

Towards a Safe and Sustainable Water: Empirical Study from Ghana Water Company Limited on Water Governance.

Gertrude DotseBampoe, Dongying Sun

Corresponding Author: Gertrude DotseBampoe
Master candidate, School of Management, Jiangsu University,
School of Management, Jiangsu University

ABSTRACT: The importance of water governance is growing as changes in population, diet, land use, and economic activities exacerbate competition between water users to access the resource they need. Moreover, as flagged by the World Economic Forum, managing water resources will become a critical issue for society. Many governance systems have made incremental progress on pressing issues facing the environment and humans but have by and large continued to operate under the conventional paradigms and underperform on water goals. Globally, water governance practices are shifting from a hierarchical, state-led, and sectoral approach to a more integrated and participatory approach. This article sets out to contribute to this largely neglected research area and explores conditions under which policy-makers implement water governance policy frameworks (WHAT), the efficiency of water-related institutions (WHO) under the care of policymakers, and the functioning of water governance instruments (HOW) in Ghana's water governance system. Using 36-water governance indicators derived from the 12 OECD principles, Excel and the traffic light color system were used to visualize the results and ease their interpretation.

The findings of the study revealed that there wasn't any principle that was fully implemented and functioning. Out of the 12 principles, two of them were under development, seven were in place but not implemented or functioning and the remaining 3 principles were in place but partly implemented or functioning. Regarding the implementation of the water governance policy framework. The study revealed that only three of the policy frameworks existing were partly functioning with the rest being existing but not functioning and under development. Like the policy framework, both water-related institutions' governance and the functioning of water governance instruments in Ghana water governance had the same results.

Most of the institutions were underdeveloped or existed but did not function likewise water governance instruments. This is a clear case of implementation illnesses, institutional breakdown, and system failure in the water governance system in Ghana. An urgent strategy to resolve such concerns was highly recommended in this study.

KEYWORDS: Water governance, OECD principles, policy framework, water-related institutions, water governance instruments

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I. Introduction

Water is pivotal to all human activity and ecosystem health. All productive sectors of society—including agriculture, energy, transport, tourism, and industry depend on a continued and timely supply of water resources and vital water ecosystem services. Decisions on how to allocate and use water resources across these sectors and other users are fundamental to sustainable development (SD) and human well-being. Growing pressures on water, including population growth, environmental degradation, and climate change, make the task of water management increasingly complex and the need for improved water governance more urgent. Balancing the uses of (often limited) water resources amongst the many competing users in an efficient, sustainable, and equitable manner requires appropriate institutional and regulatory frameworks to be in place. These are key for improved water governance.

Research initiated by the Global Water Partnership (GWP) in collaboration with the Organization for Economic Co-operation and Development (OECD) and led by Oxford University (Hassing 2009, Sadoff, Hall, et al. 2015)), positioned water at the center of economic development. The research established the symbiotic links between water and development – that water is essential for sustainable socio-economic development and, in turn, that development provides the necessary resources to invest in improving water security, water

infrastructure, and water institutions. Thus, notions of the importance of water in development are no longer intuitive; the evidence base is strong and puts water and its management at the heart of the development process

Water is a scarce resource in most cities in developing countries as a result of its physical non-availability and financial incapacity of cities to supply water for the growing populations (WHO/UNICEF, 2019). The scarcity of water in Sub-Saharan Africa is more economic rather than physical (Kirono, Butler, et al. 2016). The condition challenges cities to have a holistic governance approach that ensures water security in all its forms such as availability, accessibility, and quality to citizens (Munasinghe 2020). Previous studies indicate that cities should always have structures in place that involve all stakeholders especially water users in decision-making on water-related issues to sustain water service delivery (Nastar, Abbas et al. 2018, Richter, Blount, et al. 2018). Traditionally, the concept of governance refers to the interactions among structures, processes, and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how citizens or other stakeholders have their say (Erdiaw-Kwasie and Acheampong 2018, Erdiaw-Kwasie, Abunyewah, et al. 2020)

While water challenges are persisting, the solutions highly depend on conscious decisions and actions towards water governance at multiple levels of government and across various sectors (OECD, 2018). The question is not only "what to do" but also "who does what?" "why?" "at which level of government?" and "how?" (Akhmouch and Clavreul 2016, Akhmouch, Clavreul, et al. 2018). Thus, Water Governance as the practice of coordination and decision making becomes central, and the efficiency, effectiveness, inclusiveness, transparency, and predictability of decisions highly depend on the robustness of the water governance system (Zwarteveen, Kemerink-Seyoum, et al. 2017)

More recently, there is a general recognition of the need for integrated approaches to water governance (Pahl-Wostl 2019). Given the breadth of the issues and the integral role of many organizations and stakeholders, modes of cooperation and coordination have been widely identified in the research literature as being essential for the improvement of service delivery outcomes. However, a majority of research efforts to date focus on water supply challenges that confront rural and urban regions and impressively articulate the effects of the discrepancies in infrastructure and coverage (Munasinghe 2020).

The ambition of this article is therefore three; firstly, to assess the implementation of water governance policy frameworks, secondly evaluate the efficiency of water-related institutions in Ghana's water governance system and finally examine the effectiveness of governance instruments in Ghana's water governance with Kumasi Metropolis as the study area.

II. Theory and concepts

Water governance is becoming very important and vital because regional and provincial states remain the locus of power in managing natural resources for development, and pressure from above and below is influencing the reform agenda at the national level (Basson, Yira, et al. 2021). It is the set of processes and institutions through which management goals are identified. More simply, it seeks to define what good outcomes are and align management practices with those goals (Lautze, De Silva, et al. 2011). The GWP defines water governance as a "range of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services, at different levels of society" (Rogers and Hall 2003). In addition, the United Nations Development Program (UNDP) also defines water governance as the "political, social, economic, and administrative systems in place that influence water's use and management (UNDP, 2004). It means that it determines the equity and efficiency in water resource and services allocation and distribution and balances water use between socio-economic activities and ecosystems.

Governments have responsibility for many governance functions, such as formulating policy, developing legal frameworks, planning, coordination, funding and financing, capacity development, data acquisition and monitoring, and regulation (Koontz and Newig 2014). However, governance is increasingly moving beyond government and taking account of cooperation with other stakeholders including the private sector. Good water governance comprises many elements, but it principally includes effective, efficient, and responsive, openness and transparency providing stakeholders with information, and giving citizens and communities a say and role in decision-making (Octastefani and Kusuma 2016). Akhmouch, et al. (Akhmouch and Clavreul 2016) documented the view that such governance may involve practical assimilating parts which perhaps may validate a definition derived from practitioners. This can therefore be assumed of the governance model is supposed to engage stakeholders and give voice to all relevant parties, but in the end, governance aims at making decisions.

2.1 Water Governance and OECD Principles

The principles are based on the consideration that water governance is a means to an end, rather than an end in itself. Understanding the performance of governance arrangements is a means to ultimately improve the management of too much, too little, and too polluted water in the short, medium, and long term. Implementing a

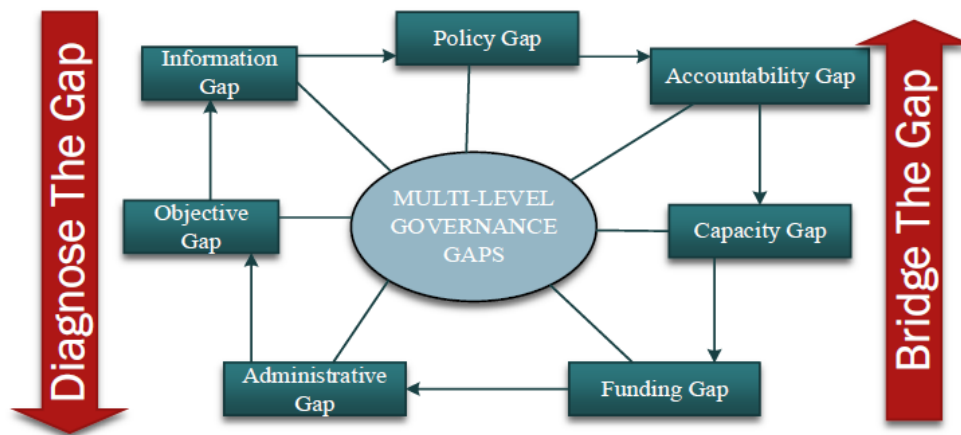
water governance framework requires countries to address the governance gap related to water policy design and implementation (OECD (2015) to achieve the goals for water governance established by the 6th World Water Forum as presented in Table 1 and Fig 1.

Table 1: Key implementation gaps in water policy

The gap in water policy	Description
Administrative gap	Geographical “mismatch” between hydrological and administrative boundaries. This can be at the origin of resource and supply gaps
Information gap	Asymmetries of information (quantity, quality, type) between different stakeholders involved in water policy, either voluntary or not
Policy gap	Sectoral fragmentation of water-related tasks across ministries and agencies
Capacity gap	The insufficient scientific, technical, infrastructural capacity of local actors to design and implement water policies as well as relevant strategies
Funding gap	Unstable or insufficient revenues undermining the effective implementation of water responsibilities at the sub-national level, cross-sectoral policies, and investments requested
Objective gap	Different rationales create obstacles to adopting convergent targets, especially in case of a motivational gap (referring to the problems reducing the political will to engage substantially in organizing the water sector)
Accountability gap	Difficulty ensuring the transparency of practices across the different constituencies, mainly due to insufficient users’ commitment’ lack of concern, awareness, and participation

Source: (OECD, 2015)

Fig. 1: Multilevel governance gaps (OECD, 2015).



The OECD Principles on Water Governance were developed on the premise that there is no one-size-fits-all solution to water challenges worldwide, but a menu of options building on the diversity of legal, administrative, and organizational systems within and across countries (OECD, 2015). They recognize that governance is highly contextual, that water policies need to be tailored to different water resources and places, and that governance response have to adapt to changing circumstances. The Principles ultimately aim to enhance water governance systems that help manage “too much”, “too little” and “too polluted” water in a sustainable, integrated and inclusive way, at an acceptable cost, and in a reasonable time frame (OECD,2015).

Although much remains to be done to propose a comprehensive framework for assessing water governance, the OECD indicator framework which was coined out of the OECD principles provides are the first concrete achievement that can significantly contribute to the development of better water policies for better lives as it aims to support the implementation of the OECD Principles on Water Governance (OECD, 2015). As a framework to guide better water policies and reform it was adopted in May 2015 by the OECD Regional Development Policy Committee and backed in June 2015 by ministers at the OECD Council Meeting at Ministerial Level.

The Water Governance Indicator Framework is conceived as a voluntary self-assessment tool to assess the state of play of water governance policy frameworks (what), institutions (who), and instruments (how), and their needed improvements over time (OECD, 2018). It is intended to be applicable across governance scales (local, basin, national, etc.) and water functions (water resources management, water services provisioning, and water disaster risk reduction (OECD,2018). It is grounded on a sound bottom-up and multi-stakeholder approach rather than a reporting, monitoring, or benchmarking perspective since governance responses to common water challenges are highly contextual and place-based. Its primary objective is to stimulate a transparent, neutral, open, inclusive, and forward-looking dialogue across stakeholders on what works, what does not, what should be improved, and who can do what.

2.2 Overview of Water Governance in Ghana and related Water Issues

The Ghanaian water governance trajectory follows a pattern where the tradition of state-led, and command-and-control regimes is giving way to models based on decentralized decision making and participatory planning. This decentralized approach involves state and non-state actors which includes water users, environmental organizations, and citizens (Acheampong, Swilling et al. 2016, Erdiaw-Kwasie and Acheampong 2018). In Ghana, several agencies provide and regulate water under statute law, namely Ghana Water Company Limited, the Community Water and Sanitation Agency, and the Water Resources Commission. The Ministry of Water Resources, Works, and Housing (MWRWH) is responsible for formulating water supply policy, overseeing operations of GWCL, sourcing funding from agencies, and coordinating sector investment plans. challenges range across issues such as stakeholder participation, pro-poor governance, and democratization of water services.

The water situation in Ghana is such that more of the population could have safe drinking water facilities if the ongoing anthropogenic activities in Ghana are gapped with the collaborative great efforts made by the traditional and local government authorities in Ghana. About 60% of water bodies in Ghana are polluted with most of them in critical condition (Dorm-Adzobu and Ampomah 2017). The quantity and quality of freshwater are still a major problem in the most countryside of Ghana as people have to use rainwater, surface water, and shallow groundwater as their drinking water sources.

Due to the persistent widespread of illegal mining activities, pollution of water bodies occurs mostly in the south-western parts of Ghana. According to Ampomah (2017) industrial waste, illegal mining, farming, and household disposals are the major causes of water pollution in Ghana; hence traditional and local government authorities need to help in the protection of water bodies. There is an urgent need to improve the quality of freshwater bodies in those areas. It is indisputable fact that freshwater resources in Ghana are under threat as water resources are running dry and increasingly becoming scarce by the day. Managers of water treatment plants in Ghana are forced to shut down due to pollution that is making the cost of water treatment of water bodies very expensive. This boils down to the issue of water governance.

Although IWRM integrates land use and water resources planning and management and promotes a participatory approach (Bandaragoda 2000), Ghana's water policy astoundingly, does not recognize certain key institutions in charge of land administration in the institutional framework for implementation as displayed. Notably, the Ministry of Lands and Natural Resources and the Lands Commission, who play crucial roles in land administration, are excluded from the framework. The Ministry has overall responsibility for land issues as well as mines and forestry while the Lands Commission approves for lands to be given out for development. Perhaps, the absence of these major institutions in the water resources management framework explains why the activities of mining companies and illegal miners continue to wreak heavy environmental havoc in Ghana, particularly on water resources (Amponsah-Tawiah and Dartey-Baah 2011).

Worse still, traditional authorities (Chiefs) are excluded from the institutional framework for water resources management. Meanwhile, in Ghana, these leaders play a critical role in land administration, affectionately called the custodians of the land (Kessey, 2006). About 80% of Ghana's land area is owned by traditional leaders who are responsible for the allocation, administration, and management of these lands (Ministry of Lands and Natural Resources, 2011). How then can water resources management strategies be implemented effectively without involving these institutions? Unless this is an oversight on the part of the policymakers, excluding these vital institutions from Ghana's water policy is inimical to its effective implementation and constitutes an inexcusable blunder.

2.3 Transformational Change theory

With the growing importance of environmental movements and indigenous communities in resource management, it has started to incorporate "local knowledge" or "lay knowledge". Recognizing the need to manage novel ecosystems in the future, it is important to create fundamental dynamics and future trajectories of a system especially in water governance (Biesbroek, et al. 2014). Transformation or transformational change is increasingly being discussed as a necessary societal response option to manage current and projected water-related issues. From organizational theories where the nature of transformational change erupts, its key dimensions, and whether and how it can be steered, governed, or facilitated, are some of the recurring questions of the past 30 years. Levy and Merry (1986) in their organizational transformation book, describe transformation as "multi-dimensional, multi-level, qualitative, discontinuous, radical organizational change involving a paradigmatic shift." The basic argument underlying transformation is that organizations, to survive, need to adapt to volatile and uncertain environments, including changing markets, regulations, safety risks, financial crises, and natural disasters.

According to Catrien et al., (2017), transformation in a governance system must have a structural change in several interdependent system components and change in the overall system logic which is determined by the underlying governance and management paradigm. This form of governance system must be

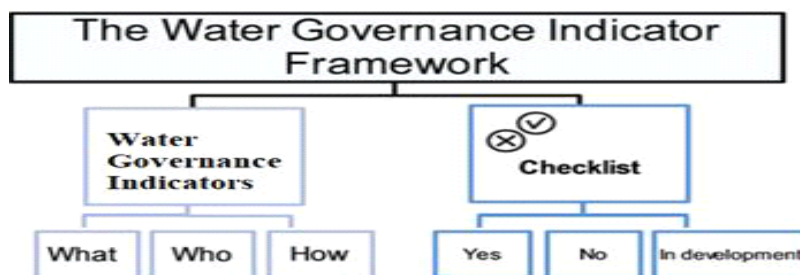
deliberative acts to improve and facilitate how things are done, rather than what is done (Schein 1987; Dawson 2003). This means that instead of focusing on the technical implementation of system transformations, the focus is on the governance processes that enabled the emergence, adoption, and implementation of this new paradigm.

An increasing number of scholars recognize that transformational change also requires innovative governing strategies and the development of new governance intervention repertoires (Pahl-Wostl *et al.* 2007; Kates, Travis, and Wilbanks 2012). Transformational change is thus not just about isolated instances of change brought about by a few people, but about changes in the way of looking, thinking, and acting, with sweeping consequences for the arrangement of organizations, markets, technology, social relations, and concepts (Termeer and Nooteboom 2012). It requires a regime change, in which underlying values are questioned from the level of individual behavior to the mechanisms and structures of the global political economy.

III. Methods and Results

Given the water problems that occur in Ghana under the prevailing water governance system of a top-down approach, this study set out to investigate these issues using institutional heads from the Ghana Water Company Limited in the Kumasi Metropolis. The study relied on the 36-water governance indicators derived from the OECD, which were produced over six years and based on the rigorous multi-stakeholder engagement of public, private, and non-profit sectors. The evaluative criteria on water governance developed by the OECD were adopted because they were comprehensive and adequate to assess the performance of agencies responsible for water governance in the selected case study. The 36 indicators are clustered around three main dimensions: policy framework (WHAT); water governance institutions (WHO); and instruments in water governance (HOW).

Fig. 2: Water Governance Indicator Framework (OECD, 2018)



Managers from GWCL in the area were requested to choose an option for each of the 36 Water Governance Indicators based on their subjective judgments.

Fig. 3: Scorecard of the indicator

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning
	1	2	3	4	5

Survey responses were analyzed using SPSS for descriptive statistics and Excel for interpretation. To visualize the results and ease their interpretation, the traffic light color system was applied, where red means framework not in place, blue represents framework under development, yellow corresponds to the framework in place but not implemented or functioning, purple represents framework in place but partly functioning and finally the color green implied the framework fully implemented and functioning. This procedure was repeated for each of the 36 indicators. Finally, all indicators were jointly reassessed to harmonize the ratings and to get a coherent overall picture.

Table 2: Descriptive statistics of management respondents

		Frequency	Percent	Mean	Std.	variance
gender	female	13	25.0	.75	.437	.191
	male	39	75.0			
Age	20-30 years	12	23.1	2.1731	.92294	.852
	31-40 years	25	48.1			
	41-50 years	9	17.3			
	51-60 years	6	11.5			
Educational level	secondary	1	1.9	2.98	.139	.019

Number of years at GWCL	Tertiary	51	98.1	3.23	1.293	1.671
	at1-5 years	5	9.6			
	6-10 years	11	21.2			
	11-15 years	15	28.8			
	16-20 years	9	17.3			
Department	20 years and above	12	23.1	1.90	.774	.598
	distribution	18	34.6			
	water quality department	21	40.4			
	GIS department	13	25.0			

Source: Author's research data

Table 2 above entails the demographic features of the sampled respondents of the management at GWCL which comprises gender, age, educational level, number of years at GWCL, and their respective departments. Out of the total respondents, a majority of 75% were males and the remaining 25% were females. About 23.1% were from the age 20-30 years, 48.1% were from 31-40 years, 17.3% were from 41-50 years, and 51-60years were approximately 11.5%. From the table, all respondents but one had tertiary education amounting to 98.1%, and the remaining 1.9% for that one respondent had secondary education. The department with the highest number of respondents was the Water Quality Department taking about 40.4%, followed by the distribution department with about 34.6%, and lastly, the GIS department taking the remaining 25.0%.

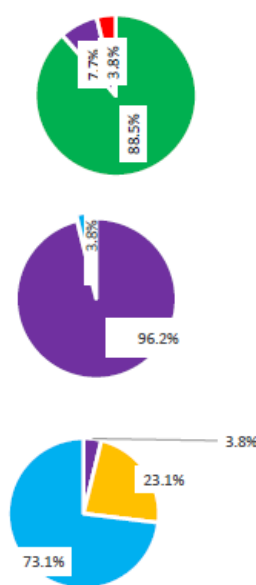
3.1 Governance Principles

This section reported the assessment of the OECD principles in the Ghanaian water governance system. All the principles were made up of three indicators which focused on the existence and level of implementation of water governance framework (What), existence and functioning of institutions in the governance system (Who), and existence and level of implementation of mechanisms in water governance. Each principle and indicator are discussed separately in the following.

3.1.1 Principle 1- Clear role and responsibilities

Three OECD indicators were for this principle in the Framework and were applied well in the Ghanaian context. Based on the first indicator (1. a), most of the participants (88.5%) believed that there is in place implementation of water law at all levels and it is functioning. The weighted average score for this indicator was 4.37 out of 5, which points to the framework is in place and functioning.

Table 3: Principle 1- Clear roles and responsibilities

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place, functioning
	1	2	3	4	5
Principle 1: Clear roles and responsibilities Indicator 1a. Existence and level of implementation of a water law Indicator 1b. Existence and functioning of ministry, line ministry, central agency with corewater-related responsibilities for policy making Indicator 1c. Existence and implementation of mechanisms to review roles and responsibilities, to diagnose gaps and adjust when need be	Response 				Weighted Average Score 4.37 (in place functioning) 3.61 (In place, partly implemented/functioning) 2.4 (In place not implemented/functioning)
	Total Weighted Average Score of the Principle = 3.46/5				

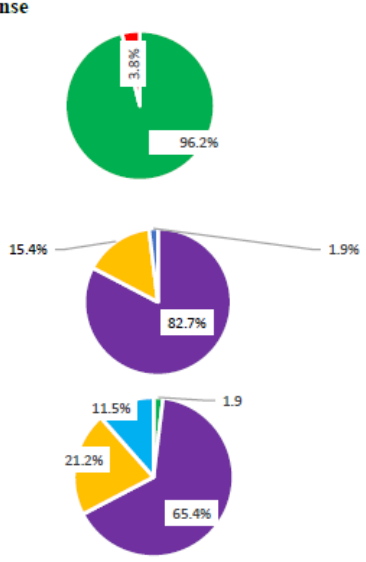
Regarding indicator (1. b), the majority of the participants, 96.2%, were certain that the functioning of the ministry, line ministry, and central agency with core water-related responsibilities for policymakers were in place and partly implemented while the remaining believed the framework is under development. It recorded a weighted average score of 3.61 out of 5 and signifies the indicator being in place but partly implemented/functioning. To end with the last indicator (1. c) in this principle, the majority of the participants (73.1%) believed that mechanisms to review roles and responsibilities, diagnose gaps and adjust when need be is under development. The rest of the participants 23.1 % and 3.8% respectively believed these mechanisms are in place but not functioning or are in place but partly implemented and the weighted average score for this indicator was 2.4 out of 5 which points to the framework in place but not implemented or functioning. Overall the weighted average score of the principle was 3.46 out of 5, which means the principle is in place but partly implemented/ functioning in the water governance system of Ghana.

3.1.2 Principle 2- Appropriate scale in the basin

The second principle had three OECD indicators for its assessment in the Ghanaian context.

The first indicator in this principle (2. a) which was concerned about the implementation of integrated water resources management policies and strategies had 92.6 % of the respondents believing that the indicator is in place and functioning with the remaining participants believing that such things are not in place. The weighted average score for this indicator was 4.67 out of 5, signifying that, the indicator is in place and functioning. Concerning the second indicator (2. b), which was about the existence and functioning of institutions managing water at the hydrographic scale, 82.7% of the participants had the view that such an indicator is in place and partly functioning. The rest of the participants 1.6% and 15.7 % believed that this indicator is under development or in place but not functioning respectively and the weighted average score for this indicator was 3.85 out of 5. Lastly, the third indicator in this principle (2. c) focuses on the existence and implementation of cooperation mechanisms for the management of water resources across water-related users and levels of government from local to the basin, regional, national, and upper scales had 65.4% of the participants had the view that the indicator is in place and partly implemented while 21.2% of the participants believed existence and implementation of co-operation mechanisms for the management of water resources across water-related users are in place but not implemented. The remaining respondents believed the indicator is under development or is in place and functioning fully and the weighted average score for the indicator was 3.27 out of 5. The overall weighted average score of the second principle was 3.93 out of 5, which means that the principle is in place but partly implemented in the Ghanaian water governance system.

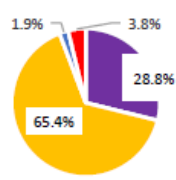
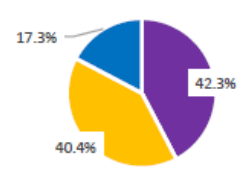
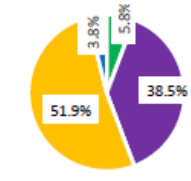
Table 4: Principle 2- Appropriate scales within the basin

Indicator	Not in place 1	Framework under development 2	In place, not implemented/functioning 3	In place, partly implemented/functioning 4	In place functioning 5
Principle 2- Appropriate scales within basin Indicator 2a. Existence and level of implementation of integrated water resources management policies and strategies Indicator 2b. Existence and functioning of institutions managing water at the hydrographic scale Indicator 2c Existence and level of implementation of co-operation mechanisms for the management of water resources across water-related users and levels of government from local to basin, regional, national and upper scales	Response				Weighted Average Score
					4.67 (In place functioning)
	Total Weighted Average Score of the Principle = 3.93/5				3.85 (In place, partly implemented)
				3.27 (In place, partly implemented)	

3.1.3 Principle 3- Policy coherence

The third principle of water governance in the Ghanaian content also provided some useful information.

Table 5: Principle 3- Policy Coherence

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning
	1	2	3	4	5
Indicators					
Principle 3- Policy Coherence	<p>Indicator 3a.</p> <p>Existence and level of implementation of cross-sectoral policies and strategies promoting policy coherence between water and key related areas, in particular environment, health, energy, agriculture, land use and spatial planning</p>		<p>Response</p> 		<p>Weighted Average Score</p> <p>2.67 (In place, partly implemented/functioning)</p>
	<p>Indicator 3b.</p> <p>Existence and functioning of an inter-ministerial body or institutions for horizontal co-ordination across waterrelated policies</p>				<p>2.45 (In place, partly implemented/functioning)</p>
	<p>Indicator 3c.</p> <p>Existence and level of implementation of mechanisms to review barriers to policy coherence and/or areas where water and related practices, policies or regulations are misaligned</p>				<p>2.79 (In place, partly implemented/functioning)</p>
			<p>Total Weighted Average Score of the Principle 2.64/5</p>		

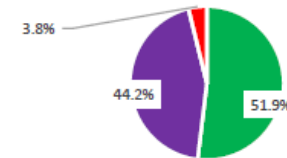
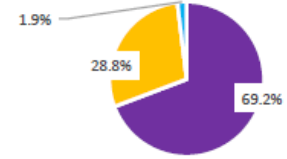
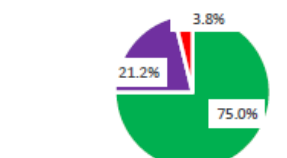
Relating to the first indicator in this principle (3. a), which focused on the existence and implementation of cross-sectoral policies and strategies promoting policy coherence between water and key related areas, 65.4% of the participant held the view that the indicator is in place but not implemented, 28.8% believed it's in place but partially implemented, 3.8% and 1.9% thought that it is not in place or framework is under development respectively. The weighted average score for this indicator was 2.67 out of 5. Regarding, the second indicator (3. b) in this principle, 42.3% of participants believed that the existence and functioning of an inter-ministerial institution for horizontal coordination across water-related policies are in place but partly implemented. The remaining participants 40.4% and 17.3% believed the functioning of an inter-ministerial institution for horizontal co-ordination across water-related policies was in place but not impended or under development respectively and the weighted average score for this indicator was 2.79 out of 5 which points to it being in place but not implemented or functioning. Lastly, the third indicator (3b) which looks at the existence and implementation of mechanisms to review barriers to policy coherence and regulations are misaligned, 51.9% of the participants think that such mechanisms are in place but not implemented and 38.5% of the participants believed such mechanisms are in place but partly implemented. This indicator was scored 2.79 out of 5 based on a weighted average of the participants' responses. Overall the principle scored 2.64 out of 5, meaning that the principle is being in place but not implemented or functioning.

3.1.4 Principle 4- Capacity

About the first indicator (4. a), the majority of the participant 51.9% believed that there are in place and implementation hiring policies, based on a merit-based and transparent professional and recruitment process of water professionals independent from political cycles and it is functioning whiles 44.2% believed that such guidelines are in place but partly implemented with the remaining holding the view that such guidelines are not in place. Thus, the weighted average score for this principle was 4.17 out of 5. The second indicator (4. b) which looked at the existence and functioning of mechanisms to identify and address capacity gaps in water institutions had a majority of 75% of the participants were convinced that such mechanism is in place and functioning. 21.2% of the remaining participants believed that such mechanisms are in place but partly

implemented while the rest of the participants had the view that such mechanism isn't in place at all. The weighted average score for this indicator was 4.57 out of 5.

Table 6: Principle 4- Capacity

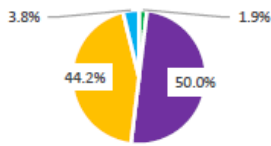
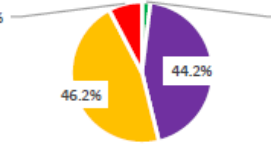
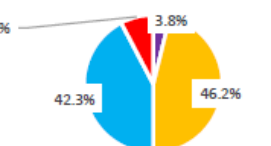
Indicator	Not in place 1	Framework under development 2	In place, not implemented/functioning 3	In place, partly implemented/functioning 4	In place functioning 5
Indicators	Response				Weighted Average Score
Principle 4- Capacity	Indicator 4a. Existence and level of implementation of hiring policies, based on a merit based and transparent professional and recruitment process of water professionals independent from political cycles				4.17 (In place, functioning)
	Indicator 4b. Existence and functioning of mechanisms to identify and address capacity gaps in water institutions				4.57 (In place, functioning)
	Indicator 4c. Existence and level of implementation of educational and training programmes for water professionals				3.43 (In place, partly implemented)
			Total Weighted Average Score of the Principle 4.06/5		

Finally, (4. c) focused on the existence and implementation of educational and training programs for water professionals. The majority of the participants 69.2% believed that implementation of educational and training programs for water professionals exist but they are partly implemented in the sector. On the other hand, 28.8% of the remaining believed such training and programs are in place but not functioning while the rest of the participants (1.9%) are of the view that the framework is under development. The weighted average score for this indicator was 3.43 out of 5. Overall, the total weighted average score of the principle was 4.06 out of 5, which indicates that the framework for this principle is in place but partly implemented under the water governance system in Ghana.

3.1.5 Principle 5: Data and information

The fifth principle used three OECD indicators for its assessment. The first indicator in this principle (5. a), measured the existence and functioning of updated, timely shared, consistent, and comparable water information systems. Most of the participants, 50.0% of the participants, believed that such a framework is in place and partly implemented in the water governance system of Ghana. A section of the participants 44.2% and 3.8% believed that such information systems are in place but not implemented or under development respectively. The weighted average score of this indicator was 3.02 out of 5. The next indicator (5. b) which was concerned about the existence and functioning of public institutions, organizations, and agencies in charge of official water-related statistics had 46.2% of the respondents holding the view that institutions are in place but not functioning and 42.3% believing that such institutions are under development in the water governance system of Ghana. The remaining respondents 7.7% and 3.8% respectively believed that such institutions or agencies do not exist at all or exist but partly functioning. The weighted average score for this indicator was 2.13 out of 5. Similarly, regarding implementation of mechanisms to identify and review data gaps, overlaps and unnecessary overload had the view that such systems are in place but not functioning or implemented. Furthermore, 44.2% of the participants believed such systems are in place but partly functioning while the rest believed such systems are in place or are not in place at all. The weighted average score for this principle is 2.0 out of 5, which confirms that the mechanisms are under development. Overall the weighted average score of the principle was 2.38 out of 5, which means the principle is in place but not implemented or functioning in the water governance system of Ghana.

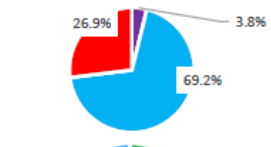
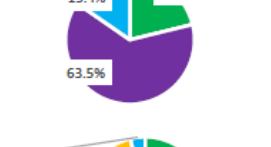
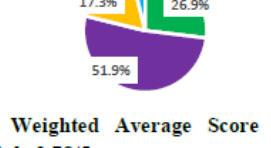
Table 7: Principle 5- Data and information

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning	
	1	2	3	4	5	
Principle 5- Data and information	Indicators			Response		Weighted Average Score
	Indicator 5a. Existence and functioning of updated, timely shared, consistent and comparable water information systems					3.02 (In place, partly implemented)
	Indicator 5b. Existence and functioning of public institutions, organizations and agencies in charge of producing, co-ordinating and disclosing standardised, harmonised and official water-related statistics					2.13 (in place, implemented)
	Indicator 5c. Existence and level of implementation of mechanisms to identify and review data gaps, overlaps and unnecessary overload					2.0 (Framework under development)
			Total Weighted Average Score of the Principle 2.38/5			

3.1.6 Principle 6: Financing

This principle was applicable in the Ghanaian context and was based on three OECD indicators for its assessment. With the first indicator concerned the presence and implementation of governance arrangements that help water institutions collect the necessary (6. a), 69.2% of the participants agreed that such arrangements are under development while 26.9% of the participants agreed that governance plans do not exist in the Ghanaian water governance system. The remaining participant agreed that the indicator is in place and partly implemented and the weighted average score for this indicator was 2.0 out of 5.

Table 8: Principle 6-Financing

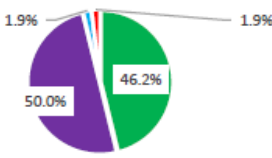
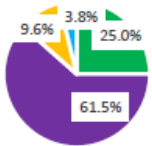
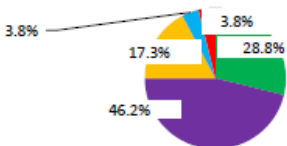
Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning	
	1	2	3	4	5	
Principle 6-Financing	Indicators			Response		Weighted Average Score
	Indicator 6a. Existence and level of implementation of governance arrangements that help water institutions collect the necessary revenues to meet their mandates and drive water-sustainable and efficient behaviours					2.0 (Framework under development)
	Indicator 6b. Existence and functioning of dedicated institutions in charge of collecting water revenues and allocating them at the appropriate scale tax?					3.25 (In place, not implemented)
	Indicator 6c. Existence and level of implementation of mechanisms to assess short-, medium-, and long-term investment and operational needs and ensure the availability and sustainability of such finance					3.10 (In place, not implemented)
			Total Weighted Average Score of the Principle 2.78/5			

Equally, concerning the second indicator (6. b), which is about the existence and functioning of dedicated institutions in charge of collecting water revenues and allocating them at the appropriate scale tax 63.5% of the respondents agreed that such institutions exist but partly functioning while 21.2% agreed that such institutions exist and function. The remaining respondents 15.4 agreed that such institutions are under development. The weighted average score for this indicator was 3.25 out of 5, meaning such institutions exist but do not function in the water governance system of Ghana. In addition, the last indicator (6. c), which focused on the existence and implementation of mechanisms to assess short-, medium-, and long-term investment and operational needs had 51.9% of the respondents agreeing that such mechanisms exist and partly function. Some of the participants (26.9%) also agreed that mechanisms exist and function fully while 17.3% and 3.8% respectively agreed that such mechanisms are in place but not functioning or are under development. The weighted average of this indicator was 3.10 out of 5. Overall, the total weighted average score of the principle was 2.78 out of 5, which means the principle is in place but not implemented or functioning in the water governance system of Ghana

3.1.7 Principle 7: Regulatory

The seventh principle of water governance is benchmarked on the regulatory aspects of water governance in Ghana. The first indicator (7. a) recognized the existence and functioning of a sound water management regulatory framework to foster enforcement and compliance. Half of the participants (50%) believed that such a regulatory framework does exist and partly functions in the water governance system of Ghana while 46.2% believed this framework is fully functional. The weighted average score for this indicator is 3.68 out of 5. The second indicator (7. b) looked at the existence and functioning of dedicated public institutions responsible for ensuring key regulatory functions for water services and resources management. Again, the majority of participants (61.5%) believed that such institutions do exist and partly function while 25% believed these regulator institutions are fully functional. The weighted average score for this indicator was 3.15 out of 5. To conclude for this principle, principle (7. c) focuses on the existence and implementation of regulatory tools to foster the quality of regulatory processes for water management at all levels had 46.2% believing that such regulatory tools or processes are in place and partly implemented, 28.8% believing these processes are fully functioning, 17.3% holding the view that these processes exist but are not operational. The rest of the participants believed that these regulatory processes are under development or do not exist at all, and the weighted average score for this indicator was 2.87 out of 5.

Table 9: Principle 7-Regulatory Framework

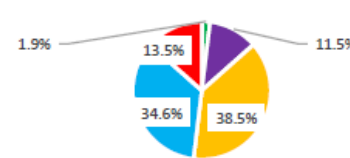
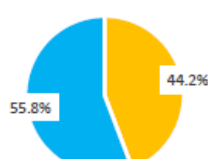
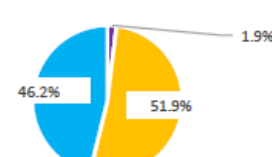
Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning
	1	2	3	4	5
Principle 7-Regulatory Framework	Indicators		Response		Weighted Average Score
	Indicator 7a. Existence and level of implementation of a sound water management regulatory framework to foster enforcement and compliance, achieve regulatory objectives in a cost-effective way, and protect the public interest				3.68 (In place, partly implemented)
	Indicator 7b. Existence and functioning of dedicated public institutions responsible for ensuring key regulatory functions for water services and resources management.				3.15 (In place, partly implemented)
	Indicator 7c. Existence and level of implementation of regulatory tools to foster the quality of regulatory processes for water management at all levels.				2.87 (In place, not implemented)
		Total Weighted Average Score of the Principle 3.23/5			

Overall the principle scored 3.23 out of 5 based on the total weighted average and confirmed that the current regulatory framework is in place but not implemented or functioning in the water governance system of Ghana.

3.1.8 Principle 8- Innovative governance

The eighth principle of water governance, which was about innovative practices in the water governance system of Ghana with three OECD indicators was received fairly with much interest by the participants.

Table 10: Principle 8-Innovative governance

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning
	1	2	3	4	5
Indicators					
Principle 8-innovative governance	<p>Indicator 8a.</p> <p>Existence and level of implementation of policy frameworks and incentives fostering innovation in water management practices and processes?</p>				<p>Weighted Average Score</p> <p>2.17 (in place, not implemented)</p>
	<p>Indicator 8b.</p> <p>Existence and functioning of institutions encouraging bottom-up initiatives, dialogue and social learning as well as experimentation in water management at different levels</p>				<p>2.0 (Framework under development)</p>
	<p>Indicator 8c.</p> <p>Existence and level of implementation of knowledge and experience-sharing mechanisms to bridge the divide between science, policy and practice</p>				<p>2.13 (In a place not implemented)</p>
			<p>Total Weighted Average Score of the Principle 2.17/5</p>		

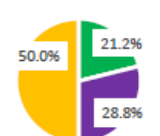
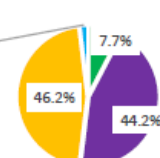
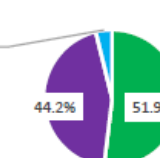
Involving the first indicator in this principle (8. a), which looked at the presence and application of policy frameworks and incentives fostering innovation in waters, 38.5% of the participant held the view that the indicator is in place but not implemented, 34.6% believed the framework is under development, 13.5 % believed such policy framework does not exist and 11.5% and 1.9% respectively thought that it is in place and partly implemented or fully functional. The weighted average score for this indicator was 2.17 out of 5. Similarly, (8. b) was concerned about engagement through institutions encouraging bottom-up initiatives, dialogue, and social learning as well as experimentation in water management at different levels. Most of the participants (55.8%) agreed that such institutions are under development whiles the remaining 44.2% believed that such institutions exist but not functioning. The weighted average score for this indicator is 2.20 out of 5. The last indicator for the second indicator (8. b) of this principle, talked about the existence and implementation of knowledge and experience-sharing mechanisms to bridge the divide between science, policy, and practice on the water. Again, the majority of the participants (51.9%) believed that such mechanisms are in place but not functioning whiles 46.2% believed the framework is under development in the water governance system of Ghana. The remaining respondents believed such mechanisms are in place and partly implemented. The weighted average score for this principle is 2.13 out of 5, meaning such knowledge and experience-sharing mechanisms are under development. Overall, the total weighted average score of the principle was 2.17 out of 5, which means the principle is under development in the water governance system of Ghana.

3.1.9 Principle 9- Integrity and transparency

The application of the ninth principle of water governance was not different from other principles in the Ghanaian context. Three OECD indicators characterized this principle. Half of the total participants 50% of the first indicator (9. a) believed that institutional frameworks on integrity and transparency in water management exist but are not implemented whiles the remaining holds opposing view that such framework is fully in place or

partly functioning. Accordingly, the weighted average score for this indicator was 2.73 out of 5. The second indicator in this principle (9. b) was structured to assess the existence and functioning of independent courts and supreme audit institutions that can investigate water-related infringements. Like other indicators, 46.2% of the respondents said such independent institutions are in place but not functioning while 44.2% believed that these independent institutions are in place but partly functioning. The rest of the respondents believed that these institutions exist fully or are under development and the weighted average score was 2.68 out of 5.

Table 11: Principle 9-Integrity and Transparency

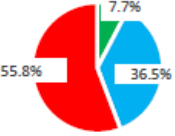
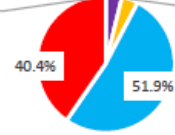
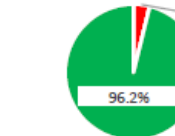
Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning	
	1	2	3	4	5	
Principle 9-Integrity and Transparency	Indicators			Response		Weighted Average Score
	<p style="text-align: center;">Indicator 9a.</p> <p>Existence and level of implementation of legal and institutional frameworks (not necessarily water-specific) on integrity and transparency which also apply to water management at large</p>					2.73 (In place, not implemented)
	<p style="text-align: center;">Indicator 9b.</p> <p>Existence and functioning of independent courts (not necessarily water-specific) and supreme audit institutions that can investigate water-related infringements and safeguard the public interest</p>					2.68 (In place, not implemented)
	<p style="text-align: center;">Indicator 9c.</p> <p>Existence and level of implementation of mechanisms (not necessarily water-specific) to identify potential drivers of corruption and risks in all water-related institutions at different levels, as well as other water integrity and transparency gaps</p>					3.75 (In place, functioning)
				Total Weighted Average Score of the Principle 3.05/5		

The third indicator (9. c) was about the existence and level of implementation of mechanisms to identify potential drivers of corruption and risks in all water-related institutions at different levels had most of the participants 51.9% of agreeing that this mechanism exists and functioning while 44.2% agreed that this mechanism exist and partly implemented with the remaining participants agreeing that the framework is under development. The weighted average score for this indicator was 3.75 out of 5. The overall score for this principle was 3.05 out of 5, which concludes that this principle exists but not functioning or implemented.

3.1.10 Principle 10- Stakeholder engagement

The information on the tenth principle of water governance was characterized by these three indicators.

Table 12: Principle 10-Stakeholders Engagement

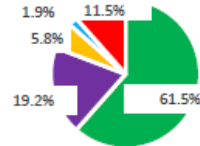
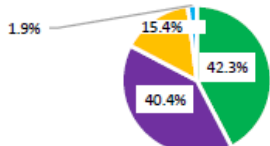
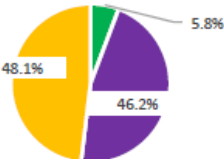
Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning	
	1	2	3	4	5	
Principle 10-Stakeholders Engagement	Indicators Indicator 10a. Existence and level of implementation of legal frameworks to engage stakeholders in the design and implementation of water-related decisions, policies and projects		Response 			Weighted Average Score 1.82 (framework under development)
	Indicator 10b. Existence and functioning of organisational structures and responsible authorities to engage stakeholders in water-related policies and decisions					2.0 (Framework under development)
	Indicator 10c. Existence and level of implementation of mechanisms to diagnose and review stakeholder engagement challenges, processes and outcomes					4.72 (In place, functioning)
			Total Weighted Average Score of the Principle 2.85/5			

The first indicator for the assessment of this principle (10. a) focused on the existence and level of implementation of legal frameworks to engage stakeholders in the design and implementation of water-related decisions, policies, and projects. The majority of the participants (55.8%) agreed that such a framework does not exist at all. On the other hand, some of the participants believed that the framework is under development or is fully in place functioning. The weighted average score for this indicator was 1.82 out of 5. Likewise, the second (10. b) indicator measured the presence and functioning of organizational structure and responsible authorities to engage stakeholders in water-related policies and decisions. The majority of the participants (51.9%) agreed that these frameworks are under development, followed by other views that these frameworks are not in place at all. The weighted average score for the indicator is 10. b was 2.0 out of 5. The last indicator (10. c) had 96.2% of the participants believing that the existence and implementation of mechanisms to diagnose and review stakeholder engagement challenges, processes, and outcomes in the water sector do exist while the remaining respondents believed such mechanism does not exist, and the weighted average score was 4.72 out of 5. The overall score for this principle was 2.85 out of 5, which concludes that this principle is in place but not functioning or implemented.

3.1.11 Principle 11: Trade-offs

This principle was been in the Ghanaian context by the three OECD indicators. Concerning the first indicator (11. a) for the assessment of this principle, which is about the existence and implementation of formal provisions or legal frameworks fostering equity across water users. The majority of the respondents (61.5%) believed that such a framework does exist and fully functioning while 19.2 % believed that such a mechanism exists but is partly implemented. The weighted average score for this indicator is 3.17 out of 5. About the second indicator (11. b) again 42.3% of participants believed the existence and functioning of the institution(s) to protect water users are in place functioning while 40.4% believed the indicator is in place but partly implemented in the water governance system of Ghana. The rest of the participants believed that such institutions might exist but not function or are under development and the weighted average score for this indicator was 3.33 out of 5.

Table 13: Principle 11- Trade-offs across users, rural and urban areas, and generations

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning
	1	2	3	4	5
Principle 11- Trade-offs across users, rural and urban areas, and generations	<p>Indicator 11a.</p> <p>Existence and level of implementation of formal provisions or legal frameworks fostering equity across water users, rural and urban areas, and generations</p>				3.17 (In place, partly implemented)
	<p>Indicator 11b.</p> <p>Existence and functioning of an Ombudsman or institution(s) to protect water users, including vulnerable groups</p>				3.33 (In place, partly implemented)
	<p>Indicator 11c.</p> <p>Existence and implementation of mechanisms or platforms to manage trade-offs across users, territories and/or over time in a non-discriminatory, transparent and evidence-based manner</p>				3.14 (In place, partly implemented)
				<p>Total Weighted Average Score of the Principle 3.21/5</p>	

Last, of all, the last indicator in this principle (11. c) focusing on the existence and implementation of mechanisms or platforms had 48.1% of the participants agreeing that the platform exists but not functioning while 46.2% of the participants believed the mechanism to manage trade-offs across users, territories are in place but partly implemented. The remaining respondents believed the indicator is in place and fully implemented and the weighted average score for the indicator was 3.14 out of 5. The overall weighted average score for this principle was 3.21 out of 5.

3.1.12 Principle 12- Monitoring and Evaluation

The last principle measured the monitoring and evaluation of water governance in Ghana. With regards to the first indicator (12. a), 96.2.2% of the respondents were of the view that the implementation of policy frameworks promoting regular monitoring and evaluation of water policy and governance in the water governance system in Ghana is under development while 3.8% believed these frameworks do not exist at all. The weighted average score for this indicator was 2.43 out of 5.

Table 14: Principle 12- Monitoring and Evaluation

Indicator	Not in place	Framework under development	In place, not implemented/functioning	In place, partly implemented/functioning	In place functioning
	1	2	3	4	5
Indicators Indicator 12a. Existence and level of implementation of policy frameworks promoting regular monitoring and evaluation of water policy and governance Indicator 12b. Existence and functioning of institutions in charge of monitoring and evaluation of water policies and practices and help adjust where need be Indicator 12c. Existence and level of implementation of monitoring and evaluation mechanisms to measure to what extent water policy fulfils the intended outcomes and water governance frameworks are fit-for-purpose	Response 				Weighted Average Score 4.6 (In place functioning) 2.45 (in place not implemented) 2.76 (in place not implemented)
	Total Weighted Average Score of the Principle 2.55/5				

Furthermore, the second indicator (12. b), which is about the existence and functioning of institutions in charge of monitoring and evaluation of water policies and practices, most of the participants 34.6% believed that such institutions are in place but it's partly functioning whiles 32.7% of the participants had the view that such institutions exist but not functioning. The weighted average score for this principle was 2.45 out of 5, which the institutions charged to monitor and evaluate water policies are under development at all levels in the water governance system of Ghana.

Lastly, with the third indicator (12. c), 36.5% of the respondents agreed that monitoring and evaluation mechanisms to measure to what extent water policy fulfils the intended outcomes and water governance frameworks are fit for purpose do exist but do not function whiles, other participants, 32.7% agreed that these mechanisms are functioning fully and the weighted average score for this indicator was 2.76 out of 5. The overall weighted average score for this principle was 2.55 out of 5, indicating that the principle is in place but not implemented or functioning.

IV. DISCUSSION, CONCLUSION, AND RECOMMENDATION

The study discovered that there wasn't any principle that was fully implemented and functioning. Out of the 12 principles, two of them were under development, seven were in place but not implemented or functioning and the remaining 3 principles were in place but partly implemented or functioning. This discloses that the water governance system is suffering from 'implementation illnesses'. The following paragraphs elaborate on each of the principles. Additionally, figure 12 displays a pictorial view of the summary.

At least 85% of water utilities worldwide are under the control of governments, but most of these utilities are often poorly performing (Araral and Wang 2013). A question that has emerged is how can the governance of public water utilities be improved to make them more efficient, responsive, and sustainable. Many studies suggest that a key solution is to give them autonomous status, but the political economy of water makes this more difficult in practice (Araral and Wang 2013). The Trinidad case study provides a good example of where this has proven challenging. Water professionals in Trinidad are familiar with the instruments, policies, and best practices to achieve financial independence and decision-making autonomy, but these are not being implemented.

The analyses showed that water law exists in the country, but its implementation has not been fully achieved. Also, there are gaps, overlaps, and ambiguity in the roles and responsibilities of water institutions, and there are no mechanisms to diagnose these issues. IWRM has been formally adopted as the central paradigm of water management. However, the model is yet to be fully functional. Concerning Policy coherence, the analyses

revealed that Ghana has some frameworks and institutions in the system for improving cross-sectoral policies coherency; however, their implementation has been a significant problem.

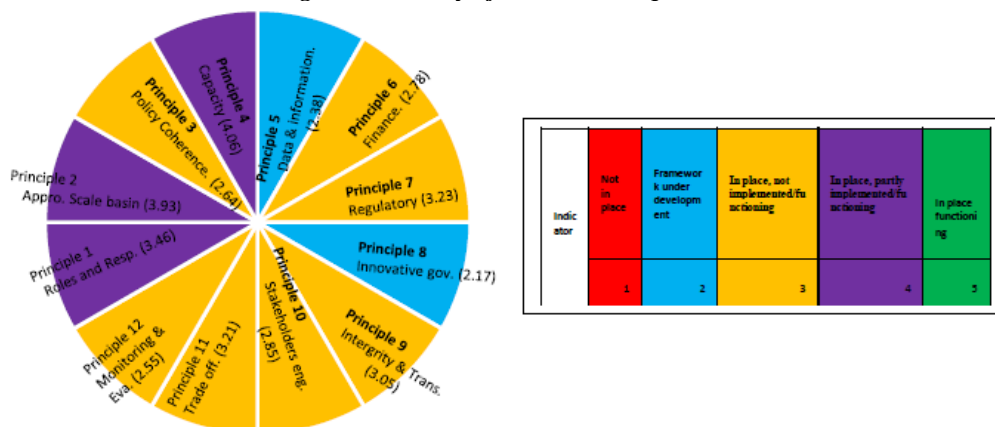
Currently, there is a clear understanding of the capacity gap in the water sector, and there are mechanisms already existing to assess this issue. However, its full implementation has not been achieved. The analyses showed that Ghana is faced with a shortage of water-related data and water-related information systems that could serve as coordination, cooperation, and decision-making tools. It was established that such mechanisms are still under development. Hence these issues limited the capacity of the government to define effective and efficient policies based on evidence. The study revealed that finance is one of the overlooked dimensions in the current water governance system. Not only that, proper financial frameworks to acknowledge the economic value of water exist but are not implemented. The study disclosed that water-related regulatory frameworks exist; however, some of them remained on paper and were not implemented while others were partly implemented. In the current system, the regulation function is fragmented among different institutions, which are also simultaneously policymakers too. This type of arrangement overloaded the institutions due to the shortage of capacity, and thus regulation is happening at a very superficial level.

This principle was not much aligned with the Ghanaian water milieu as the country is still busy with the most necessary aspects of water. Nevertheless, frameworks and mechanisms to promote innovative ideas related to water governance are under development according to the findings of the study. This principle was also defined very broadly by the OECD which covers almost all the governance, including courts. Its evaluation has been very difficult for participants. Nevertheless, frameworks and institutions exist for promoting transparency and integrity; however, their implementation was a challenge. The study divulged that the mechanisms exist but are not implemented.

The current system is faced with a shortage of legal frameworks to ensure the engagement of stakeholders in the design processes of policies and projects. Similarly, there are no dedicated institutions to assure the stakeholders' engagement in the processes. The mechanisms are partly under development and not implemented. Participation of stakeholders is very key to a successful water governance system however the Ghanaian water governance system is failing in that.

Equity is a partially forgotten dimension of water governance in the current system. Frameworks to promote equity are in existence according to the study, however, they are not implemented. Similarly, there are no institutions to protect vulnerable groups nor mechanisms implemented to address these kinds of issues. Monitoring and Evaluation: M&E of water policy and governance are missing and have never been performed. The system is lacking frameworks, institutions, and mechanisms to promote regular M&E functions.

Fig 12: Summary of OECD Principle

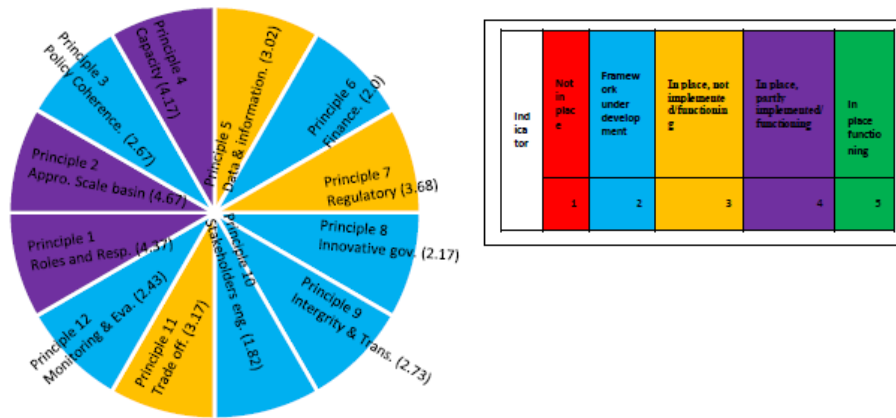


Most of the water governance in Ghana has not been the best as most of the principles were under development or not functioning. Even capacity which was been implemented was functioning weakly. This raises a red flag for urgent attention to solve the weak implementation of the water governance system in Ghana as the UN heads towards the achievement of SGD-6 by 2030. Further breakdown of the principles into the framework(what), institutions(who), and mechanisms(how).

Frameworks (what):

The ‘what’ indicators in all the principles measured the existence and level of implementation of the water governance policy framework. The evaluation showed that only three of the policy frameworks existing were partly functioning with the rest being existing but not functioning and under development.

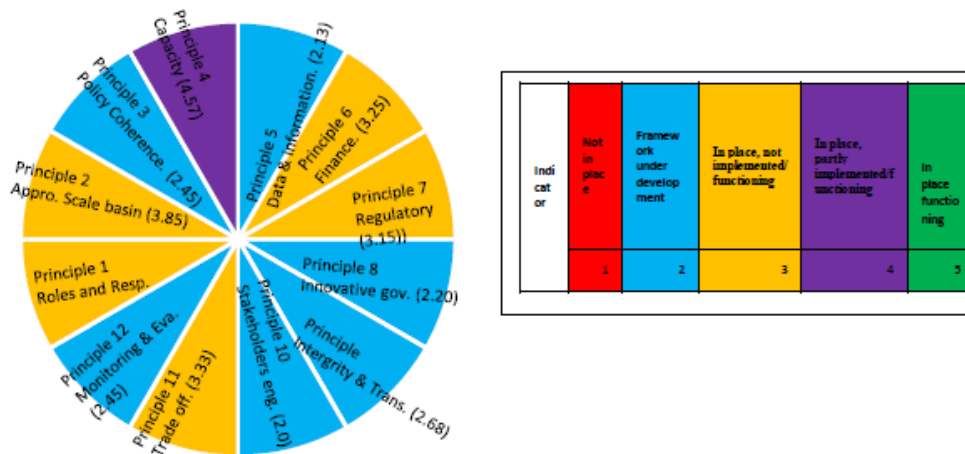
Fig 13: Summary of framework



Institutions (who):

The ‘who’ indicators in all the principles assessed the existence and functioning of water governance institutions in Ghana. Like the policy framework, the institutions in the water governance system in Ghana had a similar outcome. Most of the institutions were underdeveloped or existed but not functioning; an only institution for capacity was partly functioning. This shows a clear case of an institutional breakdown in the water governance system of Ghana.

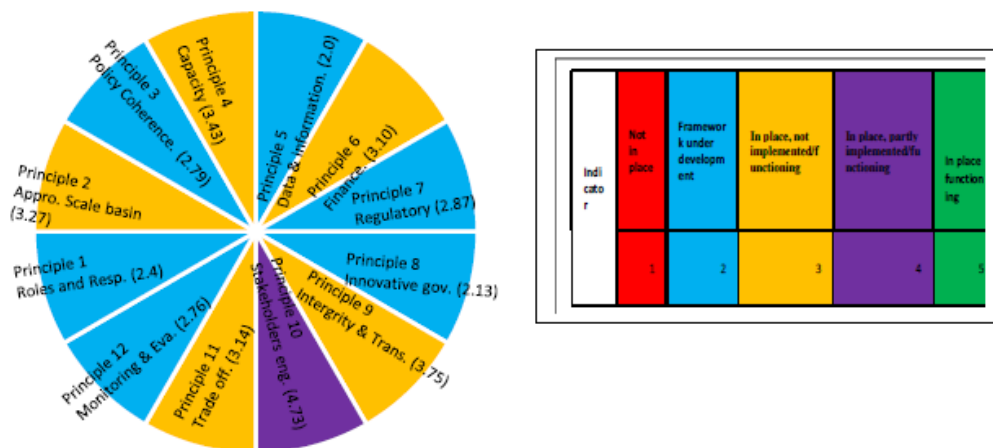
Fig 14: Summary for institutions



Instruments (how):

The ‘how’ indicators in all the principles evaluated the functioning of water governance instruments in Ghana. The assessment of instruments reported the same results as in the case of framework and institutions. Most water governance instruments were under development and those existing were not implemented. Only one mechanism was partly implemented in the water governance system of Ghana. This is proof that when a governance system is facing a challenge of “what” and “who”, it transcends into its “how”.

Fig.15: Summary of mechanism



V. Conclusion

According to literature, implementation challenges are common in water resources planning and Management (Barrett 2004) Mitchell, 2011). The effective implementation of integrated water policies is not occurring globally, creating what is known as a ‘policy-implementation gap’, which is the difficult process of moving from policy to action (Barbosa et al.,2016). Barrett (2004) described in her article about implementation studies four reasons which divide the gap between policy and implementation. First the lack of clear policy objectives; leaving room for differential interpretation and discretion in action, second a multiplicity of actors and agencies involved in implementation; problems of communication and coordination between 'the links in the chain', the third factor consists of interest differences between actors and agencies; problems of differing perspectives and priorities affecting policy interpretations and motivation for implementation. The last factor that causes policy implementation failure is relative autonomies among implementing agencies; limits of administrative control.

To decrease the gap between policy and practice the traditional view on policy implementation must be challenged. Implementation should be regarded as an integral and continuing part of the political policy process rather than an administrative follow-on (Barrett, 2004). There is a need for vertical and horizontal cooperation between different sectors and levels of authority (Camagni, 2017). Mitchell (2011) pointed out that also in the water sector more attention is needed to the policy-implementation gap because in water management and governance the implementation gap seems hard to overcome due to complex interconnections with the land base and other resource systems. Despite several studies about policy implementation, it is still difficult to frame a theory of policy implementation. This difficulty exists mainly because it is a complex field and most studies are composed of single case studies. There is a lack of a theoretical framework (DeLeon &deLeon, 2002). However, it can be difficult to develop a theoretical framework for policy implementation because some policies can be quite broad, with vague goals and objectives. This also makes it hard to determine the implementation of such policies and often indicators to measure implementation usually are not defined by the policy or cannot be quantified, which leads to a discussion regarding how to determine its success (Barbosa et al., 2016).

In the history of Ghana’s water sector, strong political interferences have characterized top managerial appointments at the Ghana water company limited and Public Utility Regulatory Commission. There are three scenarios of political interference that have shaped the urban water management sector. Firstly, there is a strong political allegiance of top management appointees to the government in power. Secondly, change in government usually comes with new ministerial and managerial appointments, instead of appointments relying on merits or competency they are rather based on political connections. Finally, long-term retention of top position rests on the ability to establish a “harmonious relationship” with the incumbent government. These create an avenue for corruption, political manipulation, restricted independent decision-making, job insecurity, and uncertainty in water institutions (Acheampong, Swilling, et al. 2016).

It is evident from the study that the arrangements for stakeholder engagement are ambiguous, and a tendency towards top-down interventions still prevails. More research should be carried out on the transformational change in the water governance system of Ghana. Transformational change is often associated with change that is in-depth fundamental, truly new, large scale (and quick and it is contrasted with incremental change. Based on insights from the organizational change literature, this paper argues that Ghana water company limited must introduce the conceptualization of continuous transformational change with a focus on new strategies that enable and accelerates small in-depth change through innovation, collaboration, and

engagements. These roles and strategies require time and patience, especially with water users. People need to be able to experiment in their situation, to see how things work when done differently, and share these experiences with others. Stakeholder engagement should be institutionalized to remove power inequalities that may exist and also by defining roles and responsibilities for achieving a joint work program.

Furthermore, there should be an initiation of inclusive processes to reduce conflicts, integrate a variety of knowledge and achieve a degree of consensus for sustainable water governance. New technologies should be adopted to solve water issues.

To improve good data quality and tools, an integrated database should be developed to provide good quality data to agencies with a mandate for water governance. An integrated database that is shared by several agencies with information on households, such as the central statistical office, the town and country planning division, utility companies, and social welfare agencies, can resolve this lack of customer information on free riders. This database should be continuously updated to ensure the accuracy of the customer base. Geographic information systems (GIS) technology can assist in database development and in mapping the geographic location of areas where there are major water-related issues. In areas where satellite imagery cannot produce the detailed imagery necessary to ascertain settlement characteristics, drones could be used to conduct aerial surveys to produce high-resolution imagery with a greater degree of precision. The advent of affordable electronics, networking technology, and personal devices, including widespread access to mobile phone services, and cloud-computing-based data analytics, also enable the installation of distributed sensor networks that facilitate local actors in the data collection and knowledge generation process. Such innovative citizen science has the added benefit of bringing generators and users of knowledge closer together to improve decisions making staff will be needed to undertake ground checks to establish which households have no legal water connections. The drive to engage citizens in reporting leaks to the water agency, as used in Trinidad, is a step in the right direction and should be expanded to other aspects of water governance.

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