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

Gap Analysis and Action Plan – Scoping Report (DRAFT)

February 2019

Democratic Republic of Congo

Report Number 1.3

SADC

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY

TOWARDS A COMMON FUTURE

GROUNDWATER MANAGEMENT INSTITUTE

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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This report is accessible online through SADC-GMI website: www.sadc-gmi.org

Citation: SADC-GMI, (2019). *Gap Analysis and Action Plan – Scoping Report (DRAFT): Democratic Republic of Congo.* SADC GMI report: Bloemfontein, South Africa.

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 Democratic Republic of Congo a 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 Democratic Republic of Congo 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 Democratic Republic of Congo 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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ACKNOWLEDGEMENTS

The following individuals and organisations are thanked for their contributions to the project:

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Stakeholders Engaged

The project team would like to thank all those stakeholders that contributed to the project from Government, Private Sector, Civil Society and Academia and Research.

The authors also like to express sincere appreciation to members of the **SADC Sub-Committee on Hydrogeology** for identifying the need for this project, following on the numerous challenges that they experience in their respective countries. Without the dedicated facilitation and support from the members of the SADC Sub-Committee on Hydrogeology, who also serve as focal points for groundwater development in their respective countries, this exercise would not have been accomplished.

In this regard, special thanks are given to:

Mr Manuel Quintino, Angola; Mr Kedumetse Keetile, Botswana; Mr Cyrille Masamba, Democratic Republic of Congo; Mr Trevor Shongwe, Kingdom of eSwatini, Ms Christinah Makoae, Lesotho; Mr. Luciano Andriavelojaona, Madagascar; Ms Zione Uka, Malawi; Mr Pokhun Rajeshwar, Mauritius; Ms Ana Isabel Fotine, Mozambique; Ms Maria Amakali, Namibia; Mr Frankie Jose Dupres, Seychelles; Mr Zacharia Maswuma, South Africa; Ms Mwanamkuu Mwanyika, United Republic of Tanzania; Mr Frank Ngoma, Zambia; and Mr Robert Mutepfa, Zimbabwe.

Additionally, the authors thank all other professionals from the Member States who contributed to the project by providing ideas and feedback, in particular, professionals from various organisations who contributed to the over-all project, and senior officials from the Member States. The contribution of all institutions and individuals who supported the project through ideas and comments and may not have been credited by name, is greatly appreciated.

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

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LIST OF ACRONYMS

ACRONYM	DEFINITION
AfDB	African Development Bank
CIWA	Cooperation in International Waters in Africa
CNAEA	National Action Committee for Water and Sanitation
DRC	Democratic Republic of Congo
DTE	Decentralized Territorial Entities
GEF	Global Environment Facility
GESI	Gender, equity and social inclusion
GMI-PLI	Groundwater Management Institute – Policy, Legal and Institutional
GW	Groundwater
PNSPE	National Public Water Policy Development Process
REGIDESO	Regie de Distribution d'eau
SADC	Southern African Development Community
SADC-GMI	Southern African Development Community – Groundwater Management Institute
SNHR	National Rural Water Supply Service

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 DRC.

1.2. Socio-economic drivers for DRC

The Democratic Republic of Congo (DRC) straddles the equator. It is the second country in Africa with an area of 2,345,409 km^2. It is geographically limited by nine following countries:

- In the north: the Central African Republic and the Sudan;
- In the east: Uganda, Rwanda, Burundi and Tanzania;
- In the west: the Republic of Congo
- In the south: the Republic of Angola and Zambia.

The relief is dominantly plateau with hot and wet climate. The DRC has a developed hydrography with the river Congo, 4700 km long. 'The DRC is one of the three countries in the world in which more than 50 per cent of the population do not have access to safe drinking water.'(www.unicef.org).

Its population is estimated at 75 million (6.8% of African population). The economy of the country depends mainly on mineral resources. The DRC's geographic capabilities include natural resources throughout its national territory, such as cobalt, gold, oil, diamond, silver, zinc, uranium, manganese, tin, germanium, radium, bauxite, iron ore, coal, hydroelectricity and wood.

This country has suffered natural disasters and ecological problems, such as, volcanism in the east, deforestation, soil erosion, loss of wildlife and water pollution. Its mineral helped to build big cities especially in Lualaba and Haut Katanga Provinces. The DRC was a theatre of many political instabilities. In 2002, these conflicts affected deeply the economic sector of the country.

Water resources in the DRC are abundant in both surface and underground waters. However, on the scale of a country marginalized for a decade, economically ruined and ravaged by war almost continuously since 1996, the progress registered in 2002 is a real step forward for the DRC, especially with the signing of agreements of Pretoria on December 17, 2012 but without impact on the population. The DRC suffered a severe depression linked to a management marked by corruption and then to the civil wars that ravaged the country. With a growth of 5, 2% in 2008 and 2, 7% in 2009, it was then one of the African countries most affected by the crisis of 2008-2009. During the war, the population of corpses thrown there poisons the waters of rivers or lakes. The conflicts that have ravaged the country have a strong impact on the access to drinking water for following reasons:

- The hydraulic infrastructures are in poor conditions because of the destruction and the lack of maintenance for those which are still existing;
- The lack of land use planning which lead to the contamination of aquifers, land degradation and deforestation.

1.3. Water resources

1.3.1. Status of water resources (surface, groundwater and transboundary)

DRC surface waters account for about 52 per cent of Africa's water reserves, while the country's reserves account for 23 per cent of the continent's renewable water resources. The DRC is in fact the country with the most abundant water resources in Africa. The Congo River has the largest surface water flow with an average flow rate of 39 000 m^3/sec.

The rains are regular and abundant but vary geographically and according to the seasons (from 800 mm to 1 800 mm). The DRC also enjoys considerable water autonomy, with 70 per cent of its current renewable water resources coming from rainfall in the country. The abundant water resources are intrinsically linked to its vast forests, which cover more than 155.5 million ha. Indeed, the vast majority of the population depends on the sources fed by dense forests. While the overall rate of deforestation at the national level remains relatively low (estimated at 0.2 per cent per year), in some parts of the country, especially in the savannah, gallery forests and especially around urban centres, the phenomenon reaches a high level and directly threatens drinking water sources.

Majority of the country is underlain by porous aquifers and alluvial aquifers, with a big volume. Ground water availability is estimated at 12 per cent of the total water availability of 16 605 m^3/capital/annum. The groundwater quality is acceptable for drinking water except in some mountainous areas in the east.

The DRC shares 5 transboundary aquifers:

- Kalahari/ Katangian Basin
- Coanga
- Tanganyika
- Dolomitic Basin
- Aquifer Cotier

1.3.2. Groundwater environment and ecology

The Congo River is the most powerful and the second longest river in Africa. The annual flow of the river is stable because of the relative homogeneity of the equatorial climate, characterized by the absence of a real dry season and the buffer role of the large swamps of the lowland Central lowland rainforest. Despite the abundance of surface water, the vast majority of the Congolese population depends on groundwater sources for drinking water. It is estimated that groundwater accounts for almost 47 percent (421 km3/year) of the DRC's renewable water resources.

Besides being a vital water supply to people the ecological functioning of groundwater in the environment is incipient. There is recognition that groundwater ecosystems deliver services that are of immense societal and economic value, such as: (a) purification of water and its storage in good quality for decades and centuries, (b) active biodegradation of anthropogenic contaminants and inactivation and elimination of pathogens, (c) nutrient recycling, and (d) mitigation of floods and droughts (Griebler and Avramov, 2015).

Information on the extent and quality of underground water supplies and spring water is scarce and, when available, often obsolete and covering a small geographical area.

Although surface water is abundant, the majority of Congolese depends on groundwater and spring as a source of drinking water. The geology of the DRC is complex. Aquifers of the DRC can be grouped as following:

- The aquifers are very productive in the Central Basin. It is composed of large alluvial sediments up to 120 meters thick. The recharge comes directly from rainwater and the river system;
- A Tertiary-quaternary aquifer of southern Kasaï, which consists mainly of a semi-continuous sandy loam, and soft sandstone, whose thickness can reach 100 meters in certain areas.
- The Mesozoic (Karroo) and limestone sandstone aquifers that surround large parts of the Central Basin, around Gemena, Kisangani and northern Kasai. This region is characterized by fast recharge and low or moderate productivity. In some areas, fracking has led to the development of karstic systems.
- A high-yielding calcareous-dolomitic sedimentary complex constituting an important aquifer in southern Katanga. This system is characterized by heterogeneous aquifers.
- Precambrian crystalline and fractured base rocks (basalt and granite) forming the mountainous terrain along the Great Rift Valley from Lake Tanganyika to Lake Edward, as well as Bas-Congo,

contain discontinuous aquifers, but with high potential Groundwater. It has generally an acid pH that requires equilibration. Karstic and carbonate aquifers such as the Katanga dolomites, however, produce basic groundwater. Soft sandstone, quartz and sandy aquifers generally contain little solids and dissolved minerals. On the other hand, the thermal waters of volcanic and tectonic origins of the Albertine Rift, and the dissolution from sulphurous host rocks (gypsum shale, calcite formations, etc.) as can be found in Katanga and in the littoral zone, produce a much-mineralized groundwater. Since it can also be heavy metals, detailed examinations are needed to ensure that the water is safe for consumption

1.3.3. Status of groundwater infrastructure

Although the DRC is the African country with the most important hydrological resources, it is now facing an acute crisis of drinking water supply due to damaged infrastructure (weakened by years of underinvestment and conflict), rapid population growth and water supply coverage rate that has declined until recently. The social and health consequences of the breakdown of water services have been considerable.

In the DRC, more or less 1 million people did not have access to drinking water in 2015. Seventy-six percent of the population had access to an improved water source due to 96% in urban areas and 40% in rural areas.

The President of the Republic delivered a speech in August 2018 saying, 52% of the Congolese population has access to drinking water this year.

There is a major geographical gap between drinking water access in urban and rural areas. However, in 2011, in many parts of the DRC, less than 5% of the population had access to drinking water. Financial investments are clearly oriented towards urban areas, with 85% of total funding going to urban water development, although the rural population still comprised 58% of the total population in 2014.[

Indeed, the sustainability of investments in water infrastructure is frequently threatened by the resulting environmental degradation. Two decades of underinvestment, aggravated by the destruction of facilities during the conflict, have severely damaged the country's water infrastructure and services. The major investments made for water supply infrastructure in urban areas come mainly from the World Bank, but also from the African Development Bank (ADB) and more recently from the national public water service Regie de Distribution d'eau (REGIDESO). Until recently, the deteriorated state of water infrastructure and rapid population growth accounted for the decline in access to water. An important part of REGIDESO's infrastructure dates to the colonial period and the period of investments made between 1970 and 1990. The rural water sector is characterized by the dilapidated state of its infrastructure.

1.3.4. Groundwater supply and demand

Some regions such of south of Kasai and Katanga are likely to face water shortages soon. Vulnerable areas where rising demand for an already dense and growing population is weighing on water resources. Drought-prone areas in the savannah areas of Katanga and Kasai Plateau are also exposed to seasonal water shortages.

In the DRC, water supply is one of the first daily tasks for women and children. Water supply is much more related to gender. REGIDESO is the company in charge of drinking water supply. It is struggling to satisfy its

customers because of the deterioration of these facilities and the increase in demand especially in residential area. To overcome this deficit, many households are forced to buy water at disproportionate prices.

Some provinces such as Katanga and Kivu have mining companies operating. These companies use huge quantities of water for their process plant. They are mainly using groundwater for mineral processing. In general data relative to the use of groundwater are not updated because of lack of investment.

Table 1 : Number of boreholes and headcount of the population served per province during the 2012-2013 campaign (Source: Ministry of Rural Development)

Province	Number of boreholes drilled			Population served (Number of inhabitants)
	Manual Pump	Submersible Pumps	TOTAL	
Kinshasa	7	4	11	87 000
Bas Congo	11	2	13	51 000
Bandundu	2	4	6	82 000
Equateur	18	1	19	38 000
Province Orientale	13	1	14	33 000
Nord Kivu	16	2	18	56 000
Sud Kivu	9	1	10	29 000
Maniema	5	1	6	25 000
Katanga	7	3	10	67 000
Kasai Oriental	10	0	10	10 000
Kasai Occidental	4	3	7	64 000
Total	**102**	**22**	**124**	**542 000**

Table 2 : Number of boreholes and headcount of the population served per province during the 2011-2012 campaign (Source: Ministry of Rural Development)

Province	Number of boreholes drilled			Population served (Number of inhabitants)
	Manual Pump	Submersible Pumps	TOTAL	
Kinshasa	13	24	37	493 000
Bas Congo	16	5	21	116 000
Bandundu	2	3	5	62 000
Equateur	17	0	17	17 000
Province Orientale	25	2	27	65 000
Nord Kivu	33	0	33	33 000
Sud Kivu	21	6	27	141 000
Maniema	5	0	5	5 000
Katanga	76	11	87	296 000
Kasai Oriental	0	6	6	120 000
Kasai Occidental	17	6	23	137 000
Total	**225**	**63**	**288**	**1 485 000**

Table 3: Number of boreholes and headcount of the population served per province during the 2013-2014 campaign (Source: Ministry of Rural Development)

Province	Number of boreholes drilled			Population served (Number of inhabitants)
	Manual Pump	Submersible Pumps	TOTAL	
Kinshasa	14	26	40	534 000
Bas Congo	17	13	30	277 000
Bandundu	4	2	6	44 000
Equateur	3	0	3	3 000
Province Orientale	25	2	27	65 000
Nord Kivu	33	0	33	33 000
Sud Kivu	28	4	32	108 000
Maniema	5	0	5	5 000
Katanga	82	11	93	302 000
Kasai Oriental	0	6	6	120 000
Kasai Occidental	17	6	23	137 000
Total	**228**	**70**	**298**	**1 628 000**

Table 4: Number of boreholes and headcount of the population served per province during the 2014-2015 campaign (Source: Ministry of Rural Development)

Province	Number of boreholes drilled						Population served (Number of inhabitants)
	Manual Pump	Submersible Pumps	Immerged Pumps	Extension Adduction	Adduction	TOTAL	
Kinshasa	0	26	0	0	0	0	0
Bas Congo	11	13	0	0	0	16	16 000
Bandundu	0	2	3	1	1	7	112 000
Equateur	0	0	0	0	0	0	0
Province Orientale	0	2	0	0	0	0	0
Nord Kivu	14	0	0	0	2	16	64 000
Sud Kivu	0	4	0	0	0	0	0
Maniema	5	0	5	0	1	13	132 000
Katanga	10	11	1	0	0	16	35 000
Kasai Oriental	0	6	0	0	0	0	0
Kasai Occidental	0	6	0	0	0	0	0
Total	**40**	**70**	**9**	**1**	**4**	**68**	**359 000**

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.

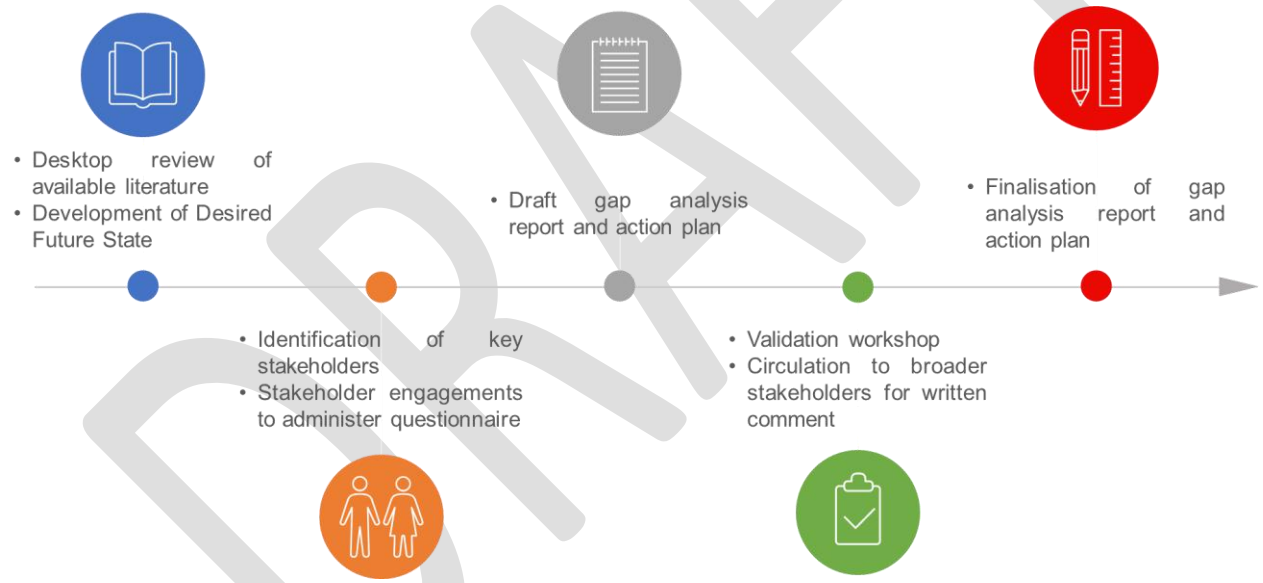

Figure 1: Methodology Outline

The literature collected consists of policies, legislation, tools, standards and groundwater governance assessments conducted in DRC. Full lists of documents reviewed are presented in **Appendix A**. The stakeholders engaged are presented 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

In the Democratic Republic of Congo, access to drinking water remains a challenge. It is therefore necessary to introduce new policies and effective management schemes at the level of the public water service resource in order to promote water. Thus, in its article 71, the water law stipulates that the government must define the national policy of the public water service. This policy must define the guiding principles that create the better conditions to the mobilization of investments and encourage the improvement of water use.

The National Public Water Policy Development Process (PNSPE) was launched in 2003 as part of a national seminar on the reform of the drinking water and sanitation sector. Its elaboration continued with the organization of the round table on infrastructures in 2004. The process made significant progress with the adoption at the end of 2008 of the Sectorial Letter relative to the drinking water supply of the urban area.

In 2010, the Ministry in charge of water resources set up a focal group, entrusting it with the responsibility of preparing the PNSPE. Since its creation, the Group has produced only preparatory documents for the PNSPE.

3.2. Policies to support groundwater management

Through the PNSPE, the first objective the policy is to place all the responsibilities for drinking water supply and resource management under the authority of a single Ministry. Beyond this, provinces and decentralized territorial entities (DTEs) are responsible for the production, distribution and marketing of drinking water and the financing of new water works. The second major objective is to separate the responsibilities of control of the work from those of the management and the exploitation of the services. The Ministry in charge of water, the provincial governments and the executives of the ETDs carries out the implementation of the PNSPE.

Apart from the still-embryonic PNSPE, there are other policies in the DRC that deal with water management in general. These policies such as the “code of hygiene of the Democratic Republic of Congo” and “mining code of 08 March 2018” which are close but not totally dedicated to the groundwater. The Code of Hygiene of the Democratic Republic of the Congo refers to groundwater only in its article 120 in which they speak about the way to evacuate the water in the sumps to avoid any contamination of the groundwater.

The mining code, meanwhile, recognizes the following:

- Article 3: Groundwater is the exclusive property of the state;
- Article 6: The conservation of water is very important and can sometimes need the intervention of the Prime Minister to delimit a portion of the national territory as res protected area;
- Article 112: Mining cooperatives must respect the standards for water use and protection of the environment.

In 2013, the ministry of the environment prepared a draft of a national policy for the sustainable management of water resources. The DRC does not have a clear water policy, it does have a ministry dedicated to water and guide the sustainable development of the sector.

3.3. Gaps and challenges identified

In the DRC, there is no policy totally dedicated to groundwater.

3.4. Enablers required to unlock these gaps/challenges

The table below reflects the enablers required to unlock the identified gaps and challenges being experience.

Table 5: Enablers required to unlock the policy gaps and challenges

Groundwater gap/challenges	Enablers
Lack of implementation of water policy (inertia and resistance to change)	▪ Priority should be given to preparing a policy/strategy for water resources management and the organization of public water services. ▪ Develop the appropriate regulations and guidelines for the effective implementation of the Water Law ▪ Priority areas include the provision of water services (which include construction guidelines), water quality standards, practical standards for the delineation of source water protection zones, monitoring rules drinking water quality and guidelines for collecting and accessing water data. ▪ Training of public officials and other stakeholders on new regulations for the water sector would also be desirable.

4. LEGISLATION

4.1. Evolution

Before the country's independence, there were several water laws that are obsolete nowadays. In the DRC, there is a lack of policy on water regulation and a ministry totally dedicated to water. Since the 1980s, the country's political situation has weakened the strengthening of legal and institutional frameworks related to water.

4.2. Legislation to support groundwater management

About ten ordinances and decrees used to regulate the water sector, many dating back to the pre-independence period.

- The Ordinance of 01 July 1914 on the pollution and contamination of lakes and rivers and parts of watercourses, which provides for the delimitation of protected areas for the abstraction of water
- Decree of May 6, 1952 on the Concessions and the Administration of the Waters of the Lakes and Rivers
- Ordinance No. 52/443 of 21 December 1952 on measures to protect sources, groundwater, lakes and rivers, to prevent pollution and waste of water and to control the exercise of water rights use and rights of occupation granted as amended to date
- Ordinance of March 26, 1971 defining the action of the state regarding river and wastewater
- In 1998, the National Action Committee on Water and Sanitation (CNAEA) drafted the first draft of the draft Water Code, but lack of consensus, this document was not valid
- In October 2003, the national seminar on the reform of the drinking water and sanitation sector invited the Congolese Government to launch a reform of this sector
- In 2005, three water code projects coexisted: one from the CNAEA (1998), one from the Ministry of the Environment (2004) and another from the National Energy Commission (2005)
- In 2006 CNAEA steered the process of developing the DRC water code until it was adopted at a national validation workshop in October 2010
- In 2006, faced with this situation, a mission was entrusted to the CNAEA to oversee the process of drafting the DRC's water code. The framework of this process was intended to be participatory, inclusive and interactive
- Thus, between 2006-2010, several activities were organized including the merging of 3 existing water codes and preparation of a first draft of the water code (draft validated in workshops

These regulations largely are out of date and mainly focused on the protection of water resources against contamination, the supply of drinking water and the management of user rights. These ordinances do not provide a coherent legal framework for organising a multi-stakeholder water sector.

Thus, the water law 15/026 of December 2015 had replaced them. The law provides legal and sustainable water management framework. The law grants rights to 26 provinces to enable these provinces to become key players in terms of planning and monitoring actions and to be involved in all actions undertaken.

This law is based on Articles 9 and 48 of the Constitution. It also includes the provisions of Articles 203 (16) and 204 (26) concerning competing constitutional powers and those exclusively reserved to the provinces; the universal principles of water resource management and public water service.

Its objectives are:

- Respond to the obligation prescribed to the State by Articles 9 and 48 of the Constitution as referred to above;
- Setting the rules of sustainable and equitable management of water resources;
- Fix the liability rules relating to public service water and sanitation by adapting them to current requirements of economic and social development;
- Determine the necessary tools for the rational and balanced management of water heritage, a multisectoral approach that considers present and future needs;
- Solving the problem of inadequate legal and institutional framework as well as the low rate of access to drinking water;
- Protecting water resources and regulate its use;
- Make efficient sector;
- Attract, through security measures, investors to the sector and promote a national water emergence by using public private partnership.

The law relative to water:

- Affirms that the use of drinking water has priority over other uses;
- Defines the principle of drinkability of water by placing an obligation on anyone who produces water for the population to provide drinking water;
- Identifies bodies accredited to verify the drinkability of water;
- Dictate the skills of regionalized and decentralized entities;
- Defines the responsibility of the main actors related to water;
- Allow the creation of association of groundwater users (Art.32);
- Gives authority to decentralised and local entities to take decision on water supply in case of any shortage;
- Recognize the development of a water management plan by catchment or sub-catchment (Art.15)
- Affirms that human right to water is recognized.

One of the points highlighted from the code of code of hygiene, stipulates that the works of catchment, treatment, storage and elevation of water must be protected from floods. It must also be installed in such a way as to avoid any risk of pollution.

4.3. Gaps and challenges identified

The Water Law of December 31, 2015 was developed in a complex context, due to the absence of a specific policy on water. One of the main purposes of this water law is sustainable and equitable management of

surface and groundwater. This law outlined guiding principles for the development of a series of instruments for planning and managing the efficient use of water resources. These principles include a national water strategy that considers the objectives of all sub-sectors, national and provincial water action plans, prioritizing interventions and their modalities, and development plans based on basins and evacuation areas. The principles do not exist yet and must be developed.

- **Lack of laws relating to groundwater:** The law does not explicitly address the need to address gender issues in groundwater management.
- **Lack of gender equality:** Gender is not considered in relation to women's participation in water management structures. Gender is not considered in relation to the need for women to have equitable access to groundwater and the resources needed to exploit groundwater.

Finally, the water law does not mention explicitly the customary practices relative to water.

4.4. Enablers required to unlock these gaps/challenges

Table 6:Sectoral legislation and implementation for groundwater management

Groundwater gap/challenges	Enablers
Lack of laws relating to groundwater	▪ Priority should be given to the development of water resources management and strategies for national water utilities. ▪ Develop and promulgate regulations on the provision of water services (including construction guidelines), operating rules for delineation of drinking water source protection zones, construction guidelines for rural and peri-urban water supply structures, for data collection and sharing of information on water. ▪ Development of subsidiary regulations will need to be complemented by an important training and awareness program that promotes effective enforcement.
Lack of gender equality	▪ Develop structure or organograms in sectors which is inclusive of women ▪ Allow equitable access to groundwater to all women, by ensuring all infrastructure can be operated by any gender
Lack of stakeholder involvement	▪ Stakeholders represented in local-level institutions for groundwater management
No compliance monitoring and enforcement	▪ Regulations for compliance monitoring and enforcement ▪ Development and regulations of water quality standards. Rules on monitoring of drinking water quality standards and guidelines.

5. STRATEGY AND GUIDELINES

5.1. Evolution

In the Democratic Republic of Congo, no strategic planning of groundwater management in place. Economic, social, technical and institutional strategies have been developed by international institutions on behalf of the country or sometimes the sub region in the context of groundwater management.

5.2. Strategies and guidelines to support groundwater management

The development, management and allocation of water resources in countries such as the DRC should follow basic principles. Several strategies that address institutional spheres of influence, technical infrastructure, economic framework, and social and environmental frameworks need to be developed.

5.2.1. Institutional strategies

National water policy

The country does not have a clear national water policy. This is a major handicap as national policies are of paramount importance as they provide a framework for legislation, strategic planning and the conduct of operations. The publication of the national water policy based on integrated management is essential. The political will and commitment of the leaders are the main elements that condition the government's ability to implement the water resources management policy.

Legislation and regulatory framework

As the Water Law is published, water quality needs to be improved and related problems (health, the state of the environment, etc.) improved. This can be done by requiring groundwater polluters to take the necessary measures to prevent water contamination by raising awareness and educating users and stakeholders about the precautions to be taken to avoid waste and pollution of water. Those who do not comply with these strict but reasonable ecological or health standards will be punished under the "polluter pays" principle. These sanctions are an effective deterrent, but also a means of covering the costs of compensation.

Management level

The problem of water has three dimensions:

- Water resources management occurs at different levels, from national to household, and encompasses several sectors
- The separation between the management functions and the distribution functions.
- The adoption of the integrated approach may be difficult to achieve initially because of the interference of the many institutions with interests in the water sector, the financial needs and the relatively long delays that are necessary for have positive results.

Management and organizations of transboundary river basins

The proper functioning of transboundary river basin organizations in the region is a matter of concern in the republic. The DRC must strive to deploy efforts with riparian countries to agree on rational strategies for integrated water resources management. The key approach is to foster regional cooperation and integration by helping to develop and strengthen institutions for shared water management, helping to develop appropriate laws and supporting infrastructure for data generation and sharing. and information.

Decentralization

It is important to ensure that those institutions to which responsibilities are given are effectively strengthened and empowered to be effective, autonomous and accountable. It is important to ensure that quality standards are set, rules are set for pricing, and mechanisms for promoting competition and advocating for users are put in place. This also applies to mechanisms for combating pollution and protecting aquatic ecosystems

5.2.2. Technical Strategies

Better knowledge of water resources

Long-term strategic planning is based on knowledge. Therefore, projects to build capacity in this area should be given priority. Water resource planners need information about the presence and distribution of water and natural and physical factors such as topography, soils, geology and land.

One of the main functions of the regulation of water resources should also be to ensure that users have accurate and timely, and that prices accurately reflect the situation on the water market.

Appropriate technology

Good water resource management requires accessible, socially acceptable technologies adapted to the level of development. Continuity of operation and maintenance must be guaranteed. Traditional techniques and practices should be carefully evaluated, adopted or adapted as appropriate. It should be emphasized, however, that the concept of appropriate technology in no way excludes the use of modern and sophisticated technologies, if it does not lose sight of efficiency in relation to cost and maintenance.

Water scarcity management

Technical measures are needed to respond to the combined effect of projected increased demand, future water scarcity in the country, and unequal distribution of water over time and space. These measures, while not exhaustive, will include the development of water conservation structures such as dams to allow the storage of a larger volume of water for the use of water to permit move water from surplus areas to deficit areas. On the demand side, water productivity needs to be increased through increased efficiency through the rehabilitation of existing facilities, the construction of more efficient systems and the change of water use systems. Other innovative approaches will need to be applied, where appropriate, such as water harvesting, soil management and increased water recycling.

5.2.3. Economic Strategies

Role of pricing in integrated water resources management

Good pricing is the cornerstone of a more rational management of water resources. Economic, environmental, financial and social considerations play a decisive role in the royalty process. They are briefly outlined below

Economic considerations

Tariffs should be set in such a way as to encourage users to use water efficiently and moderately in their various activities, and producers to provide good quality water at appropriate tariffs. To consider water of good quality as an economic good is to recognize that it involves an opportunity cost. Maximum welfare is achieved when tariffs correspond to the long-run marginal cost of production (distribution and supply), including the opportunity cost of groundwater. In these circumstances, the economic efficiency or the efficiency of the distribution of resources is reached.

Financial considerations

For projects to be financially viable without the need for state subsidies, the average unit tariff charged to the user must be equal to the unit financial cost of water production and distribution. However, if for any reason the State is obliged to pay subsidies, an independent mediator who will serve as an intermediary between the State and the water distribution services must determine these reasons in a transparent manner, preferably, considering the direct cost recovery from users.

Public-private partnership

Private sector participation in the water sector can be an effective means of mobilizing investment and enhancing the autonomy and accountability of service providers. In principle, the private sector can participate in all water sub-sectors. He is mainly active in water supply and sanitation. Public authorities must encourage their participation in this sub-sector.

5.2.4. Social Strategies

As water is a social good, all dimensions of water resource management need to be properly analysed from a social perspective, to identify the social issues that are critical for integrated water resources management. The need to create appropriate networks for water resources assessment, water quality control and the resolution of social and cultural issues related to the sustainable management of water resources is a challenge for the DRC. Social analysis and the identification of key social issues from the start of projects will allow for appropriate solutions to address the negative impacts. It is therefore necessary to evaluate the social impact of projects. However, the methods to be used will have to be determined according to the projects. The following lines present the strategies corresponding to the different social issues involved in the integrated management of water resources.

Among the social strategies, those that are taken as major are the following:

- Population pressure and urbanization
- Health and Education
- Gender Issues
- Participatory approach

5.2.5. Environmental Strategies

Important environmental issues should be identified early in the water resource development cycle

Environmental interactions

There is a close relationship between the degradation of water resources and poverty. Poor people often use poor quality water, contaminated with sewage, industrial pollutants and mud deposits from farmland or erosion, and suffer from debilitating diseases. In poor societies, as in the Democratic Republic of Congo, the population spends a lot of time doing water chores and looking for firewood. This chore is especially the responsibility of women and children. Timber cutting, harvesting of crop residues and animal dung on Arab lands for the supply of energy to households leads to degradation and soil erosion. This has implications for the quality and quantity of water. In addition, DR Congo, a poor country, faces problems in terms of resources, knowledge and organizational skills to take action to mitigate environmental degradation. This gives rise to an endless spiral of poverty and environmental degradation. Policies should therefore be explored, such as interest-free loans, to mitigate ecological degradation and reduce poverty in the context of integrated water resources management.

Construction of environmentally sound dams and reservoirs

Dams will be needed for water conservation and these dams will play a key role in providing water for domestic and industrial uses, for power generation, for flood protection and for irrigation. A good feasibility study and a sound assessment of the environmental impact should indicate whether the construction of a dam and reservoir would be viable and economically, environmentally and socially acceptable. In addition, see if mitigation measures can offset the damage. The construction of dams and reservoirs should be accompanied by adequate mitigation measures to compensate for negative physical, biological or socio-economic impacts, such as resettlement.

Solid and liquid waste management

Just as it is necessary to purify wastewater, it is important to protect surface water and groundwater from the harmful effects of waste. Garbage dumps must be in such a way as to eliminate any risk to human health. The government is expected to integrate into the national water policy the relationship between solid and liquid waste management and integrated resource management

5.3. Gaps and challenges identified

- Make a clear national policy/strategy of groundwater management;
- Establishment of a database relating to water, accessible to users

- No government commitment to implement strategies
- Insufficient human capacity
- Lack of guidelines and strategies

5.4. Enablers required to unlock these gaps/challenges

The table below gives the enablers required to support the implementation of the strategy and guidelines implementation.

Table 7: Enablers required to support strategy and guidelines implementation

Groundwater gap/challenges	Enablers
Lack of clear policy /strategy of groundwater management	▪ Implement national policies for integrated management of water resources; ▪ Prioritize projects in line with the national policies that will be established, focusing on the concept of integrated water resources management;
Lack of database relating to water	▪ Establishment of a database relating to water, accessible to users;
Insufficient human capacity / shortage of staff in government to implement provisions for groundwater management	▪ Training and education ▪ Facilitation and mentoring ▪ Collaborative research programmes ▪ Private-Public-Civil society partnerships ▪ Internships
No guidelines and standards	▪ Draw up guidelines and standards including best practices from other African countries ▪ Strengthen specialized institutions to develop activities such as training and research; ▪ Support the efforts of the riparian countries to define, by agreement, strategies for integrated management of water resources; ▪ Support multinational organizations and basin organizations, covering more than one country; ▪ Obtain general agreement with riparian countries on project proposals from one country for the exploitation of shared water resources.

6. INSTITUTIONAL FRAMEWORK

6.1. Evolution

The management of water-related sectors is characterized by an array of institutions that generally have overlapping or even conflicting mandates.

The DRC has experienced various political and conflict crises that have prevented these deficiencies from being effectively mitigated. Thus, the law on water that implemented in 2015 in order to create a new institutional architecture for the organization and management of the water sector. The law provides for the development of a water resources management strategy extended to the decentralized entities that are the new provinces. The effective implementation of this law would establish an institutional framework for the decentralized management of the water sector.

6.2. Institutional arrangements to support groundwater management

The institutions responsible for the managements of the various aspects related to water are several in the DRC. Institutions are compromised due to lack of funding. They have various responsibilities, which are defined as follows:

- Ministry in charge of water resources and energy: its water and hydrology department is in charge of REGIDESO, a public company in charge of drinking water distribution in urban areas;
- Ministry of Rural Development: Within the National Rural Water Supply Service (SNHR), this ministry is responsible for the distribution of drinking water in rural and peri-urban areas;
- Ministry of Planning: in charge of coordinating water activities through the National Action Committee for Water and Sanitation (CNAEA);
- Ministry of Health: in all hospitals and in some programs, such as villages and cleaned schools, he is actively working to provide good quality drinking water in remote villages;
- Ministry of the Environment, Tourism and Nature Conservation: Throughout its Water Resources Department, it coordinates urban sanitation services;
- Ministry of Transport: it is responsible for the collection of hydrological data;
- Ministry of Agriculture: He oversees small-scale irrigation

Among all ministries, two of them are more dedicated to groundwater management. It is the ministry of environment and the ministry of energy.

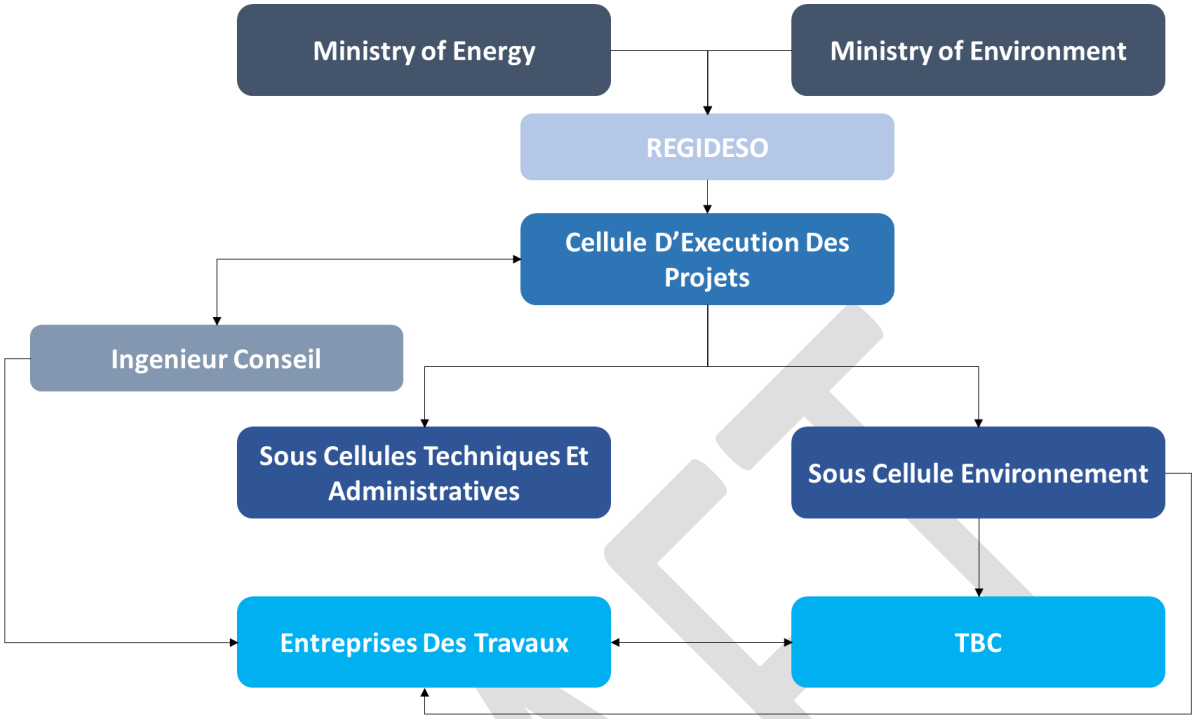

Figure 2: Challenges with Integrated Water Resources Management (Tshibanda kalonji)

DRC has many institutions in charge of groundwater. Each of them has a chart of its own. It is therefore difficult to find a global organization chart. The following figure shows the general structure of REGIDESO.

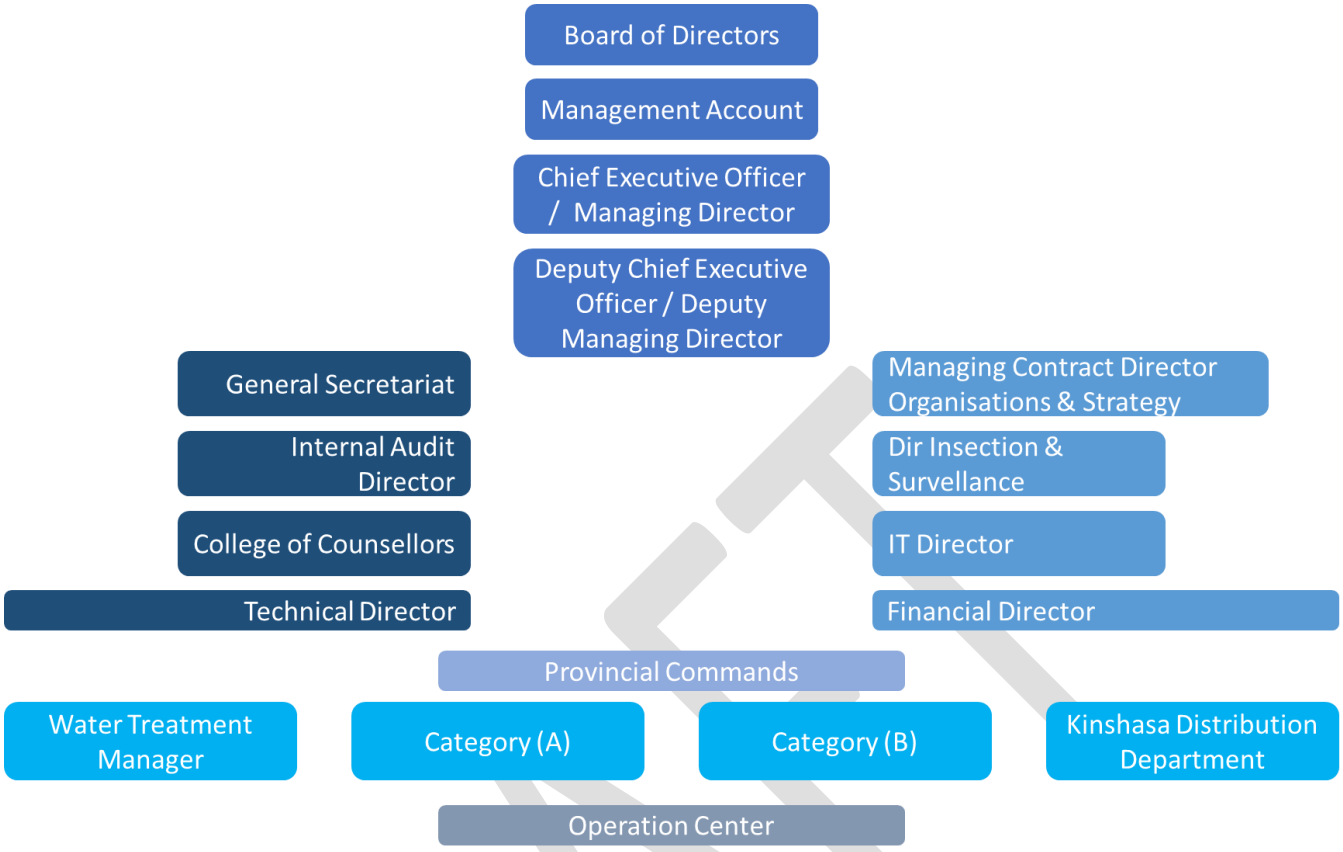

Figure 3: General Organogram of the REGIDESO

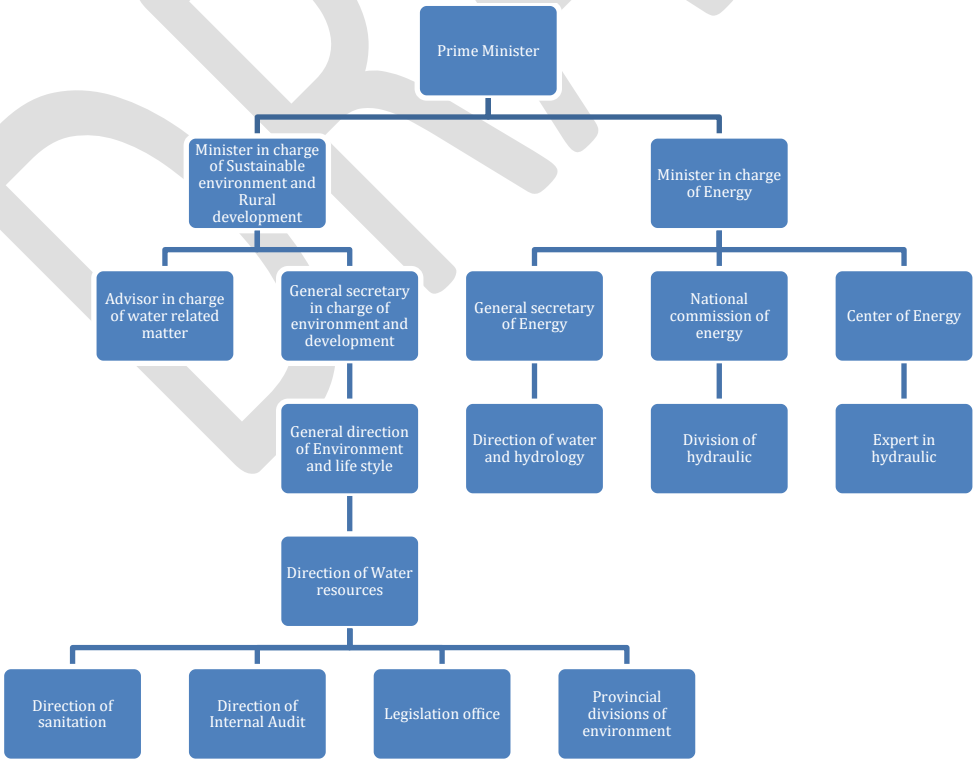

Figure 4: General Organogram of water management in DRC

6.3. Gaps and challenges identified

In the DRC, groundwater management is quite difficult as several ministries and numerous national, regional and international organizations manage it. Because of being overcrowded, some water-related tasks fall under several ministries, leading to institutional competition and to confusions, sometimes.

For example, there is the ministry in charge of energy and that in charge of the environment who have responsibility for the distribution of drinking water. They do the quality tests while the same mandate is also given to the Ministry of Health, through its Villages Assainis and Ecoles assainis programs.

6.4. Enablers required to unlock these gaps/challenges

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

Table 8: Enablers required to unlock the institutional gaps and challenges

Groundwater gap/challenges	Enablers
National Coordination Unit	▪ Institutional coordination, constituting water user associations or water point committees ▪ Water Law aims to give management to the decentralized entities, this guiding principle would aim at strengthening the capacities of the provincial authorities in charge of water. ▪ Funds must be mobilized for the technical and administrative training of the main actors in areas such as legislation and public water policies, the development of institutional arrangements and the provision of equipment. ▪ Trainings will have to consider the heterogeneity of the different entities of the country.
Weak groundwater function in national government	▪ Groundwater Governance Unit for coordination ▪ Groundwater Champion ▪ Groundwater Chief Directorate at national level, with adequate staff and equipment
Academic Institutions	▪ To build capacity at the technical and institutional levels by creating a ministry or institution dedicated solely to water management ▪ Management institutions must follow a guiding principle that is supposed to be a well-planned and financially realistic process

7. CHALLENGES TO IMPLEMENTATION

The abundant hydrological resources of the DRC are a major asset for the country's development. The challenges in the water sector are important and can be overcame. These may be managed by the deployment of targeted investments and sector governance reform.

Opening opportunities for the participation of private companies and social economy organizations in the water sector, will lead to innovative approaches that could be met by addressing these following four (4) challenges of the water sector:

- The development of a national groundwater Policy/strategy that will attract investment and encourage the improvement of water use;
- Institutional and human capacity building. Creating a ministry dedicated to water or strengthening governance for the groundwater sector is an ideal that should be targeted;
- Mobilization of funds for the promotion of water resources management;
- The development of a hydrogeologist team attached to a well-defined institution for the collection of hydrological, hydrogeological, meteorological and geological data that will be stored in a national database.

Although water resources in the DRC are very abundant in term of surface and groundwater, access to drinking water is not easy because of the very poor hydraulic infrastructures and the lack of maintenance. It is important to note that DRC is one the countries with high recurrence of Cholera. It is also important to notice that the main purpose of the water law is the sustainable and equitable management of surface and groundwater as stipulated by article 9 and 48 of the constitution of the DRC. Thus, the water law covers surface and as well as groundwater in continent and the ocean.

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 9: Action Plan "Must Haves"

Prioritisation	Element	Description
Must have: ***those elements of the regulatory framework that are critical***	**Policy**	▪ Train all actors working in water related sectors to reinforce their capacity ▪ Implement a detailed framework for groundwater management in DRC ▪ Make more operational all groundwater management institutions
	Legislative	▪ Must implement guidelines for the development of a series of instruments for planning and managing the efficient use of water resources ▪ Reinforce structures in charge of application of the existing water law
	Institutional	▪ Must create an institution fully dedicated to water ▪ Must provide effective power on water management to decentralized entities ▪ Each entity must have a senior hydrogeologist
	Strategy/ **Guidelines**	▪ Institutional and human capacity building; ▪ Mobilization of funds for the promotion of water resources management; ▪ The development of a hydrogeologist team attached to a well-defined institution for the collection of hydrological, hydrogeological, meteorological and geological data that will be stored in a national database.

Table 10: Action Plan "Should Haves"

Prioritisation	Element	Description
Should have	**Policy**	▪ A Policy dedicated only to Water Must be developed to be the guiding principles that will create the conditions for mobilizing investment and incentivize the improvement of water use ▪ Implement a specific policy for groundwater management
	Legislative	▪ Establish a clear scheme for conflict resolutions
	Institutional	▪ Every department where groundwater is involved should use a hydrogeologist
	Strategy/ Guidelines	▪ The development of a national strategy for groundwater management; ▪ Implement a key performance index for all actions relative to groundwater management

Table 11: Action Plan "Could Haves"

Prioritisation	Element	Description
Could have	**Policy**	▪ Finish the implementation of the groundwater policy
	Legislative	▪ Insert in the water law the detailed strategy of groundwater utilization
	Institutional	▪ Promote institutions where they are training young hydrogeologists ▪ Encourage hydrogeologist to work in a water related sector
	Strategy/ Guidelines	Make a standard relative to groundwater management

Table 12: Action Plan "Won't Have"

Prioritisation	Element	Description
Won't have	**Policy**	▪ Continued to manage groundwater without any policy
	Legislative	▪ Insert the groundwater management as a part of general water resources. It should be treated separately
	Institutional	▪ Continued to manage groundwater by several institutions which objectives are sometimes overlapping
	Strategy/ Guidelines	▪ Continued to manage groundwater without any policy transformed into a strategy

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APPENDIX A: LITERATURE INVENTORY LIST

No	Year	Title of Document	Author	Publisher	Report Number	Link (if it is a website document)
1	2015	Loi N 15/026 du 31 Décembre 2015 relative à l'eau	Presidence de la Republique	Cabinet du president de la republique	15/026 du 31 Decembre 2015	http://www.journalofficiel.cd/jordc/index.php
2	2013	Elaboration de la politique nationale de gestion durable des ressources en eau de la Republique Democratique Democratique	Ministere de l'environnement, conservation de la nature et tourisme	Direction des ressources en eau	Draft	NA
3	2013	Constitution de la Republique Democratique du Congo	Presidence de la Republique	Cabinet du president de la republique	Loi N 11/002 du 20 Janvier 2011	http://www.journalofficiel.cd/jordc/adm/uploads_jo/14fbf5f413899203486d5b618982ad12.pdf#nameddest=1
4	2015	Development of the Master Plan for Integrated Urban Water Management (GIEU) from the city of Kinshasa and feasibility study for the supply of drinking water to Kinshasa	Banque Africaine de développement			
5	2007	'Natural resources in the Democratic Republic of Congo' – Developmental Potential?	Berke, C., Pulkowski, J.	Germany		
6	2014	Promote the extension of mini-grids and standpipes in the DRC, Paris	Biteete, L., Schaub-Jones, D. and Szczuczak, L.	Paris		

No	Year	Title of Document	Author	Publisher	Report Number	Link (if it is a website document)
7	2016	Law on Water, Kinshasa, n° 15/026 du 31 December 2015	Official Journal of the DRC		15/026 du 31 December 2015	
8	2006	Constitution of the DRC, Kinshasa	Official Journal of the DRC			
9	2018	Law n°18/001 amending and completing the Act n° 007/2002 of 11 July 2002 on the Mining Code, Kinshasa	Official Journal of the DRC			
10	2013	Development of DRC's National Sustainable Water Resources Management Policy - Draft, Kinshasa	Ministry of the Environment, Nature Conservation and Tourism			
11	2012	National synthesis report on sustainable development in the Democratic Republic of Congo - Draft, Kinshasa	Ministry of the Environment, Nature Conservation and Tourism			
12	2015	Code of hygiene of the DRC, Kinshasa	Ministry of Health.			
13	2010	Analysis of the environmental and social legislation of the mining sector in the DRC, Kinshasa	Mopiti, D., Mbalanda, P., Mosolo, G., Kabwe, G.			

APPENDIX B: STAKEHOLDER ENGAGEMENT LIST

Full Stakeholder List

No	Title	Name	Surname	Affiliation	Role	Sector Group	Telephone	Email:	Priority (yes/no)
1	Mr	Luyela	Jean Claude	Ministère du plan (Comité National de l'action de l'eau, de l'hygiène et de l'assainissement)	Executive secretary	National government	243819279331		
2	Mr	Masamba	Cyrille	Ministère de l'énergie (Département de l'eau et de l'énergie)		National government	243818821988	cyrillemas@yahoo.fr	Yes
3	Mr	Mulwa	Bienvenu	Ministère de l'environnement		National government	243815294374 243992556869	Bienvenu.mulwa@gmail.com	Yes
4	Mr	Koshi	Georges	Ministère du développement rural (Service National d'hydraulique Rurale)	Director	National government	243815039093 243844703256	geokoshi@yahoo.fr	Yes
5	Mr	Katende	Trudon	Ministère de l'énergie (Regideso)	CEO	National government	243817369599	katkbk7@yahoo.fr	
6	Dr	Ilunga	Oly	Ministère de la sante (Pour la qualité des eaux dans les zones éloignées de grands centres)	Minister	National government		o.ilunga@cliniquesdeleurope.be and olyilunga@yahoo.fr	Yes
7	Mr	Ndala	Benjamin	Commision Internationale du Bassin Congo-Oubangui-Sangha	General secretary	Subregional institution	243817252903 243817630011	cicos_inst@yahoo.fr and abouhalilou@yahoo.fr	Yes
8	Mr	Jean Michel	Ossete	Global water paternship - Afrique centrale	President	Subregional institution		gwpcaftac@iucn.org	Yes

No	Title	Name	Surname	Affiliation	Role	Sector Group	Telephone	Email:	Priority (yes/no)
9				Ministère des transports (pour la collecte des données hydrologiques)		National government			Yes
10				Ministère de l'agriculture (Pour l'irrigation à petite échelle)		National government			Yes

Stakeholders Engaged

Name	Organisation
Mr. Bienvenu Mulwa	Ministry of Environment
Mr. Cyrille Masamba	Ministry of energy
Mr. Trudon Katende	Former Director of REGIDESO
Mr. Georges Koshi	National Rural Water Supply Service
Mr Daudet Kitwa	Civil society of Lualaba province
Adalbert Mbuyu	University of Kolwezi and Kolwezi Institute of Applied Technology

Stakeholders that completed the questionnaires

Name	Position	Stakeholder Group
Mr. Bienvenu Mulwa	Engineer, Ministry of Environment	National Government
Mr. Cyrille Masamba	Engineer, Ministry of Energy	National Government
Mr. Trudon Katende	Former CEO, REGIDESO, Ministry of Energy	National Government
Mr. Georges Koshi	Director, Ministry of Rural Development	National Government
Mr Daudet Kitwa	Lawyer, Civil Society of Lualaba Province	Province
Adalbert Mbuyu	Lecturer, University of Kolwezi	Education

APPENDIX C: DESIRED FUTURE STATE SUMMARY

Reflection of Policy Framework as per the minimum requirement for 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;	Not done	There is no a groundwater policy in the DRC.
The social, economic and environmental values of groundwater are all recognised;	Not done	There is no a groundwater policy in the DRC.
The human right to water is recognized and a rights-based approach to groundwater management is taken, *inter alia*, through:	Not done	There is no groundwater policy in the DRC. The human right is recognized in the water law.
Prioritization of drinking water/basic human needs in water legislation;	Not done	The prioritization is established
Ensuring that land-based rights cannot entitle unlimited access/use of freshwater, including groundwater;	Not done	This item is recognized in the water law.
Ensuring groundwater is legally recognized as a public good;	Achieved	In the DRC water law, water resource is public good.
Recognising the role of groundwater in meeting basic human needs for food security;	Achieved	The water law recognize the role of water in meeting all needs (relative to water) of Congolese.
Legal recognition of customary rights to freshwater, including groundwater;	Not done	There is no a groundwater policy in the DRC.
Legal mechanisms to ensure gender equity in access, use and management of freshwater, including groundwater;	Not done	There is no a groundwater policy in the DRC.
Provision of pricing mechanisms that incentivize equitable distribution of rights to access and use of groundwater, as well as prioritization of small-scale users' livelihoods and food security needs, especially youth and women.	Not done	There is no a groundwater policy in the DRC.
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;	Not done	There is no a groundwater policy in the DRC.
The biophysical and ecological linkages between ground and surface water for their	Not done	There is no a groundwater policy in the DRC.

Minimum requirement for desired future	Status	Comment
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);	Not done	There is no a groundwater policy in the DRC. In the water law, it is stated that everyone working in the area relative to water has to protect the ecosystem
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 done	There is no a groundwater policy in the DRC.
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;	Not done	There is no a groundwater policy in the DRC.
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;	Not done	There is no a groundwater policy in the DRC
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;	Not done	There is no a groundwater policy in the DRC
Effective institutional arrangements are coordinated at trans boundary, national and local levels;	Not Achieved	There is no a groundwater policy in the DRC. Some organization such as CICOS are working on groundwater in more than one country, including the DRC
Public access to geo-hydrological data held by the state is promoted and facilitated	Not done	There is no a groundwater policy in the DRC. The country need strong investments to gather geo-hydrological data and manage it throughout a database
The water law take into account water resources (Ground and surface)	Partially	Groundwater and surface water have to be separated in the water law

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	
Explicit reference to groundwater and conjunctive use management in catchment/water management and development plans and drought/emergency management plans	Achieved	The legislation has an explicit reference to groundwater in several articles. In case of any catastrophe (Drought, emergency management plan, etc.), the government and each entity has to develop a plan (Article 102).
Human right to water recognized in groundwater legislation, facilitating prioritization of drinking water and basic human needs, as well as small-scale users	Not achieved	In the water law, there is no explicitly an article where the human right is taken into account. However, some in specific articles (Article 5) it is said that all Congolese has the equal and fair right to water resources.
Regulate Groundwater Quantity ***a. 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 legislation does recognize categorization of water users but these categories are not defined (See Article 85)
The permitting of groundwater use should not be tied exclusively to land tenure;	Achieved	The authorisation of groundwater use is provided by the land tenure and the ministry in charge of urbanism (See article 45)
Legislation should allow for the categorisation of water users;	Achieved	The legislation does recognize categorization of water users but these categories are not defined (See Article 85)
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	In the DRC water law, water resource is public good.
New legislation should strive towards changing ownership rights to 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	Water resources are subjects to authorization as stated in many articles (21, 23, 68, 75 and 112). However, there is no permit or authorization for domestic use or scientific research (Article 24).
The legislation recognises and legalises affordable, small-scale and indigenous solutions;	Achieved	The owner of a concession have to give access to small scale water users (31(C), 32, 58, 71, 73, 78, 81 and 84)
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	In the DRC, there is no a regulation of borehole drillers, drilling, etc. Need to be implemented.

Minimum requirement for desired future	Status	Comment
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);	Achieved	It is recognized and developed in articles 110, 111, 112, 113, 114, 115, 116, 117, 118 and 119
The legislation should enable the regulation of exploration;	Not achieved	The article 30 talk about climatic, hydrologic and hydrogeological data but not a regulation about groundwater exploration
The legislation should allow for zoning for overused/fragile aquifers;	Achieved	The legislation take it into account (Articles 38, 47, 48, 49 and 50)
Groundwater use organizations should be integrated into existing institutional frameworks (e.g., catchment management, customary institutions)	Achieved	Organizations such as Regideso, SHNR are part of ministries in charge of 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;	Achieved	Water users and stakeholders can create a team to manage and protect water resources
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	Achieved	The water law states that the national and provincial government has to create a team to be in touch with stakeholders to contribute to develop policy and manage water resources (Article 14)
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 legislation does not mentioned a gender anywhere.
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 address the need to monitor water quality (Article 31).
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 that are being monitored does not include the ground water

Minimum requirement for desired future	Status	Comment
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 article 57 of the water law states that the DRC government concludes trans boundaries agreements to define mutual relations in the use, enforcement and value and protection of water resources and aquatic ecosystems in a fair way
The legislation should enable access by the public to geohydrological data held by the state.	Not achieved	The country need strong investments to gather geo-hydrological data and manage it throughout a database
Water conservation and efficiency of use Legislation should enable regulation to ensure the efficient use of groundwater, such as the use of economic incentives and imposition of technologies.	Partially achieved	The regulation of the water use is stated in the legislation. However the efficiency of the use of groundwater by new technologies is not defined
Compliance and Enforcement		
Clear mechanisms for promoting compliance with groundwater regulations should be included in the legislation	Not Achieved	The legislation provides clear mechanisms. It's covered by articles 110, 111, 112, 113, 114, 115, 116, 117, 118 and 119
Enforcement provisions should include, *inter alia*, 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.	Achieved	It's well stated and managed by various institutions (See Institutional framework)
Conflict resolution mechanisms and/or the right to appeal		
Regulatory measures		
The legislation must enable the relevant authority (Minister) to make regulations on any relevant matter in the legislation	Achieved	The way conflicts need to be solved is clearly 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	

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		
Groundwater Protection Mechanisms ***Regulating Pollution (Point source and non-point source)***		
i. Water quality targets; ii. Regulation of emissions/wastewater discharge/waste storage including the impact of mines on groundwater quality: Permits can 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;	Not achieved	There is no clear reference relative to water use in mining environment. Mining companies use the ESIA to overcome this lack
iii. Classification of water bodies; and	Partially achieved	The water bodies were already classified under the existing legislation.
iv. Reducing and regulating abstraction.	Not achieved	It's need to be clear written in the policy and legislation
v. Powers of compliance monitoring and enforcement	Partially achieved	The is a need to enforce the monitoring power
Regulating Depletion		
Regulation of abstraction and recharge (usually via permitting);	Partially Achieved	The water law covers only the abstraction of water resources. It's need to be updated to introduce the recharge
Sustaining wetlands;	Achieved	
Land use zoning – prohibition of abstraction in certain zones; cropping or irrigation practices; protection zones for recharge areas; no surfacing/drainage requirements; and	Achieved	The land use zoning is established by various articles of the water law
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	It's need to be included in the water law
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	
Where water legislation provides for catchment level or basin level planning, groundwater should be integrated into those plans (for example through impact assessment requirements);	Not Achieved	In DRC legislation, first of all groundwater need to be well specified and separated from general water resources

Minimum requirement for desired future	Status	Comment
The legislation should specify that groundwater management planning should take into account and be integrated into land use and environmental planning; and	Partially Achieved	In DRC legislation, first of all groundwater need to be well specified and separated from general water resources.
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.	Partially Achieved	The legislation specify that government and stakeholders have to work together on the water management. The response to climate change need to be monitored and regulated

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	The legislation contains provision for its implementation.
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 bodies are recognised in the water law but their efficiency need to be monitored and improved.
The authority or body should collaborate with other authorities, competent for public health, land-use planning, soils management, waste management;	Partially achieved	Several ministries manage water resources. Their relation has to be well defined to avoid any overlapping
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	They are associations, which organizes discussions about groundwater. Their vulgarisation is poor and need to be strenghten

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TOWARDS A COMMON FUTURE

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