

Acknowledgement

The Groundwater Management Strategy was developed through a unique and successful process for which a number of agencies and individuals need special mention and commendation.

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Foreword

Water resources - with both ecological and economic value - are of vital importance for sustaining life, health and the integrity of humans and ecosystems. However, there is a widespread concern that water resources, including groundwater, are coming under pressure from increasing demand and declining yields. As a result many governments have been reforming water resources management within an Integrated Water Resources Management (IWRM) approach. A fundamental observation of IWRM is that water is one (interlinked) resource requiring a holistic approach to management and hence groundwater should be fully incorporated.

In Ghana there is also the growing interest to identify sustainable yield in groundwater systems, which calls for building up scientific data and information on the groundwater potential of the entire country. This is to complement the established legal and institutional regimes for making rational and informed choices and decisions. In a bid to address this phenomena among others, the Water Resources Commission developed the foremost Groundwater Management Strategy to guide long-term responsive groundwater polices, actions, and services to ensure the safety of the people, to enhance economic activity, and to promote groundwater sustainability.

This Groundwater Management Strategy has been developed through a consultative process that involved the key groundwater data management institutions and a review of the experiences gained under the Hydrological Assessment Project executed by the WRC. Without doubt the strategy will serve as an informative document for promoting stakeholder engagement for groundwater management within a decentralized framework.

Special gratitude is extended to all those who worked tirelessly towards developing this germane strategy document.

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List of Acronyms

CIDA	-	Canadian International Development Agency
GAEC	-	Ghana Atomic Energy Commission
IWRM	-	Integrated Water Resources Management
LGSA	-	Local Government Services Act
LI	-	Legislative Instrument
MoU	-	Memorandum of Understanding
MWH	-	Ministry of Works and Housing
WRC	-	Water Resources Commission
WRI	-	Water Research Institute

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1.0 Objective

With the support of the CIDA-funded Hydrogeological Assessment Project of the Northern Regions of Ghana, the Water Resources Commission has achieved the establishment of a groundwater monitoring network and information management system. The initially foreseen decentralized institutional set up for groundwater monitoring in the north has nevertheless only been partially achieved in the lifespan of the project. The achievement of a fully decentralized groundwater monitoring system needs to be embedded in the overall national and sectoral ongoing decentralization processes to ensure its sustainability.

The purpose of the Groundwater Management Strategy is to guide the long-term decision-making, actions, and investments of the Water Resources Commission as it continues to strength its approach for groundwater management in Ghana under a decentralized stakeholder engagement model.

The objective of the strategy is to provide a five to ten year road map for investments and actions to be undertaken by the Water Resources Commission to achieve decentralized sustainable groundwater management.

2.0 Governance Context

Prior to the 1990s, the management of the Ghana's water resources was fragmented among various Ministries and institutions with no clear water management policy or direction. Ghana's water resources were treated as a private resource, according to British Common Law. There was no water policy, strategies, action plans, and mechanisms for inter-sectoral coordination or conflict resolution.

In the early 1990s the Government of Ghana acknowledged that water is a resource that must be managed to ensure economic development, social well-being, and environmental health. As a result an integrated, multi-sectoral, catchment-area approach based on Integrated Water Resources Management (IWRM) principles was adopted for the development and management of Ghana's water resources.

As a result of Government of Ghana's move to a focus on water management, the Water Resources Commission (WRC) was established in 1996 through an Act of Parliament.

2.1 National Water Policy

The National Water Policy of Ghana provides a framework for the sustainable management of Ghana's water resources. It is addressed to all water users, water managers, and water decision and policy makers within the central and district

government structures, non-governmental organizations, and international agencies. The policy recognizes the cross-sectoral dimension of water and encompasses sectoral policies on sanitation, agriculture, industrial (e.g. mining) transport, and energy.

The strategic goal of National Water Policy is the sustainable development, management, and use of Ghana's water resources to improve health and livelihoods, reduce vulnerability while assuring good governance for present and future generations.

Under the National Water Policy, the Ministry of Water Resources, Works and Housing recommends appropriate legislation to support policy implementation. The recommendations recognize customary and traditional laws and practices in Ghana, as well as water conservation, pollution controls, protection of catchment areas, protection of fisheries, and existing legal enactments, such as the Water Resources Commission Act and historic ones such as the Rivers Ordinance (Cap 226 of 1903).

A number of key policy measures and actions are noted under the strategic actions and policy section of the National Water Policy. These measures and actions are critical to the theme of the development of a groundwater management strategy and are highlighted for reference:

- i. Strengthen District Assemblies to enable them to assume a central role in supporting community management of water and sanitation facilities, and in maintaining the integrity of aquatic ecosystem.
- ii. Fully implement the enacted requirements related to the licensing of water uses (permits).
- iii. Institute appropriate water charges (water uses fees) with the dual purpose of providing a tool for regulating water use and a means of defraying the costs incurred in maintaining an efficient system for Integrated Water Resource Management activities.
- iv. Accelerate the representation of women at all levels and in all spheres of water management activities.
- v. Support data collection agencies to provide data and information on land use and water resources.
- vi. Support the standardization of methods for data collection, archiving, processing, and dissemination, both at the national level and at the regional level for riparian countries.
- vii. Facilitate the assessment and analysis of water resources availability and the impact of climate change and catchment degradation on water resources.

2.2 Ghana's Legal and Regulatory Framework

Water is considered an essential natural resource and as such in Ghana falls under the legal and regulatory provisions of Article 269 of Ghana's Constitution. The provisions of Article 269 seek to protect water resources by establishing a

Commission to regulate, manage, and coordinate Government policies in relation to water. Section 12 of the Water Resources Commission Act (1996) stipulates that “the property in and the control of all water resources is vested in the President, or anyone authorized by the President, on behalf of and in trust for the people of Ghana”.

This stipulation that water resources are vested in the President implies that there is no longer any private ownership of water in Ghana.

In the case of Ghana, the Water Resources Commission Act of 1996 (Act 522) conferred on the Water Resources Commission the mandate to enact regulations for water resources. The mandate of the Commission is to formulate a comprehensive national policy on water resources management; to plan, coordinate and monitor water resources development, conservation and management; as well as control and regulate the utilization of Ghana’s water resources.

One such regulation is the Water Use Regulations, 2001 (L.I. 1692), which provides procedures for allocating permits for various water uses including domestic, commercial, municipal, industrial, agricultural, power generation, water transportation, fisheries (aquaculture), environmental, recreational, and under water (wood) harvesting.

The Water Use Regulations enable the Water Resources Commission to grant rights for water use, and in the granting of these water use permits, the Commission must ensure that water allocations for various uses will be beneficial to the public interest and the greater good of society.

The Water Resources Commission Act provides for certain categories of water use to be exempt from the requirement of prior permit. For instance, the use of water for the purpose of fighting fires, as well as the law does provide lawful access to and the abstraction of water for domestic use.

However, to date, the unofficial mandate for the establishment of standards and specifications for the construction of boreholes and hand dug wells has fallen under the responsibility of the Community Water and Sanitation Agency.

3.0 Water Resources Commission

3.1 Mandate and Mission

As previously noted, the Water Resources Commission (WRC) was established by an Act of Parliament in 1996 (Act 522) with the mandate to regulate and manage Ghana’s water resources and co-ordinate government policies in relation to them. The Act stipulates that ownership and control of all water resources are vested in the President on behalf of the people, and clearly defines the Water Resources Commission as the overall body responsible for water resources management in Ghana. The Commission, which provides a forum for integration and collaboration of different interests, is composed of the major stakeholders involved in the water sector.

The responsibilities of Water Resources Commission, which are set out in Section 2 of Act 522, can be summarized as:

- Processing of water rights and permits;
- Planning for water resources development and management with river basins (catchments) as the natural units of planning,
- Collating, storing, and disseminating data and information on water resources in Ghana;
- Monitoring and assessing activities and programs for the utilization and conservation of water resources.

In practice, the Water Resources Commission seeks to achieve the goals and pursue its responsibilities through:

- Adopting the process of Integrated Water Resources Management (IWRM) in the management and regulation of the nation's water resources (including shared resources with their riparian neighbours).
- Establishing an adequate and cost effective organization, which can assist and guide the Government of Ghana in order to achieve the goals of IWRM and monitor achievements.
- Establishing good working relations with all stakeholders in the water sector.
- Inviting existing institutions and the private sector to participate in establishing the Commission's tools and procedures.

3.2 Significant WRC Actions to Date

Since 1999, the Water Resources Commission has increasingly been involved in the water sector in the country. The Commission has facilitated the approval of the Legislative Instruments (L.I. 1692 Water Use Regulations, 2001 and L.I. 1827 Drilling License and Groundwater Development Regulations, 2006) by Parliament to give meaning to the Water Resources Commission Act of 1996, ACT 522.

In 2002, the Water Resources Commission under the auspices of the then Ministry for Works and Housing prepared a Ghana Water Policy. With the establishment of the Water Directorate and the reformulation of the Ministry to the Ministry of Water Resources, Works and Housing the policy was updated in 2007 to include policies specific to urban water supply, community water supply, and sanitation services.

The Water Resources Commission has been actively developing and putting in place river basin management boards in five of Ghana's sixteen river basins, with the goal of scaling up to all of the nations watersheds. The Commission has also developed and implemented a regulatory framework and process for the issuance of application and permitting for ground and surface water abstraction in Ghana.

4.0 Vision on Groundwater Management

The Water Resources Commission's long-term vision is to provide Ghana with responsive groundwater polices, actions, and services to ensure the safety of its people, to enhance economic activity, and to promote groundwater sustainability.

To realize the vision the Water Resources Commission during the period 2011 to 2020 will strive to:

- (a) Collect, interpret, analysis, and exchange groundwater data and information on the state of the country's groundwater resource to support activities of the water supply, agriculture, industry, tourism, trade and commerce sectors.
- (b) Strengthen polices and regulations for the protection and long-term sustainability of Ghana's groundwater resources under an IWRM framework.
- (c) Engage in national, regional, and international cooperation in the field of groundwater management.

5.0 Long Term Outcomes

The expected long-term outcomes of the groundwater management strategy are:

- (a) Improved knowledge base and understanding of the hydro-geological setting in Ghana and open access to reliable groundwater resource information for Ghana.
- (b) Strengthened capacity in the technical and institutional aspects of groundwater assessment, planning, and development.
- (c) Broad stakeholder engagement of central, regional, and local governance institutions.
- (d) Improved groundwater resource management and development under an IWRM framework in Ghana.

6.0 Stakeholder Engagement

The Water Resources Commission has a central role in water policy development and the harmonization of water resources management and related issues concerning all consumptive and non-consumptive uses of water in Ghana. The Commission's mandate is to regulate and manage Ghana's water resources and to

coordinate government's policies in relation to water, as well as attain some measure of environmental protection and conservation.

The Commission is also mandated to facilitate and to ensure that Ghana adopts an integrated, cross-sectoral, river basin approach to water resources management. Areas of operation can be categorized as carrying out regulatory functions and facilitating capacity building and awareness raising initiatives at decentralized IWRM levels. The key institutional element of the decentralization IWRM approach is the role that the District Assemblies perform.

The Local Government Act 1993, Act 462, and LI 589 established the District Assembly structure in 1993. In order to strengthen the decentralization process, the Government of Ghana has passed the Local Government Services Act (LGSA). The LGSA brings together the core district administration and most sector departments (with the notable exceptions of health and education) into a unified local government service. When fully implemented, the Act will help to create a more cohesive District Assembly system and over time, this should help to strengthen the local government level in Ghana.

Given this evolving institutional situation and the need for further strengthening and capacity building at the District Assembly level, a long-term perspective is required if the Water Resources Commission is to successfully move to a stakeholder engagement model for its program delivery.

A key consideration for the Water Resources Commission's groundwater management strategy is how to facilitate stakeholder engagement through a decentralization approach. It is proposed that over the long term this greater stakeholder engagement can be achieved by promoting the implementation of River Basin Management Boards for the various watersheds throughout the country.

As such the River Basin Management Boards provide a sound institutional mechanism for achieving the stakeholder engagement and vertical decentralization objectives of the Water Resources Commission. The River Basin Boards encompassing a broad range of stakeholders, including representation from the District Assemblies, and the River Basin Boards may facilitate program delivery and the coordination of capacity strengthening for operational needs of the Water Resources Commission.

However couple with the long-term strategy of engaging the River Basin Management Boards is a more immediate need to ensure elements of the groundwater management strategy are on a sustainable footing. One of the more critical elements of the groundwater management strategy requiring attention is the collection of reliable and standardized data and information on the state of the groundwater resources in Ghana.

Furthermore careful consideration needs to be given to the core functions and responsibilities of the River Basin Management Board to ensure all functions will benefit from a decentralized stakeholder engagement process. For example, groundwater monitoring is a specialized technical function that may require a more focused and horizontal decentralized approach to ensure standardization of the data collection and processing function. Consequently, an approach, which relegates monitoring to a number of stakeholders at the local level, may not be an appropriate strategy for sustaining the monitoring function.

7.0 Next Steps

The proposed next steps consider both the immediate and long-term aspects of the Water Resources Commission's groundwater management strategy. The suggested next steps are to address the immediate monitoring aspect of the groundwater management strategy through a shared partnership approach with a central agency or institution and over the long-term focus on strengthening the River Basin Management Boards to achieve the broader outcomes of the groundwater management strategy.

For the long-term process a proposed road map for stakeholder engagement following a decentralized strategy through the River Basin Management Boards is presented in Table 1.

The road map highlights a number of broad activities that need to be undertaken by the Water Resources Commission as it evolves towards a decentralized stakeholder engagement model which supports the Commission in the performance of its mandated responsibilities.

The implementation of the strategy must recognize the capacity constraints of the Water Resources Commission and the controlled and progressive manner being used to establish the River Basin Management Boards.

The key activities to be undertaken for the implementation of the ground water management strategy are:

- (a) Strengthened governance of the IWRM process by:
 - Recruitment of IWRM professional and support staff
 - Provide orientation and training to lead staff
 - Develop IWRM targeted basin priorities
 - Draft IWRM process plan
 - Develop budget requirements and allocations

- (b) Develop Decentralization Protocol

- Identify decentralized functionalities and institutional arrangements between WRC, River Basin Management Boards, and other stakeholders
- Host workshop to confirm protocol
- Update protocol with stakeholder feedback

(c) Technical Tools and Procedures

- Identify needed training and support procedures for local program delivery
- Develop training and capacity strengthening programs
- Develop operational procedures for required functions
- Develop “Trainers the Trainers” strategy

(d) Pilot Implementation for Decentralization

(e) Assess Pilot Implementation of Decentralization Model and Update the Process based on Lessons Learned

It is recognized that the long-term approach of strengthening the River Basin Management Boards for the implementation of the groundwater management strategy will not address the immediate needs of the monitoring under the groundwater management strategy. As previously mentioned a shared partnership approach with a central agency or institution is purposed.

Two potential central agency partners have been identified for consideration, the Water Research Institute and the Ghana Atomic Energy Commission.

The Water Research Institute (WRI) has been conducting groundwater observation in the northern region of Ghana for the Water Resources Commission under an outsourcing model for a number of years. The Institute has a research mandate, however funding and capacity is significantly constrained, hence limiting the Institute’s research efforts. Exploratory discussions on entering into a more collaborated partnership approach versus the outsourcing approach for the conduct of the groundwater observing program (groundwater level and groundwater quality) have been held. However the funding and capacity limits of the Water Research Institute have resulted in very limited interest in a partnership approach. In addition, the WRI’s ability to satisfy the analytical requirements of the groundwater quality program is significantly constrained.

The Ghana Atomic Energy Commission (GAEC) has recently been engaged in the conduct of a groundwater isotopic study for the northern region of Ghana with the Water Resources Commission. Similar to the Water Research Institute the study with the GAEC was supported under an outsourcing approach. Initial exploratory discussions on entering into a more collaborated partnership approach for the

conduct of the groundwater monitoring program have been held. The Ghana Atomic Energy Commission is interested in pursuing these discussions as part of its overall strategy of building a significant groundwater capacity under a newly formed Groundwater Division.

Furthermore, the GAEC has some funding support from the International Atomic Energy Agency as well as government. The capacity for the new Division will be achieved with the reassignment of existing internal staff as well as through strong collaborative and an internship program with the national university program under a sponsored graduate program.

Given the present situation with the WRI and the GAEC, it is suggested that discussions on a shared partnership approach for the conduct of the groundwater-monitoring program be pursued. However, this should not precluded discussions with other core stakeholders.

In support of these discussions a MoU on groundwater monitoring, assessment, and data exchange has been developed. As well as these data and information that would be gathered under such a shared partnership approach, data gathered by the Water Resources Commission's well drillers' permitting process would be available to the Parties of the MoU.

In addition, the Water Resources Commission should aggressively pursue a strategy of requiring all donor funded programs related to groundwater exploration and use be required to incorporate a groundwater monitoring function into these programs. The groundwater data and information would be subjected to the same open exchange as that under the MoU between the Parties.

Table 1: Water Resources Commission - Road Map For Stakeholder Engagement

Activity	When																Investment	
	Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	Y 9	Y 10	Y 11	Y 12	Y 13	Y 14	Y 15	Y +	\$	Effort
1. Governance of IWRM Process																		
a. Recruit IWRM professional and support staff																		
b. Provide orientation and training to lead staff																		
c. Develop IWRM targeted basin priorities																		
d. Draft IWRM process plan																		
e. Develop budget requirements and allocations																		
2. Develop Decentralization Protocol																		
a. Identify decentralized functionalities and institutional arrangements between WRC, IWRM Boards and other stakeholders																		
b. Host workshop to confirm protocol																		
c. Update protocol with stakeholder feedback																		
3. Technical Tools and Procedures																		
a. Identify needed training and support procedures for local program delivery																		
b. Develop training and capacity strengthening programs																		
c. Develop operational procedures for required functions																		
d. Develop "Trainers the Trainers" strategy																		
4. Pilot Implementation for Decentralization																		
a. Assess candidate IWRM Boards																		
b. Select Pilot IWRM Board																		

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c. Develop implementation plan with Pilot IWRM Board																			
d. Purchase required support infrastructure																			
e. Conduct training for Pilot IWRM Board																			
f. Implement the developed plan																			
5. Assess Pilot Implementation for Decentralization																			
a. Conduct post implementation workshop with Pilot Board and Stakeholders																			
b. Revise and update decentralization protocol and implementation plan																			
c. Conduct workshop to present revised decentralization protocol and plan																			
6. Implement Updated Decentralization Protocol for Pilot IWRM Board																			
a. Conduct refresher training for Pilot IWRM Board																			
b. Implement revised decentralization protocol																			
c. Conduct assessment workshop with Pilot IWRM Board and Stakeholders.																			
d. Asses whether adjustments to the decentralization protocol are required																			
7. Implement Decentralization in IWRM Board Priority 1																			
a. Develop implementation plan with IWRM Board																			
b. Purchase required support infrastructure																			
c. Conduct training for IWRM Board																			
d. Implement the developed plan																			
e. Conduct assessment workshop with IWRM Board and Stakeholders.																			
f. Determine adjustments and develop responsive plan																			
g. Implement adjustments																			
h. Conduct annual review workshop with IRWM Board and Stakeholders																			

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8. Implement Decentralization in IWRM Board Priority 2																			
a. Develop implementation plan with IWRM Board																			
b. Purchase required support infrastructure																			
c. Conduct training for IWRM Board																			
d. Implement the developed plan																			
e. Conduct assessment workshop with IWRM Board and Stakeholders.																			
f. Determine adjustments and responsive plan																			
g. Implement adjustments and assess effectiveness																			
h. Conduct annual review workshop with IRWM Board and Stakeholders																			
9. Implement Decentralization in IWRM Board Priority 3																			
a. Develop implementation plan with IWRM Board																			
b. Purchase required support infrastructure																			
c. Conduct training for IWRM Board																			
d. Implement the developed plan																			
e. Conduct assessment workshop with IWRM Board and Stakeholders.																			
f. Determine adjustments and responsive plan																			
g. Implement adjustments and assess effectiveness																			
h. Conduct annual review workshop with IRWM Board and Stakeholders																			
10. Repeat process for each IWRM Board as required																			

