

Policy, Legal and Institutional Development for Groundwater Management in the SADC Member States (GMI-PLI)



Gap Analysis and Action Plan – Scoping Report (Final)
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This report emanates from the project Policy, Legal and Institutional Development for Groundwater Management in the SADC Member States (GMI-PLI) commissioned by the Southern African Development Community Groundwater Management Institute (SADC-GMI), and executed by Pegasys.

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FOREWORD

The Southern African Development Community (SADC) Member States, through the support of International Cooperating Partners have gone through a series of Water Sector Reforms which varied in terms of policy, legal and institutional development. The focus of the water sector reforms has been on Integrated Water Resources Management and aimed at achieving sustainable and equitable distribution of water resources in the respective Member States. To a large extent, the water sector reforms did not comprehensively address the sustainable management of groundwater resources, yet 70% of the population in the SADC region depend on it. Climate change continues to negatively affect the availability of surface water, placing significance reliance on the use of groundwater for both urban and rural supply throughout the region. Human wellbeing, livelihoods, food security, ecosystems, natural habitats, industries and urban centres growth throughout the SADC Region are increasingly becoming more reliant on groundwater. The SADC region in general has an abundance of groundwater resources. However, due to several factors which include the lack of an enabling policy, legal and institutional environment, only an estimated 1.5% of the available renewable groundwater resources are currently being utilised.

It is estimated that there are about 30 Transboundary Aquifers (TBAs) and 15 transboundary river systems and that these systems are central to the water security of the region. There is therefore a need for Members States to establish and strengthen existing policy, legal and institutional frameworks to achieve equitable and sustainable access to water resources through joint management of the transboundary resources. It is in view of the above and in response to the need to strengthen the sustainable use of groundwater resources conjunctively with surface water at both the national and regional level, that the Southern African Development Community – Groundwater Management Institute (SADC-GMI) was established by the SADC Secretariat, on behalf of the Member States.

The vision of the SADC-GMI is, “to be a Centre of Excellence in promoting equitable and sustainable groundwater management in the SADC region”. The key focus areas of SADC-GMI are to 1) advocate, raise awareness and provide technical support in SADC around sustainable management through the dissemination of information and knowledge; 2) create an enabling environment for groundwater management through policy, legal and regulatory frameworks; 3) promote action-oriented research; 4) promote impact-oriented capacity building and training for groundwater management in the region; 5) lead and promote regional coordination for groundwater management; and 6) support infrastructure development for groundwater management.



In pursuance of the focus area of creating an enabling environment, SADC-GMI implemented the project entitled “Policy, Legal and Institutional Development for Groundwater Management in the SADC Member States, (GMI-PLI)”. The methodology for said project included the development of the Desired Future State, conducting a baseline study of best practices, and description of policy, legal and institutional frameworks which promote sustainable groundwater management. Using an in-Country Experts model, a systematic analysis of the existing policy, legal and Institutional frameworks in comparison with the Desired Future State was conducted to identify gaps that required to be addressed in order to fulfil the SADC-GMI mandate – to achieve sustainable groundwater management in all 16 SADC Member States. The analytical assessment of the gaps identified at national level culminated in the production of 16 National Gap Analysis & Action Plan Reports and the higher-level Regional Gap Analysis Report. The latter summarises the findings across the SADC region.

This National Gap Analysis for the Kingdom of Eswatini provides an overview of the existing gaps in policy, legislation, strategy, guidelines and the institutional frameworks and further suggests enablers required to unlock the identified gaps/challenges. The report provides a clear guidance for the Kingdom of Eswatini to develop an implementation roadmap through a process of prioritising the Strategic Actions in close liaison and in consultations with all relevant stakeholders. It is hoped that these National/Regional Gap Analysis and Action Plan Reports will aid the Kingdom of Eswatini to develop their own Roadmap which will ultimately advance the groundwater narrative and bring it at par with surface water in terms of policy, legal and institutional frameworks which will no doubt enhance sustainable groundwater management at a national and regional level in the SADC Region.

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DOCUMENT INDEX

Presented in the table below is a list of products developed during the GMI-PLI Project:

Phase	Document	Report No.
Country Reports	Gap Analysis and Action Plan – Scoping Report: Angola	1.1
	Gap Analysis and Action Plan – Scoping Report: Botswana	1.2
	Gap Analysis and Action Plan – Scoping Report: Democratic Republic of Congo	1.3
	Gap Analysis and Action Plan – Scoping Report: Kingdom of Eswatini	1.4
	Gap Analysis and Action Plan – Scoping Report: Lesotho	1.5
	Gap Analysis and Action Plan – Scoping Report: Madagascar	1.6
	Gap Analysis and Action Plan – Scoping Report: Malawi	1.7
	Gap Analysis and Action Plan – Scoping Report: Mauritius	1.8
	Gap Analysis and Action Plan – Scoping Report: Mozambique	1.9
	Gap Analysis and Action Plan – Scoping Report: Namibia	1.10
	Gap Analysis and Action Plan – Scoping Report: Seychelles	1.11
	Gap Analysis and Action Plan – Scoping Report: South Africa	1.12
	Gap Analysis and Action Plan – Scoping Report: Tanzania	1.13
	Gap Analysis and Action Plan – Scoping Report: Zambia	1.14
	Gap Analysis and Action Plan – Scoping Report: Zimbabwe	1.15
	Gap Analysis and Action Plan – Scoping Report: Comoros	1.16
	Tanzania GW-PLI Roadmap	1.17
	Kingdom of Eswatini GW-PLI Roadmap	1.18
Regional Reports	Regional Gap Analysis and Action Plan	2
Groundwater Management Guidance Documents	Development of a Groundwater Policy, Legal and Institutional Roadmap	3.1
	Operation and Maintenance of Groundwater Schemes	3.2
	Building Groundwater Resilience	3.3.
	Institutionalisation of Groundwater Management	3.4
	Strategic Approach to Financing Groundwater Management	3.5

CONTENTS

FOREWORD	ii
ACKNOWLEDGEMENTS	iv
DOCUMENT INDEX	v
LIST OF FIGURES	viii
LIST OF TABLES	viii
LIST OF ACRONYMS	ix
1. INTRODUCTION	1
1.1 Background to the GMI-PLI Project.....	1
1.2 Socio-economic drivers for the Kingdom of Eswatini	1
1.3 Water resources	2
1.3.1 Status of water resources (surface water and groundwater)	2
1.3.2 Groundwater environment and ecology	4
2. METHODOLOGY	6
2.1 Overview.....	6
3. POLICY	10
3.1 Evolution.....	10
3.2 Policies to support groundwater management	10
3.3 Gaps and challenges identified	11
3.4 Enablers required to unlock these gaps/challenges	11
4. LEGISLATION	12
4.1 Evolution.....	12
4.2 Legislation to support groundwater management	13
4.3 Gaps and challenges identified	14
4.4 Enablers required to unlock these gaps/challenges	14
5. STRATEGY AND GUIDELINES	16
5.1 Evolution.....	16
5.2 Strategies and guidelines to support groundwater management	16
5.3 Gaps and challenges identified	17
5.4 Enablers required to unlock these gaps/challenges	17
6. INSTITUTIONAL FRAMEWORK	18
6.1 Evolution.....	18
6.2 Institutional arrangements to support groundwater management	18



6.3	Gaps and challenges identified	21
6.4	Enablers required to unlock these gaps/challenges	22
7.	CHALLENGES TO IMPLEMENTATION	24
8.	ACTION PLAN.....	26
9.	REFERENCES.....	29
	Appendix A: Literature Inventory List.....	31
	Appendix B: Stakeholder Engagement List	33
	Appendix C: Desired Future State Summary	36

LIST OF FIGURES

Figure 1: Methodology Outline	6
Figure 2: WMIs that has relevance to groundwater management.....	18

LIST OF TABLES

Table 1: Enablers required to unlock the Policy gaps/challenges.....	11
Table 2: Enablers required to unlock the Legislation gaps/challenges.....	14
Table 3: Enablers required to unlock the Strategy and Guidelines gaps/challenges.....	17
Table 4: Enablers required to unlock the Institutional Framework gaps/challenges	22
Table 5: Action plan Must Have	26
Table 6: Action Plan Should Have	27
Table 7: Action Plan Could Have	27
Table 8: Action Plan Won't Have.....	28

LIST OF ACRONYMS

ACRONYM	DEFINITION
ACAT	African Corporation Alliance Trust
BERCS	Baphalali Eswatini Red Cross Society
CEO	Chief Executive Officer
CIDA	Canadian International Development Agency
CIWA	Cooperation in International Waters in Africa
DFID	Department for International Development
DWA	Department of Water Affairs
EEID	Emandla Ekuphila Irrigation District
EU	European Union
EVAC	Eswatini Vulnerability Assessment Committee
EWSC	Eswatini Water Services Corporation
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Purpose
GEF	Global Environment Facility
GESI	Gender Equity and Social Inclusion
GMI-PLI	Groundwater Management Institute – Policy, Legal and Institutional
GW	Groundwater
IDs	Irrigation Districts
IWRM	Integrated Water Resources Management
IWRMP	Integrated Water Resources Master Plan
JPTWC	Joint Permanent Technical Water Commission
JWC	Joint Water Commission
KOBWA	Komati River Basin Authority
M&E	Monitoring and Evaluation

ACRONYM	DEFINITION
MEPD	Ministry of Economic Planning and Development
MNRE	Ministry of Natural Resources and Energy
MoA	Ministry of Agriculture
MoH	Ministry of Health
MoSCOW	Must, Should, Could, Would
NDS	National Development Strategy
NGO	Non-Governmental Organisations
NWA	National Water Authority
PLI	Policy, Legal and Institutional
PRIMA	Progressive Realisation of the IncoMaputo Agreement
PRSAP	Poverty Reduction Strategy and Action Plan
RBA	River Basin Authorities
RWSS	Rural Water Supply Schemes
SADC	Southern Africa Development Community
SADC-GMI	Southern Africa Development Community – Groundwater Management Institute
SDG	Sustainable Development Goals
SWADE	Kingdom of Eswatini Water and Agriculture Development Enterprise
SWAp	Sector Wide Approach
UNDP	United Nations Development Program
UNICEF	United Nations Children Fund
USAID	United States Agency for International Development
WAB	Water Apportionment Board
WASH	Water Sanitation and Hygiene
WHO	World Health Organisation
WMI	Water Management Institution
WUA	Water Users Association

1. INTRODUCTION

1.1 Background to the GMI-PLI Project

The critical role of groundwater in building the region’s resilience to climate change and improving water security is reflected by the World Bank in their June 2017 online article: *People in Southern Africa are largely dependent on groundwater shared between countries and communities for health and well-being, food production, and economic growth*. As climate variability alters the amount of surface water that is available, people in the region are increasingly turning to groundwater, a resource that is already challenged by threats of depletion and pollution.

The sustainable management of groundwater is a key part of the broader water security for the region, especially in understanding transboundary aquifers. The Southern African Development Community (SADC) has established the Groundwater Management Institute (GMI) to better understand the region’s needs and improve their groundwater management capabilities.

The SADC Groundwater Management Institute (SADC-GMI) is the implementing agency of the World Bank funded Sustainable Groundwater Management in SADC Member States Project. This funding is secured through the Global Environment Facility (GEF) and the Cooperation in International Waters in Africa (CIWA) trust. Part of this funding has been dedicated by the SADC-GMI to respond to gaps in the existing policy, legal and institutional (PLI) frameworks for groundwater management in the region towards fulfilling one of four main components of the project –“Enhancing institutional capacity of governments in SADC Member states and transboundary organisations”. The objective is to be met through a series of organised steps which broadly included the development of a benchmark document called the Desired Future State Document, a Gap Analysis and high-level Action plan for all SADC Member States and for the region, development of a suite of guidelines to strengthen groundwater management regionally. To inform the guideline on the development of a groundwater PLI Roadmap, Tanzania was selected as a pilot from which to draw lessons and develop the process.

This report presents the outcomes of the gap analysis for the Kingdom of Eswatini.

1.2 Socio-economic drivers for the Kingdom of Eswatini

The Kingdom of Eswatini is a relatively well watered country, blessed with vast tracts of land highly suitable for irrigation. Water is central to the economy of the Kingdom of Eswatini as it contributes significantly to the country’s GDP via agriculture export earnings. The economy is predominantly agriculture-based with 77 percent of the population in rural areas who derive their livelihoods from subsistence agriculture. Infrastructure such as roads, electricity, potable water, and communications as well as the health sector are also expanding in response to investments in irrigated agriculture. Irrigated agriculture consumes the bulk (870 Mm³/annum) of water, of which 67% is applied to sugar cane (DWA, 2017). The Kingdom of Eswatini’s Gross Domestic product (GDP) per capita GDP \$3.500 and GDP of \$6.259 billion lend the country to be classified as a middle-income country. Despite this status though, about 63% of the country’s citizens

live below the national poverty line, about 26% of the population between the ages 15 and 49 are infected with HIV / AIDS (Government of the Kingdom of Eswatini, 2017).

In addition to the fore-mentioned problems, the country is also faced with various economic, environmental and social problems that include high population growth (1,093,238 in 2017 indicating an increase of 74,789 persons when compared to the 2007 results which stood at 1,018, 449 persons), food insecurity, climate change and climate related disasters amongst many (Government of Swaziland, 2017). In the years 2015/16 the country experienced the worst drought in 35 years which the government declared a national disaster necessitating humanitarian support from all ends. In 2016, the Eswatini Vulnerability Assessment Committee (SVAC, 2016) indicated that about 350 000 people were in dire need of emergency assistance of which the Lubombo and most parts of the Shiselweni regions were the most affected.

The Government's National Development Strategy (NDS, 2016) provides the overarching national development framework for the country that focuses on improved standard of living particularly; poverty eradication, employment creation, gender equality and environmental protection. The Government developed and adopted the Poverty Reduction Strategy and Action Plan (PRSAP, 2007) to serve as a critical means and guide to realize the national vision and contributes towards attaining the Sustainable Development Goals (SDGs). To strengthen the implementation of the PRSAP, a Sector Wide Approach (SWAp) was adopted and piloted in the planning and budgeting process in four priority sectors namely; agriculture, education, health and water & sanitation. The SWAp approach is aimed at adding value with regards to improving coordination of development partners, reducing duplication of efforts, streamlining resources with good examples in Health, Education and the Water Sanitation and Hygiene (WASH).

Clean basic water, basic sanitation and hygiene are of prime importance for human health and survival. Evidence has shown that the provision of WASH is very essential for sustainable development including the improvement of life for a country's citizens. The government of the Kingdom of Eswatini is committed to providing a better life to all of its citizens, part of which involves providing 100% coverage of affordable and accessible WASH services for all its citizens by the year 2022. Nonetheless, the water development program is however faced with water scarcity as in many areas, the available water resources are unable to meet the growing needs of users. The water resources in the river basins are variable in time and space. As the standards of living are improving, the demand for potable water is also increasing, particularly in rural areas where access is now estimated at 60 % (DWA, 2017).

1.3 Water resources

1.3.1 Status of water resources (surface water and groundwater)

The Kingdom of Eswatini receives summer rainfall and are sometimes subjected to severe tropical storms (cyclones) originating in the Indian Ocean. The mean annual rainfall varies between 400 millimetres (mm) in the west and 1 200 mm in the east. Evaporation varies between 2 200 mm/annum (mm/a) in the west to 2 000 mm/a in the east. The average mean annual rainfall over the whole country is 800 mm/annum

and the total precipitation is estimated at about 14 cubic kilometres per annum (km^3/a). However, there is a noted level of uncertainty regarding the available water resources (GWP, 2009). The figures are between 2,836 m^3 /per capita per annum in 1998 while other estimates place it at 4.5 km^3/year (DWA, 2017). Total withdrawals for agricultural, domestic and industrial purposes are estimated at almost 1 km^3 whereby irrigation uses about 90-95 percent of the water resources in the country (DWA, 2014). The general climatic characterization of the country is subtropical with wet hot summers with 75% rain falling between October and March, and cold dry winters occurring between April and September. The ecological zones show clearly different climatic conditions, ranging from sub-humid and temperate in the Highveld to semi-arid and warm in the Lowveld.

The long-term average rainfall figure for the Highveld, the Middleveld, the Lowveld, and the Lubombo Plateau are 950 mm, 700 mm, 475 mm, and 700 mm respectively (GWP, 2009). About 75% of the annual rainfall is received in the summer period. Rainfall variability is experienced from year to year and either leads to periods of flooding or drought episodes. Hydrological studies estimate that about 50% of the precipitation is immediately lost to evaporation with only 18% ending up as surface runoff and 4, 6% reaching the groundwater table (DWA, 2014). The balance of 27.4% is utilised for biomass generation and is productively lost through evapotranspiration. Mean annual temperature varies from 17°C in the Highveld to 22°C in the Lowveld.

The waters of the rivers traversing Kingdom of Eswatini have to be shared among the co-basin States. According to international law a particular state is not entitled to use consumptively all the water that would naturally drain from its land on to the land of a neighbouring state. The general rule of international law is contained in the Helsinki Rules, the Revised SADC Protocol (2000) and the United Nations Convention on the Non-navigational Uses of Shared Watercourses. Each basin state is entitled, within its territory, to a reasonable share in the beneficial use of the waters of an international drainage basin and a reasonable share is to be determined through negotiations in the light of all relevant factors in each particular case.

The overall national water supply coverage (homesteads) for both urban and rural areas is currently at 58%. Approximately 176,647 homesteads have been provided with infrastructure to the recommended walking distance for both rural and urban water supply and the overall access estimated at 37%. Access to water is below the coverage simple due to non-functionality of some RWSS and a projected design not fully reached by benefiting homesteads (DWA, 2016). The rural water supply access is very low currently at 29% (65,845) homesteads. Water access in urban areas is at 69%.

Water pollution including groundwater pollution results from various sources within the country and as well as sources beyond the country's borders. By virtue of the fact that all of the rivers of the country originate in South Africa, the upstream activities taking place in neighbouring South Africa has impacts on the surface and groundwater resources occurring in Eswatini in addition to local polluting activities. Heavy industrial activities along the Usuthu Basin, rapid growth in irrigation activities concentrated within the Mbuluzi and Komati River basins and as well as pollution due to mining activities and pit latrines result in the pollution of groundwater in the country.

1.3.2 Groundwater environment and ecology

According to Dakin et al., (1988), groundwater flow systems are mostly shallow, and residence times are inferred to be in the order of tens of years. The cumulative groundwater discharge (cold springs and seepages) sustains some flow in the small streams on the plateau and the escarpment, even during extended dry seasons. Groundwater recharge is between 0.5 and 15% of average annual rainfall (Piteau Associates, 1992).

According to Piteau and Associates Engineering Ltd (PAEL, 1992), the aquifers in the country have been divided into twenty-four hydrogeologic units with various sub-units. The most productive of these hydrogeologic units are the Greenstone Belt, Mozaan, Weathered Basalts and Fault Zones with average borehole yield greater than 2 ℓ/s even though shallow aquifers are common. Numerous springs and seeps occur in the Highveld and Lebombo areas. Only 5-20% of the average rainfall accounts for groundwater recharge through the infiltration of rainfall and seepage from streams and rivers. Furthermore, groundwater resources are substantial and are a potential for rural water supplies particularly in the Middleveld and Highveld regions. The report concluded that the resource potential was equivalent to sustained flow of 21m³ /s.

The EC/GOS, (2006), reports that the CIDA Groundwater Project of 1992 estimated the renewable groundwater resources to be of the order of 21m³/s in the whole country, with only about 6% being used. The groundwater resources have potential for significant exploitation in several of the higher parts of the country, however not in the Lowveld where most aquifers are very poor for groundwater development. Groundwater recharge in the most critical areas of Kingdom of Eswatini is estimated at 2% in the Lowveld and 5% of annual rainfall in the Lubombo. Today there are over 5,000 boreholes in the country, with over 2,000 boreholes in the Kingdom of Eswatini portion of the Maputo River basin only. The groundwater resources of the Kingdom of Eswatini have potential for exploitation, however these resources are not available in sufficient quantity to allow large scale abstraction, hence virtually all irrigation in Kingdom of Eswatini is based on surface water (The EC/GOS, (2006).

Since wetlands play a vital role in the water cycle, these areas require to be kept clear of surface pollution, solid or fluids toxins. It is widely accepted that groundwater provides base flow to rivers and sustains them during low flow periods. Many ecosystem services have a direct linkage with groundwater storage, recharge and discharge. However, the interdependencies between ecosystem services and groundwater are not yet recognised and valued in decision making and in the management of water resources and river basins. Furthermore, the country faces growing water demands and will increasingly rely on groundwater as surface water reaches availability limits. Status of groundwater infrastructure

Infrastructure coverage is relatively low in the country and more especially in the urban areas. The Lowveld (Lubombo and Shiselweni Regions) have more infrastructure coverage however that is covering very few and sparsely distributed homesteads. In order to increase water supply coverage in the Kingdom of Eswatini a number of factors need to be considered in the planning of settlements (DWA, 2016). It is evidently costly for the Government to provide and supply water to sparsely located homesteads than

congregated settlements. The cost for developing infrastructure within the recommended distance becomes excessively expensive for investors or developers. It has also been deduced that a majority of communities are supplied with groundwater sources however the reliability and their potential is very low judged from the high number of non-functional groundwater source schemes due to insufficient water resource. This therefore emphasizes the need to for improvement in the groundwater surveying and exploration in order to reduce the probability of exploration of areas with low groundwater yields. There is a need for re-establishment of groundwater monitoring sites and improvement of surveying techniques. The Water Point Mapping report indicated that a total of 116,587 homesteads will therefore require infrastructure of which 9,381 homesteads are in urban areas and 107,206 homesteads are in rural areas (DWA, 2016).

Groundwater supply and demand

Characteristic average borehole yield in the Precambrian Basement aquifer of the Kingdom of Eswatini is 1.1 l/s with over a third of boreholes drilled yielding less than 0.5 l/s (United Nations, 1989). This report indicates that prospects are better in the Karoo, particularly where it is intruded by volcanic dykes, where borehole yields are sufficient to supply commercial irrigation schemes. Mwendera (2006), reported that modern borehole drilling is, in places, providing yields suitable for electric submersible pumps to supply rural water supply schemes. According to the Water point Mapping Report commissioned by the Department of Water Affairs, (DWA, 2016), 75% of homesteads in rural water supply schemes (RWSS) are supplied from groundwater through boreholes. This trend is expected to be maintained in future developments of water supply infrastructure since it reflects the physical and ecological dispensation of the country. It is therefore important to understand and accurately quantify the amount of groundwater available to cater for the new homesteads through an in-depth study of the water resource.

In general, groundwater quality is good when compared with WHO guidelines, except in some areas of the Lowveld. The best quality of groundwater is found in the Highveld, Middleveld and Lubombo Plateau regions where there is a lot of flushing as a result of high rainfall and relatively steep gradients resulting from the topography of the mountains. The worst quality of groundwater is found in the Lowveld where fluoride as high as 18 g/mℓ and high salinity levels exist as a result of stagnant conditions. Nitrate conditions have been observed at 15 mg/ℓ resembling natural conditions (GWP, 2009).

2. METHODOLOGY

2.1 Overview

The methodology for the gap analysis included conducting a desktop review of available literature. This was coupled with the development of a desired future state to provide a baseline for groundwater management and is discussed in more detail below. Key stakeholders were also identified during the early stages of the gap analysis and multiple engagements were held whereby a questionnaire was administered to evaluate the current state of groundwater management in the country. Based on the desktop review, stakeholder engagements and results from the questionnaire, a draft gap analysis report and action plan was developed which was then validated at Validation Workshops. These workshops involved key groundwater actors from the Member State and provided an opportunity to obtain buy-in and support for the gap analysis reports as well as obtaining further inputs. The draft report was also circulated to broader stakeholders i.e. Water User Associations, Water Service Providers etc. whereby written comment was received. The draft gap analysis report was then finalised based on the comments received from the Validation Workshops and broader stakeholders. The methodology outline is illustrated in the figure below.



Figure 1: Methodology Outline

The documents and reports consulted are listed in **Appendix A**, while the stakeholders consulted are given in **Appendix B**. The structured questionnaire is based on the Desired Future State and is elaborated on below.

The desired future state has been contextualised for the SADC region, taking into account:

- The high levels of groundwater dependency in many SADC countries, in rural areas in particular;
- The variety of geohydrological contexts;
- High levels of poverty, gender disparities, social exclusion and pollution; and
- Relatively low levels of state capacity – skills, infrastructure and finance.

It sets out the **minimum** requirements that support the delivery of national, regional and international developmental goals, including the Sustainable Development Goals, meeting basic human needs to water, energy and food (the WEF nexus), and the protection of ecosystems that are dependent on groundwater.

The sections below describe, at a high level, what is considered to be the minimum best practice for policy, legislation and subsidiary legislation, regulations and standards for effective groundwater management. For a more detailed description of the desired future state, see **Appendix C**.

The **minimum policy requirements** that should be in place are:

- A long-term policy to protect groundwater by preventing pollution and overuse.
- The social, economic and environmental values of groundwater are all recognised.
- The human right to water is recognized and a rights-based approach to groundwater management is taken.
- Groundwater is recognised as a highly important source of domestic and agricultural water supply and a key resource for poverty alleviation, food security, and the sustainable economic development of rural areas.
- The biophysical and ecological linkages between ground and surface water for their use, protection and management are recognised, including land use zoning for groundwater protection and recharge (conjunctive use).
- The importance of the maintenance of the ecological integrity of wetlands in groundwater management is recognised (recharge zones).
- Intersectoral collaboration is promoted and facilitated.
- The need for adaptive management is recognised.
- The roles of various stakeholders and water users in groundwater management is recognised and participation of stakeholders is promoted and facilitated.
- An apex body that is responsible explicitly for GW management and playing the role of custodian/trustee on the part of the state is clearly defined.
- Effective institutional arrangements are coordinated at transboundary, national and local levels.
- Public access to geohydrological data held by the state is promoted and facilitated.
- Additional environmental principles necessary to protect and sustain groundwater are mandated, including: the precautionary principle, the principle of gender equity and social inclusion (GESI), the principle of subsidiarity, and the principle of intergenerational equity.

The **minimum legislative requirements** that should be in place are those that explicitly addresses the use, management, and protection of groundwater and provides the necessary tools for the state to regulate, manage, control, protect and develop groundwater resources in conjunction with surface water resources. At a minimum, legislation and/or subsidiary regulations should:

- Provide the status of groundwater noting that all water has a consistent status in law, irrespective of where it occurs, and there is explicit reference to groundwater and conjunctive use management; and recognise the human right to water recognized in groundwater legislation, facilitating prioritization of drinking water and basic human needs, as well as small-scale users.

- Regulate groundwater quantity by providing conditions for accessing groundwater through water use authorisations system that does not discriminate (especially against the rural poor), is not tied exclusively to land tenure and enables effective compliance monitoring and enforcement.
- Provide groundwater protection mechanisms that includes regulating pollution (point source and non-point source), regulates depletion, regulates abstraction and recharge (usually via permitting) and provides for the sustaining wetlands;
- Enables integrated planning through specifying the need for long term plans (at catchment or basin level) to ensure the sustainable use of groundwater, including drought management plans and cross-sectoral coordination.
- Make provision for institutional arrangements including the mandate, competence and power of the relevant authorities, enabling the integrated management of groundwater and surface water resources, engaging in the arbitration of competing demands and diverging interests regarding groundwater abstraction and use, and support the collaborative engagement with other sector authorities, competent for public health, land-use planning, soils management, and waste management.
- Support effective stakeholder engagement through specifying when and how stakeholders, the public and/or other water users are to be engaged in the development of laws and regulations, planning, decision making and self-management regarding groundwater and should specifically address the issue of the involvement of women and youth in decision-making and the implementation of groundwater supply schemes.
- Provide for Monitoring and data collection to support regulation including protocols for data collection, management, exchange and dissemination, including standardization and harmonization of data, as well as national monitoring and information systems for the management of data and information.
- Regulate to ensure water conservation and efficiency of use.
- Support compliance and enforcement through clear mechanisms for promoting compliance with groundwater regulations through enforcement provisions that enable inspections, the imposition of fines and/or additional administrative penalties and other instruments to address failure to comply with the law.
- Conflict resolution mechanisms and/or the right to appeal.
- Enable the development of regulations on any relevant matter in the legislation to regularise aspects of groundwater management and incentivise appropriate use of groundwater resources.

The actual **requirements for subsidiary regulation** will differ from country to country, according to their own National Legislation. However, it is important to understand the extent to which critical issues around groundwater management have been translated into regulations. Below are some examples of how this could look.

- Subsidiary legislation or regulations pertaining to use, protection including on-site sanitation, borehole drilling, and appropriate financial and economic regulatory tools e.g. water pricing.
- Clear protocols and standards on data collection and storage.
- Templates for municipal by-laws.



- Community management of groundwater and community participation in groundwater management.

From an **institutional perspective**, it is critical that countries have as a minimum, a dedicated Ministry for water resource management, which is also the custodian for ground water management. Noting that the groundwater is a localised resource, decentralised institutions at trans-boundary, catchment and local government level are crucial, where groundwater management fits into overall mandate for water resource management

3. POLICY

3.1 Evolution

The country did not have a Water Policy prior to the Water Act of 2003 coming into law and even then, a Water Policy was never developed to inform the Water Act of 2003 as is the norm. Historically, the country has regulated water use and management through customary rights exercised through traditional leaders (chiefs / indunas) (Armstrong, 1986). This malpractice continued right through colonisation whereby there was an increasing emphasis to attach water to land ownership. There was no comprehensive groundwater management policy during this time and groundwater was considered mostly private for the exclusive use of the land-owner. These included issues of water pricing whereby the value of water was not considered leading to wastage. Water allocation was attached to a portion of land and the permits were in perpetual ownership. There was poor representation of users in water management institutions and representatives were appointed by the responsible Minister. Pollution control and monitoring was not given the importance it deserves to an extent that pollution penalties were negligible charges. Such challenges derived from the irrigation interests on which the Water Act was founded.

3.2 Policies to support groundwater management

The purpose of the **National Development Strategy** (NDS, 2013), is to formulate the country's Vision and Mission Statement with appropriate strategies for socio-economic development for the next 25 years and provide a guide for the formulation of development plans and for the equitable allocation of resources (DWA, 2017). It is designed to strengthen the Government's development planning and management capacities and anchor it firmly to a national consensus on the direction of future developments in the country.

The Revised **Integrated Water Resources Master (IWRM) Plan** (2016), proposes revised mandates for the National Water Authority (NWA), the River Basin Authorities (RBA) and the Department of Water Affairs (DWA) on policies, legislation, strategies, plans and actions undertaken in the country and in the basin(s) by state and non-state actors relevant to land and water management by means of horizontal and vertical coordination, in particular through stakeholder involvement at basin level.

The goal of the **Water Policy** (2018), is to foster a climate resilient and sustainable development focus. Studies indicate that climate change will affect water resources availability as a result of changes in precipitation, increased temperatures, run-off patterns, increased demand for water among other things. With regards to groundwater, the Policy elaborates on the allocation of groundwater for primary use, groundwater utilisation control and groundwater abstraction. The Water Policy 2018 states that Groundwater shall not be allocated for purposes other than primary use, unless prior exemption has been obtained from the NWA or its delegated authority. Concerning water utilisation control, the Policy objective is to ensure proper and efficient allocation of ground water as an integral part of water resources within the Kingdom by encouraging conjunctive use and management of groundwater and surface water, where possible among other strategies. In abstracting groundwater for primary purposes, the aim is to

Issue water permits for all water uses including groundwater abstraction for primary purpose as well as to develop and enforce water allocation guidelines and regulations. In addition, the government aims to enforce measuring or otherwise quantification of all water uses and to develop and manage water uses database.

3.3 Gaps and challenges identified

In as much as the Water Policy (2018) does recognise good values associated with groundwater resources, however there is more ground to be covered in terms of physically transmitting and raising awareness on specifically on groundwater affairs. The gaps and or challenges identified include: the lack of Groundwater Policy, lack of Groundwater rights in the country, weak inter-sectoral integration and collaboration, poor availability of information and low knowledge on groundwater resources, weak implementation of adaptive management, poor monitoring of groundwater resources, and poor participation of stakeholders in groundwater management and development.

3.4 Enablers required to unlock these gaps/challenges

Table 1: Enablers required to unlock the Policy gaps/challenges

Groundwater gap/challenges	Enablers
There is a lack of Groundwater Policy	<ul style="list-style-type: none"> Develop Groundwater Policy
Lack of Groundwater rights in the country	<ul style="list-style-type: none"> Define water rights
Weak inter-sectoral integration and collaboration	<ul style="list-style-type: none"> Establish Groundwater Coordination structures among all water users / use organisations including inter-ministerial levels.
Poor availability of information and low knowledge on groundwater resources	<ul style="list-style-type: none"> Capacity building is required at all levels (government and water user management institutions). Develop state of the art data collection, storage and dissemination systems
Weak implementation of adaptive management	<ul style="list-style-type: none"> Incorporate the principle of adaptive management within the Policy to be developed for groundwater use, development and management.
Poor monitoring of groundwater resources	<ul style="list-style-type: none"> Develop M&E unit/ department and ensure a functional M&E system is in place.
Poor participation of stakeholders in groundwater management and development.	<ul style="list-style-type: none"> Develop effective stakeholder engagement and facilitation mechanisms. Conduct community and all stakeholder mobilisation campaigns to raise awareness on groundwater resources.

4. LEGISLATION

4.1 Evolution

The **2005 Constitution of the Kingdom of Eswatini** is currently enforced in the country and establishes the Kingdom of Eswatini as an absolute monarchy.

Prior to 1967 there was no comprehensive policy governing water resources in the country. Instruments such as the **Order by Ngwenyama in Libandla; Order No. 4 of 1954** were applied in water management in the country. This Order empowered the Central Rural Development Board to report on the condition of natural resources, i.e. water, soil, grass and timber, on land held by the State and to recommend to the Ngwenyama the steps to be taken for the protection of these resources and for the improvement of grazing control methods (DWA, 2017).

The Kingdom of Eswatini did not have a clear policy on water use and management until the Water Act of 1967. **The Water Act of 1967** formalised the sector and in that Act powers to manage and allocate water were vested in a Water Apportionment Board (WAB). The Minister responsible for water could hear appeals against the decisions of the Board. He/she had power to over-rule the decision of the WAB. Even under the Water Act of 1967, persons beneficially using water under rights acquired prior to the passing of the Act, either through common law or through allocation under one of the previous statutes, retain these rights and moreover, a riparian proprietor (proprietor of land bordering or traversed by a public stream) is entitled to an apportionment of an amount for reasonable use of normal flow (not stored water) even if he has not yet used his/ her water (Armstrong, 1986). The Government had an almost exclusive responsibility for water in the country and the resource was not considered as finite and limited, hence issues of efficiency and sustainability were not promoted. The Water Act (1967) did not deal with the fragmentation of water among different ministries and departments and it also did not extend the participation wide enough and most of the authority still rested in government. The legislature previously used in Water Management included the:

- Water Act of 1967,
- Protection of Freshwater Fish Act of 1938,
- Kingdom of Eswatini Electricity Act of 1963,
- Water Services Act of 1992,
- Komati River Basin Water Resources Development and Utilization Act of 1992,
- Joint Water Commission Act of 1992,
- Kingdom of Eswatini Environmental Authority Act of 1992 and
- Kingdom of Eswatini Administrative Order of 1998.

The Water Act (1967) was replaced by the Water Act of 2003. This Act promotes the adoption and implementation of integrated water resources management (IWRM). In pursuit of eliminating fragmentation, it further promotes stakeholder participation and coordinated water resources management by establishing government and public organisations for water resources management. It also created basin level structures (River Basin Authorities, Irrigation Districts and Water User Associations)

with significant powers to manage the resource. Above these structures is a National Water Authority (NWA), whose role is to supervise the activities of the structures described above and to advise the Minister on policy matters (DWA, 2017).

The **Swaziland (Eswatini) National Trust Commission** was established in 1972 and is aimed at conserving the natural and cultural heritages through sustainable use and promotion of environmental awareness. In 2013, the Kingdom of Eswatini completed the accession to the Ramsar Convention – Convention on Wetlands whereby the Swaziland National Trust Commission became responsible for wetland conservation issues including engaging with stakeholders to strengthen conservation management of wetlands in the country.

4.2 Legislation to support groundwater management

The **Water Act 2003** recognises groundwater as a social good commodity and spells out clearly the desire for groundwater resources to be treated conjunctively with surface water resources. However, the complexity of groundwater is not escalated to the same level as surface water mainly because there is shallow knowledge about the country's groundwater resources. Resuscitation of the groundwater research program remains stifled by many influential factors. The Act drastically enhances water management in the country in a number of ways. With regard to water allocation it brings allocation of surface and groundwater under the same authority. This enhances the understanding of water allocations in the country and facilitates enforcement of conjunctive use of surface and groundwater resources (DWA, 2017).

The Act also introduces the penalties for water pollution and irresponsible waste management. Among many other changes that are being introduced by the Act, is the introduction of volumetric water allocation, which will facilitate enforcement of water conservation and rationing measures in times of drought. With regards to groundwater, the Act prohibits the drilling or sinking of a borehole or well on any land or expand an existing drilled or bored well without having applied for and obtained a drilling permit from the Board.

Similarly, to surface water use, groundwater use is highly dependent on a host of legal institutions, such as:

- Existing formal and customary rights regimes
- Legislation that specifies access, allocation, and quality
- Regulations that control planning and zoning
- Laws and statutes that protect recharge areas, potable water sources, riparian corridors and habitats, and endangered species
- Enforcement directives
- Pricing and use regulations
- Mandates for public participation and transparency, and
- International treaties, agreements, and protocols

One significant stride in the country that positively impacted on the water sector was the enactment of the **Constitution of the Kingdom of Eswatini in 2005**. Provisions related to water are contained in Sections 210 and 215. Section 210 of the Constitution declares water as a national resource, promotes that water use is to take into consideration the principle of sustainable development and vests the ultimate responsibility for its protection in the State. On the other hand, Section 215 rules out any private right of property in any water found in Kingdom of Eswatini. Other related sections address environmental protection which has implications for water as well as Parliament’s intervention with regards to enactment of laws related to water.

4.3 Gaps and challenges identified

- There is no legislation solely developed for groundwater resources management as well as a Water Services Act.
- There is Insufficient coordination co-operation among different government departments involved groundwater resources management and related activities.
- The roles of various stakeholders and water users in groundwater management is weak.
- There is a lack of a holistic and integrated approach in planning for the whole sector (Sector Wide Approach to Planning).
- There is no provision for an effective conflict-resolution mechanism to resolve disputes between competing users.
- The human right to water is recognized but a rights-based approach to groundwater management is not fully taken into account.
- There is poor data collection, monitoring, compliance and control systems for groundwater management.
- Inter-sectoral collaboration is promoted but its facilitation remains a challenge.
- Adaptive management is recognised but its application at all levels is weak.
- The roles of various stakeholders and water users in groundwater management is not clearly specified.

4.4 Enablers required to unlock these gaps/challenges

Table 2: Enablers required to unlock the Legislation gaps/challenges

Groundwater gap/challenges	Enablers
There is no legislation solely developed for groundwater resources management as well as a Water Services Act.	<ul style="list-style-type: none"> ▪ Develop a fully-Integrated Water Resources Legislation. ▪
There is insufficient coordination and co-operation among different government departments involved in groundwater resources management and related activities.	<ul style="list-style-type: none"> ▪ The existing local-level water management institutions require to be capacitated to understand and manage both surface and groundwater.
The roles of various stakeholders and water users in groundwater management is weak.	<ul style="list-style-type: none"> ▪ Develop training programmes for local-level institutions for groundwater management.
There is no provision for an effective conflict-resolution mechanism to resolve disputes between competing users.	<ul style="list-style-type: none"> ▪ Establish conflict resolution mechanisms for groundwater management right at the Policy level.

Groundwater gap/challenges	Enablers
<p>There is poor data collection, monitoring, compliance and control systems for groundwater management.</p>	<ul style="list-style-type: none"> ▪ Make the data available facilitating shared knowledge of overall resource conditions. ▪ Develop enforcement actions. ▪ Implement prosecution.
<p>There is a lack of a holistic and integrated approach in planning for the whole sector (Sector Wide Approach to Planning).</p>	<ul style="list-style-type: none"> ▪ Establish SWAp and ensure groundwater management is strengthened.
<p>The human right to water is recognized but a rights-based approach to groundwater management is not fully taken into account.</p>	<ul style="list-style-type: none"> ▪ Adopt a clear definition of human right to water and clearly state the role of Government to meeting the rights.
<p>Inter-sectoral collaboration is promoted but its facilitation remains a challenge.</p>	<ul style="list-style-type: none"> ▪ Establish collaboration and coordination mechanisms and support them through resources.
<p>Adaptive management is recognised but its application at all levels is weak.</p>	<ul style="list-style-type: none"> ▪ Strengthen adaptive management through capacity building and support mechanisms of government and community institutions.
<p>The roles of various stakeholders and water users in groundwater management is not clearly specified.</p>	<ul style="list-style-type: none"> ▪ Clearly articulate stakeholder involvement in groundwater management through by laws.

5. STRATEGY AND GUIDELINES

5.1 Evolution

Groundwater management in the Kingdom of Eswatini has always been shadowed by surface water management. Pollution control and monitoring was not given the importance it deserves to an extent that pollution penalties were negligible charges. Such challenges as the above derived from the irrigation interests on which the water act was founded. Not much has been done to cover groundwater management even though the Water Act of 2003 calls for the development of the following: Drilling regulations, Borehole drilling standards, Groundwater pricing tools. There is a need to consider developing all the missing subsidiary schedules and review of the existing schedules to meet the present and future conditions. There are no clear protocols and standards on data collection and storage. Template for municipal by-laws does not exist and there are no guidelines, protocols or regulations on community-based management of groundwater.

5.2 Strategies and guidelines to support groundwater management

- Drilling Regulations only exist in draft format.
- Borehole Drilling Standards document was developed and is available.
- Groundwater Pricing tools have not yet been developed as required by the Water Act (2003).

Other regulations to support groundwater management include the following:

The Purification of Industrial Water and Effluent Regulation 1967 -provide for the purification of water used for industrial purposes, according to the requirements and standards established in the First Schedule and to the methods of testing set out in the Second Schedule.

The Water Pollution Control Regulations, 1999- provide with respect to (protection of) water quality in Kingdom of Eswatini. Every water authority must exercise its powers in such a manner as to ensure, as far as is reasonably possible by the exercise of those powers, that at all times the water quality of each water body under its jurisdiction meets the water quality objectives contained in the First Schedule. Intentionally or negligently discharging into a water body of effluent which exceeds one or more of the effluent standards is declared to be an offence

Waste Regulations, 2000 (L.N. No. 31 of 2000)- control the management of solid and liquid waste disposed of on land and water bodies. These indicate that a person shall not collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that is likely to result in an adverse effect. Waste shall be disposed of in accordance with provisions of regulation 5. Regulation 6 concerns import, export and trade in waste.

The Ozone Depleting Substance Regulations, 2003- prohibit: the import, export or storage of a controlled substance or product listed in the First and Second Schedules without a license issued by the Kingdom of Eswatini Environmental Authority; import or export a controlled substance or product from or to a country that is not a party to the Montreal Protocol on Substances that Deplete the Ozone Layer; and import or export a controlled substance on or after the date specific in the Second schedule.

5.3 Gaps and challenges identified

- Insufficient human capacity / shortage of staff in government to implement provisions for groundwater management.
- The lack of regulations specifically for groundwater management.
- There are no clear protocols and standards on data collection and storage.
- Template for municipal by-laws does not exist and there are no guidelines, protocols or regulations on community-based management of groundwater.

5.4 Enablers required to unlock these gaps/challenges

Table 3: Enablers required to unlock the Strategy and Guidelines gaps/challenges

Groundwater gap/challenges	Enablers
Insufficient human capacity / shortage of staff.	<ul style="list-style-type: none"> ▪ Build capacity through training at local and international organisations.
There are no clear protocols and standards on data collection and storage.	<ul style="list-style-type: none"> ▪ Develop clear protocols and standards on data collection and storage to be housed within the M&E unit to be established within DWA.
Template for municipal by-laws does not exist and there are no guidelines, protocols or regulations on community-based management of groundwater.	<ul style="list-style-type: none"> ▪ Develop template for municipal by-laws.
Lack of groundwater management regulations	<ul style="list-style-type: none"> ▪ Finalise Drilling regulations and roll them out. ▪ Develop Groundwater Pricing Tools, workshop them with stakeholders and adopt them. ▪ Develop regulations and standard operating procedures for compliance monitoring and enforcement. ▪ Develop regulations for operation and maintenance of groundwater supply schemes. ▪ Develop regulations for provision of groundwater data and information.

6. INSTITUTIONAL FRAMEWORK

6.1 Evolution

The Water Act 1967 did not address the fragmentation of water management among different ministries and departments or sectors and it also did not allow for effective stakeholder participation. Most of the water management and control rested with government. At a global level, the debate around efficient, effective and sustainable water resources management crystallized the principle of Integrated Water Resources Management (IWRM), which at its core recognizes the river basin as the unit of resource management. Consequently, the IWRM process has been promoted for adoption as a platform for formulating and implementing water policies across all levels of governance. In promoting and mainstreaming IWRM, an attempt to achieve optimal sharing of water across sectors within the country, as well as sharing it with riparian states is promoted.

6.2 Institutional arrangements to support groundwater management

As per the dictates of the Water Act (2003), water resources management is spread across ministries, departments, stakeholder organisations, private users and NGOs as indicated in the figure and described below:

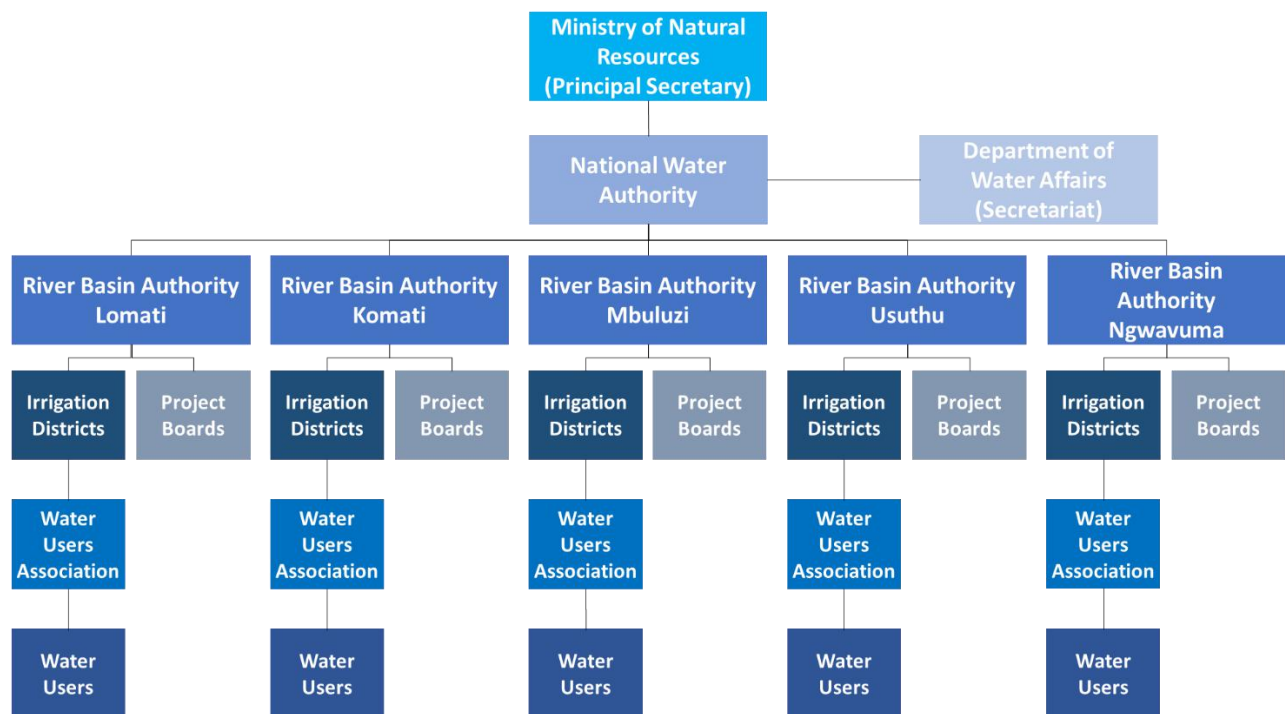


Figure 2: WMIs that has relevance to groundwater management (Source: Author)

a) Ministry of Natural Resources and Energy (MNRE)

The MNRE is responsible for providing general management of land, minerals, and water and energy resources. It is responsible for ensuring optimal development, management and supply of adequate water resources in a sustainable manner through the Department of Water Affairs.

b) The Ministry of Agriculture (MoA)

The Ministry of Agriculture has a Land and Water Development section that is responsible for designing and construction of small irrigation dams. The Eswatini Water and Agricultural Development Enterprise (SWADE) facilitates small-scale irrigation development for livelihood support and income generation.

c) Ministry of Health (MoH)

The Environmental Health Department of the Ministry of Health is responsible for construction of pit latrines and providing hygiene education on proper use of drinking water and sanitation facilities. On a smaller scale, the Department is also involved in spring protection.

d) Ministry of Economic Planning and Development (MEPD)

The Ministry of Economic Planning and Development is responsible for allocating resources to national policy objectives and priority development initiatives and for co-ordination and monitoring of the technical and financial implementation of all the development plans and programmes. The Micro projects is a unit under the Ministry of Economic Planning and Development. The organisation funds the following WASH activities; piped water supplies and standpipes; water pumps; culverts; footpaths.

e) National Water Authority (NWA)

The National Water Authority (NWA) is responsible to advise the Minister on policy directions relating to water affairs at national level. It is also responsible to coordinate the work of different boards, water sector agencies and international water commissions.

f) The Department of Water Affairs (DWA)

The Department of Water Affairs within the Ministry of Natural Resources and Energy is the secretariat for the NWA, and it provides technical support and advice to the authority. It is composed of the Water Resources Branch, the Rural Water Supply Branch and the Geological Surveys Unit. The Rural Water Supply Branch of the Department of Water Affairs on the other hand is responsible for design, construction and maintaining water supply schemes in rural areas.

g) The Eswatini Water Services Corporation (EWSC)

The Eswatini Water Services Corporation is a parastatal organization that is responsible for water supply, operation and maintenance of water supply infrastructure and sewage facilities in urban areas of the country. Due to sustainability needs, the SWSC has had to extend its services to rural areas too.

h) River Basin Authorities (RBAs)

The Water Act (2003), establishes five River Basin Authorities that consists of representatives of all the relevant water sectors in a particular river basin whose members are nominated by basin stakeholders. The River Basin Authorities report to the National Water Authority. River Basin Authorities establishment and operation has been compounded with problems such as capacity, technical and financial issues.

i) Irrigation Districts (IDs)

The Water Act (2003) established the Irrigation Districts who are responsible for efficient utilization of water within their sub basin. They ensure that every one takes water according to the permitted volumes and they encourage efficient use of the available resource in the local area. It is the responsibility of the Ministry to establish Irrigation Districts upon recommendation of the NWA. The Irrigation District reports to the River Basin Authority.

j) Water Users Association (WUAs)

A Water Users Association can be formed by permit holders in a defined area with the objective of maximizing the benefits from such permits to members of the association though this is not a statutory body.

k) Others water management organisations

Community leadership consisting of Chiefs and indunas who administer customary laws, play an important role in utilization and management of water resources though they are often ill-equipped to handle the technical complexities of water management.

Private water management bodies include Mhlume Water Company, Big Bend Canal Users Association, Inyoni Yami Eswatini Irrigation Scheme. These service providers supply bulk water for irrigation within different basins.

Bilateral and multilateral development institutions that support Kingdom of Eswatini in the water sector include the Food and Agriculture Organisation (FAO), the Canadian International Development Agency (CIDA), Department for International Development (DFID), United Nations Children Fund (UNICEF), United States Agency for International Development (USAID), Republic of China, United Nations Development Program (UNDP), World Health Organisation (WHO) and the European Union (EU).

On the other hand, there are several NGOs operating in the country that have interest in water issues and include Baphalali Eswatini Red Cross Society (BSRCS), World Vision, WaterAid and African Corporation Alliance Trust (ACAT). Such interest varies between advocacy and improving rural water supplies and sanitation coupled with small-scale agriculture.

For planning purposes, the Water Act (2003) established the Water Resources Master Plan which was later amplified into an Integrated Water Resources Master Plan (IWRMP) with the main objectives of consolidating information accrued from various national and regional studies on water into one strategic Plan. The aim being to quantify available water resources in each river basin, present and future water requirements by sector for the years 2016 and 2025, reaffirm the country's transboundary water requirements and quantify environmental flow requirements. This IWRMP is aimed at assisting the country in identifying and filling in information and data gaps in water resource development and management looking at domestic water supply and sanitation and assess the potential for large water transfer schemes to service large national projects in water scarce areas; investigating the potential for groundwater utilisation and development among other issues, nonetheless, this plan is still being developed.

Transboundary groundwater management

The Kingdom of Eswatini together with her riparian States, Mozambique and South Africa, has applied the Helsinki Rules as a basis for negotiating on issues relating to the shared river basins. On the one hand, the UN Convention inspired the revision of the SADC Protocol on Shared Watercourse Systems as it contains the fundamental principles of water management, conflict resolution, and environmental safety that have been developed during the last three decades. Other Agreements include the regional Revised SADC Protocol on Shared Watercourses, the Agreement between the Government of the Republic of South Africa and the Government of the Republic of Portugal in regard to Rivers of Mutual Interest and the Cunene River Scheme, signed on 13 October 1964, to which Eswatini acceded in 1967 and the Tripartite Interim Agreement of August 2002 between Mozambique, South Africa and Eswatini for cooperation on the protection and sustainable utilization of the water resources of the Incomati and Maputo rivers, referred to as the “Interim Inco-Maputo Agreement” (IIMA, 2002).

There is therefore established water commissions on the different shared rivers such as the Joint Permanent Technical Water Commission (JPTWC) between Mozambique and Eswatini on water resources of common interest on the Umbeluzi River, the Joint Water Commission (JWC) between South Africa and Eswatini established in 1992 for the management of the Incomati and Maputo rivers and the Komati River Basin Authority (KOBWA) established in 1992 for the development and utilization of the water resources of the Komati River Basin.

There were studies conducted between 2010 and 2011 through the Progressive Realisation of the IncoMaputo Agreement (PRIMA) that involved an assessment of groundwater resources and recommended action plans required to ensure sustainable utilisation of groundwater within the IncoMpauto Basin. There is currently not established transboundary institutions specifically for groundwater management but more for surface water management.

6.3 Gaps and challenges identified

There are no formal agreements for various water institutions to work together as the SWAp for water resources management and irrigation sectors is still to be established. There is a problem in that there is no split of key water resource management functions with regards to water resource/ groundwater protection, planning, water use authorisation. Groundwater resources management is lagging behind surface water resources management with regards to stakeholder participation and institutional development. There is poor knowledge and information availability. There is poor enforcement and compliance with regards to drilling and pollution control. Capacity within the government is relatively poor. The institutional arrangements prescribed by the Water Act (2003), i-e NWA, River Basin Authorities, Irrigation Districts and Water Users Associations, are plagued with lack of financial and technical resources. The five RBAs were gazetted and established by the year 2016 whereby the Usuthu RBA even hired a CEO but it is not fully operational due to the reasons mentioned above. The Emandla Ekuphila Irrigation District (EEID) established in 2006, is fully operational and has an established office in Tshaneni within the Komati

Basin and this is enhanced by the financial incomes generated through the sugarcane businesses operated by the small-scale farmers.

To strengthen the implementation of the PRSAP, a Sector Wide Approach (SWAp) was adopted and piloted in the planning and budgeting process in four priority sectors namely; agriculture, education, health and water & sanitation. The SWAp approach has added value in terms of improving coordination of development partners, reducing duplication of efforts, streamlining resources with good examples in Health, Education and the Water Sanitation and Hygiene (WASH). The SWAp is however not yet developed for the water resources and irrigation sectors.

Training and capacity building on groundwater is ad-hoc as there are no local institutions conducting capacity building nor research. Groundwater training and research is carried out by international organisations. The Eswatini Water and Agricultural Development Enterprise (SWADE), a government parastatal responsible for irrigation and smallholder empowerment has helped to provide and facilitate training activities on water resources management. KOBWA has also facilitated knowledge sharing on water management.

6.4 Enablers required to unlock these gaps/challenges

The following enablers are required to unlock the institutional gaps and challenges.

Table 4: Enablers required to unlock the Institutional Framework gaps/challenges

Groundwater gap/challenges	Enablers
There is no clear split of roles / responsibilities regarding water resource management, functions need to be clear i.e. water resource/ groundwater protection, planning, water use authorisation.	<ul style="list-style-type: none"> There is a need for water resources policy to separate water resources management functions such that water resource/ groundwater protection, planning, development and water use authorisation are cascading along the institutional set up. The government is currently the regulator and implementer.
The development role for groundwater in Eswatini is still poorly understood, resulting in underutilisation and poor management only remembering it during times of crisis.	<ul style="list-style-type: none"> Improve capacity building and research in country to upscale groundwater resources knowledge and its development and management.
Poor stakeholder participation	<ul style="list-style-type: none"> Strengthen stakeholder organisations and forums by establishing a stakeholder participation framework to be financed by government and managed by the stakeholders.
Poor institutional development	<ul style="list-style-type: none"> Strengthen institutional development through financing and capacity building.

Groundwater gap/challenges	Enablers
Poor knowledge / information	<ul style="list-style-type: none"> ▪ Improve knowledge / information through development of information sharing websites, forums and documents / publications.
Poor enforcement and compliance	<ul style="list-style-type: none"> ▪ Strengthen enforcement and compliance monitoring through the establishment of the M&E unit.
Low capacity at all levels	<ul style="list-style-type: none"> ▪ Build capacity at all levels of water management.

7. CHALLENGES TO IMPLEMENTATION

▪ **Lack of a groundwater policy and support systems for groundwater management**

The lack of a specific groundwater policy result in groundwater not given much attention in terms of planning, development, management and use. Even the water users' management institutions are more biased towards surface water including the pollution control and prevention mechanisms.

▪ **Limited data and monitoring of groundwater**

The country needs a national groundwater monitoring network to aid in the management of under groundwater resources.

▪ **Limited integration with broader WRM**

Groundwater management only receives attention during periods of emergency and more especially during drought situations. This leads to over exploitation in some instances and unnecessary drilling at some instances.

▪ **Groundwater leadership needs to be strengthened**

The country has an under-developed Groundwater Division within the DWA, thus it is paramount that the Department realises the opportunity through SADC_GMI to resuscitate and expand the crucial groundwater research program which will up scaled the knowledge about the country's underground water potential.

▪ **Conversion of Policy/legislation into appropriate implementation tools**

There is a need for a national groundwater management policy that lays down norms and standards to guide regional and local groundwater management practices. There is a general lack pf standards and regulations and even those in existence, do not take into account the uniqueness of the subsurface but focus on coordination of land-based activities.

▪ **Lack of qualified human resources**

The lack of a succession plan of qualified human resources in the division creates an unsustainable growth of the discipline and as such a feasible Groundwater Strategic Plan is required to look into this aspect among others.

▪ **Lack of groundwater regulations**

The country lacks up to-date groundwater regulations, drillers manuals, etc.

▪ **Poor understanding and implementation of the Adaptive management concept.**

Adaptive management is recognised in the Water Policy, but this is poorly understood and implemented.

▪ **Poor funding for groundwater exploitation**

Currently the government allocates very low funding towards rural water supply which is mainly achieved through borehole drilling and this in average is about E30 Million per year. This is not enough for developing one new water supply schemes and it also affects the operation and maintenance of existing schemes.

▪ **Poor gender mainstreaming mechanisms**



The importance of gender mainstreaming is clearly articulated in the Water Policy, however, the Water Act (2003) does not show the same clarity. On the same vein, the conceptualisation of gender mainstreaming is still at its infancy and no clear mechanisms are put in place to ensure its implementation. Capacity building at all levels is required on gender mainstreaming along with the relevant mechanisms for its operationalisation.

8. ACTION PLAN

The MoSCoW method of prioritisation has been used to develop the action plan. This method identifies the *Must have, Should have, Could have, and Won't have* elements for the Groundwater Management Regulatory Framework.

Table 5: Action plan Must Have

Prioritisation	Element	Description
Must have: <i>those elements of the regulatory framework that are critical</i>	Policy	<ul style="list-style-type: none"> Develop groundwater management plans to promote early preparedness rather than the current ad-hoc and reactive utilisation and management. Establish clear groundwater management objectives. Include protection zoning. Incorporate principles of adaptive management.
	Legislative	<ul style="list-style-type: none"> Develop and implement Standard and Operating procedures for compliance monitoring and enforcement (including groundwater metering). Establish penalties for illegal groundwater utilisation. Ensure compliance to drilling, borehole construction and completion, pumping tests and water quality tests. Improve operation and maintenance of rural groundwater supply schemes for sustainability purposes.
	Institutional	<ul style="list-style-type: none"> Improve DWA capacity related to groundwater management both financially and technically as well as infrastructure / equipment. Strengthen the capacity of established local level groundwater governance organizations on technical, financial and operational aspects. Establish separate institutions for monitoring of the resource, licensing, compliance monitoring and enforcement, planning etc Strengthen Transboundary groundwater management. Establish transboundary groundwater agreements Decide on institutional form of local groundwater management institutions.
	Strategy/ Guidelines	<ul style="list-style-type: none"> Develop groundwater management regulations Establish a reliable groundwater monitoring system able to capture all data, process, report and disseminate data for the various stakeholders' needs.

Table 6. Action Plan Should Have

Prioritisation	Element	Description
Should have	Policy	<ul style="list-style-type: none"> ▪ Develop groundwater specific management policy (to include groundwater quality and quantity). ▪ Establish specific coordination mechanisms in policy for groundwater management.
	Legislative	<ul style="list-style-type: none"> ▪ Develop groundwater management regulations ▪ Establish mediation mechanisms for conflict resolution. ▪ Provide greater clarity of rights, duties and institutions for consistent jurisprudence.
	Institutional	<ul style="list-style-type: none"> ▪ Strengthen funding for water users institutional support as well as for capacity building.
	Strategy/ Guidelines	<ul style="list-style-type: none"> ▪ Develop a National Groundwater Resources Strategy and Plan and develop catchment management and water allocation plans. ▪ Implement guidelines and procedures to minimise delays in procurement by Setting priorities and Performance monitoring and reporting mechanisms to be followed.

Table 7. Action Plan Could Have

Prioritisation	Element	Description
Could have	Policy	<ul style="list-style-type: none"> ▪ Make provisions for groundwater resources mapping and monitoring at national and local levels.
	Legislative	<ul style="list-style-type: none"> ▪ Initiate the process of reviewing and amending the National Water Act (2003) to strengthen provisions for groundwater management <ul style="list-style-type: none"> ○ Multi-sectorial participations in local-level institutions. ○ Pre-authorisation for groundwater development and use. ○ Priority groundwater management areas for issuing groundwater abstraction licenses ○ National Groundwater Strategy
	Institutional	<ul style="list-style-type: none"> ▪ Groundwater research institutions and forums.
	Strategy/ Guidelines	<ul style="list-style-type: none"> ▪ Awareness creation on the value of groundwater infrastructure including instrumentation; Community ownership and acceptance; Protection measures; Prosecution; Incentives.

Prioritisation	Element	Description
		<ul style="list-style-type: none"> Update guidelines and standards with reference to groundwater management regulations

Table 8. Action Plan Won't Have

Prioritisation	Element	Description
Won't have	Policy	<ul style="list-style-type: none"> Continued institutional dominance of surface water in a country where the majority relies on groundwater, and where surface water resources are fully allocated is unsustainable.
	Legislative	<ul style="list-style-type: none"> Continued legal and policy uncertainty regarding groundwater institutions and local governance not effective.
	Institutional	<ul style="list-style-type: none"> Consolidation and dominance of interim and relatively weak local groundwater governance organisations.
	Strategy/ Guidelines	<ul style="list-style-type: none"> Poor landscape for groundwater strategy development and implementation.

9. REFERENCES

- Armstrong, A.K. (1986). Legal Aspects of Land Tenure in Swaziland. Paper Prepared as Part of the Ministry of Agriculture and Cooperatives' Research on Changes on Agricultural Land Use: Institutional Constraints and Opportunities. Mbabane, Ministry of Agriculture and Cooperatives
- Dakin, R. A., Vilakati A. and Balsour, J. D. (1988). Hydrogeological studies in southern Lowveld area, Swaziland. *Proceedings of International Groundwater Symposium on Hydrogeology of Cold and Temperate Climates and Hydrogeology of Mineralized Zones*, Halifax, Nova Scotia, pp 52-59.
- DWA, (2014). Vulnerability Assessment Report - Climate Change Vulnerability Assessment of the Water Sector and Infrastructure in Swaziland. Mbabane, Swaziland.
- DWA. (2016). The Review and Finalization of the National Water Policy and Strategy. Situational Analysis Report.
- DWA. (2017). The Draft National Water Policy. Department of Water Affairs, Ministry of Natural Resources and Energy, Mbabane.
- EC/GoS. (2006). Country Environment Profile EUROPEAID/ 119860/C/SV/multi Lot 6: Environment Request of Service: 116781.
- Global Water Partnership. (2009). IWRM Survey and status report: Kingdom of Swaziland.
- Government of Swaziland. (2007). The Kingdom of Eswatini Poverty Reduction Strategy and Action Programme (PRSAP).
- Government of Kingdom of Swaziland. (2017 a). Draft National Water Policy.
- Government of Kingdom of Swaziland. (2017 b). Socio-economic impacts of the 2015/16 drought. National Disaster Management Agency, Mbabane, Kingdom of Swaziland.
- Government of Eswatini(2017c). The 2017 Population and Housing Census: Preliminary Results, the Central Statistics Office, Mbabane, Kingdom of Eswatini.
- Government of Swaziland. (1938). The Protection of Freshwater Act, 1938. Mbabane. Kingdom of Swaziland.
- Government of Swaziland. (1992). The Eswatini Environmental Authority Act, 1992, Mbabane. Kingdom of Swaziland.
- Government of Swaziland. (2013). A framework for National Development Strategy; A review. Ministry of Economic Planning and Development, Poverty Reduction and Monitoring & Evaluation Division (PRMD). Mbabane, Swaziland.
- Government of Swaziland. (2016). The Integrated Water Resources Master Plan, 2016-2025. Department of Water Affairs. Mbabane.
- Government of Swaziland. (2003). The Water Act, 2003. Mbabane. Kingdom of Swaziland.



Mwendera, E. J. (2006). Rural water supply and sanitation (RWSS) coverage in Kingdom of Swaziland: towards achieving Millennium Development Goals. *Physics and Chemistry of the Earth. Parts A/B/C*, 31, 15/16, 681-689.

Piteau Associates. (1992). *Groundwater resources of Swaziland. Report*, 50pp. Piteau Associates Engineering, North Vancouver, BC.

Robins, N. S. and Bath, A. H. (1979). *Assessment of the thermal springs of Swaziland. Institute of Geological Sciences Technical report WD/OS/79/16*.

SADC Review. (2006). *SADC Review 10th Anniversary, 1997-2006*.

United Nations. (1989). *Country paper – Kingdom of Swaziland. United Nations, New York. Natural Resources/Water Series*, 19, 261-268.

APPENDIX A: LITERATURE INVENTORY LIST

No.	Year	Title of Document	Author	Publisher	Report Number	Link (if it is a website document)
1	1999	Eswatini Pollution Control Regulations	Government of Eswatini			
2	2003	Eswatini Water Act	Government of Eswatini			www.ielrc.org/content/e0309.pdf
3	2001	The Water Pollution Regulations	Government of Eswatini			
4	2016	The National Climate Change Policy.	Government of Eswatini			
5	1997	The Environment Policy and Environment Action Plan.	Government of Eswatini			
6	2010	The Disaster Risk Management Plan and Disaster Risk Management Policy.	Government of Eswatini			
7	2015	The National Irrigation Policy	Government of Eswatini			
8	2015	The Eswatini National Agricultural Investment Plan	Government of Eswatini			
9	1997	The National Development Strategy	Government of Eswatini			
10	1992	The Water Services Act.	Government of Eswatini			
11	2017	Eswatini Government. <i>Draft National Water Policy.</i>	Government of Eswatini			
12	2005	Irrigation in Africa in figures – AQUASTAT Survey 2005	FAO	Aquastat		http://www.fao.org/nr/water/aquastat/countries_regions/SWZ/



No.	Year	Title of Document	Author	Publisher	Report Number	Link (if it is a website document)
13	2013	The thermal springs of Eswatini—a review	N.S Robins	British Geological Survey, Maclean Building, Wallingford, OX10 8BB, UK		http://gwd.org.za/sites/gwd.org.za/files/03%20N%20Robins_Thermal%20springs%20of%20Swaziland.pdf
14	1986	Legal Aspects of Land Tenure in Swaziland. Paper Prepared as Part of the Ministry of Agriculture and Cooperatives' Research on Changes on Agricultural Land Use: Institutional Constraints and Opportunities.	A.K Armstrong			http://armstrong_1986_legal_aspects_of_land_tenure_in_swaziland%20(2).pdf
	2006	Rural water supply and sanitation (RWSS) coverage in Kingdom of Swaziland: towards achieving Millennium Development Goals	E.M Mwendera	Physics and Chemistry of the Earth	Parts A/B/C, 31, 15/16, 681-689.	
	1992	Groundwater resources of Swaziland.	Piteau Associates	Piteau Associates Engineering, North Vancouver, BC.	Report, 50pp	

APPENDIX B: STAKEHOLDER ENGAGEMENT LIST

Full List of Stakeholders

No.	Title	Name	Affiliation	Role	Sector Group	Email	Priority (yes/no)
1	Mr	Musawenkhosi Mwelase	Department of Water Affairs- Rural Water Supply section	Groundwater Engineer	National Government	wenkhosi796@gmail.com	Yes
2	Ms	Nompumelelo Ntshalintshali	Department of Water Affairs - Groundwater Section	Rural Water development Engineer	National Government	nompie25@gmail.com	Yes
3	Mr	Trevor Shongwe	Department of Water Affairs - Policy and Institution Section	Chief Water Engineer	National Government	trevorshongwe@gmail.com	Yes
4	Mr	Ncamiso Mhlanga	WaterAid	Country Manager	NGO	ncamisomhlanga@wateraid.org	Yes
5	Mr	Sihle Mzileni	National Disaster Management Agency	Operations Manager	Government Parastatal	sihle@ndma.co.sz	Yes
6	Mr	Muntu Simelane	World Vision International	WASH Manager	NGO	muntu_simelane@wvi.org	Yes
7	Ms	Nomahlubi Matiwane	Eswatini Water Services Corporation	Communications Manager	Private Company	nomahlubi.matiwane@swsc.co.sz	Yes
8	Mr	Musa Masilela	Eswatini Water and Agriculture Development Enterprise	Water Manager	Government Parastatal	moosawenkosi@yahoo.com	Yes

No.	Title	Name	Affiliation	Role	Sector Group	Email	Priority (yes/no)
9	Mr	Boniswa Dladla	UNICEF	WASH Specialist	Donor / Development Partners	bdladla@unicef.org	Yes
10	Dr	Sipho Nkambule	Eswatini Cane Growers Association	Managing Director	Private Company	drsipho@scga.co.sz	No
11	Dr	Leonard Ndlovu	National Water Authority	Chairperson	Local Stakeholder / Water User	lnlovu@rssc.co.sz	No
12	Mr	Sakhiwe Nkomo	Komati Basin Water Authority	Water Manager	Private Company	sakhiwe.nkomo@kobwa.co.za	No
13	Mr	Makhosi Dlamini	Microprojects Eswatini	Water Manager	Government Parastatal	makhosi@microprojects.org.sz	Yes
14	Prof	Manyatsi Absalom	University of Eswatini	Land Use Lecturer	Academic	manyatsi@uniswa.sz	No

The final list of stakeholders engaged in the exercise were as below.

Stakeholders that completed the questionnaires

Name	Designation and Organisation	Contact Details
Mr. Sylvester Matemu	Ministry of Water and Irrigation: Water Resources - Transboundary Waters	Mr. Sylvester Matemu
Mr. Hosea Sanga	Ministry of Water and Irrigation: Water Monitoring and Assessment	Mr. Hosea Sanga
Dr. Ibrahim Mjema	Sokoine University of Agriculture: Geography and Environmental Studies Department	Dr. Ibrahim Mjema
Ms. Domina Makene	Drilling and Dam Construction Agency	Ms. Domina Makene

Validation Workshop

Name	Position	Stakeholder Group
Mr Trevor Shongwe	Director at Kingdom of Eswatini's Department of Water Affairs	Government (Validation Workshop)
Ms Thobile Dlamini	Kingdom of Eswatini Representative	Government (Validation Workshop)
Ms Thembinkosi Nunes	Compliance Officer at Kingdom of Eswatini Water Services Corporation	Government (Validation Workshop)
Mr Musawenkosi Mwelase	Department of Water Affairs- Rural Water Supply section, Groundwater Engineer	Government (Validation Workshop)

APPENDIX C: DESIRED FUTURE STATE SUMMARY

Reflection of Policy Framework as per the minimum requirement of the Desired Future State

Minimum requirement for desired future	Status	Comment
A long-term policy to protect groundwater by preventing pollution and overuse. This policy is comprehensive, implemented at all appropriate levels, consistent with other water management policies and be duly taken into account in other sectorial policies;	Partially achieved	The country never had a Water Policy prior to the establishment of the Water Act of 2003 into law. However efforts have been made to get a National Water Policy into place which is currently a Draft (2017). Yet to be promulgated.
The social, economic and environmental values of groundwater are all recognised;	Partially achieved	The draft policy does recognise good values associated with under groundwater resources. However there is more ground to be covered in terms of physically transmitting and raising awareness on specifically on groundwater affairs.
<p>The human right to water is recognized and a rights-based approach to groundwater management is taken, <i>inter alia</i>, through:</p> <ul style="list-style-type: none"> - Prioritization of drinking water/basic human needs in water legislation; - Ensuring that land-based rights cannot entitle unlimited access/use of freshwater, including groundwater; - Groundwater is a public good; - Legally recognizing customary rights to freshwater, including groundwater, - Provision of pricing mechanisms that incentivize equitable distribution of rights to access and use of groundwater, prioritizing small-scale users' (including women and youth) livelihoods and food security needs. 	Partially achieved	<p>The Water Policy recognises the right to water but without defining what the right is.</p> <ul style="list-style-type: none"> - The prioritization of basic water was set. - Yes the Policy dispels the entitlement of water in proportion to unlimited land based rights. - Water including groundwater is declared a public good. - Customary rights are not explicit. - Prioritisation of small-scale users' (including women and youth) livelihoods and food security needs are explicitly spelt out in the Policy.
Groundwater is recognised as a highly important source of domestic and agricultural water supply and a key resource for poverty alleviation, food security, and the sustainable economic development of rural areas;	Partially achieved	The Policy recognises groundwater as a critical source of domestic water supply alleviation, food security, and the sustainable economic development of rural areas; but despite this recognition of the role played by groundwater resources, the resource is treated highly to match its role and value to the country. This is compounded by the lack of a National

Minimum requirement for desired future	Status	Comment
		Groundwater Strategic Development Plan, Policy, etc.
The biophysical and ecological linkages between ground and surface water for their use, protection and management are recognised, including land use zoning for groundwater protection and recharge (conjunctive use);	Partially achieved	The Policy recognises the intrinsic relation between the surface and ground water resource. However, the complexity of groundwater is not escalated to the same level as surface water mainly because there is shallow knowledge about the country's groundwater resources. Resuscitation of the groundwater research program remains could help in determining land use zones for groundwater protection and recharge. The country is faced with a major challenge of poor land use practices which consequently accelerates the rapid extinction of catchment areas and compromise recharge zones for groundwater.
The importance of the maintenance of the ecological integrity of wetlands in groundwater management is recognised (recharge zones);	Partially achieved	The Policy recognises the vital role played by wetlands but their management lies among several government Ministries and departments resulting in poor management especially without a Wetlands Policy.
Intersectoral collaboration is promoted and facilitated so that the needs and impacts of different sectors (e.g., land, agriculture, mining, municipal, and environment) are taken into account in groundwater management and the impacts of developments in those sectors on groundwater are accounted for;	Not Achieved	The Policy recognises that groundwater planning and management demands collaborative efforts across all land use stakeholders including information sharing. Nevertheless, this collaboration is more pronounced with regards to surface waters and not groundwater. This is still not the practice for groundwater.
The need for adaptive management is recognised due to the inherent limitations in the nature of scientific information in conjunction with the widely occurring dynamic processes of climate, social and institutional change;	Partially achieved	There are several climate change studies conducted in the country but these lack coherent studies on groundwater aquifer mapping and related impacts of climate change on these. Adaptive management practice is still a new concept in the country that must be incorporated into management tools taking into consideration the unpredictability nature of climate change.
The roles of various stakeholders and water users in groundwater management is recognised and participation of stakeholders in decision-making and groundwater management is promoted and facilitated;	Partially achieved	The Policy encourages participation and involvement of all stakeholders in decision making and groundwater management but currently not effected to acceptable levels. The desire to promote groundwater knowledge is one of the milestones the Department of Water Affairs must embrace and facilitate through sound legislation.
An apex body that is responsible explicitly for GW management and playing the role of	Achieved	The National Water Authority (NWA) is the apex body working with the Ministry of Natural

Minimum requirement for desired future	Status	Comment
custodian/trustee on the part of the state is clearly defined;		Resources and Energy through the Department of Water Affairs (DWA) which acts as a Secretariat responsible for groundwater management. The Department of Water Affairs through the Hydrogeology & Groundwater Drilling Section is the institution tasked with the overall responsibility of governing under groundwater resources exploration and management activities.
Effective institutional arrangements are coordinated at trans boundary, national and local levels;	Partially achieved	There are institutional arrangements coordinated at trans boundary, national and local levels; the transboundary institutional arrangements are better coordinated than the national and local level ones due to various reasons including financial and technical capacity.
Public access to geo-hydrological data held by the state is promoted and facilitated	Not achieved	Public access to geo-hydrological data held by the state is provided freely but it cannot be said that it is promoted and or facilitated as there is no readily available public groundwater data sharing platform. Access to data is controlled except where the purpose of data use is clearly articulated and approved by Authorities. Users can access information only when they request for it.
Additional environmental principles necessary to protect and sustain groundwater are mandated, including: the precautionary principle, the principle of gender equity and social inclusion (GESI), the principle of subsidiarity, and the principle of intergenerational equity.	Partially	Some of these principles (the precautionary principle, the principle of gender equity and social inclusion (GESI), the principle of subsidiarity, and the principle of intergenerational equity) are included in the existing legislation but their actual implementation remain challenge.

Reflection of Legal Framework as per the minimum requirement for the Desired Future State

Minimum requirement for desired future	Status	Comment
Provide Status of Groundwater		
All water has a consistent status in law, irrespective of where it occurs	Achieved	Yes according to the Water Act (2003) both groundwater and surface water has a consistent status in law, irrespective of where it occurs.
Explicit reference to groundwater and conjunctive use management in catchment/water management and development plans and drought/emergency management plans	Not achieved	The National Water Act addresses water resources management, including groundwater though the groundwater component is not fully expressed. This is because there is no legislation solely developed for groundwater management.
Human right to water recognized in groundwater legislation, facilitating	Achieved	Groundwater use for primary needs is exempt of abstraction permit therefore enabling citizens

Minimum requirement for desired future	Status	Comment
prioritization of drinking water and basic human needs, as well as small-scale users		free access to the resource where consumption quality standard is met.
ii. Regulate Groundwater Quantity Provide conditions for accessing groundwater Water use authorizations		
Legislation must enable the authorisation of groundwater use (with a system that does not discriminate, especially against the rural poor);	Achieved	The Water Act (2003) does not discriminate against the rural poor.
The permitting of groundwater use should not be tied exclusively to land tenure;	Achieved	The Act explicitly state that water access is not exclusively tied to land rights.
Legislation should allow for the categorisation of water users;	Not Achieved	The Act does not categorise users but it does emphasise and prioritise basic water.
Groundwater should be declared a public asset and/or authority vested in government to restrict, in the public interest, the rights accruing from its private ownership to prevent over-abstraction or inequitable access/use by landowners;	Achieved	The Act declares water as a public good and its exploration is regulated by law.
Is groundwater use allowed through use (usufruct) rights, subject to a government-controlled, permit system for large scale users with appropriate non-permit systems for addressing the needs of small scale users	Achieved	Groundwater use for commercial purposes attracts the application of a permit.
The legislation recognises and legalises affordable, small-scale and indigenous solutions;	Not Achieved	This is not stated in the Act.
The legislation should enable the regulation of borehole drillers, regulation for drilling, control of drillers, information from drillers and standards for borehole drilling;	Not achieved	Borehole drilling is currently unregulated pending passing of drilling regulations into law. Drilling is ad-hoc. Natural resources exploration are controlled by the Mines and Minerals Act (2011).
Legislation should give water inspectors the right to enter land with the offenses and associated penalties noted in the legislation (this includes appropriate fines and jail time that needs to be adjusted annually);	Not achieved	Entry for inspection purposes is stated but the lack of penalties legislation relevant to groundwater is the main challenge.
The legislation should enable the regulation of exploration;	Achieved	The regulation talks to exploration.
The legislation should allow for zoning for overused/fragile aquifers;	Not achieved	Zoning for overused/fragile aquifers is not stated and this may be due to the lack of local level groundwater aquifer mapping in the country.
Groundwater use organizations should be integrated into existing institutional frameworks (e.g., catchment management, customary institutions)	Partially achieved	The National Water Act (2003), recognises all water and land use stakeholders. The legislation recommends that water management be part of the proposed and established management

Minimum requirement for desired future	Status	Comment
		structures (NWA, River Basin Authorities, Irrigation Districts and Water User Associations). However, more bias is placed on surface water.
Stakeholder engagement		
The legislation should specify when and how stakeholders, the public and/or other water users are to be engaged in planning, decision making and self-management with regard to groundwater;	Partially Achieved	The Act widely promotes stakeholder engagement for water management through the (NWA, River Basin Authorities, Irrigation Districts and Water User Associations), but does not prescribe the how.
There should be specific mechanisms for directly involving stakeholders in the development of laws and regulations related to groundwater and decisions that may impact the use or quality of groundwater on which they depend for drinking, livelihoods, food security, economic or cultural well-being; and	Partially Achieved	The Act widely promotes stakeholder engagement for water management through the (NWA, River Basin Authorities, Irrigation Districts and Water User Associations), but the bias is more towards surface water.
The legislation should specifically address the issue of the involvement of women and youth in decision-making and the implementation of groundwater supply schemes.	Not Achieved	The Act states the need for gender mainstreaming but not necessarily making distinctions among youth and women etc.
Monitoring and data collection to support regulation		
The legislation should specify the need and parameters for a sustainable system for data collection, management and dissemination, including standardization and harmonization of data. This entails a national monitoring and information system which captures quantity and quality data from key aquifers;	Not achieved	The legislation does not specify the parameters especially for ground water parameters.
The legislation should specify the need for drought monitoring systems which extend beyond rainfall, surface water and food security indicators to groundwater and groundwater supply status, including the appropriate prediction of future hydrogeological conditions;	Not Achieved	The parameters monitored in the country do not include ground water.
In transboundary basins, legislation should address the need for standardization and exchange of data as well as the establishment of joint inventories; and	Achieved	The transboundary agreements state that data is to be shared and be standardised but its actual sharing / dissemination and standardisation remains a challenge.
The legislation should enable access by the public to geohydrological data held by the state.	Partially achieved	Access to information is permitted but the users are not aware on what information is available and the information is not translated to suit various user needs.
iii. Water conservation and efficiency of use	Not achieved	The legislation does not enable regulation to ensure the efficient use of groundwater, such as

Minimum requirement for desired future	Status	Comment
Legislation should enable regulation to ensure the efficient use of groundwater, such as the use of economic incentives and imposition of technologies.		the use of economic incentives and imposition of technologies.
Compliance and Enforcement		
Clear mechanisms for promoting compliance with groundwater regulations should be included in the legislation	Not Achieved	There is no compliance mechanisms for groundwater.
Enforcement provisions should include, <i>inter alia</i> , inspections authority for groundwater management institutions, the ability to impose fines and/or additional administrative penalties and adjust those as necessary, and enumerate criminal offenses associated with failure to comply with the law.	Partially achieved	Inspections are discussed in the legislation but compliance and enforcement issues remain unaddressed.
iv. Conflict resolution mechanisms and/or the right to appeal	Not achieved	Conflict resolutions are not discussed not conflict resolution mechanisms stated. .
Regulatory measures		
The legislation must enable the relevant authority (Minister) to make regulations on any relevant matter in the legislation	Achieved	This is catered for in the legislation.
Legislation should provide a clear ability for the government to pass regulatory measures, such as abstraction fees and waste disposal charges, to provide revenue to water management institutions and to incentivise appropriate use of groundwater	Achieved	The Act makes provisions for such.

Reflection of Strategy and Guidelines Framework as per the minimum requirement for the Desired Future State

Minimum requirement for desired future	Status	Comment
Provide Status of Groundwater		
v. Groundwater Protection Mechanisms Regulating Pollution (Point source and non-point source)		
<ul style="list-style-type: none"> i. Water quality targets; ii. Regulation of emissions/wastewater discharge/waste storage including the impact of mines on groundwater quality: Permits can 	Achieved	Groundwater is mainly targeted for human consumption so therefore the WHO quality standards are utilised. All groundwater sources for domestic use are subjected to quality analysis prior to use.

Minimum requirement for desired future	Status	Comment
be used to regulate the discharge, disposal and possibly the storage of waste should specifically take into account the vulnerability of the aquifer concerned and the provisions necessary for its protection;		
iii. Classification of water bodies; and	Partially achieved	Classification is stated, however this is common with surface water resources whose demarcation lines are well defined. It is not the case with groundwater because of its complexity. However quality analysis is compulsory on all groundwater sources.
iv. Reducing and regulating abstraction.	Achieved	Abstraction is regulated through the use of tariffs and permits.
v. Powers of compliance monitoring and enforcement	Partially achieved	Although included in the legislation there is a need to ensure the monitoring process of the explorations.
Regulating Depletion		
Regulation of abstraction and recharge (usually via permitting);	Partially Achieved	Water resources rationing is encouraged and implemented during times of water scarcity but this is more towards surface water resources.
Sustaining wetlands;	Not Achieved	The Act recognises the importance of wetlands but does not explicitly deal with wetlands per se. The protection and conservation of wetlands is encouraged under environmental protection legislation.
Land use zoning – prohibition of abstraction in certain zones; cropping or irrigation practices; protection zones for recharge areas; no surfacing/drainage requirements; and	Not achieved	The water Act and Policy addresses these issues but this is aspect is undermined by poor land use practices. This creates a huge challenge for protection of catchment / recharge areas. The land Policy was not promulgated yet it impinges on this aspect.
Legislation must make it mandatory for installation of monitoring equipment of boreholes especially for large-scale users (the information must then be supplied to the state).	Not achieved	The DWA is on the verge of implementing a new monitoring program which will ultimately cover all key supply stations that are groundwater fed including most productive aquifers. This program is underway and shall be rolled out on river basin by basin approach. A monitoring program for groundwater once existed focusing on strategic aquifers however with the increasing demand for

Minimum requirement for desired future	Status	Comment
		potable water, most of the monitoring sites ended up as potable water supply sources while some were vandalised.
Powers of compliance monitoring and enforcement	Not achieved	Monitoring and compliance remains a challenge both in terms of the non-existence of an M&E unit and no enforcement.
Planning		
The legislation should specify the need for long term plans to ensure the sustainable use of groundwater, including drought management plans and cross-sectorial coordination;	Not Achieved	The existing legislation paid little attention to groundwater aspects due to its low availability and utilisation in the country. Groundwater is given more pronounced attention only during times of water scarcity.
Where water legislation provides for catchment level or basin level planning, groundwater should be integrated into those plans (for example through impact assessment requirements);	Partially achieved	The Policy calls for this to be integrated into surface water management and planning by the existing water user organisations but the lack of information on groundwater hampers this.
The legislation should specify that groundwater management planning should take into account and be integrated into land use and environmental planning; and	Not achieved	The legislation does not precisely discuss groundwater management planning. The legislation however, does state that water resources management planning should be integrated into land use planning and environmental planning. The actual planning however is not monitored and as such implementation of the integration is practised at an ad-hoc basis.
Planning should be cyclical and based on continuous learning from data and stakeholder feedback to ensure adaptive management and effective responses to changing climatic, social, political and institutional contexts/drivers.	Not achieved	Planning is ad hoc with less planning based on continuous learning from data and stakeholder feedback and as such adaptive management and effective responses to changing climatic, social, political and institutional contexts/drivers does not inform planning. This is largely due to poor availability of information since research is not coordinated neither is data collected in a coherent manner. Causes for such is lack of finance and capacity as well as water research framework.

Reflection of Institutional Framework as per the minimum requirement for the Desired Future State

Minimum requirement for desired future	Status	Comment
Legislation should contain provision for its effective implementation, including the mandate, competence and power of the relevant authorities in accordance with uniform governance principles;	Achieved	Effective implementation is contained in the legislation and Policy but challenges related to capacity and information hinders this.
Water authorities or coordinating bodies should have the competence to integrate all aspects of water management and should be rendered competent to arbitrate among various competing demands, and diverging interests regarding groundwater abstraction and use, both in the short-term and in the long-term;	Partially achieved	Water authorities or coordinating bodies generally do not have enough capacity (human, financial, technical and infrastructure) needed to carry out their roles and responsibilities.
The authority or body should collaborate with other authorities, competent for public health, land-use planning, soils management, waste management;	Partially achieved	There is an indication for such collaboration as the Act promotes integrated water resources management, but actual collaboration is practiced at ad-hoc basis due to political and administrative reasons.
Water user associations and other appropriate forums (such as municipalities) should be utilized to strengthen the user advocacy role and achieve new partnerships and a joint management of the common resource.	Partially achieved	The user forums are still at infancy but they are gaining traction. There is a need for advocacy, networking and capacity building amongst other aspects.



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