with these themes are presented and discussed below.

4.2.1 Theme A: Budget and capacity

4.2.1.1 Budget (C1.1)

A total of 9/20 (45%) participants felt budget constraints were a restriction in obtaining personal protective equipment (PPE) (uniforms, cameras, bullet proof jackets) and hindered them in conducting and retrieving information and evidence during inspections and investigations. Limitations in PPE contributed to officials feeling frustrated in performing their duties effectively and also threatened their safety and security when engaging illegal miners.

4.2.1.2 Human resources (C1.2)

A total of 7/20 (35%) participants believed the insufficient human and resource capacity impacted on the number of inspections and investigations being done when compared to the large volume of registered water users. Participants felt the limited number of officials on the ground contributed to the submission of poor-quality inspection reports and increased delays in reporting to line management on a quarterly basis and as well as providing feedback to the water users.

Similar challenges in Peru, Bangladesh, Sudan and Nigeria have shown financial and human capacity is a continuous challenge hindering the CME officials from conducting their duties effectively (Belal, 2012 & Abdalla *et al*., 2013; Edo *et al*., 2022; Espin & Perz, 2021).

4.2.2 Theme B: CME operational challenges

4.2.2.1 Knowledge/awareness/skill and interpretation of legislation (C2.1)

A total of 17/20 (85%) participants responded that skills, knowledge, awareness, and interpretation of the legislation was a major challenge in the department and among stakeholders (namely the judiciary, South African Police Services, local communities, and traditional leaders). Participants felt these challenges contributed to poor performance in inspections and investigation, failure to win cases against the transgressors; misinterpretation of mandates of other governmental departments and insufficient information and understanding of legislation and WUAs. Officials felt the lack of understanding and awareness of CME functions created a feeling

of intimidation amongst the water users especially in the smaller or historical disadvantaged communities. It was also noted that officials on the regional level were leaving the department without transferring their skills which added pressure to new officials to perform their duties effectively.

Discussions from the literature acknowledge these challenges are experienced both in developing and developed countries within CME. Insufficient capacity development and training awareness has led to the misinterpretation of legislation leading to ambiguity of legislation making it difficult to apply by officials and stakeholders (namely the judiciary, SAPS and community leaders) (Abdalla *et al*., 2013; David, 2020; Wilson *et al*., 2022). Furthermore, gaps in scientific and technical knowledge have contributed to delays in updating new water security interventions in the sector (Naidoo *et al*., 2016). Likewise, insufficient communication and involvement of relevant stakeholders and communities are impacting on good management of water resources compromising transparency and trust in CME (Abdalla *et al*., 2013; Bodwitch *et al*., 2021; Edo *et al.*, 2022; Naidoo *et al*., 2016).

4.2.2.2 Communication (C.2.2)

A total of 12/20 (60%) participants believed the poor communication between the CME units effected the process of receiving feedback on inspections/investigations. Since new officials were being appointed and officials leaving for promotions or changing job descriptions, participants were not happy because the lack of being informed impacted their duties. Participants felt the regional office did not always communicate the outcome of the inspection to the water users which reflected as incompetent towards the department. Participants also felt managers failed to communicate relevant information on a timely basis.

The breakdown in communication between the CME and WUA units impacted negatively on process and procedures when conducting enforcement actions against the transgressor. Water use authorisations were being issued to a transgressor concurrent with the prosecution of the transgressor, making the department look incompetent which attributed to units working in silos and breakdown in communication. It was also observed that poor communication between government departments hampered inspections and investigations by duplicating processes and frustrating the water user hindering the workflow of the facility.

It is evident from the literature that insufficient communication leads to poor management of water resources, lack of transparency and trust among stakeholders (Bodwitch *et al*., 2021; Naidoo *et al*., 2016). Inadequate communication has the potential to duplicate work, create silos and promote the lack of cooperation and coordination between stakeholders (Kotzé, 2009).

Furthermore, limited communication between management and staff can contribute to inadequate decision-making and poor relationships between officials (Chepyegon & Kamiya, 2018; Pegram, 2006). Case studies in the USA and UK is evident of these challenges reflecting insufficient communication and engagement with the regulator increases the lack of awareness and compliance to environmental legislation (Bodwitch *et al*., 2021; Wilson *et al*., 2011).

4.2.2.3 Functions and delegation of powers (C2.3)

A total of 11/20 (55%) participants expressed CME functions should be separated according to water sectors (namely mining, industry, agriculture, irrigation and SFRA and afforestation) at regional level rather than officials performing CME functions for all the water sectors simultaneously. This would allow officials to specialise in specific water sectors enabling a more effective process and clear understanding of each sector's requirements as per the WUA.

According to the participants regional officials were not obligated to report to head office on the inspections they conducted as per the delegation of powers within DWS. This posed significant challenges to the inspection reports not being verified or quality checked by head office officials.

Participants felt there were no clear definitions of roles and responsibilities of CME at head office and regional offices which contributed to the lack of alignment of these functions. The fragmented administrative procedures and duplication of duties were hindering efficient CME functions. With the new delegation of powers, participants felt this would hamper enforcement actions by causing administrative processes and procedures delays.

Case studies from Nigeria, Sudan and Ghana indicate legislative, institutional and intersectoral fragmentation has led to government departments performing regulatory functions with different laws for a similar situation, creating confusion of roles and responsibilities and duplication of functions (Abdalla, *et al*., 2013; Edo *et al.*, 2022, Kotzé, 2009; Tuokuu *et al*., 2018). The challenges experienced through the different fragmentation as contributed to poor communication and corporation between officials increasing the duplication of duties and inconsistencies increasing delays in the administrative processes (Espin & Perz, 2012; Kotzé, 2009; Tuokuu *et al*., 2018; Espin & Perz, 2012).

4.2.2.4 Preplanning and collaboration (C2.4)

A total of 8/20 (40%) participants indicated there were insufficient preplanning between the head office and regional office CME units and government departments during joint inspections/investigations. Participants felt this contributed to administrative delays. Joint inspections with large number of officials also overwhelmed the water user and interfered with the

work production of the facility of which participants felt better planning in terms of human and resource capacities would be more effective during inspections/investigations.

Participants felt insufficient collaboration between the head office and regional office CME units hampered the gathering of information from water users as the same information was requested repeatedly on different occasions. This frustrated the water users. The lack of collaboration also impacted on the administrative processes and enforcement actions especially with the illegal sand mining for potential enforcement actions as departments were not aware of each department's CME actions.

Participants felt the need to conduct follow-up inspections was important to ensure the water user was rectifying the non-compliances. According to the delegation of powers, the regional office is only responsible to conduct the follow-up inspections therefore the participants felt that clear roles and responsibilities should be defined to be able to assist in the follow-up inspections elevating the burden of capacity constraints.

From the case studies in the UK, Peru, Nigeria and Sudan it is evident that poor planning and insufficient collaboration between government departments caused confusion with different mandates hindering CME from achieving its goals (Belal *et al*., 2015; Espin & Perz, 2013). It has also increased the duplication of duties and confusion of roles and responsibilities creating inconsistencies between the public and private sectors (Abdalla *et al*., 2013; Edo *et al*., 2022; Espin & Perz, 2021; Tuokuu *et al*., 2018; Wilson *et al*., 2011).

4.2.2.5 Standardisation and quality of reports (C2.5)

A total of 7/20 (35%) participants responded that the regional office lacked in confidence and understanding when preparing the inspection reports. Inspection reports reflected poor quality information and technical writing skills, which was attributed to the limited human resource capacity that must conduct a high volume of inspections by regional officials. This also impacted on the timeframes for the reports to be signed off by a manager and to be submitted to the water user.

It is evident in literature that insufficient human capacity, skills and knowledge has the potential to impact negatively in producing good quality inspection reports and delaying its submission within specific timeframes (Belal *et al*., 2015; Naidoo *et al*., 2016). Inconsistencies in communication among stakeholders may give rise to reports not being submitted on time to the water users therefore hindering water users in rectifying the non-compliances (Kotzé, 2009; Pegram *et al*., 2006).

4.2.2.6 Training and compliance promotions (C2.6)

A total number of 3/20 (25%) participants felt the regional office required training on the CME SOPs when conducting inspections and investigations. It was observed that water users lacked the knowledge and understanding of the legislation and therefore failed to comply with the WUA. Literature review has highlighted weak compliance promotion and training awareness increases inconsistencies in conducting compliance inspections and understanding legislation or WUAs (Belal *et al*., 2015; Edo *et al*., 2022; Greiner *et al*., 2015). Furthermore, SOPs provide a gradual and consistent way of implementing procedures in a clear and specific way and important to be trained in these procedures (Alers & Ferreira, 2019; Mofokeng *et al*., 2019).

4.2.3 Theme C: CME administrative processes/procedures

4.2.3.1 Buy-in and support (C3.1)

A total of 8/20 (40%) participants felt the “buy-in” and support of communities and traditional leaders had a negative response and did not accept legislation particularly in sand mining activities for lack of understanding legislation. Participants also experienced resistance from water users in historically disadvantaged communities as they did not understand legislation and lacked the resources to comply to the WUA (Denby, 2016). Participants also felt water users do not understand the value of water and therefore misunderstand its availability.

Literature review shows the cost of complying is high and unaffordable (Bodwitch *et al*., 2021; Denby *et al*., 2016). Public awareness is weak among local communities and have discouraged decision-making in the sector (Abdalla *et al*., 2013). As a result of insufficient knowledge and understanding in WUAs and the unequal distribution of water among HDS’s communities display reluctance to complying to environmental legislation (Greiner *et al*., 2015).

4.2.3.2 Existing behaviour and attitudes (C3.2)

A total of 3/20 (15%) of participants felt there were a lack of interest and team building among officials. Participants felt that some officials displayed an attitude of “powerplay” and “hearsay” from head office to compel officials work together of which reflected as unprofessional behaviour. Participants also felt relationships and corporation among officials needed to be strengthened among the different DWS units to improve the water sector.

Literature review explains that interactions through workshops, forums and meetings between officials promote information sharing on experiences and difficulties within the sector, which can provide confidence to carry out their duties (Pons *et al*., 2019).

4.2.4 Theme D: Attitude, support, behaviour

4.2.4.1 Political interferences and will power (C4.1)

A total of 8/20 (40%) of participants believed that political interferences and corruption impacted on service delivery within local government and influenced the decision-making when it came to implementing CME in the sector. Participants felt there was a lack of political will to follow through on enforcement actions especially with municipalities and therefore contributed to the scope of work to be unsuccessful and ignored. Similar experiences were observed in Bangladesh and Nigeria where the lack of political will contributed to inefficiencies in implementing legislation and making the right decisions (Belal *et al*., 2025; Edo *et al*., 2022).

4.2.4.2 Legislation and processes (C4.2)

A total of 6/20 (30%) of participants felt there were challenges with water users complying to legislation and processes within CME. Participants were adamant the Intergovernmental Relations Framework Act, 2005 should be amended as executing compliance and enforcement actions was futile against municipalities resulting in the poor operations of the Wastewater Treatment Works (WWTWs). The funding of the DWS to the municipalities was a concern and participants felt municipalities should be strictly monitored to ensure compliance to the WUAs. The lack of compliance by municipalities are due to ignorance, limited capacity of skilled and experienced staff and increased corruption in service delivery resulting in job losses and polluted water resources (Haigh *et al*., 2010; Thornhill, 2014).

Some participants were concerned about the lack of implementing compulsory licensing which they believed would be effective in ensuring the ELUs were complying and not depleting the water resources within their catchments. Through the process of compulsory licensing, it was expected to address the ELU and ensure the fair reallocation of water specifically in water stressed areas to protect the quality of water, promote beneficial use and allocation of water. The implementation of compulsory licensing is not without challenges as limited capacity and administrative burdens to issue and monitor WUAs are obstacles to the process (Anderson, 2007; Denby *et al*., 2016).

Participants felt the NWA should be amended to address the “wording” of the Act to be able to stand up in court avoiding any misinterpretations of the chapters and sections; should include on-the-spot fines to the transgressors and authorise all quarries and not specific ones. Participants felt these gaps did not allow transgressors to be accountable for their contraventions in court or pay for illegal activities' transgressions before being issued the WUA. These views coincide with Chauhan (2020) and David (2020) whereby inefficiencies in legal education and training awareness in environmental legislation have contributed to law enforcement failing to prosecute

transgressors with stringent penalties. Case studies in Sudan and Nigeria show regulation is unclear, incomplete and not updated with recent environmental issues, furthermore, wording of legislation has led to different interpretations creating ambiguity making is difficult to apply (Abdalla *et al*., 2013; Edo *et al*., 2022).

4.2.4.3 Resources and technology (C4.3)

A total of 4/20 (20%) participants believed DWS should improve on research and technology to be aligned with what the water users were implementing in terms of new innovations to improve sustainable water conservation. Participants believed ongoing research and new technology would improve management and create awareness within the sector. It was of the belief that the improvement of technology to the 4th industrial revolution would also contribute to the monitoring of the water uses. It is evident from literature that deficiencies in budget availability, communication barriers among the public and private sectors and over-bureaucracy of administrative procedures have the potential to hinder the implementation of new research and technology in CME (Kotzé, 2009; Pegram *et al*., 2006).

4.3 Discussions on the opportunities related to CME within the water sector

The following themes were identified for Q3 under the themes to include Theme A capacity and budget; Theme B Operational procedures/processes; Theme C attitude, support, behaviour and Theme D administrative processes/procedures. The challenges associated with these themes are presented and discussed below.

4.3.1 Theme A: Capacity and budget

4.3.1.1 Human resources (CO1.1)

Only 1/20 (5%) of the participants responded that capacity at head office should be improved within the enforcement unit. Employing more officials would increase the work force on the ground and relieve officials of being overloaded with work therefore, increasing human capacity with expertise and skills will help improve CME (Brownlie *et al*., 2017; CER, 2011; Dasgupta *et al*., 2000).

4.3.2 Theme B: Stakeholder engagement

4.3.2.1 Meetings and forums (CO 2.1)

A number of 8/20 (40%) participants responded that engagements and compliance promotion with the water users on understanding legislation and WUAs would improve water management.

Furthermore, collaborating with the external stakeholders provided for new interventions within the water sector. Engaging water users on platforms such as workshops and forums provided the opportunities to discuss issues and compliance promotion regarding CME functions, processes, and procedures with the water users. Similar views in the literature support stakeholder engagement to promote information sharing and the potential to increase compliance level in the sector (bin Nawawi *et al*., 2022; Lyu & Yang, 2024; Pons *et al*., 2019; Ravindar *et al*., 2016).

4.3.3 Theme C: Operational opportunities

4.3.3.1 Inspections and investigations (O3.1)

A number of 8/20 (40%) participants believed compliance inspections and investigations created awareness among water users including empowering the water users on how to comply to the WUA. Similarly, joint inspections allowed the involvement of different units which made the CME process more effective and efficient, while contributing to building relationships with the regional office as well as other governmental departments. Literature review indicates regulatory actions through inspections/investigations provide a specific and general deterrence for facilities to comply with regulations increasing compliance behaviour (bin Nawawi *et al*., 2022; Gray & Shimshack, 2011; Lim, 2016). Furthermore, joint inspections also increased networks of expertise for communication, information and resource sharing for an effective CME (Hauck & Kroese, 2006).

4.3.3.2 EMI designation (O3.2)

A total number of 8/20 (40%) participants were in favour of the designated Environmental Management Inspectors being able to carry a docket under enforcement to the National Prosecuting Attorney and not rely on the administrative process of the SAPS. Environmental Management Inspectors were designated as peace officers and able to conduct their investigation in collaboration with the SAPS (NEMA, 2003). Environmental inspectors play a significant role in monitoring relevant environmental legislation, bringing to task everyone who are failing to comply through enforcement actions (Baloyi & Masinga, 2011).

4.3.3.3 Training and awareness campaigns (O3.3)

The total number of 7/20 (35%) participants felt training and awareness campaigns would improve understanding of legislation, water use authorisation, build relationships improving the water sector. Training and awareness campaigns were seen as important opportunities to stakeholders to include the regional offices such as the judiciary, South African Police Services (SAPS) as well as communities and traditional leaders. Study cases in Mexico, India, Canada and China indicate

that training staff can develop specialists and managers with the confidence to implement regulatory actions, while public awareness can create successful relationships between public and private sectors and increase their responsibilities to CME (Dasgupta *et al*., 2000; Lyu & Yang, 2024; Pons *et al*., 2019; Ravindar *et al*., 2016).

4.3.3.4 CME systems (O3.4)

A total number of 6/20 (30%) participants believed the National Compliance Information System (NCIMS) and Enforcement Case Management Systems (ECMS) provided for the standardisation of inspection reports and tracking of transgressors and ensure information was in a central place. Participants felt both systems provided access to information of water users in a quicker time frame. Introducing new types of technology will improve monitoring and availability of data for an effective enforcement to regulations and assist government capacity (Lyu & Yang, 2024).

4.3.3.5 CME procedures (O3.5)

A total number of 3/20 (15%) participants were impressed with Compliance Monitoring and Enforcement Standard Operating Procedures (SOPs) that provided structure to the CME processes and procedures. Participants were of the belief SOPs would guide the CME processes and procedures for the current and new CME officials to ensure standardisation and awareness of CME functions and protocols (DWS, 2023). The SOPs will provide a gradual and consistent way of implementing procedures to include instructions and information to be followed in a specific way which are clear, sufficient and beneficial ensuring compliance to specific functions (Alers & Ferreira, 2019; Mofokeng *et a*l., 2019).

4.3.4 Theme D: Attitude, support, behaviour

4.3.4.1 Working relationships (O4.1)

A total number of 3/20 (15%) participants felt supporting each other and the willingness to work together was what was needed to strengthen relationships and improve skills between head office and regional office contributing to an effective CME. They believe that creating relationships with schools, communities, the private sector, and other government departments would also promote sharing of skills and create better understanding of the water sector. Similar findings in the case studies in India and Canada show that working together as public and private sectors can create successful working relationships for an efficient regulatory regime (Pons *et al*., 2019; Ravindar *et al*., 2016).

4.4 Discussion on how to overcome the challenges related to CME within the water sector

The following themes were identified for Q3 under the themes to include Theme A capacity and budget; Theme B stakeholder engagements; Theme C operational opportunities; and Theme D attitude, support, behaviour. The challenges associated with these themes are presented and discussed below.

4.4.1 Theme A: Capacity and budget

4.4.1.1 Budget (OC1.1)

A number of 5/20 (25%) of participants felt that management should engage the officials on the needs of resources as budget plays in important role in overcoming their resource challenges and ensuring projects will be completed on time. These resources would promote efficient completion of inspections and investigations and allow officials to work in a safe environment.

4.4.1.2 Human resources (OC1.2)

A total of 3/20 (5%) participants felt a bigger portion of the budget should be allocated to perform their functions and employ more skilled and technical staff under enforcement. Additionally, employing more skill officials and appointing technical staff for CME would assist in increasing the number of water users being monitored.

4.4.2 Theme B: CME operational processes/procedures

4.4.2.1 Training and awareness (OC2.1)

The highest concern was related to training and awareness campaigns at 15/20 (75%). Several participants believed training would capacitate the current and newly appointed officials on relevant legislation especially at regional office. It would further assist to create an awareness among communities and traditional leaders on illegal sand mining and legislation. There was an urgent need to train the judiciary and SAPS on the NWA as participants agreed that many enforcement cases were being lost due to the lack of understanding of relevant environmental legislation especially the NWA to be able to prosecute transgressors.

Furthermore, participants who supported the EMI training suggested it should be improved to include sector specific training to sharpen skills and knowledge. Participants felt it was necessary to roll out the CME SOPs training as it provided the procedures and protocols for each water sector the EMI should perform to promote standardisation within CME.

4.4.2.2 Inspections and investigations (OC2.2)

From the responses 7/20 (35%) felt the implementation of compulsory licensing would assist in monitoring the water uses within the catchment areas to ensure an equal distribution of water. The joint inspections would lessen the burden of disrupting the workflow of the water uses as all relevant departments would be present at the same time rather than coming on different occasions. Conducting “hot spot” inspections would be beneficial and effective in monitoring specific areas of high impact activities to ensure the water users was complying with the authorisation. The participants also felt the WUA unit should not issue an authorisation to a transgressor during an investigation as this would compromise the prosecution procedure.

4.4.2.3 Communication (OC2.3)

To breech the communication gaps, 7/20 (35%) of participants proposed the implementation of a Memorandum of Understanding (MoU) between the units to understand the functions, expectations, and objectives which also included regular engagements between regional office would help to understand the overall needs of CME. Better planning in advance was needed. Improved communication with intergovernmental departments on a regular basis would assist in understanding what is happening with CME and promote information sharing and strengthen relationships.

4.4.2.4 Preplanning and collaboration (OC2.5)

It was important to standardise and clearly define timelines for the submission of the inspection reports to the water user and follow-up inspections as indicated by 7/20 (35%) of responses. It was also proposed that the head office be given the delegation of powers to conduct follow-up inspections when the regional office was unable to do so. Preplanning was highlighted as a good practice to identify the priority sectors, due to limited capacity, and further assist in understanding the history of the water user. Collaboration with other law enforcement agencies or joint operations was expected to improve CME such as the case of tracking illegal sand miners.

4.4.2.5 Functions and delegation of powers (OC2.5)

Based on 7/20 (35%) of responses, participants felt roles and responsibilities of functions should be aligned with head office and regional office together with the separation of CME functions would contribute to an efficient CME unit and show credibility to the water users. The review of the delegation of powers would alleviate administrative burden and delays with the appointment of a senior official at head office to delegate the powers for enforcement.

4.4.2.6 Standardisation and quality of reports (OC2.6)

Based on 2/20 (15%) of responses, participants felt timelines should be standardised when submitting the inspection report to the water use. Furthermore, the timelines for when follow-up inspections should be conducted and how many follow-up inspections should be done should be clearly defined. Participants also felt that there should be standardisation of compliance monitoring procedures between head office and regional office.

4.4.3 Theme C: Attitude, support, behaviour

4.4.3.1 Existing behaviour and attitudes (OC3.1)

A total of 1/20 (5%) of participants felt promoting an incentive-based approach on work performances such as awarding bonuses for exceeding CME targets would help retain officials in the sector. Promoting team building would also strengthen relationships in the workplace.

4.4.3.2 Buy-in and support (OC3.2)

A number of 1/20 (5%) of participants believed that team buildings would build the morale of officials and promote a positive work environment.

4.4.4 Theme D: Administrative processes/procedures

4.4.4.1 Improvement to legislations and processes (OC4.1)

Of the participants 7/20 (35%) responded that the amendment of the Intergovernmental Relations Framework Act would assist the CME to win cases against the municipalities who were guilty of pollution. Participants proposed that GAs be issued to the HDI communities for low impact activities and write the authorisation in the native language for the communities to understand. Municipal funding should be monitored on a regular basis to ensure compliance in the water sector. Amendments to the legislation should include charges for specific contraventions for on-the-spot-fines, ensure the correct wording in the act, and authorise all quarries, not only selected ones.

4.4.4.2 Improvement of research and technology (OC4.2)

A total of 3/20 (15%) of participants indicated adopting the new technology and expanding new research would empower the CME officials' knowledge on what was available in the water sector thereby improving the compliance inspections and interactions with the water uses. Improvement of CME tools and aligning with the latest technology would become beneficial to the CME officials as the officials were not familiar with the latest technology the water users were using.

4.5 Chapter summary

Chapter 4 provided the results and discussions of the responses gathered during the semi-structured interview process. The next chapter will provide the research conclusion and recommendations.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The obligation of the South African water sector to the SDG 6 is to promote the sustainable management and supply of water and sanitation to all human beings (DWS, 2023; Mamokhere, 2022). In doing so, the NWRS-3 provides the DWS with the opportunity to protect, use, develop, manage and control the water resources in a sustainable manner through objectives and actions that must be implemented for the regulation of the water sector of the country. The DWS relies on CME, which essentially forms an integral part of the environmental management framework in South Africa by strengthening the regulatory functions, to improve compliance and enforcement related to WUAs (DWS, 2023).

International literature seems to suggest that several challenges related to CME (Edo *et al*., 2022; Wilson *et al*., 2011). Within the South African context similar observations have been made within the broader environmental management sector (Carden & Armitage, 2013; CER, 2012; Kotzé, 2006; Weston & Goga, 2016). Limited empirical research has been conducted to understand these challenges as well as associated opportunities for CME within the water sector specifically to WUAs. Therefore, the aim of this research was to explore those challenges and opportunities for CME related to WUAs in the South African water sector and how these challenges may be overcome for an improved CME in the sector.

A qualitative research approach was adopted as it is a flexible approach for a small sample group to project a personal, humanistic experience to understand their thoughts and actions (Renjith *et al*., 2021). The research approach was supported by semi-structured interviews of 20 participants in the field of CME within DWS in the head office in Pretoria. A thematic analysis method was applied to identify and analyse the patterns of meaning within the qualitative dataset. Through the adopted and implemented of these methods, the aim of the research was achieved.

5.2 Key findings of the research

The following sections provide a summary of the key findings for the three open-ended questions directed to the participants.

5.2.1 The key challenges to CME in the water sector

- 17/20 (85%) of responses indicated there is insufficient capacitation of officials in strengthening of skills, knowledge, awareness and the interpretation of legislation at a regional office level. The lack of knowledge and understanding of the NWA and other

environmental mandates hinders officials in conducting efficient inspections. Stakeholders, namely the judiciary; SAPS and communities do not have a clear understanding or interpretation of the NWA and other environmental legislation leading to increasing non-compliance to WUAs and delaying enforcement actions against multiple transgressors.

- 12/20 (60%) of responses indicated poor communication between CME units at head office and regional office are hindering the finalisation of the CME processes and procedure. Participants felt inadequate communication between head office and regional office officials make the department look incompetent to the water users. Inefficient communication between government departments is breaking down relationships. Poor communication in mandates of relevant departments on a strategic level is confusing the water users.

- 11/20 (55%) of responses indicated unclear undefined roles and responsibilities including the delegations of powers which contribute to duplication of duties and administrative burdens and delays of CME actions between head office and regional office officials. Regional office officials are tasked with conducting inspections in all water sectors (mining, industry, irrigation, SFRA, agro processing) due to no separation of sectors at a regional level. Furthermore, there is no clear administrative procedures between head office and regional office this hinders the process of who must conduct follow-up inspections or submitting signed inspections reports to the water users.

5.2.2 The key opportunities to CME in the water sector

- 8/20 (40%) of responses indicated stakeholder engagements through different platforms (meetings, workshops, forums) would promote the understanding of legislations and information sharing in the water sector. Stakeholders would be more educated and better informed of what is required to comply with legislation and WUAs.

- 8/20 (40%) of responses indicated inspections/investigations created an awareness of CME among water users and help build relationships between officials from different units within CME. Joint inspections involving different expertise makes CME processes effective and quicker to finalise. Doing onsite inspections also assisted officials to learn from each and to be confident.

- 8/20 (40%) of responses indicated that EMIs as designated peace officers were able to carry their own docket and therefore increase and speed up the number of

administrative and criminal prosecutions against transgressors. The power to carry a docket allows the EMIs to communicate directly with the NPA to finalise investigations and prosecutions and not necessary overload the SAPS with environmental crimes that could be investigated and resolved by the EMI.

5.2.3 How to overcome CME challenges in the water sector

Responses from the research provide insight into how challenges within CME can be overcome.

- 15/20 (75%) of responses indicated capacitating officials, water users and affected stakeholders through compliance promotions and training awareness will improve skills, knowledge and understanding of the regulatory regime. Promoting capacity building will improve compliance to legislation. Participants believe it has the potential to build relationships and confidence between the regulator and water users (Dasgupta *et al*., 2000; Pons *et al*., 2019).

- 7/20 (35%) of response indicated conducting joint inspections and strategic hot spot inspections in collaboration with other government departments is expected to increase CME actions, improve the network of expertise to communicate and share information and lessen the burden of disrupting the workflow of water users (Hauk & Kroese, 2006). Improved collaboration between CME and WUA units regarding inspections/investigations will ensure conditions of the WUA are site specific and enforceable and prevent repeated transgressors from being issued additional WUAs.

- 7/20 (35%) of response indicated it is essential to promote continuous communication between CME officials to ensure the understanding of environmental legislation and compliance to WUAs (Kotzé, 2009; Pons *et al*., 2019). Participants felt improving communication between line managers and officials will promote information sharing and a better understanding of internal decision-making and procedures. Furthermore, conducting regular engagements between the CME units at head office and regional offices regarding their needs and concerns will improve working relationships and understanding their functions (Pons *et al*., 2019; Ravindar *et al*., 2016).

5.3 Recommendations and areas of future research

Based on the findings of this research the following recommendations are presented. The proposed recommendations may assist the DWS to improve the overall effectiveness of CME within the South African water sector.

- Promote continuous training and awareness to officials and relevant stakeholders relating to CME and water legislation.
- Ensure consistent communication between the CME units in DWS and other government departments including relevant stakeholders to promote efficient CME practices and strengthen compliance behaviour.
- The roles and responsibilities should be clearly defined between head office and regional office to avoid duplication of duties and increase performance levels in CME.
- Budget allocation for PPE and resources must be prioritised for the officials to perform their duties effectively and safely during inspections/investigations.
- Improve on preplanning and collaboration between CME officials at head office and regional office including other government departments promoting efficient engagements, information sharing and positive outcomes in CME.
- Political will power and interferences must be addressed, and the responsible officials take accountability for their decision-making.
- Promote compliance promotion among stakeholders to buy into a transparent and fair regulatory regime.
- Encourage team building and incentives within CME units to motivate and encourage officials to remain and not leave the CME units.

5.4 Chapter summary

Chapter five provided the conclusion and recommendations as identified from the responses of the participants. It provided a detailed summary of the challenges, opportunities and recommendations on how to overcome the challenges within the CME regulatory regime. The scope of research has the potential to extend to the DWS regional offices as well as the CMAs within the CME offices.

5.5 Concluding remarks

From the overall research it may be concluded that the results and discussions indicated similar challenges and opportunities exist within the regulatory regime from an international and national perspective. It is evident that these findings are apparent in both developed and developing countries and within different sectors. This indicates that irrespective of the environmental activity compliance monitoring and enforcement faces similar challenges and opportunities to ensure compliance to environmental legislation. Further to this, it is important to the note the recommendations also align to the literature review and in doing so reassures the water sector that compliance monitoring and enforcement is an ongoing practice that is not isolated from the broader practices. Indeed, exploring the challenges and opportunities in the South African water

sector in relation to the WUAs provided evidence that similar findings are being experienced in the broader context and initiating these recommendations has the potential to strengthen CME unit within the DWS from a head office perspective.

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ANNEXURE A

Annexure A: Interview Design Sheet

INTERVIEW DESIGN SHEET		
INTERVIEW DATE:		
INTERVIEWER:		
PERSON/S INTERVIEWED:		
No.	**Questions**	**Responses**
	Within the context of the Directorate: CME, the following questions have been developed to understand what the challenges are related to CME, the opportunities related to CME and how the CME challenges can be overcome within the water sector.	
1.	What are the challenges related to CME within the water sector?	
2.	What are the opportunities related to CME within the water sector?	
3.	How can the identified CME challenges be overcome within the water sector?	