

Appraising institutional management of urban water supply in Ghana: the role of the stakeholders

Urban water
supply in
Ghana

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Received 22 February 2023
Revised 5 May 2023
Accepted 20 September 2023

Abstract

Purpose – Access to clean drinking water is a major encumbrance in developing countries. In Ghana, urban water supply is below internationally recognised standards, especially among the urban poor, sub-urban and rural communities. Stakeholders and institutional inefficiencies may be hindrances facing the Ghanaian water supply process. Therefore, this study aims to appraise the motivational factors and outcome of stakeholders' engagement and identify the factors that influence effective institutional management of urban water supply in Ghana.

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The authors would like to convey special thanks to the participants for providing scholarly contributions to enhance the findings of this paper. Also, the authors appreciate the comments, suggestions and recommendations provided by the anonymous reviewers, which hone and strengthen the quality of this manuscript during the blind peer-review process. The following authors affiliations were omitted: Dr Lawrence Yao Addo is at the Faculty of Engineering and the Built Environment and CIDB Centre of Excellence, University of Johannesburg, South Africa. Dr Andrew Ebekozi is at the Department of Quantity Surveying, Auchi Polytechnic, Auchi, Nigeria and Development Planning and Management, School of Social Sciences, Universiti Sains Malaysia, Gelugor, Malaysia.

Funding: Faculty of Engineering and the Built Environment and CIDB Centre of Excellence (05-35-061890), University of Johannesburg, South Africa.



Design/methodology/approach – Sequential exploratory mixed methods were adopted and analysed to proffer answers to the research questions. Nineteen participants and 521 respondents were sampled for the qualitative and quantitative phases.

Findings – Findings reveal that the institutional processes and stakeholder engagement significantly influence the effectiveness of the management of urban water supply in Ghana. Findings identified 35 motivational factors and categorised them into the health of the population, socio-economic, technological and innovation trends, policy reform and adaptive governance. Also, the 22 institutional factors identified were categorised into three groups: regulatory framework, ethics for managing water supply and the culture of managing water supply.

Originality/value – Besides the study addressing the theoretical gap regarding which variables are germane in influencing the effective management of urban water supply, the study may be among the top studies that have appraised the role of stakeholders in the institutional management of urban water supply in Ghana.

Keywords Ghana, Institutional management, Motivational factors, Stakeholders, Urban water

Paper type Research paper

1. Introduction

Safe drinking water is key to human existence, but accessibility is a major encumbrance in developing countries (Braimah *et al.*, 2016). The United Nations (UN) (2015) affirmed that water is one of the main determinants of sustainability. It was captured by Sustainable Development Goal (SDG) 6. By 2030, it is expected that every household and person should have access to safe and affordable drinking water (Jambadu *et al.*, 2023). The UN acknowledged that water scarcity negatively influences more than one-third of people worldwide. This number is estimated to increase owing to changes in the climate. It has been projected that if measures are not implemented, at least one in four people will likely be affected by recurring water shortages by 2050 (UN, 2015). This calls for concern, especially in many developing countries with poor basic infrastructure. Water is a major national and global policy issue, as revealed by the UN World Water Development Report (2009) and the Ministry of Finance and Economic Planning (MFEP) (2017). The developed countries are not left out regarding conserving water to ensure quality and accessibly adequate domestic water supply. To address this challenge head-on, about US\$53bn will be required yearly for five years to ensure every household has access to safe water (UN, 2015). WHO (2015) and Ebekozi *et al.* (2021, 2023) avowed that sub-Saharan Africa is one of the poorest regions in the world regarding basic infrastructure. WHO (2015) projected a scale of water supply from 32% to 46% to meet the needs of the people because of inadequate water services.

Achieving SDG 6 is underlined by its link to other goals, especially those focused on hunger, gender equity, poverty and infant mortality. These implications target increased investments in water supply and sustaining the investments through effective maintenance practices. Thus, stakeholders' engagement in water management is germane. This may underpin the consensus that stakeholders who are beneficiaries of water facilities will endeavour to sustain them if they take charge of their management, operation and maintenance. Mahmud *et al.* (2007), Anand (2017), Schmidt (2017) and Egan and Agyemang (2019) found unsustainable approaches or systems for managing water facilities. A critical focus area of the SDGs is water, as indicated in SDG 9 and SDG 3. SDG 9 pertains to "Secure Ecosystem Services and Biodiversity, and Ensure Good Management of Water, Oceans, Forests, and Natural Resources". SDG 3 says:

[...] all businesses and governments must commit to the sustainable, cohesive, and transparent management of water, agricultural land, forests, fisheries, mining, and hydrocarbon resources to support inclusive economic development and the accomplishment of all SDGs.

This is important to ensure effective management of water resources and improve access to portable drinking water. [Rosegrant *et al.* \(2012\)](#) reported that by 2022, countries with water scarcity would grow to 35. Presently, about 30 countries are water strained. The extreme indications suggest that close to 30% of people living in developing countries will experience acute water deficiencies by 2025 ([Barbirz *et al.*, 2008](#); [MFEP, 2017](#)).

In Ghana, studies ([Shiraz Rahaman *et al.*, 2007](#); [Appiah-Obeng *et al.*, 2010](#); [Chan and Ameyaw, 2013](#); [Ameyaw and Chan, 2015](#); [Ameyaw *et al.*, 2017](#); [Egan and Agyemang, 2019](#)) have addressed water supply issues, none regarding the role of stakeholders in the institutional management of urban water supply. [Chan and Ameyaw \(2013\)](#) identified the encumbrances facing private sector involvement in Ghanaian water supply via public-private partnerships (PPP) schemes. They found management contracts as Ghana's common form of water supply PPP. [Ameyaw and Chan \(2015\)](#) evaluated the risk allocation in PPP water projects in Ghana. This includes political interference, foreign exchange rate, non-payment of bills, corruption and water theft. [Ameyaw *et al.* \(2017\)](#) examined critical success factors for appealing to the private industry in water supply projects in developing countries. [Egan and Agyemang \(2019\)](#) examined urban water management through a failed PPP from 2005 to 2017. [Dzisi and Obeng \(2013\)](#) opined that advantaged households, businesses, institutions and organisations with water resources are not sure of sustainability. Water sustainability is key to driving the SDGs. Hence, collaborating with other developmental partners such as Global Charity and Plan International Ghana, the Ghanaian Government is working to provide accessible, potable, drinkable water for all on or before 2030. This is because inadequate water supply harms health and it limits good sanitation and hygiene ([WHO, 2015](#)). The [Ghana Statistical Services \(2012\)](#) and corroborated by [Jubilee Debt Campaign \(JDC\) \(2016\)](#) reported an increase in urban population from 32% in 1984 to 44% in 2000 and 51% in 2010. The rapid urbanisation may have hindered local governments capacity to provide basic amenities, including pipe-borne water. World Health Organisation (WHO) Report (2016) affirmed that in 2015, about 30% of Ghanaian urban residents had piped water in their homes. GOG (2015) asserted that two-third of urban residents depend on water vendors and neighbours for their water supply. Studies such as [Khatri and Vairavamoorthy \(2007\)](#), [Zaato \(2015\)](#) and [Egan and Agyemang \(2019\)](#) found that several urban water interventions in Ghana failed with little or no attention to the institutional landscape and stakeholders' engagement in the development and implementation phases. This is because most of the encumbrances may be attributed to operational and institutional inefficiencies of the Ghana Water Company Limited (GWCL) ([Egan and Agyemang, 2019](#)). Studies regarding stakeholders' engagement in the institutional management of urban water supply in Ghana are scarce. Therefore, the study aims to appraise the motivational factors and outcome of stakeholders' engagement and identify the factors that influence effective institutional management of urban water supply in Ghana via the following objectives:

- To identify the motivational factors for stakeholders' engagement to drive the effective management of urban water supply in Ghana.
- To evaluate the outcome of stakeholders' engagement in the effective institutional management of urban water supply in Ghana.
- To ascertain the institutional processes that can ensure the effective management of urban water supply in Ghana.

2. Literature review

2.1 Water policy in developing countries: an African experience

The failure to apply water policies, especially in developing countries has resulted in adverse effects on the everyday availability of water. In Cotonou (Benin), about 27% urban households had access to sanitation, compared to 85% in Dakar (Senegal) in 2013 (Addo, 2020). Many households had to switch to depending on renewable water supplies. This source is expensive and may not be sustainable. Water issue is inevitable as population growth increase (Singh, 2015). The Global ISO requirements mean that about 28% of water supply winds up in domestic use, then 22% of water use goes to industry worldwide, 5% goes to public facilities, then about 3% goes to recreational services and the remainder goes through leakages or damages. For details, refer to Tables 1 and 2. The WHO has acknowledged the need for an international convention and cooperation on what is needed to provide safe drinking water and the use of water (Howard *et al.*, 2020).

In Uganda, about 8 million people live without access to a safe source of drinking water (WHO, 2015). From 2010 to 2016, 71% of the urban population had access to drinking water (Addo, 2020). This implies stagnation in the performance of water accessibility. Although much effort has been put into improving water supply. In 2015, accessibility to water supply was levelled out between urban and rural areas, namely, 77% and 64%, respectively (Addo, 2020). The Uganda’s formulation, regulation and coordinating water policies are handled by the Ministry of Water and Environment (MWE). The Directorate of Water Development under the MWE acts as the executive arm, providing extensive support to local governments and other service providers while monitoring potable water provided by National Water and Sewerage Corporation (NWSC). The NWSC’s internal Quality Control Department examines the quality of water supplied and checks whether it complies with the national standards for drinking water, which in turn follows the WHO drinking water guidelines (Addo, 2020). Addo (2020) identified scarcity of water sources, water losses/wastage, storm water challenges, inadequate funding and operational inefficiencies as hindrances to Uganda Vision 2040. In Sierra Leone, safe drinking water is in short supply. Addo (2020) affirmed that Sierra Leone has a wide disparity between access to potable water and water resources. This disparity is caused by mostly unfunctional infrastructure and equipment to aid in the treatment of water for supply. About 32% of the rural population has access to a reliable water supply. Poor operational and maintenance arrangements

Table 1.
Global standard on
water consumption

Survival needs: water intake (drinking and food)	2.5–3 L per day	Depends on climate and individual physiology
Basic hygiene practices	2–6 L per day	Depends on social and cultural norms
Basic cooking needs	3–6 L per day	Depends on food type
Total basic water needs	7.5–15 L per day	

Source: WHO, Global Water Supply and Consumption Standard (WHO, 2015)

Table 2.
Global standard on
water management
needs

250 people per tap	Based on flow of 7.5 L/min
500 people per handpump	Based on flow of 16.6 L/min
400 people per single-user open well	Based on flow of 12.5 L/min

Source: WHO, Global Water Supply and Consumption Standard (WHO, 2015)

account for this challenge. Access to water supply is about 50% coverage rate for urban residents in Freetown. The inefficient state of the water services in Freetown cannot meet the population's needs, which have been growing at a rate of 16.5% yearly. There is a lack of a national policy, organised and coordinated legal, regulatory and institutional frameworks and deficiency in the provision of both urban and rural water supply and sanitation facilities and services (Addo, 2020).

In Ghana, the National Water Policy was initiated in 2008 by the government through the UN Development Scheme (Addo, 2020). The policy helped to clarify and deepen the understanding among individuals, unions and other international bodies of the direction and focus of the government on water research management, that is, the sector roles and priorities in ensuring the objectives set (Robinson, 2009; Ankomah, 2012). Ijebu (2016a, 2016b) opined that many developing countries in sub-Saharan Africa, Ghana included, need help following a plan to achieve water supply and sufficiency among the citizenries. The water sector policy evolved around streamlining specific donor projects to improve water resource management in Ghana. One of them is the Ghana–Netherlands WASH programme, which fits into the framework of the water sector policy (Addo, 2020; Alba *et al.*, 2022). The Ghanaian water sector has evolved around many timeframe goals to resolve specific situations. Currently, the policy for the sector is to focus on achieving universal coverage for water services by 2025. That is, water supply for urban and semi-urban, an area in Ghana. They also have increased the national water coverage rate from 64% in 2016 to 85% in 2019 and aim for 98% in 2025 (Addo, 2020). This policy applies proportionately to rural and small towns and urban water coverage. The water supply is mostly from treated water sources. In many cases, rivers, shallow boreholes, wells and ponds, lakes from Weija in the central region and Kpong Lake in the eastern region form the major source of untreated piped water (Alba *et al.*, 2022; Jambadu *et al.*, 2023). Refer to Table 3 for details of sources of water supply.

2.2 Stakeholders engagement in institutional management of urban water supply

Engagement is an “umbrella” concept that broadly refers to the actions of an organisation to ensure that people and associations and organisations can engage in or have an involvement in decision-making and development processes that concern them. Therefore, the notion of stakeholder participation includes multiple levels of government (multi-level governance), the private sector (water management), policymakers, utility providers, donor agencies, donors, civil society in various ways (e.g. residents, non-governmental organisations, consumers movements) and other related constituencies. In the case of water usage, participation relates mainly to access (enough and reasonable quality); in the case of water

Source of water supply	Water (%)
Pipe-borne	43.6
Pipe-borne (outside)	47.1
Borehole	3.1
Tanker supply	4.6
Well/dugout/pond	0.2
Spring/rainwater	1.0
River/stream	0.1
Other	0.3
Total	100

Source: Ghana Statistical Services (2012)

Table 3.
Source of water
supply in Accra

management, participation in organisational, on-the-ground activities (distribution, maintenance of facilities, control of quality); in the case of water management, it refers to execution, including contributing to decision-making. [Habermas \(1989\)](#) points to the notion that institutional requirements are preconditions, including inclusivity, common concerns and disrespect of social class. [Arnstein \(1969\)](#) “ladder of citizen participation”, as presented in [Figure 1](#), defined eight steps or “rungs”, ranging from manipulation as the lowest in the non-participation category to citizen influence as the highest stage and highest degree of citizen power. This spectrum demonstrates that the engagement of residents is significantly graded. In terms of engagement, the United Nations Development Programme Water Governance Facility (2013) “levels of engagement” and the [OECD \(2015\)](#) “level of engagement were identified”. The [OECD \(2015\)](#) defined stakeholder engagement as the process by which any person or group with an interest or stake in a water-related topic is involved in the related activities, decision-making and implementation processes. The person or group may be directly or indirectly affected by water policy and/or can influence the outcome positively or negatively, as presented in [Figure 2](#).

Stakeholder engagement is a multi-faceted exercise with various progressive levels that imply different forms and intensities of stakeholder engagement. [OECD \(2015\)](#) identified communication, consultation, participation, representation, partnership and co-decision and co-production as the levels of engagement. Regarding communication, [OECD \(2015\)](#) affirmed that it is the first level of engagement that intends to make water-related information and data available to other parties. It seeks to raise awareness and understanding of the issue ([Bourne, 2015](#)). [Bourne \(2015\)](#) avowed that consultation takes place during meetings at which a specific reform, strategy or project is clarified, and organisations, groups and individuals participate in a dialogue to express their views but may also take the form of written submissions or votes (e.g. referendum, surveys). Participation does not inherently ensure an effect on the decision-making process, whereas substantive contributions to the process define participation. In other words, involvement is a degree of commitment ([Addo, 2020](#)). Representation participation encourages stakeholders to discuss and deliberate what they want as individuals and as a group to find the best

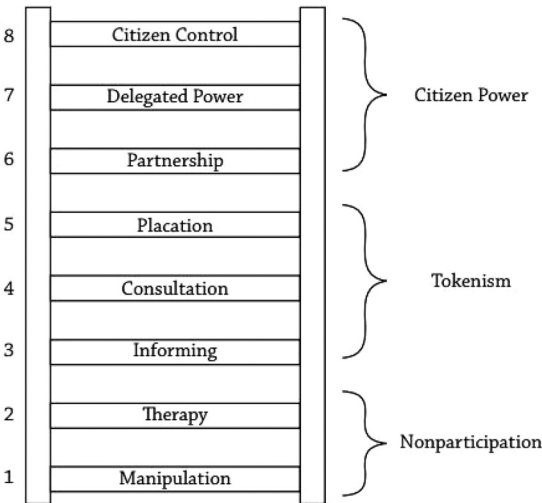
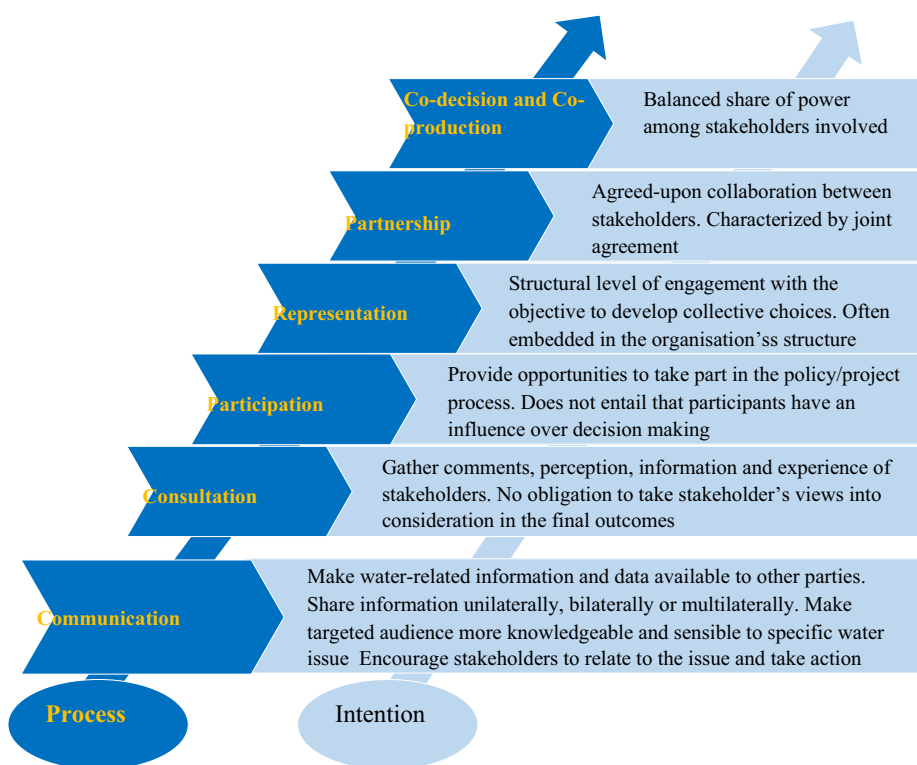


Figure 1.
Eight rungs on the
ladder of citizen
(public) participation

Source: Arnstein (1969)



Urban water supply in Ghana

Figure 2.
Terminology and typology of levels of engagement

Source: OECD (2016)

solution possible to advance their common interests (Bourne, 2015). Participation is distinguished by a joint arrangement to share costs and benefits between the parties concerned (Durham *et al.*, 2014). Effective co-production and co-decision rely on providing the best balance of leadership, skill (e.g. technologies, peer support) and resources (e.g. appreciation, awards) to ensure that all partners are buying into the phase of transition and to ensure value for efforts (Wamsler, 2017).

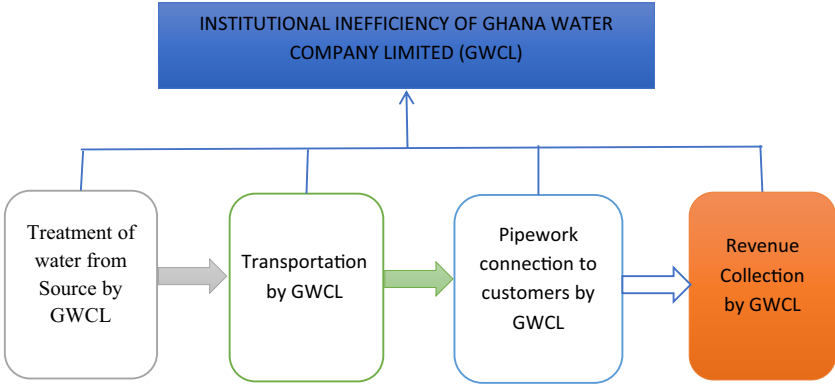
Lack of stakeholder engagement in developing and implementing these interventions may have contributed to the hindrances in Ghana's urban water supply. The source of the problem comes from its operational and institutional inefficiencies (Addo, 2020; Jambadu *et al.*, 2023). There are documentation and factual concerns about the institutional inadequacies that have caused its ability to supply water to decline (Van Rooijen *et al.*, 2008; Ainuson, 2010). The institutional inefficiency of GWCL may have resulted in huge challenges to water supply in the urban area. Addo (2020) affirmed that GWCL does not have the required revenue to expand its operations to meet the increasing water demand. GWCL is solely responsible for handling and operating almost every line of process water supply delivery (Amartey, 2010). This has also resulted in huge inefficiencies in the system because there is no proper feedback on solutions to challenges from either customers or stakeholders in the delivery process. As Dankwah indicated, unlike the Volta River Authority, where the Chief Executive Officer reports directly to the president, GWCL is

under an inadequately resourced ministry, which has over the years, not done any significant rehabilitation work on the equipment of the company (Addo, 2020), as presented in Figure 3.

3. Research method

This study used a sequential exploratory mixed methods approach. This mechanism is characterised by an initial qualitative data collection and analysis phase, sequentially followed by a questionnaire survey. The quantitative results were used to validate the qualitative results to increase generalisability. Scholars such as Johnson *et al.* (2007), Creswell (2014) and Ebekoziem *et al.* (2019) affirmed that this approach attempting to join the wisdom of both viewpoints would assist the investigator in proffering answers to the issues of interest, hence adopted in this study. Firstly, for the qualitative phase, phenomenology was adopted. Plano-Clark and Creswell (2015) affirmed that phenomenology focused on the experience of the central phenomenon and analysed the meaning of the collected data by describing themes about the essence of the experience. The oral interview was based on the investigators' experience, past literature and a pilot semi-structured questions oral interview test (Denzin and Lincoln, 2017; Ebekoziem *et al.*, 2019; Jaafar *et al.*, 2021; Ibrahim *et al.*, 2022). The study's participants were urban water services providers, regulatory bodies, government agencies and non-governmental agencies, as presented in Table 4. Besides ensuring adequate representation of the stakeholders, they are knowledgeable in Ghana's urban water supply. Purposive sampling technique was used. Nineteen participants achieved the study's saturation. The participants rank, although full identity is concealed in Table 4 indicates that those

Figure 3. Conceptualisation of standalone process of GWCL's management of urban water supply with no engagement of stakeholders



Source: Modified from Addo (2020)

Table 4. Background of the participants

Item	Categorisation of interviewees	Code of interviewees	No. of interviewees
1	Urban water service providers	UWSP	P1-P3
2	Regulatory bodies	RGB	P4-P6
3	Government agencies	GA	P7-P11
4	Non-governmental agencies	NGA	P12-P19
Total number of interviewees			19

Source: Authors' own work

interviewed were considered as experts. Secondly, for the quantitative phase, the study populations in the quantitative phase were the worker of GWCL, users, water regulators, non-governmental and government agencies and private water distributors. Note, the second phase of the data collection included the users (domestic and commercial) to have all-inclusive findings and report any deviation from the collected data. Also, the questionnaire cut across all the respondents. This is because the questions were simplified tailored to address the study's main research questions and all-inclusive findings and generalisation. A total of 521 were retrieved and adopted usable for the study from the sample size of 600 derived by formula from Yamane study as cited in [Addo \(2020\)](#), presented in [Table 5](#). This represents 86.83% response rate. Regarding the statistical analysis, refer to [Table 6](#) for the summarised analysis method.

Category	Freq.	%
<i>Age group (years)</i>		
18–30	74	14.2
31–40	168	32.2
41–50	215	41.3
51–60	59	11.3
Above 60	5	1.0
Total	521	100
<i>Highest educational qualification</i>		
No formal education	12	2.3
Basic school certificate	47	9.0
Senior school certificate	57	10.9
National diploma or certificate	98	18.8
Bachelor's degree	219	42.0
Master's degree	75	14.4
Doctorate degree	13	2.5
<i>Area of residence</i>		
Accra east	263	50.5
Accra west	152	29.2
Tema	106	20.3
<i>Category of stakeholder</i>		
Worker of GWCL	102	19.6
Domestic water user	221	42.4
Commercial water user	26	5.0
Water regulator	2	0.4
Non-governmental agency	100	19.2
Government agency	54	10.4
Private water distributor	16	3.1
<i>Years of experience in water sector</i>		
0	64	12.3
1–5	114	21.9
6–11	109	20.9
12–17	45	8.6
18–23	41	7.9
Above 23	148	28.4
Total	521	100.0

Source: Authors' own work

Table 5.
Summary of
respondents
background
information

Table 6.
Analytical procedure
for the research
questions and tools
used

Research questions	Data type	Method of analysis
What are the motivational factors for stakeholders' engagement to drive for the effective management of urban water supply in Ghana?	Quantitative Qualitative	Frequencies, percentages, mean, std. dev. Exploratory factor analysis with IBM SPSS CFA SEM with AMOS Thematic analysis
What is the outcome of stakeholders' engagement in effective institutional management of urban water supply in Ghana?	Quantitative Qualitative	Frequencies, percentages, mean, std. dev. Exploratory factor analysis with IBM SPSS CFA SEM with AMOS Thematic analysis
What are the institutional processes that can ensure the effective management of urban water supply in Ghana?	Quantitative Qualitative	Frequencies, percentages, mean, std. dev. Exploratory factor analysis with IBM SPSS CFA SEM with AMOS Thematic analysis
Source: Authors' own work		

4. Results and discussion

The presentation follows the order of the study's objectives.

4.1 Motivational factors that drive the effective

This sub-section presents findings regarding motivational factors from the participants viewpoint. Findings agree that water is essential to human survival; the water shortage affects everyone. The action of the users drives the management of the urban water supply systems. The users, through the media, always agitate for water to be provided, both in improved quality and quantity. This should motivate for more work to be done. P2 says, "[. . .] the actions of the urban dwellers [. . .]" When it comes to management, the regulators had little to say. Their main concern was about whether water was fit for purpose and that it is good for consumption. They added that their main driving factor is delivering on their mandate of ensuring that the water, that is, being distributed, meets the required standards. P6 says, "[. . .] the main driving factor is delivering on their mandate of ensuring that water being distributed meet standards [. . .]" The first factor is the weather and climatic change. Human activities all over the world are destroying water resources. Especially in Ghana, where *Galamsey* (illegal mining) is the order of the day, many water bodies have been destroyed. There is also bush burning that leads to deforestation. Bad waste disposal also eventually ends up in the rivers and the sea. Human activities are contaminating even underground water sources. The country's geographical location means there will always be drought conditions at certain time and many rivers may dry up. Thus, the safety of the water source is a major driving force for which there should be an effective way of managing urban water supply:

Government agencies are driven by the fact that their input in the sector is crucial for policy formulation and regulations. Other institutions need the input of government agencies to deliver on their mandate effectively [. . .] said P9.

There are several factors that the members of non-governmental agencies mentioned. P18 says:

One is that everybody needs water to survive. It is an essential commodity, but the resources are far from the people and there is a need to make sure it is brought to those who need it for consumptions. Water is all around, but human behaviour makes it a scarce resource. The

destruction of water bodies is another main concern. As efforts are made to get the resource closer to urban dwellers, there is also the need to protect the sources. Another factor is the changing technology levels which must take advantage of. It can be observed in many Ghanaian communities most water systems are being provided through the help of NGOs and these are technology driven, especially in cases where the source is underground water [...].

The institutional mandate for which non-governmental agencies exist is to be part of decision-making in the sector and this is also a factor for the effective management of the urban water supply. P17 says, “[...] another factor is the need to address the SDGs [...]”

Table 7 shows the motivators for stakeholders’ engagement. The study performed a descriptive analysis on the 35 factors and it was found that both “growing water based diseases such as guinea-worm need to be eradicated” and “The health benefits of water” were ranked first with a mean score of 3.52 and “Human Pollution of water bodies” was ranked second with a mean score of 3.46; “Unplanned settlements of people in unapproved locations in the urban areas” was ranked third with a mean score of 3.41; “Vulnerable groups such as the poor with limited or no direct access to piped water supply” and “Differences in income and educational level of city dwellers” were both ranked fourth with a mean score 3.40 and “Unfinished project for urban water supply” was ranked fifth with a mean score of 3.38. For others, refer to Table 7. Findings identified 35 motivational factors and categorised them into health of the population (Ali *et al.*, 2012; Clasen *et al.*, 2014; WHO, 2015), socio-economic (Durdyev *et al.*, 2018), technological and innovation trends (Bediako *et al.*, 2018), policy reform (Acheampong *et al.*, 2016) and adaptive governance [in Maheepala *et al.* work as cited in Addo (2020)]. They hinted that an adaptive governance system that integrated Urban Water Management to ensure community participation, flexible co-management, ethical practices and so on is an emerging approach for urban water utilities to minimise the impact of urban water systems on the natural environment and maximise social and economic vitality that engender overall community well-being.

4.2 Stakeholders’ engagement in the institutional management of urban water supply

This sub-section presents findings regarding stakeholders’ engagement in the institutional management of urban water supply. Participant P3 says, “[...] urban water supply can be managed effectively when all the stakeholders contribute their quota [...]” Each stakeholder has a major role to play. Each one needs to plan and ensure that the plan is implemented. For instance, if there were a good plan in place, there would not be a struggle for water during the dry season. There is always water shortage during such times. For effective planning, stakeholder collaboration is key. P6 says, “[...] stakeholders can do their work more diligently [...]” The members of the regulatory bodies made the point that stakeholders can do better and should ensure that they do their work more diligently with no fear or favour. Stakeholders should coordinate with other institutions to improve and enforce the rules to ensure water quality standards comply. For effective improvement, regulatory bodies need to get more involved. For instance, they should regularly check on the water quality supplied by the GWCL. “[...] there is the need to ensure inclusiveness of every necessary stakeholder [...]” said P11. There is a lack of financial institutions willing to support water projects with funds (P2, P5, P12 and P17). Findings agree with Badu *et al.* (2013), Egan and Agyemang (2019) and Jambadu *et al.* (2023). Egan and Agyemang (2019) discovered that GWCL will need US\$100m per annum investment or US\$2bn to ensure that all Ghanaians can access adequate, safe, affordable and reliable water by 2025. Badu *et al.* (2013) found a lack of potable water confronting rural regions of Ghana basic infrastructure development because of inadequate funding. All those involved need to play a role in water delivery to the urban dwellers and it is necessary to come together to make decisions where necessary.

Table 7.
Motivators for
stakeholder
engagement

Variables	Very low extent. . . Very high extent					Mean score	SD	Rank
	1	2	3	4	5			
Growing water-based diseases such as guinea-worm need to be eradicated	13.1	7.3	25.9	22.5	31.3	3.52	1.345	1
The health benefits of water	1.9	15.5	29.2	35.7	17.7	3.52	1.015	1
Human pollution of water bodies	3.3	11.9	41.3	22.6	20.9	3.46	1.050	3
Unplanned settlements of people in unapproved locations in the urban areas	5.4	10.7	42.8	19.4	21.7	3.41	1.103	4
Vulnerable groups such as the poor with limited or no direct access to piped water supply	5.4	17.3	27.8	30.7	18.8	3.40	1.135	5
Differences in income and educational level of city dwellers	7.7	14.4	30.9	24.2	22.8	3.40	1.203	5
Unfinished projects for urban water supply	6.0	15.7	33.2	24.2	20.9	3.38	1.153	7
Unfavourable economic trends such as financial crisis	4.8	14.2	36.5	29.9	14.6	3.35	1.046	8
Future uncertainty	5.8	16.1	34.5	24.2	19.4	3.35	1.134	8
Deteriorating environmental quality within cities	4.8	22.6	28.4	21.7	22.5	3.34	1.191	10
Insufficient budget allocation for improving infrastructures for urban water supply	5.6	17.1	31.7	30.1	15.5	3.33	1.100	11
Reforms on subsidies	4.2	17.5	33.8	30.3	14.2	3.33	1.053	11
Policy/project implementation for urban water supply	5.0	18.0	31.3	31.5	14.2	3.32	1.079	13
Pressure calls for greater transparency	3.8	16.3	41.3	22.3	16.3	3.31	1.048	14
Policy to support continuity of project	4.4	14.8	43.2	20.9	16.7	3.31	1.053	14
Increasing infrastructures in urban areas	6.5	22.1	27.3	23.6	20.5	3.30	1.206	16
Potential reuse of potable water	7.9	15.7	35.3	21.7	19.4	3.29	1.176	17
Novelty to change the physical structure for urban water systems	5.4	17.9	34.4	29.2	13.2	3.27	1.070	18
Inequalities in water supply	5.2	22.5	29.8	26.3	16.3	3.26	1.132	19
Household size of city dwellers	10.0	15.5	33.2	21.5	19.8	3.26	1.224	19
Increasing percentage of people living in urban areas	13.4	15.0	27.3	21.7	22.6	3.25	1.323	21
Novelty to change financial outlook for urban water systems	5.6	15.2	43.0	21.5	14.8	3.25	1.059	21
High tariffs for urban water supply services	6.9	14.8	40.9	21.9	15.5	3.24	1.099	23
Economical use of water	5.8	19.6	34.9	24.2	15.5	3.24	1.111	23
Perceived unethical practices in the supply of urban water	5.2	19.0	35.5	27.3	13.1	3.24	1.066	23
Recovery of energy and nutrients from used water	6.7	18.4	33.4	27.3	14.2	3.24	1.113	23
Pressure calls for greater accountability	6.0	20.5	32.4	26.5	14.6	3.23	1.114	27

(continued)

Variables	Very low extent . . . Very high extent					Mean score	SD	Rank
	1	2	3	4	5			
Community participation the management of urban water supply	6.5	19.4	37.8	19.8	16.5	3.20	1.129	28
Decision-making in the management of urban water supply	6.3	19.2	35.9	25.0	13.6	3.20	1.096	28
To develop urban water supply resources	5.6	23.8	31.1	24.4	15.2	3.20	1.129	28
Pricing of urban water supply	5.4	23.4	32.2	24.6	14.4	3.19	1.112	31
The use of Information and Communication Technologies	6.7	20.9	34.5	24.6	13.2	3.17	1.108	32
Flexible co-management mechanisms	10.6	20.3	34.2	22.5	12.5	3.06	1.161	33
Global directives such as adoption of SDGs	10.9	20.0	37.2	20.0	11.9	3.02	1.147	34
The privatisation of urban water supply system	9.6	24.4	33.6	21.9	10.6	2.99	1.127	35

Source: Authors' own work

Table 7.

There should be effective consultation among various stakeholders, as the job should not be left to only GWCL. All stakeholders should be able to deliver well on their mandate. It is necessary to improve engagement and ensure the inclusion of key stakeholders. Stakeholder empowerment and social integration, especially at the local level, which will include urban dwellers are important. P16 says, “[...] considered stakeholders of an assigned task must be knowledgeable on urban water supply activities [...]” Stakeholders should all play their roles effectively but there should be room for support from the government. The government oversees everything, so operating without their support, the activities of stakeholders would be discouraged.

Table 8 presents the quantitative aspect of the study's findings. Results were grouped into Areas of Stakeholders' Engagement, Mechanisms for Engaging Stakeholders, Outcome of Sustainable Stakeholder Engagement and Obstacles to Stakeholder Engagement. The Areas of Stakeholder Engagement were identified as consisting of 11 factors. A descriptive analysis was performed on the 11 factors and it was found that “Revenue mobilization by GWCL” was ranked first with a mean score of 2.56 and “Training and capacity building of staff of service providers” was ranked second with a mean score of 2.50 (OECD, 2015). The Mechanisms for Engaging stakeholders consist of 19 factors and it was found that “Information hotlines” were ranked first with a mean score of 2.65 (OECD, 2015). This is justified as OECD (2015) found that stakeholder engagement for effective water governance inventoried 24 mechanisms for stakeholder engagement in water governance. These mechanisms were classified into two types, namely, “formal” and “informal” mechanisms. Regarding Outcome of Sustainable Stakeholder Engagement, “Adequate funds for water investment” was ranked first with a mean score of 2.85. For others, refer to Table 8.

4.3 Institutional process

This sub-section presents findings regarding the institutional process for effective urban water supply in Ghana. P1 says:

Table 8.
Outcome of
sustainable
stakeholder
engagement

Variables	Not at all influential . . . Extremely influential					MS	SD	Rank
	1	2	3	4	5			
Adequate funds for water investment	25.1	11.1	33.2	14.6	15.9	2.85	1.372	1
Building social capital	17.1	24.8	31.3	14.6	12.3	2.80	1.238	2
Increase awareness of activities in water supply	13.4	29.0	30.5	18.6	8.4	2.80	1.146	2
There will be efficient dialogue	15.0	27.3	32.1	15.4	10.4	2.79	1.182	4
Ensure monitoring and evaluation	13.4	25.3	39.2	14.8	7.3	2.77	1.086	5
Helping opinion-forming and development of preferences	15.9	26.9	32.2	14.0	10.9	2.77	1.198	5
Developing technical and non-technical innovation	14.6	27.1	34.2	16.1	8.1	2.76	1.133	7
Building trust and confidence	12.5	32.1	30.3	17.9	7.3	2.75	1.110	8
Raising responsiveness on water costs	11.9	30.9	35.5	13.6	8.1	2.75	1.088	8
Promote equity	14.0	31.3	30.3	15.4	9.0	2.74	1.150	10
Encourage knowledge sharing	15.2	26.9	34.5	15.7	7.7	2.74	1.129	10
Raising alertness on water quality	12.5	32.6	30.9	17.1	6.9	2.73	1.097	12
Enhance decision-making	14.2	26.3	38.0	15.2	6.3	2.73	1.080	12
Assist in the operation of water infrastructure	15.4	28.0	31.9	18.0	6.7	2.73	1.128	12
Raising awareness on water availability	11.9	32.6	34.0	14.0	7.5	2.73	1.081	12
Supporting effective implementation of a water project	15.0	32.2	27.3	17.5	8.1	2.71	1.157	16
Increase ownership of water infrastructure	14.8	29.2	32.6	17.1	6.3	2.71	1.107	16
Maintaining water infrastructure	15.9	24.8	39.2	13.6	6.5	2.70	1.093	18
Investment in water infrastructure	15.7	23.0	44.0	10.7	6.5	2.69	1.066	19
Encourage innovation	13.2	32.2	33.6	14.0	6.9	2.69	1.084	19
Increasing water users' willingness to pay	12.7	38.6	24.2	17.3	7.3	2.68	1.121	21
There will be respect for codes of conduct	14.4	31.3	33.2	14.2	6.9	2.68	1.098	21
Fostering capacity building and training	15.7	25.3	40.9	11.9	6.1	2.67	1.069	23
Supporting consensus building	13.4	32.6	34.0	14.4	5.6	2.66	1.057	24
Reduce conflict in urban water supply	14.6	29.6	38.4	10.9	6.5	2.65	1.063	25
Raising awareness on water risks	18.4	30.3	29.0	13.8	8.4	2.64	1.177	26
Supporting effective implementation of a policy and reform	19.2	27.1	33.6	11.7	8.4	2.63	1.166	27
Fostering corporate social responsibility	14.6	32.4	35.5	11.9	5.6	2.61	1.050	28
Facilitate partnership in urban water supply management	20.5	28.0	29.4	14.8	7.3	2.60	1.177	29
There will be financial sustainability of water management	15.4	33.0	34.7	11.5	5.4	2.59	1.051	30
Building political acceptability	17.1	32.4	33.4	10.9	6.1	2.57	1.085	31
Ensuring proper enforcement of laws	21.9	32.2	27.3	9.6	9.0	2.52	1.193	32
Source: Authors' own work								

[. . .] going through the right process is key to the sustainability of water supply [. . .] go through many processes before water is supplied to the urban dwellers. In supplying water, they test water acidity before it is treated. Another testing is done after treatment. They also ensure the lines are properly laid for water distribution [. . .].

Findings show that water supply itself requires the customer or water user to bring their site plan for the provision of water, which in some situations, an affidavit is added. The user

writes a letter to the district manager, after which a team from the water company goes to do a survey and an estimate is given to the user (the estimate often takes about two weeks to prepare, after payment is made then water is connected). P5 says:

[...] [...] before the decision of the service providers to distribute water to consumers, the regulators make sure the water goes through testing. They conduct a series of tests to confirm the primary test for contamination. The process then goes through a final evaluation before distribution is done [...].

Findings show that the drinking water management framework helps them to assess the drinking water supply system. The framework also ensures preventive measures for drinking water contamination and quality management. They have developed operational procedures and process controls to verify drinking water quality. P10 says:

[...] for the institutional processes that are in place to ensure the management of urban water supply in Ghana is sustainable, they oversee managing and protecting all water resources in the country. So, they work hand in hand with the Ghana Water Company Limited and other institutions like the community water, the ministry, water aid, the water research institute, and others[...].

Findings reveal that individual is redirected to the assembly to obtain a permit and then the GWCL get the person connected. However, for large community water needs, it is the government agencies who lead the way throughout to ensure that the GWCL extend its lines to the community then the individuals who need it in their homes go through the procedure described to get connected. The assemblies provide points to sell water to the community at large. However, should there be shortages or problems, the GWCL is contacted to ensure a constant supply. So, for any institutional processes, the government agencies work with the water company.

Table 9 presents the quantitative aspect of the institutional processes and identified 22 factors. “The policies for managing urban water supply need reforms” was ranked first with a mean score of 3.19 and both “It is an idea that urban water supply should be managed effectively” and “It is a desire to ensure that urban water supply is managed effectively” were ranked second with a mean score of 3.07 each; “The value of stakeholder engagement would solve problems in urban water supply” was ranked third with a mean score of 3.04; “It is an acceptable standard to participate in the management of urban water supply” was ranked fourth with a mean score 3.00 and “Society appreciates the engagement of communities in urban water supply” was ranked fifth with a mean score of 2.99. Findings identified 22 institutional factors and categorised them into regulatory framework (OECD, 2015), ethics for managing water supply (Duflo *et al.*, 2012) and culture of managing water supply (Luckmann and Farber, 2016). Luckmann and Farber (2016) explained that cultural systems of engagement, values, beliefs and assumptions of stakeholders, internal change to engage, social identity and personal desire to engage and willingness to engage are important to create the needed environment for stakeholders. For others, refer to **Table 9**.

5. Conclusion

This study engaged 19 participants and 521 respondents for the qualitative and quantitative phases. The identified motivational factors were grouped into the health of the population, socio-economic, technological and innovation trends, policy reform and adaptive governance. Also, the identified institutional factors were grouped into the regulatory framework, ethics for managing water supply and culture of managing water supply. As part of the study's implications, it will educate stakeholders and GWCL on how to accomplish proficiency in water supply and persuade key stakeholders to have an open

Table 9.
Institutional
processes for
effective urban water
supply

dialogue to inform planning across the Ghanaian water supply sector. Also, besides the study addressing the theoretical gap regarding which variables are germane in influencing the effective management of urban water supply, the study may be among the top studies that have appraised the role of stakeholders in the institutional management of urban water supply in Ghana. The study focused on the Greater Accra Region of Ghana. Future studies should cover Ghana territory and other aspects of urban water supply. Also, it is pertinent for future studies to analyse major findings further to relate and model all variables in Ghana's context. The outcome of such a future study may validate findings from this study.

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