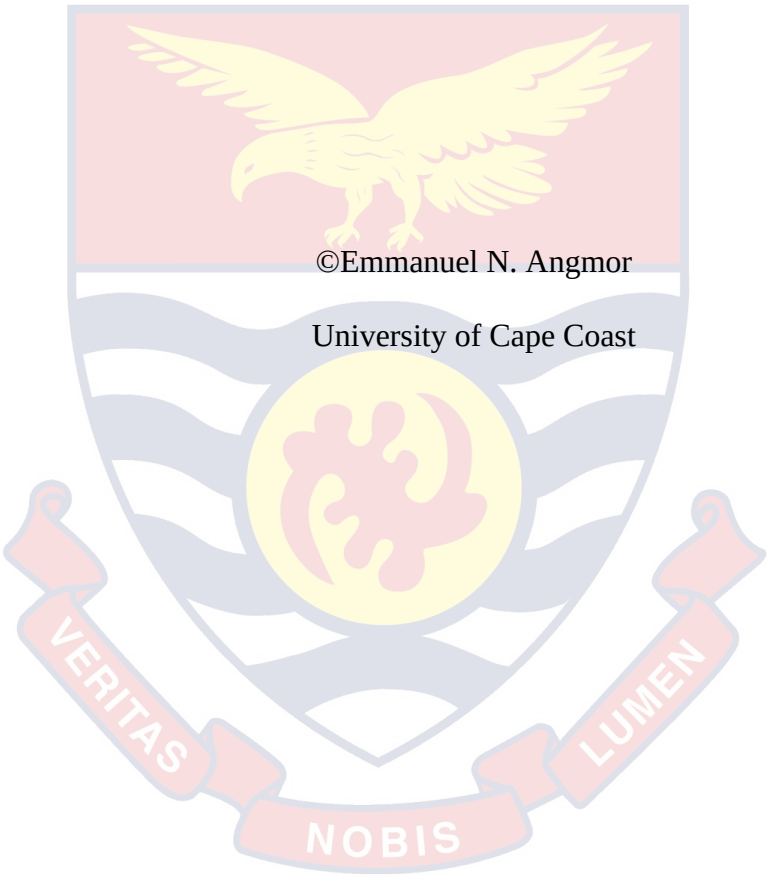
UNIVERSITY OF CAPE COAST

MAKING RURAL DRINKING WATER SUPPLY PROGRAMMES WORK: A STUDY OF THE WATER AND SANITATION MANAGEMENT TEAMS IN THE EASTERN REGION

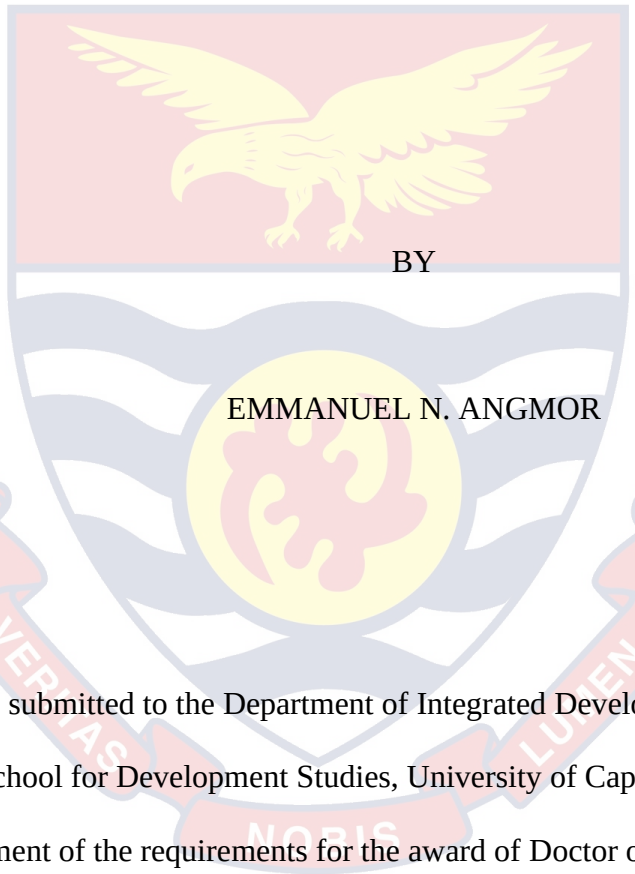
EMMANUEL N. ANGMOR

2020



UNIVERSITY OF CAPE COAST

MAKING RURAL DRINKING WATER SUPPLY PROGRAMMES WORK: A STUDY OF THE WATER AND SANITATION MANAGEMENT TEAMS IN THE EASTERN REGION



BY

EMMANUEL N. ANGMOR

Thesis submitted to the Department of Integrated Development Studies of the School for Development Studies, University of Cape Coast in partial fulfilment of the requirements for the award of Doctor of Philosophy Degree in Development Studies

MAY 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature…….. Date…….

Name:……

Supervisor's Declaration

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature ……Date:……

Name:…….....

Co-Supervisor's Signature.…….Date:……..

Name:…….

ABSTRACT

The study evaluated the Water and Sanitation Management Teams in the Eastern Region of Ghana. A total of 398 respondents were used for the study. Interview guide, focus group discussions guide and questionnaires were used for data collection. SPSS version 20 was used to analyse the data. The results showed that there is an institutional framework for the management of the rural water systems. However, the relationship between the stakeholders is weak. The water and sanitation unit in the Districts could not provide the necessary administrative, financial and technical support for the Water and Sanitation Management Teams (WSMTs). Monitoring of the WSMTs by the DWSTs is weak. The study shows that initial training was done for the WSMTs; however, retraining was not adequate. The study reports on inadequate funds for the District to work effectively with the WSMTs. The study cited low women representation in the WSMTs, and area mechanics and spare parts dealers were reluctant to offer their services to the WSMTs because of unsettled debts. Financial and administrative records were not prepared and kept. The study identified unwillingness to pay for water services due to the absence of financial transparency and the WSMTs had no maintenance plan for the water systems. The study recommended that WSMTs should be given monetary motivation, the CWSA, RWSA and the DWSTs should be should well-resourced to work effectively, interference from chiefs should not be encouraged, WSMTs should be accountable to the community and WSMTs should improve revenue mobilisation to enhance replacement and development of more water systems.

KEY WORDS

Institution

Management

Participation

Rural Communities

Sanitation

Sustainability

Water

ACKNOWLEDGEMENTS

My gratitude goes to my principal supervisor, Prof. Stephen B. Kendie for his enormous support and valuable comments. I am very grateful for his guidance throughout the study. I thank my Co-Supervisor Prof. Francis E. Amuquandoh for his immense contribution during the study.

To my parents Rev. Samuel L. Angmor and Mrs. Gladys Angmor, I acknowledge your financial commitment and spiritual support in my education. My appreciation to my siblings (Frank, Peter, Ebenezer, Comfort, Faustina, and Mary)

To the Management and staff of Presbyterian University College, Ghana, without your support it would have been very difficult. I want to express my heartfelt gratitude to Prof. Sraku Lartey, Prof. Frank Sena Arku, Prof. Edward Wiafe, Caroline Tettey and Francisca Tuah for their support.

My final thanks go to my wife Monica Naki Wakermeh and children Dromi Naki Angmor and Maukle Tettey Angmor for their prayers and support.

DEDICATION

To my wife, children, parents, and siblings

TABLE OF CONTENTS

	Page
DECLARATION	ii
ABSTRACT	iii
KEY WORDS	iv
ACKNOWLEDGEMENTS	v
DEDICATION	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xi
LIST OF FIGURES	xiii
LIST OF ACRONYMS	xiv
CHAPTER ONE: INTRODUCTION	
Background to the Study	1
User Committees in Rural Water Supply Systems	11
Statement of the Problem	19
Objectives of the Study	24
Research Questions	24
Justification for the Study	25
Organisation of the Study	26
CHAPTER TWO: REVIEW OF RELATED LITERATURE	
Introduction	29
Theoretical Perspective	29
Participation Theory	29
Institutional Theory	37
Empirical Studies	45

Legal and Institutional Framework for Water Supply 59

Community Ownership of Water Supply Systems 62

Sustainability and Rural Water Supply 66

Gender in the Management of Rural Water Supply Systems 69

CHAPTER THREE: RESEARCH METHODS

Introduction 80

The Study Area 80

Description of Rural water Supply System Management in the Districts 84

Research Philosophy 85

Research Approach 86

Study Design 90

Target Population 90

Sample Size and Sampling Approach 91

The Evaluation indicators of Rural Water Supply Systems 94

Sources of Data 97

Data Collection Instruments 97

Data Collection Procedure 101

Data Processing and Analysis 102

Pre-Testing of Data Collection Instruments 103

Ethical Considerations 104

Limitations of the Study 105

CHAPTER FOUR: INSTITUTIONAL SUPPORT IN THE MANAGEMENT OF RURAL WATER SUPPLY SYSTEMS

Introduction 107

Characteristics of the respondents 107

The Monitoring Role of the DWSTs 108

The District Water and Sanitation Plan 111

Initial Training and Retraining of WSMTs 114

Hygiene and Sanitation Education and Support for Major Repairs 120

External Audit of the WSMTs Account and change of Water System Management. 123

Summary 128

CHAPTER FIVE: THE WATER AND SANITATION MANAGEMENT TEAMS AND COMMUNITY PARTICIPATION IN THE MANAGEMENT OF THE WATER SYSTEMS. 129

Introduction 129

Formation of the Water and Sanitation Teams 129

Gender Composition of WSMTs 130

Initial Motivation before the acceptance to be part of the WSMT. 137

The Work of the WSMTs in the Management of Rural water Supply Systems 139

Maintenance of the Water Supply Systems and User fees 140

Organisation of Meetings and Records Keeping by the WSMTs 144

Repair of Broken-down Water Supply Systems, Water Quality Testing and Bank Accounts. 147

Functionality and Reliability of the Water Supply Systems 152

Community Participation in the Management of Rural Water Systems. 160

Summary 165

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction 167

Objectives of the Study 167

Summary of Findings 168

Institutional Support for Rural Water Supply 168

Community Participation 169

Monitoring of WSMTs by the District Water and Sanitation Teams 170

Financing of Rural Water Supply System Maintenance 170

The Operations of the WSMTs 171

Conclusion 172

Contribution to Knowledge 174

Recommendations 175

Recommendations for Community Participation 175

Recommendations for WSMTs 176

Recommendations for DWSTs 177

Recommendations for the CWSA 178

Suggestions for further Research 179

REFERENCES 180

APPENDICES 224

APPENDIX A:\Questionnaire 224

APPENDIX B: Focus Group Discussion Guide 232

APPENDIX C: Questionnaire 234

APPENDIX D: Interview Guide 238

LIST OF TABLES

Table		Page
1	Rural water coverage in the Eastern Region of Ghana	21
2	Definitions of participation	31
3	Main Focus and Views of Institutional Theory	42
4	Distribution of sample size	93
5	Systematic Sampling Table	94
6	DWSTs monitoring role of the WSMTs	109
7	Initial training by DWSTs for the WSMTs	115
8	Retraining by DWSTs for the WSMTs	118
9	Hygiene and sanitation education by the DWST for the WSMTs	120
10	DWSTs auditing of the WSMT accounts	123
11	CWSA to take over the operation and management of rural water systems	125
12	The number of women in the WSMTs	131
13	Position of women in the WSMT	134
14	Motivation to be a member of the WSMT	137
15	Average meeting times in a month	144
16	Number of waiting days to repairs faulty water systems	147
17	Water quality sampling and analysis	149
18	Functional status of the water systems	153
19	The reliability of water flow through the year	155
20	The number of times the boreholes break down in a year	156
21	Availability of spare parts for repairs	158

22 The time it takes an area mechanic to come and fix faulty water systems 159

23 Community knowledge on the functions of the WSMTs 161

LIST OF FIGURES

Figure		Page
1	Conceptual Framework of the Study	76
2	Regional Map showing the studied Districts	84

LIST OF ACRONYMS

CBO	Community Based Organisation
COM	Community Ownership and Management
CSIR-INSTI	Council for Scientific and Industrial Research, Institute
CWSA	Community Water and Sanitation Agency
DA	District Assembly
DMTDP	District Medium Term Development Plan
DOM	District Operation Manual
DRA	Demand Responsive Approach
DWSPs	District Water and Sanitation Plans
DWST	District Water and Sanitation Team
EPA	Environmental Protection Agency
ESAs	External Support Agencies
FGDs	Focus Group Discussions
GoG	Government of Ghana
GSS	Ghana Statistical Survey
GWP	Global Water Programme
GWSC	Ghana Water and Sewerage Corporation
ICWE	International Conference on Water and Environment
IIED	International Institute for Environment and Development
ILO	International Labour Organisation
IRC	International Resource Centre
IWRM	Integrated Water Resources Management
MDGs	Millennium Development Goals
MLGRD	Ministry of Local Government and Regional Development

MoF	Ministry of Finance
MWRWH	Ministry of Water Resources Works and Housing
NCWSP	National Community Water and Sanitation Programme
NDPC	National Development Planning Commission
POs	Partner Organisations
RCC	Regional Coordinating Council
RWSS	Rural Water Supply System
SDGs	Sustainable Development Goals
UCs	User Committees
UN	United Nations
UNDP	United Nations Development Programme
WASH	Water Sanitation and Hygiene
WATSAN	Water and Sanitation
WD	Works Department
WHO	World Health Organisation
WSMTs	Water and Sanitation Management Teams

CHAPTER ONE

INTRODUCTION

Background to the Study

Water is central to humanity's social and economic existence (Agnew & Woodhouse, 2011); therefore, ensuring that it continues to flow uninterruptedly has become a critical issue in the development discourse. Water is a foundation of life and livelihoods, and it is important for sustainable development. Lack of or inadequate access to safe water is a form of deprivation that threatens life, destroys opportunity, and undermines human dignity globally (UNDP, 2006). Sustainable water supply serves as a footing for the achievement of SDG 6, which is to ensure availability and sustainable management of water and sanitation for all. According to the study by Guppy and Anderson (2017), 40% of the world's population will live in water-stressed areas by the year 2035. According to UNESCO (2018) 2.1 billion people lack access to safely-managed drinking water services. It further reports that, if efforts are not made to correct the situation, the water gap between demand and availability will increase by the year 2030. This impending development danger demands the continuous engagement of stakeholders for immediate solutions.

Although Ghana achieved 87% safe drinking water access, which exceeds the country's Millennium Development Goal (MDG) target of 78% (WHO, 2015), about 38% of the population in rural communities and small towns in Ghana are not served with potable water supplies (GWSSDP, 2014). However, there was an improvement from 30% in the 1990s to about 64% in 2015 (CWSA, 2015). Continued water supply deficit has been attributed to

technical and institutional factors (Asingwire, 2008; Mugumya, 2013; Starkl *et al*., 2013). Moreover, the study by Hirsch (2006) reports that, most of the water management problems and issues remain highly local and contextual. Therefore, in the attempt to solve the problems, an increasing body of water management literature encourages inclusion and participation of the local community (Carlson & Sandström, 2008; Marshall, 2008; Meinzen-Dick, 2007; Seixas & Davy, 2008). This has led to major technical and institutional reforms in the provision and the management of community water resources.

The discourse on the best practices for the provision and management of water systems to meet the needs of the world's growing population dates back to the 1970s. The first major conference by the United Nations (UN) in 1977 on water resource was convened in Mar del Plata to deliberate and take initiatives on clean water provision (Salman, 2014). The conference was aimed at making clean drinking water accessible to communities. The conference declared the period 1981-1990 as the first International Decade for Clean Drinking Water. This was followed-up with successive conferences and declarations. Subsequently, participants at the 1992 International Conference on Water and the Environment in Dublin recommended a set of principles that promoted the concept of water as an economic good as well as a social good that should be managed at the lowest possible level (Nayar & James, 2010).

This has evolved into three management principles for water provision over the years, specifically first the state as a stakeholder, second the involvement of the market (Bakker, 2003 & Page, 2005) and third the community. According to the Dublin Conference, to manage water as an economic good, consumer demand must guide project investment decisions.

Specifically, projects should adopt clear and transparent measures that allow users to select the level of service, technology, and location of facilities that best fit their needs, with a clear understanding of the costs and responsibilities of the alternatives. The major milestone in the evolution of rural water supply and sustainability of systems started from the shift from the supply-driven approach (SDA) to the demand-responsive approach (DRA)

Since 1977, there have been several reforms of water supply systems at the global level which has influenced national water policies. Reforms in the water sector have taken place in various developing countries, such as Ghana (Braimah & Fielmua, 2011), India (Gopakumar, 2010), Zambia (Chitonge, 2011), Malawi and Tanzania (Mathew, 2005), Zimbabwe (Kujinga & Jonker 2006; Derman & Hellum 2007), Ethiopia (Lenaerts *et al.*, 2013), Burkina Faso, and Mali (Cherlet & Venot, 2013) and South Africa (Goldin, 2010). The results of the water policy reforms are a mixture of successes and failures (Asingwire, 2008; Mugumya, 2013; Nakano & Otsuka 2011; Nkonya *et al.*, 2008; Fielmua, 2011; Chitonge, 2011; Lenaerts *et al.*, 2013).

The global reforms presented Ghana the opportunity to improve its water sectors to increase rural water supply coverage. The Government of Ghana (GoG), in line with the shifting trends, initiated a review of its policies on water and sanitation provision to keep pace with the changing trends at the global level. In 1987, a donor conference on water and sanitation was held in Accra, Ghana. Subsequently, in February 1991, participants from Sector Institutions and External Support Agencies (ESAs) met at Kokrobite in Ghana, for a workshop to prepare the foundation for the Rural Water and Sanitation Sector Strategy (Boateng & Kendie, 2015).

The National Community Water and Sanitation Programme (NCWSP) was initiated in 1994, in line with the decentralisation policy (Braimah & Jagri, 2007). This led to the creation of the Community Water and Sanitation Division, a semi-autonomous unit, under the then Ghana Water and Sewerage Corporation (GWSC), to manage rural water and sanitation delivery. After four years of existence, autonomy was granted the Division to give greater motivation to its work. The Division was transformed into the Community Water and Sanitation Agency (CWSA) by an Act of Parliament, Act 546, in December 1998 (Constitution of Ghana, 1992), with the mandate to facilitate the provision of safe drinking water and related sanitation services to rural communities and small towns in Ghana (CWSA, 2016). The CWSA has since been facilitating the implementation of the National Community Water and Sanitation Programme, through the decentralised structures at the Districts.

The Water and Sanitation Management Teams (WSMTs) are situated in the decentralisation policy, which is premised on the use of both the bottom-up and the top-down approaches in the management of rural water supply systems. The WSMTs are formed by the beneficiary community and trained by District Water and Sanitation Teams to manage rural water systems. The driving force behind the formation of the WSMTs is participation (Kendie, 1994). According to Gyau-Boakye and Ampomah (2003), Ghana's policy objectives on rural water supply reforms include, putting ownership and management of water supply and sanitation facilities in the hands of rural communities, strengthening the Community Water and Sanitation Agency to adequately address the water and sanitation needs of the rural population and

adopting strategies for ensuring water supply services to vulnerable groups such as poor rural communities and the urban poor.

Many countries in Africa, notwithstanding the many reforms, still remain with limited access to potable water supply. In several parts of Africa, especially sub-Saharan Africa, water supply is inadequate and dwindling (Obeta, 2013) and, in effect, it has the tendency to erode many years of development gains. A study by the Water and Sanitation Programme (2002) reported on water, sanitation, and hygiene as vital components of sustainable development and alleviation of poverty. The studies further emphasised that the continuous access to safe water has great potential for the improvement of public health.

Similarly, a study by Kendie (2002) and Cairncross and Feachem (2006) established a relationship between water, sanitation, and hygiene. There relationships between the source of drinking water supply and the incidence of waterborne and water-related diseases. The study by Arku (2010) cited that access to water enables women directly and men indirectly to save considerable time for other activities that supported their well-being. Varis (2007) maintain that the importance of water and sanitation for improved health, food security, and quality of life cannot be underestimated in development. Irrespective of the many benefits, providing safe drinking water to rural areas has not been met adequately due to many challenges.

Over the years, one of the persistent challenges of rural water supply is the poor operationalisation of institutional support to drive the work of user committees to ensure that drinking water facilities are provided, maintained, and managed in an efficient, equitable, and sustainable way. The study by IRC

(1997) indicated that the provision of potable water in rural areas is relatively moderate, but the appropriate systems for the sustainability of such water projects are difficult. This has resulted in the use of many strategies to manage rural water supply facilities.

According to Singh (2006), the water and sanitation sector is continuously developing and testing new strategies to help promote sustainable rural water supply and sanitation globally. The use of user committees is premised on the philosophy that users are better placed to sustainably manage their water systems. The use of user committee is also hinged on the participation theory. The participation theory has been used globally over the years to sustain rural water supply systems. The origin of participation may be traced to the fact that community water systems that were centrally provided and managed have proved unsustainable (World Bank, 1982, 1993, 1994).

The use of the participation theory for sustainable water supply emerged from the New Delhi Global Consultative Conference on Safe Water held in 1990 to review the International Drinking Water Supply and Sanitation Decade (Kwashie, 2007). The conference certified community management as one of the guiding principles for rural water and sanitation delivery (Najil & Edwards, 1991). The IRC (2004) report that the new framework for global water supply underscores that communities should not just be involved in system initiation, but should accept final responsibility for and ownership of the entire lifespan of the water system. According to Kendie (1994), since the 1990s, the community management approach has been institutionalised as a standard project management strategy for the development of rural water

supply and sanitation. This approach allows local governments to hand over some or all their control over the design, construction, ownership, and operation of water services (Segal, 2001) to ensure that local people participate fully in their water and sanitation.

According to the study by Daemane (2015), the importance of user participation has become an essential idea within contemporary development theory and practice. The participation theory maintains that rural people should participate in the decision-making processes of development projects, even if the projects are partly or fully funded by external agencies (Bock, 2001: Chambers, 1995). Perkins and Zimmerman (1995) report that, for effective participation to occur, it must be complemented with the empowerment of the participants; therefore, state institutions and development partners must make training, retraining, and education of user committees very extensive.

The mechanisms of participation grant power to individuals and groups to share their experiences and concerns, as well as to gain influence over conditions that matter to them (Fawcett *et al*., 1995). Therefore, the interaction between communities (both men and women), their environment and external agencies improve skills, critical political consciousness, and the capacity to influence their situation. This will support community members to realise their common interests and develop social relations (Brennan, Flint; Luloff, 2008) which supports communities to solve their water supply facility problems. Participation theory advocates the collective efforts of both men and women in development. However, Chachange (1991) argues that, in theory, men and women participate in water and sanitation projects equally at all

levels, but in practice, women still tend to be the implementers and men, the decision-makers at the community level.

The study by IRC (1994) demonstrates that men have traditionally been responsible for making decisions and have dominated the processes which affect the management of water supply. Similarly, the study by Dayal, Wijk-Sibesma, and Mukherjee (2000) cited while women are involved, the nature of their involvement, relative to that of men, is biased towards voluntary physical work, such as cleaning and greasing hand pumps and collecting payments. The study by Boateng and Kendie (2015) shows the marginalisation of women in rural water project planning and management. Men handle management decisions such as the use of collected payments. The study attributes it to the combination of both institutional feebleness and the culture of the people. Consequently, this has led to frequent breakdown of water projects.

Despite many institutional arrangements and reforms to solve the problem of unsustainable water supply systems, the non-functionality of rural water supply systems is very prevalent. The formation of institutions is extensively recognised as being central to the achievement of development especially water supply (Andrews, 2013; Jutting, 2003; Leftwich & Sen, 2010). Barley and Tolbert (1997) explain institutions as a web of values, norms, rules, beliefs and taken-for-granted assumptions. Casson *et al*., (2010) describe institutions as a matrix, where formal rules found in laws, regulations, and policies are embedded in and overlap with deep-seated social attitudes and values.

Although the rules, laws, and values are significant, without organised human support the instructions cannot work. It implies that effective application of the laws and values is dependent on the capacity of the human support in the institution. Shand (2015) reiterates that the power of institutions is manifest through human action, providing the structures for social interaction and behaviour. The philosophy that supports the use of institutions in this study is the institutional theory.

Institutional theory has become a very dominant perspective in organisational management (Greenwood, Oliver, Sahlin; Suddaby, 2008). Institutional theory has been extensively used to demonstrate the impact of institutions (Oliver & Mossialos, 2005). Continued scarcity of water in rural areas has been widely attributed to deficit institutional arrangements (Global Water Partnership, 2002; Mugumya, 2013). Institutions in natural resource management have consequently been dichotomised as either rational or socially embedded (Cleaver, 2002). The rational choice perspective refers to the standardised behavior, and the social refers to human behaviour that is dynamic and changes over time.

Water management systems are functional and effective when institutional frameworks are well organised and implemented. Institutional arrangements shape water-related decisions and water policies and drive behaviours related to water sharing and use (Hassenforder & Barone, 2019). The responsibilities lie in the interactive arrangements between the stakeholders in the organisation to solve water-related problems and create opportunities. Hence, water policies are highly dependent on institutional arrangements. Although Ghana has put in place an institutional framework for

sustainable rural water supply systems, water management at the community level is confronted with many challenges. Several communities that once jubilated over commissioned drinking water projects (Ball & Collin, 1991) have gone back to their past unsafe water supply sources.

Even though rural water management has been transferred to user committees (called in Ghana as Water and Sanitation Management Teams WSMTs) to reduce the challenges of rural water supply, there are still overwhelming challenges of poor user payment for water services (Fry, 1993), inadequate motivation of water and sanitation committee members (Kwashie, 2009), the persistence of poor hygiene and sanitation practices (Kendie, 2002), poor revenue mobilisation (Braimah & Jagri, 2007), low participation of women in water and sanitation projects (Boateng & Kendie, 2015), inadequate access to spare parts (Harvey & Reed, 2003), poor leadership and innovations (Kendie, 1994), no legitimate authority of user committees to enforce regulations (Bolt, Schouten & Moriarty, 2001), cultural barriers (Black & Fawcett, 2008), and poor participation of women as a results of low educational level (Evertzen, 2001).

Additionally, there are reported cases that many Water and Sanitation Management Teams are often slow in the repair of faulty rural water projects (Kwashie, 2009). The study also stated that user fees could not be collected, meetings are not held and records are not kept. Similarly, Scott (2001) maintains that water source areas are bushy and broken boreholes are not replaced. However, according to Kwashie (2007), user committees will improve in their work when they are motivated. Kwashie (2007), emphasised that, without motivation, the performance of WSMTs, in terms of ensuring

the proper handling of hand-pumps, hygienic practices at water collection points, obtaining an orderly collection of water fees, effective management of conflicts ensuing from water collection and sanitation at water sites will be difficult. These difficulties have largely affected the effective performance of WSMTs and rural water supply facility management. Researchers have become concerned with understanding the factors that support sustainable rural water supply systems (Kleemeier, 2000) and thus, the study was designed to contribute to the discourse on improving and sustaining rural water supply systems.

User Committees in Rural Water Supply Systems

Water is an essential and indispensable element of life (Brooks, 2007). It is a finite resource without an alternative, and upon which there is total dependence for survival (Salman, 2014). The failure to provide safe drinking water and adequate sanitation services to all people is one of the development failures. Social and economic development is closely tied to water; therefore, poverty is more prevalent in areas that face acute water shortage. Water-related diseases caused by unsafe drinking water and the absence of proper sanitation facilities are among the leading causes of death in the developing world (Salman, 2014; UNICEF/WHO, 2006). By 2050, one-fourth of the world's population is expected to live in countries with chronic water shortage, mostly in the Middle East, Africa, and parts of India and China (United Nations, 2010).

According to Mbata (2006) water has become one of the largest and certainly the most universal of all problems facing mankind in the 21st century. The study by Vásquez and Espaillat (2016) shows that, the

unreliability of water systems has become a major concern in many developing countries. There are varied challenges in the sustainability of rural water projects in developing countries. Cultural norms, local conflicts, misunderstanding, beneficiaries' perceived needs, personal qualities of project personnel, and poor technical decisions are among the most commonly reported (Schouten & Mariarty, 2003).

The International Resources Centre (1997, 2004) and Mugabi and Kayaga (2010) identified the inability to pay for water service as a challenge of rural water supply. IRC (2004) outlines two main causes of high default rates in the payment for the use of water by local people. The first was that there were frequently no institutionalised and regular procedures for funds collection. The second was that action against defaulters had never been taken seriously. After some time, those who had not paid for the use of water continued to enjoy regular service.

Water user committees never had the courage, authority, and legitimacy to prosecute defaulters. Community members who failed to pay the initial contributions toward the installation of the systems and those who continuously defaulted in the payment of water rates were not sanctioned and this had caused many other people to stop paying the levy. Evans (1992) argues that, rather than instilling in villagers a sense of ownership and responsibility, the raising of cash contributions, and provision of labour and local materials for the construction of the schemes convinced them that they had already paid a fair share of the cost. Hence, the government should, therefore, be willing to take on the longer-term responsibilities for operation and maintenance.

Rananga and Gumbo (2015) indicate full cost-recovery in rural areas is particularly problematic due to low incomes and the attachment of rural communities to their traditional and free sources of water supply. These are mostly small-scale subsistence farmers whose incomes are so low that it becomes difficult for them to pay for water services (UNICEF, 1990). In sustainable financing for rural water models in sub-Saharan Africa, Harvey and Reed (2007) noted that full cost recovery for rural water supply is an unrealistic goal because most of the rural communities cannot afford to pay for the capital costs in the context of communal models. For instance, a study to assess the cause of poor operation and maintenance of communal water supplies in rural Kenya by Rukunga *et al*., (2007) and a similar study in Tanzania by Maganga *et al*., (2002) agree that operation and maintenance of water supply costs are often incurred by the governments as hidden costs and result in constraints to expansion.

In water services, tariffs must be designed so that at least operation and maintenance costs (and preferably capital costs) can be recovered (Rodriguez, 2003). However, UC's are forced to adopt what Bannock at el., (1987) described as shadow pricing. This is a concept applied to situations where the actual price cannot be charged or where actual prices do not reflect the real costs of a specific activity. In other words, the committees are forced by the prevailing circumstances to charge lesser amounts that hardly covered high operational and maintenance costs in managing water systems (Va´squez, 2011). In many developing countries, system revenues seem insufficient to operate and maintain water infrastructure (Vásquez & Espaillat, 2016). As a

result, service interruptions have become more frequent which has made people to rely on unsafe drinking water (UNDP, 2006).

Unfortunately, for most of the rural water user committees, their inability to ensure an appreciable level of revenue management efficiency was compounded by the fact that almost all of them were unable to identify alternative sources of funding for ensuring sustained operation and maintenance management of their water supply systems (Kwashie, 2009). Kwashie (2009), furthermore, shows that there was considerable pressure on some WSMTs, especially those managing water projects in the Nkwanta District, to keep the rates for the use of improved water facilities as low as possible in order to stem the spread of guinea worm and other water and excreta-related diseases.

Kwashie (2009) further report that, water from boreholes provided by the Social Investment Fund through the District Assemblies was free, and so the people did not understand why they should pay for water from boreholes that they had contributed to its construction (Mugabi & Kayaga, 2010). Similarly, in a bid to eradicate guinea worm in the Nkwanta District, the Global 2000 Sasakawa Guinea Worm Eradication Programme felt that water provided by any external support should be free. The programme argued that this was the only way to stop the people from using water from the streams, ponds and rivers. The difficulty in this situation to the rural water supply is that community members might prefer a cheap alternative solution to their problem to an expensive one. Alan, McLaughlin and Kazooba (2015) maintain that, the leadership of rural water user committees is very critical in the success of user committees.

It is also argued that leadership in funds mobilisation, management and use is very important in rural water system sustainability. The study by Evans and Appleton (1993) revealed that, cash to cover maintenance costs could be raised from both inside and outside the community. External fundraising was found to be the motivating factor that led to high levels of performance in terms of revenue collection. This external fund mobilisation required strong leadership within the user committee and in the communities. Indeed, available literature on this has shown a positive relationship between strong leadership and enhanced performance by local organisations.

The study by Briscoe and Ferranti (1988), Evans and Appleton (1993), Kendie (1994) and UNDP (1998) shows that successful community-managed water supply and sanitation projects were those in which local committees had strong and innovative leaders who were able to enforce usage control rules and regulations, implemented their decisions, ensured transparency in handling community finances and adopted prudent administrative and financial management practices. The problem of commitment on the part of committee members is one of the challenges of rural water sustainability.

The fact that committee members preferred other social engagements to WSMTs activities implied that it was not possible for them to consider their personality values in the organisation or put communal objectives and interests above their personal ones (Kanter, 1969). This proposition, thus, questions the viability of the management of community-based development efforts by committees that work purely on a voluntary basis. Katakweba's (2001) study of the Arumera West Water and Sanitation Programme in Tanzania concluded that most projects based solely on voluntarism were not sustainable. Similarly,

Scott (2001) shows that projects based on volunteerism were often characterised by non-functional user committees, inability to collect fees, infrequent holding of meetings, and poor keeping and preservation of records. The inability to reward committees in monetary terms becomes evident in their determination, performance and functionality of the user committees.

Community compliance to water regulations has been a challenge in the management of rural water supply systems. The legal support for user committees to function within the framework of the constitution of states does not exist. There seems to be no legal or any definite policy framework that empowered rural water user committees to implement regulatory policies that enforce payment of user fees (Bolt, Schouten & Moriarty, 2001). Most WSMTs, therefore, had to depend on traditional authorities, unit and zonal committees and their representatives in the various Districts, as support structures, for their legitimacy to function effectively.

Thus, it was found that WSMTs operating in communities that had strong traditional authorities, proactive leadership of unit committees and influential District members that could offer support were able to ensure some appreciable levels of community compliance. Compliance was also found to be possible in communities, especially those in the North Tongu District, that had close-knit and kinship ties where clan and family heads and, indeed, their entire membership collectively had considerable influence on the behaviours of their members.

Inadequate collaboration and coordination among stakeholders contribute significantly to the failure of rural water projects. The available

literature on project management also indicates that stakeholders' alignment is important to improving the long-term success of any project (Freeman, 2010; Loucopoulos & Kavakli, 1995; Vaidya & Mayer, 2014). Jansz (2011) specify that, in spite of many factors that can influence long-term sustainability of water infrastructure, it is paramount that stakeholders work together effectively with transparent coordination.

Similarly, Pearce-Oroz *et al*., (2011) argue that inter-sector coordination contributes to sustainable water service, and closer alignment between local and national stakeholders is critical for this end goal of sustainability of rural water supply systems. The alignment and coordination are fostered and realised through the agreement between stakeholder values, which drive and unify stakeholder actions that are beneficial to project success (Luftman, 2003; Winn, 2001). Comparative to the study, are stakeholders such as the CWSA, DA, development partners, spare parts dealers, area mechanics and communities effectively coordinating for continuous water supply in rural Ghana.

Cultural norms that barred women from effective participation in water decision-making negatively affect sustained rural water supply systems. Culture cannot be concealed in the poor performance of user committees of rural water supply. To increase the sustainability of development projects amidst concerns for environmental conservation and equitable distribution of benefits, the global community has increasingly advocated the involvement of both men and women as equal partners in development projects (Were, Roy & Swallow, 2006). A World Bank review of 121 rural water supply projects concluded that women's participation strongly enhanced project effectiveness

and sustainability (Nishimoto, 2003). Gender relations are crucial to rural water project success, with women having primary responsibility for water management.

Men's and women's divergent social positions lead to differences in water use, water rights and access to water (Zwarteven & Meinzen-Dick, 2001). The ability of women to effectively manage water resources is compromised as men control land, finances, industry and government, and, thus, access to water (Crow & Sultana, 2002). Moreover, legal or formal water rights are usually vested in the presumed household heads, typically men. Exclusion of women is also common in water management structures from the local to the basic level that tends to be dominated by men, particularly, large-scale water users and administrative, political and economic elites (Guerquin *et al*., 2003).

Low female participation in water user committees, in terms of both quality and quantity, is reported for Kenya (Wambu & Kindiki, 2015), 121 rural water supply projects in developing countries (Narayan, 1995) and India (Prokopy, 2004). In Malawi, the sustainability of a government programme to supply water to 50 rural and peri-urban districts was at risk of collapse when male-dominated committees collected fees irregularly, failed to adhere to agreed times for opening and closing taps, and mismanaged funds collected. User groups and committees' meetings were rarely held, as most men worked away from their homes. The exclusion of women in the negotiation process, which is in accordance with local customs, became a major challenge to the Chesilot water project in Kenya (Were, Roy & Swallow, 2008).

To improve the management of water points, users were encouraged to elect 60 percent of women and 40 percent men to the water committees (Maharaji *et al*., 1999). At the same time, both men and women were sensitised on the benefits of involving women in committees. Under the new structure, project bills were paid on time, membership grew, meetings became regular and attendance at meetings increased substantially (Maharaji *et al*., 1999). Success in the Philippines Communal Irrigation Project was attributed to the integration of women in project operations. As in Malawi, the involvement of women in membership increased payment of fees, as women-controlled household finances (Nishimoto, 2003).

It is important to study the issues that affect rural water supply systems to ensure sustainable flow of water for improved welfare. The issues are institutional, technical and community based. A careful empirical study will help policy makers and implementers to have a better understanding of the prevailing issues on the sustainability of rural water issues in the study areas which can also be replicated in other areas.

Statement of the Problem

Regardless of the many reforms in the management of rural water supply systems, the issue of sustainability persists as a major concern. Although Ghana developed some approaches to promote sustainable rural water supply systems, an extensive attempt came through the National Community Water and Sanitation Programme (NCWSP). The programme is aimed at using WSMTs and other stakeholders to facilitate the sustainability of rural water supply systems. The WSMTs are set up by the community with the help of the Districts. The WSMTs work with the Districts, the Regional

Coordinating Council, the Community Water and Sanitation Agency and other development partners to ensure sustainable rural water systems.

The work of the WSMTs entails the collection of fees for water services, fixing minor repairs, keeping financial records, promotion of hygiene and sanitation, cleaning of water project site, organisation meetings and serving as a link between the community, development partners and the District on water and sanitation issues. The Districts, the Regional Coordinating Council, the Community Water and Sanitation Agency, spare parts dealers, area mechanics and development partners provide administrative, technical and financial support to the WSMTs. This is done to build the capacity of the WSMTs to support sustainable rural water system development and management.

Despite this institutional arrangement to support sustainable rural water delivery, not much progress has been achieved on the reliability of rural water supply systems in the Eastern Region of Ghana. Table 1 shows the rural water coverage in the Region.

Table 1: Rural water coverage in the Eastern Region of Ghana

Study Areas	No of Comm.	BHs	Not working BHs	Total Rural Popn	Rural Popn served	Unserved rural popn	% of unserved popn
Akuapem North	234	98	39	92,358	46,467	45,891	50
Upper Manya	282	203	98	174,971	77,328	97,643	55
Kwahu Afram Plain North	184	94	37	91,433	39,323	52,110	56
Kwahu Afram Plain South	134	160	47	104,272	57,445	46,827	45
Kwahu East	106	102	30	63,710	27,700	36,010	56
Kwahu South	97	73	15	73,086	28,492	44,594	61
Kwahu West	102	97	25	9,8413	47618	50,795	51
Lower Manya Krobo	76	32	12	51,533	25162	26,371	51
New Juaben	44	27	9	25,775	7,326	18,449	71
Nsawam Adoagyire	66	35	12	23,529	15,664	7865	33
Upper West Akim	282	203	78	174,971	77238	97,733	55
Suhum	126	92	32	60,364	32,609	27,755	46
West Akim	75	95	38	55,576	28,671	26,905	48
Yilo Krobo	239	142	78	113,890	62,961	50,929	44
Akuapem South	100	57	21	42,244	26,567	15,677	37
Akyemansa	92	155	76	97,135	63,259	33,871	35
Atiwa	116	205	85	171,885	109,475	62,410	36
Ayensuano	179	124	45	75,314	35,245	40,069	53
Birim Central	125	111	25	95,343	55,237	40,106	42
Birim North	86	135	32	69,439	53,126	16,313	23
Birim South	117	129	40	110,763	75,784	34,979	31

Table 1 Cont'd

Dekyembour	132	112	23	131,944	87,230	44,714	33
East Akim	136	160	57	116,811	82,627	34,184	29
Fanteakwa	147	188	77	106,614	64,288	42,326	40
Kwaebibirem	100	122	59	103,242	60,409	42,833	41

Source: CWSA, (2016)

The Eastern Region, in 2013, had rural water coverage of 57.29%, and this increased to 57.62% in 2014 and reduced to 57.29 in 2016 (CWSA, 2017), which is below the national average of 65%. The rural water deficit in the Eastern Region shows that the region may not achieve the Sustainable Development Goal 6, which aims to ‘‘ensure availability and sustainable management of water and sanitation for all by the year 2030’’.

From Table 1, The Akuapem North Municipality and the Upper Manya District are among the top 10 Districts with the highest non-functional boreholes. Out of the 98 boreholes in the rural communities of the Akuapem North Municipality, 39 are not operational, which has denied additional 45,891 people access to clean water. Equally, out of 203 boreholes in the Upper Manya District, 98 are not working, which has also deprived additional 97,643 people access to clean water. The accumulated effect of the poor rural water coverage shows that 42.71% of the rural people in the Eastern Region lack access to clean water (CWSA, 2016). Consequently, the Ghana Health Services Report (2016) maintained that, water-related typhoid fever and diarrhea are among the top 10 morbidity cases in the study areas.

This study sought to evaluate the effectiveness of the Water and Sanitation Management Teams (WSMTs) and the supporting arrangements responsible for sustainable rural water supply systems in the Eastern Region of Ghana. The study used the formative evaluation approach. The evaluation focuses on the approved institutional processes and outcomes of the WSMTs and the supporting arrangements at the national, regional and District levels. The study precisely examined how the WSMTs and the backing institutional arrangements are working to achieve the objectives. Specifically, the study

was conducted in some rural communities in the Akuapem North Municipality and the Upper Manya District of the Eastern Region of Ghana.

Objectives of the Study

The main objective of the study was to assess the Water and Sanitation Management Teams (WSMTs) in sustaining rural water supply systems in selected Districts of the Eastern Region. The specific objectives were to:

i. examine the institutional support for sustainable rural water supply systems.
ii. assess the extent of community participation in the management of the water systems.
iii. analyse the performance of the Water and Sanitation Management Teams in the management of the water systems.
iv. make policy recommendation for sustainable rural water supply systems

Research Questions

Based on the research problem and the objectives of the study, the following research questions directed the study:

i. What are institutional supports for sustainable rural water supply systems?
ii. To what extent do community members participate in the management of the water systems?
iii. What is the performance of the Water and Sanitation Management Teams (WSMTs) in sustaining rural water supply systems?
iv. What are the policy recommendations to improve sustainable rural water supply systems?

Justification for the Study

Water-related issues such as the sustainability of water systems have become very topical. With this concern, community participation and institutional support have become a necessity for the sustainable management of rural water supply systems. Appropriate management of water systems is very important, considering the hazards posed when rural water systems are non-functional. Hence, the study will provide systematic scientific evidence to improve the management of rural water supply systems for uninterrupted water supply.

The stakeholders such as the CWSA, Regional Coordinating Council (RCC), Works Department (WD), Metropolitan, Municipal, and District Assemblies (MMDAs), user committees, Development Partners (DPs) and other interested investors in the provision of sustainable rural water supply must interdepend to ensure sustainable delivery of rural water supply. Effective participation of the major stakeholders must be considered in rural water policy preparation, implementation, and management.

The effective performance of the institutional framework is as important as the material outcomes of rural water projects. The refusal of rural water supply institutions to comply with the sector arrangements and strategies are major issues. All stakeholders must apply the defined standards of the rural water supply institutional arrangements. Where necessary, feedbacks and experiences from stakeholders can be used to improve the existing standards of sustainable rural water supply. Guidelines and policies can also be reviewed based on feedbacks and experiences to ensure that they serve the purpose of

current water users and help respond to challenges of contemporary sustainable rural water system.

Gaps exist between institutional arrangements and the participation of local people in the management of rural water systems. The use of the participation theory and the institutional theory in the study provides knowledge and explanations on how they can be harnessed to achieve sustainable rural water supply systems. The use of the theories contributes to a better understanding of the factors and problems related to sustainable rural water supply from the viewpoint of institutional arrangement and participation. The use of the institutional and the participation theory presents the medium for effective evaluation of WSMTs to determine to what extent are their objectives achieved.

Organisation of the Study

The thesis is organised in six Chapters. Chapter One introduces the problem being investigated. It provides a description of the background information to the study problem, highlighting the research problem, objectives of the study, research questions, justification for the study, and the organisation of the research. The chapter discussed the water discourse in the development agenda. It focused on global debate and discussion on how water evolved into the global development agenda. Ghana's perspective on the evolution of water in its development process is discussed. This section also discussed community participation and ownership of the rural water supply system. Chapter Two discussed the literature review, which comprised theoretical underpinning of the research and empirical review. The review covers empirical reviews to gain understanding of the user committees,

participation, water and sanitation issues, gender in water management, and institutional issues aimed to improve and manage rural water supply.

Chapter Three examined the research methods of the study. It comprised of the description of the study area, description of rural water supply system in the Districts, research philosophy, research approach, study design, target population, sample size and sampling approach, sources of data, data collection instruments, data collection procedure, data processing and analysis, pre-testing of data collection instruments, limitation of the study and ethical consideration. Chapter Four assessed institutional support for the the sustainability of rural water supply. The Chapter describes the institutions at the District Assembly and the local level in rural water supply system management. With regards to institutions, it focused on the Community Water and Sanitation Agency (CWSA), District Water and Sanitation Teams, the Works Departments, and the Water and Sanitation Management Teams (WSMTs).

Chapter Five focused on the performance of the rural water supply management and participation of the community. It examined the performance of the institutions for sustainable rural water supply systems in the region It assessed community participation in the management of rural water supply systems. The chapter highlights the interaction between the CWSA, RWST, DWST and the WSMTs within the decentralisation policy. Technical issues in rural water supply, for example, how major repairs, training, and retraining, hygiene and promotion, and the supply of spare parts are discussed. How local lessons and experiences are used for contextual improvement of services is also discussed.

The chapter further aassessed the performance of Water and Sanitation Management Teams in the management of rural water systems. The chapter assessed the work of the WSMTs in recordkeeping, operation and maintenance, sanitation, and hygiene promotion, organisation of meetings, information dissemination, broad-stakeholder consultation with community members in decision-making and revenue mobilisation. Chapter Six presents the policy recommendation of the study to improve rural water supply system management. The chapter focused on the summary, conclusions, policy recommendations, contribution to knowledge, limitations, and areas for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter explores the relevant literature to position the research from an empirical perspective. Review of literature is the process of searching and discussing issues based on what others have done on the phenomenon (Amfo-Otu, 2018). The section critically reviews important current debates, theories, and concepts underpinning rural water supply systems and their implications for sustainable rural water supply. Debates on global and local perspectives on the changing trends of rural water management are documented in the review. Other pertinent issues in the sustainability of rural water supply are discussed in the empirical review. Based on the theories and empirical studies reviewed, the conceptual framework for the study is developed in the chapter.

Theoretical Perspective

This section focuses on the theories that underpin the study, specifically the participation theory and the institutional theory. This section explains how researchers have used the participation theory and the institution theory to describe the phenomenon under study and other water related issues.

Participation Theory

The participation theory has become one of the most discussed theories and practices in development. The inclusion of people in development is the basis of the participatory theory (Daemane, 2015). The utilisation of citizen involvement mechanisms to address social problems has become more common (Kaufman & Poulin, 1996). Participatory approaches to development

received scholarly discourse due to the growing backlash against top-down approaches (Volger, 2003), because of its propensity to solely focus on professional and scientific expert knowledge. Recently, a range of participatory methodologies and tools were developed specifically for rural water supplies (Bolt & Fonseca, 2001; Dayal, Wijk-Sijbesma, & Mukherjee, 2000; Deverill, Bibby, Wedgood, & Smout, 2002), often becoming part of the standard intervention model for organisational implementation of projects.

Discussion, data sharing, and creating space for people to express their opinions have been found to be the main practice of the participatory discourse. The participation theory varies with its application and definition. The way participation is defined also depends on the context in which it occurs. It might be principle, practice or an end in itself. The participatory approach to development basically allows the local community and local players to express their views and to help define the development course for their area, which is in line with their views, expectations, and plans. Participation as collective efforts to increase control over resources and institutions on the part of groups and movements of those hitherto excluded from control. Community development demonstrates a social process resulting from citizen participation (Corcoran, Pettinicchio; Young, 2011; Hornsey *et al*., 2006).

Through citizen participation, a broad cross-section of the community is encouraged to identify and articulate their own goals, design their methods of change, and pool their resources in the problem-solving process (Harrison, 1995). It is widely recognised that participation in government schemes often means no more than using the service offered or providing inputs to support

the project (Smith, 1998). This is contrasted with stronger forms of participation, involving control over decisions, priorities, plans, and implementation or the spontaneous, induced or assisted formation of groups to achieve collective goals (Arnstein, 1969; Cohen; Uphoff, 1980). Table 2 shows different definitions of participation which include variables such as influence, control, benefits, redistribution of decision-making powers, evaluation, and empowerment attained from the user committee's involvement in all phases of the development process.

Table 2: Definitions of participation

Citation	Definition of Participation
Cohen and Uphoff, 1977	Involve people in decision-making processes, programme implementation, benefit-sharing, as well as evaluation of development interventions.
Conyers, 1981	Means for getting information about not only local conditions but needs and attitudes as well. It involves eliciting beneficiary commitment to the process.
Paul, 1982	A process in which beneficiaries are actively involved in influencing the direction and effecting of a development project. This is done to enhance people's well-being with regard to income, personal growth and self-reliance.
Narayan, 1995	A voluntary process in which people of all groups, including those marginalised in income, education, ethnicity, gender and decision-making, exercise voice and choice.
Blackburn *et al*., 2000	Participation means creating conditions for people to realise their right to participate in and access to information for the decision-making process.

Source: Adapted from Kumar, (2002)

The arguments that support participation in development are many. The notion that development policies and practices premised on beneficiaries

is more likely to meet the interest of the primary stakeholders. Fung and Wright (2001) set out the reasons why participation is important:

i. They convene and empower individuals close to points of action who possess knowledge about relevant situations.
ii. Citizens or street-level bureaucrats may also know how to best improve the situation.
iii. Create the possibility of generating better solutions over more hierarchical and less reflective aggregation procedures and create heightened commitment because they are not imposed from above.
iv. Shorten the feedback loop between decision, action, effect, observation, and reconsideration.
v. Because there are multiple command points, they allow discovery and diffusion and the learning capacity of the system as a whole can be enhanced.

Community empowerment is very important in the delivery of the necessary output of local people. The capacity of the local people to take charge of responsibilities at the community level after the exit of the outsiders is considered very important. This is mostly achieved when the outsiders are able to empower the user community on the project. Brager, Specht and Torczyner (1987) cited participation as a means to educate citizens and to increase their competence for the required results. According to Christens (2012), there should be capacity building and a deliberate redistribution of power to the have-not citizens.

This supports Rahman's (1995) view that participation is the exercise of people's power in thinking and acting, as well as in controlling their action

in a collective framework. Castelloe and Watson (2000) report that, for effective participation to occur, individuals, families, or communities must accept responsibility for their welfare and develop a capacity to contribute to their own and the community's development. It demands community and developmental organisations and local governments to work with the purpose of influencing decisions that affect the community (Roodt, 2001). The ability of local people to control the participation processes is very important.

Khazaei, Elliot and Joppe (2015) explain stakeholders must influence and share control over development initiatives, and the decisions and resources which affect them. However, in most development projects, the project sponsors are not passive facilitators of local knowledge production and planning. At the most basic level, project staffs own the research tools, choose the topics, record the information and abstract and summarise according to the project criteria of relevance. Discourses of participation are strongly influenced by institutional arrangements. Institutions help to formalise mutual expectations of corporate behaviour.

The study by Babajanian (2008) indicated social and informal community institutions as very important in participatory development approaches. In participatory approaches to improve rural water management, institutions (for example, WSMTs) are seen as very important. Institutional inclusion has become an integral part of participatory approaches. The institutions ensure efficient delivery of development, the inculcation of desirable characteristics among participants (responsibilities, ownership, cooperation, and collective behaviour) and empowerment. In recent years, participation theory has received many criticisms and reviews (Nelson &

Wright, 1995). The criticism is focused on the technical limitation of the approach and stress the need for re-examination of the methodological tools used, and those that pay attention to the theoretical, political and conceptual limitation.

Participatory approaches are presented as flexible and continuously evolving in the light of societal problems of application and adapting to a specific context. Cleaver (1999) report that, participatory development is justified as it ensures efficiency and effectiveness of investment and contributing to empowerment and democratisation. However, there is little evidence of long-term effectiveness of participation materially improving the lives of the poor or as a strategy for social change (Arboleda, 2015). The preposition that participatory development will bring about transformation has also been criticised by Kumar (2002). In furtherance, whether participation is a means or an end and the applicability and the appropriateness of the tools used have also been questioned by Nelson and Wright (1995).

The criticisms of participation have become more vehement that participation is referred to as another form of dominance to make the vulnerable think that they are making the decisions (Rahman, 2007). At the height of the criticisms, participatory development has been likened to tyranny (Cooke & Kothari, 2001). A cursory review of literature on participatory development revealed many studies on techniques as the solution to locally-based development. This technique-based participatory-accepted view is increasingly being subjected to critical analysis (Mosse, 1995; Goebbel, 1998). A technique-based approach fails to adequately address issues of power, control of information, and other resources. According to Agamben (2009),

participatory development is now an internalised part of life and has become the mentality of government (Foucault, 1998; Lemke, 2001).

The purpose for participation is determined by the government outside the realm of community concerns. This is evident as the requests for the formation of User Committees (UCs) are imposed to mobilise the local people towards goals planned externally. This is reiterated by Kendie and Abane (2001) as the creation of water user committees was not a voluntary action raised from the people's awareness of a problem. Development agents' methods control the core objective of participation, which defeats the premise advanced by Turner (1968) and Chambers (1983) that participation gives autonomy to participants.

The political willingness to involve user communities is very important in the maintenance of rural water projects. A study by Commonwealth Foundation (1999) in over forty (40) countries found a growing discontent with their government on the part of citizen's absence in participation. According to Brown and Chin (2013), there is a symptom of a lack of deeper weakness of public commitment to local participation in development. A power relation in the creation of participation space is very important in participatory development. Many observers of the participatory practice argue that the process has tended to be coercive (Cooke & Kathari, 2001) because practitioners resist giving up their authority to direct change (Pottier, 1997).

Additionally, Cornwall (2002) and Brock *et al*., (2001) suggest a continuum of spaces which include closed space (decisions are made by a set of actors behind closed doors without broadening the boundaries for inclusion), invited space (those that users or citizens are invited to participate

by various author-organisations), and claimed or created space (the space which are claimed by less powerful actors from or against the powerful holders or created autonomously by them). Cornwall refers to the created space as 'organic' space which emerged from a set of common concerns and popular mobilisation around identity.

The spaces exist in dynamic relationships with one another and are constantly opening and closing through struggles for legitimacy, resistance, co-optation, and transformation. Having a voice clearly depends on more than getting a seat at the table. In participatory arenas in which experts are present, even the well-equipped middle-class layperson may end up feeling intimidated because, according to Freire (1972), local people have internalised discourse discrimination. They barely imagine themselves as actors, let alone agents.

To conclude, participation has become an act of faith in development, something we believe in and rarely question. However, participation in development should have an in-depth investigation so that local communities are not used as human software through which investment can be made with the least local opposition. The success of participatory development for the sustainability of rural water projects should be evidenced on the rightness in the approach, process and outcome (Hardina, 2006). The development and growth of countries depends on their understanding of and responsiveness to the needs of the local communities

Personal dialogue, discussions, and shared decision-making are crucial. The prescribed approaches, their applicability in a different cultural context and the role of the informal personal relations in local decision-making processes are necessary. The non-contextual and universal nature of

participatory techniques and methods pose a serious impediment to the positive outcomes of participation (Pippard & Bjorklund, 2003). The international covenants define indigenous people as distinct and unique (ILO, 1989; UN, 2007; UNPFII, 2004, 2006); therefore, rural water supply planning approaches involving the locals should be distinct and unique as well.

Institutional Theory

Institutional theory is derived from the conviction that institutions matter in influencing organisations' outcomes. Institutions are important as they are active in setting up a context in which actors can conduct a relatively higher proportion of positive-sum bargains. Institutions provide guidelines and resources for acting as well as prohibitions and constraints on the action (Scott, 2001). The institutional theory deals with how the institutional environment affects organisational behaviour. The past years have seen a major reaffirmation of institutional theories in many fields of development. There has been an increase in the appreciation of the institutional theories and their applications in economics (Alston, Eggerston & North, 1996; Khalil, 1995; North, 1990) and in sociology (DiMaggio & Powell, 1991; Scott, 1995; Zucker, 1987). There has been a revitalisation of institutional approaches to the basic questions in these disciplines.

From the perspective of water, Koppen *et al*., (2007) describe a rural water system failure as unable to recognise and build upon existing community-based water laws, structures, and practices governing water. The study cited this failure negatively affects management of water resources. The failure to engage with these laws and institutional structures whilst attempting to replace them with institutions inappropriate to community context actually

represents a missed opportunity to improve water resource management and alleviate poverty (Van Koppen *et al*., 2007). The study by Sokile *et al*., (2003) mention several other studies support the view that traditional institutions, laws, and management practices may provide a more realistic starting point for achieving democratic, equitable and efficient resource management.

Institutional theory is divided into three schools of thought; these are the rational choice institutionalism, sociological institutionalism, and historical institutionalism (Hall & Taylor, 1996). According to Scott (2008), the three schools of thought are categorised based on three pillars: regulative, normative, and cultural-cognitive. The regulative is premised on rationality; the normative focus on the accepted norms and values, and the cultural-cognitive is based on culture and logical actions. Hall and Taylor (1996) maintain that rational choice institutionalism has fixed and pre-defined sets of preferences and behaves strategically to achieve targeted objectives. Individuals have precise and ordered knowledge of their responsibilities.

According to Ostrom (1990), the rational choice emphasised the role of institutions in limiting the actor's choices, while allowing them to express their views. Institutions are rules that guide the actor's calculations and make their behaviour predictable by playing on incentives and sanctions (Tsebelis, 2002). In rational choice, changes occur when actors feel that the change will maximise their utility and reduce cost (Alley, 2001). It analyses action situations or core patterns of repeated interactions and the rules that affect them. The rational choice may focus on who makes decisions; how decisions are made, the rules used to allocate resources, the rules governing the organisation, rules enforcement, and prescribed sanctions. From the

perspective of rural water supply, the rational choice refers to the practices that govern stakeholders from the national level to the local level on prescribed rural water practices.

It focuses on instrumental production systems and institutional policies to control and manage rural water supply systems. The rational choice of institutions is mostly from the formal organisations that are formed on the basis of science or rationally-prescribed ways of doing things. In Ghana, the documented functions of CWSA, the regional office of CWSA, DWSTs, Development Partners (DPs), area mechanics, and WSMTs are prescribed in CWSA (2016).

The prescribed rational performance indicators determine whether the stakeholders in the rural water supply sector are performing to expectation or not. Additionally, monitoring and evaluation of the rural water supply organisation are also done alongside the scientific performance indicator in the policy document that is formed. However, well-defined policy responsibilities make it difficult to account for issues that are external to the policy, for example, the subjective issues that cannot be measured scientifically.

The sociological institutionalism explains institutional forms and procedures in cultural terms. It represents an attempt to renew the knowledge developed by the sociology of organisations. It explores the cognitive processes and cultural dimensions. Sociological institutionalists follow a variant of the “cultural approach” and apply a broad definition of institutions, which tends to include culture itself as a form of institution. Institutions are systems that regulate and organise the relationship between individuals. Institutions must highlight the cultural perspective patterns of institutions. This

approach has been criticised because too much weight is put on cultural patterns. His cultural analysis is limited to value-orientation (Scott, 2008). The sociological dimension of rural water supply is premised on the community norms and values that used to support or complement the rational choice to ensure the maintenance of water supply systems. These norms and values are passed on from generation to generation, and modified or changed from time to time. Any policy direction on rural water supply must ensure proper integration of the sociological aspect for successful planning and implementation.

Historical institutionalism defines institutions as the formal or informal procedures, routines, norms and conventions embedded in an organisational structure. Historical institutionalism suggests that, to understand the emergence of an institution, one must analyse its historical and path dependence phenomena (North, 1990; Pierson, 2000). Their studies further argued that past decisions can influence present and future actions. For example, water reforms are influenced by past water rules by formal or informal institutions of the state and the community. A study by Font and Subirats (2010), report that, the historical approach is relevant in analysing water-related institutional arrangements. The historical institutionalism is premised on both rationality and subjectivity. It applies the use of both the prescribed procedures and cultural approaches.

It uses the application of formal policy documents of operation and the undocumented norms and values of beneficiary communities to ensure the representation of stakeholders' ideas for the sustainability of RWSS. The strength of historical institutionalism is evidenced by the fact that it combines

positivism with subjectivism. The subjective aspect brings in the voice of the community members to complement the scientific methods. This can guarantee the continuous modification of rural water policy documents that will meet contemporary community situations for effective results or outcomes. The main ideas and views of the institutional theory have been summarised by Mahoney and Thelen (2010), in Table 3.

Table 3: Main Focus and Views of Institutional Theory

	Historical	Rational choice	Sociological
Focuses on	. Major institutions . Long term . Formal rules	. Collective action dilemmas . Different levels of rules . Formal and informal rules	. Informal institutions, norms of behavior . Cultural aspects
View on institutional structures	.Relatively stable and persistent . Influence and are influenced by power inequalities	. Rules that contribute to the calculation of actors and make their behaviour predictable by playing on incentives and sanctions	. Self-reproductive .Tied to code appropriateness .Taken for granted by actors
View on institutional change	. Path dependence . Paradigm shift . Important change due to a change in the structure of policy ideas or to an accumulation of small endogenous changes	. Strategic interactions . Actors maximising their utility	. Driven mainly by exogenous causes . New actors imposing their preferred alternatives . Institutional logics reproduced across policy domains and geographical areas

Source: Mahoney & Thelen, (2010)

Over the years, scholars have raised many criticisms against the institutional theory. From the contestations, it is clear that each of the schools of thought on the institutional theory has its weaknesses and could benefit from a greater exchange with the others. The rational choice theory, which is based on positivism, has received its share of criticism. The rational choice has developed a precise relationship between institutions and human behaviour. However, this model rests on rather simplistic assumptions about human action, focusing on rationality, instrumentality and strategic calculation. It, therefore, misses the important dimension of human behaviour such as social norms and values.

Primarily, concerning the assumption that actors seek to maximise their interest when making choices, critics argue that actor preferences are not necessarily utility-based and that socialisation of actor's play, at least an important role as their calculated interest. Rational choice theory of its vision of the community ignores issues related to power and the politics of natural resources in local communities. Lejano, Ingram and Ingram (2013) have outlined the need to take into account networks, narratives and processes of knowledge creation in application of the rational choice theory.

Some criticisms have also been leveled against the sociological school of thought. From a rational-choice neo-institutionalist perspective, sociological neo-institutionalism is seen as over-homogenising the ways of thinking and the representations and actions within organisations. However, one of the major weaknesses of this approach is the broad definition of institutions, which makes the empirical application of the concept difficult. The basic similarity in all institutional theoretical claims is that something

which is identified at a higher level is used to explain processes and outcomes at lower level of analysis (Amenta, 2005; Clemens; Cook, 1999). The sociological school of thought is of little assistance, explaining the change from outside the institutions. A number of theorists point out that the institutional theory does not fully explain the broader view of the micro-processes inside organisations or why organisations influence and react to their environment (Hirsch, 1997).

In conclusion, the strength of the institutional theory is that it seeks to make sense of the organisation as part of complex social systems. The linkage between institutions and performance is indisputable. But how institutions contribute to performance is important to identify and assess the need for institutional change depending on the current levels of performance. Institutions being rules and role structures, practices and norms, do not perform, or effect performance; it is the management or the people in an organisation that actually affect performance.

The literature on institutional theory is relevant for rural water policy and managers, as it allows them to develop a fine understanding of what water institutions are and how they evolve over time to ensure the sustainability of the water supply system. The ideal practice for rural water supply system (RWSS) management must be based on the rational choice, sociological and the historical institutionalism. This gives the WSMTs and other rural water stakeholders the chance to operate both on formal and informal procedures to sustain rural water supply systems. The use of the three categories of institutionalism integrates their advantages for sustainable management of the rural water systems.

The institutional theory and the participation theory play very important roles in the management of rural water supply systems. Since human beings make institutions functional, it is important the human resource must be educated and empowered to function effectively. Effective participation of the human resources improves the outcomes of institutions. The operational involvement of the people in the institution from the bottom to the top and from the top to the bottom provide helpful institutional environment for success.

Empirical Studies

Over the years, participation and institutional theories have become essential with contemporary development issues. In this study, the two theories were used to explain how participation and institutional arrangements can influence the achievement of sustainable rural water supply systems. According to the study by Wallace and Wolf (2006), what is recognised as data, and the way the data is analysed and interpreted must be grounded in empirical studies.

A study by Tadesse *et al*., (2013) used both the institutional and the participation theory to explain rural water supply management and sustainability. The study is titled, Rural Water Supply Management and Sustainability: The case of Adama Area, Ethiopia. The study used both quantitative and qualitative research methods. The main objective of the study was to explore rural water supply systems with the case study in the Adama area, in central Ethiopia. Focus group discussions and key informant interview were used for the study. The participants were selected randomly. Both quantitative and qualitative data were collected and analysed.

Four sample water schemes were selected and a total of 148 (63 were female) representatives of households were selected for the study. The study assessed issues such as community participation, water committee empowerment, management and governance of water supply schemes, women participation, functional status of water supply schemes, sanitation and hygiene issues, external support, and monitoring system of water supply schemes.

The finding of the study indicated that community participation in planning and implementation was very good however monitoring mechanisms of operation and management was poor. Community participation in the choice of technology was poor. The water schemes were located at reasonable distances, less than 2 km in most cases and the time taken for a round trip to fetch water from the source was less than or equivalent to 30 minutes in most cases, however, the queuing time was more than an hour. The finding reports inadequate water supply as only about 15% of the beneficiaries could get 20 liters of water per day. The water sources were exposed in many cases to human waste, wildlife, livestock, and uncontrolled flooding. Sanitary practices in the study areas were poor as only about 3.4% had ventilated and improved pit latrine and open pit and/or open field defecation were widely practiced.

The study by Braimah and Fielmua (2011) explained the influence of Community Ownership and Management (COM) on water supply systems. The study was hinged on the participation of relevant stakeholders in the sustainability of access to rural water and sanitation. The purpose of the study was to assess the main issues and prospects of COM as a strategy for improving sustainable access to rural water and sanitation in the Nadowli

District of the Upper West Region of Ghana. Qualitative method was used for the study. Focus group discussion was used for data collection. The purposive sampling was used.

The main issues in the study included community participation, access to spare parts, effectiveness of water and sanitation related institutions, economic situation of the people, and availability of alternative sources of water. The study identified community participation, willingness and ability to pay, access to spare parts, institutional capacity and fund raising strategies for O&M as the issues that influence COM for sustainability of the water systems. The findings of the study stated that chiefs and elders were the most influential in decision making in the communities especially on water and sanitation provision and management. The study revealed that willingness and ability to pay was influenced by the presence of alternative sources of water and income levels.

The study revealed that communities without water were willing to contribute the 5%, therefore it was not an obstacle to access water supply. The respondents confirmed that payment was done when repairs were needed. The value of the fault is calculated and the cost is spread among household heads and their spouses. The study identified in some communities, the borehole pumps were so outdated that getting their spare parts was difficult anytime there was a breakdown. Additionally, high cost of the suitable spare parts was a problem for the communities.

The study mentioned that the benefits of COM improves sustainability, however its long term success is subject to how the District Assembly (DA) addressed the foremost challenges of poverty and transparency of the

appropriate institutions. The study recommended a gradual approach adopted to implement COM through the community. COM should be flexible and adaptive such that in the process of implementation so that adjustments can be made to suit the contextual issues of the beneficiaries while maintaining the purpose of community management. The study recommends flexible operational policies to allow experienced and willing members who want to continue to serve to do so beyond their term.

A study by Sun *et al*., (2010) used the institutional theory. The study accounts for institutional arrangements in rural water supply. The study used the qualitative and the quantitative research approach. Interview was used for data. According to the study, providing safe drinking water in rural areas is a major challenge because it is not easy to establish institutional arrangements that will ensure that drinking water systems are provided, maintained, and managed in an efficient, equitable, and sustainable way. Like many other countries, Ghana has adopted the community-based approach to meet this challenge. Community-based water and sanitation committees (WATSANs) are in charge of managing drinking water facilities at the local level.

They are supported by water and sanitation teams of each district administration and by the Community Water and Sanitation Agency, an independent agency that has been created to facilitate the community-based approach. The study was based on the analysis of two survey data sets of WATSANs and households in rural Ghana. The study indicated that communities that have a higher level of existing community groups are more likely to have functioning WATSANs, while ethnically diverse communities are less likely to have these organisations. The study mentioned WATSAN

committees have a positive effect on the mobilisation of payment for water services. The study shows that leadership matters in the provision of safe drinking water. Specifically, the study suggests female leaders of the WATSAN committees seem to be effective.

The study by Hutchings (2018) applied the institutional theory. The study reports on the case for realignment in the discourse and conceptualisation of community management of rural water supply. The study used the mixed-method approach. Key informant interviews and focus group discussions were used for data collection. The study used data from 20 case studies of reportedly successful community management programmes from India. The study argued that current discourse is negligent of the substantial role of the state and other supporting agencies in financing and supporting services.

In the context of such substantial levels of support, the study stated that the tendency to treat the challenge of rural water supply systems as one of either community participation or collective action problem that only the community can address further limits current thinking. The study reports that, the recasting of primary challenge of rural water service delivery has improved cooperation and coordination between state and citizen. The study recommends a more significant focus on collaboration as a way to overcome sustainability problems in rural water supply systems.

The study of Katz and Sara, (1998) used the institutional theory. The study's objective was to evaluate the impact of different project rules and the applications of such rules on sustainability. The primary hypothesis of the study was that water-supply services that are more demand-responsive are

more likely to be sustainable at the community level than services that are less demand-responsive. Both qualitative and quantitative analyses were used. The study specified that user demand requires that users of water and sanitation facilities make their own informed choices and commit resources in support of their choices. The study includes ten projects in Benin, Bolivia, Honduras, Indonesia, Pakistan, and Uganda. The projects are stand-alone RWS initiatives and multi-sector projects. They were primarily financed by the World Bank, but also involved financing by other donors. The study concluded that the demand-responsive approach is more appropriate for the sustainability of rural water supply systems.

The institutional theory was applied in the study by Alan *et al*., (2015). The study is titled, ‘‘improving the effectiveness of Ugandan water user committees’’. The study used qualitative method through participatory approach and workshop discussions. The participants were selected purposively. The study reported the negative impact that arises when decision-making over local water resources is devolved to local communities in the absence of a simultaneous attempt to explain to the newly created communities what rights and responsibilities have been transferred to them during the transition. The study examined the main issue affecting the functionality of Ugandan water user committees responsible for managing communal water and sanitation (WASH) services.

The study demonstrated that the effectiveness of the water user committees is compromised by poor understanding of their rights and responsibilities by stakeholders within and outside the committees. From the finding, a handbook was produced that explained the rights and

responsibilities in a form that is accessible to all community members. Preliminary feedback from committees that have used the handbook suggests that it has the potential to improve the functionality of the water user committees, thereby helping to improve the local management of WASH services in Uganda.

According to the study, the majority of poorly functioning WUCs and the wider communities in which they were located had very little understanding of their rights and responsibilities. This is worsened by the fact that, in many rural and peri-urban communities, water has traditionally been managed by customary rights, many of which are based on oral traditions or longstanding informal agreement which may or may not be compatible with the modern rights (Alan, McLaughlin; Kazooba, 2015).

Arku *et al*., (2011) used the participation theory to explain rural water supply management. The study determined how local NGOs water project has impacted the people of rural communities which it serves. The study assessed whether and how their Water and Sanitation committee involved the wider community in decision-making regarding planning, implementing and managing the project. The study used the mixed method. Focus group discussions, structured and semi-structured interview questions, and observation were used for data collection. The systematic sampling technique was used for the study. The finding shows that with the presence of the water project, the majority of the study respondents were able to assess clean water in less time than they otherwise would have spent without the project. Also, they suffered fewer incidences of waterborne diseases and felt honoured having a water project in their community.

The study noted that in spite of the limited involvement by the general community in decisions of the WATSAN committee concerning the project, the residents had better access to water. About half of the respondents were unaware of the means by which water became available. In the same way, many lacked the knowledge of how the day-to-day operation and management of boreholes occurred. Based on the findings, it is argued that there is a need to critically assess the participation agenda. Thus, is community-wide participation in development interventions necessary? Are rural residents merely concerned about the end goal of having clean water available or they have other benefits they hope to attain through these projects?

The study by Kwashie (2007) focused on the management and sustainability of water supply facilities in rural communities: lessons from the Volta Region of Ghana. Theoretically, the study used the institutional and participation theory. The study focused on the extent to which target communities, working through Water and Sanitation (WATSAN) Committees, were able to continuously maintain water supply facilities extended to them under the Volta Region Community Water Supply and Sanitation Programme (VRCWSSP).

The study determined the factors that influenced their ability to achieve continuous water supply through an efficient maintenance management culture. The results of the inquiry became the basis for making some policy recommendations for, first, enhancing the capacity of the water and sanitation committees to maintain the water supply facilities on a sustainable basis and, second, developing a framework for re-shaping thinking about community management of water supply systems in general.

According to the CWSA (2014), the institutional framework for the rural water and sanitation sub-sector comprises two major components, clarification of roles and responsibilities, sector collaboration and coordination. However, the sub-sector faces several institutional challenges from the national to the local level.

The strategy reports of inadequate funding for the sub-sector. Weak sector co-ordination and collaboration in the implementation of water and sanitation activities have largely assumed a project-based approach, rather than being considered part of a larger programme for development. Furthermore, some NGOs implement their programmes/projects outside the Government's norms and standards. Collectively, these have resulted in multitude approaches, systems, procedures and often conflicting priorities. The weak alignment and harmonisation in the sub-sector need to be urgently addressed, particularly in light of decentralisation and its related institutional reforms.

A study by Jansz (2011) used the institutional theory to explain rural water supply sustainability in Niassa province, Mozambique. A qualitative method was used for the study. Semi-structured interview and purposive sampling was used for the study. Two types of information were gathered to gain an understanding of sustaining services over time. Interviews were held with communities and their water committees to understand the realities of maintaining services and interviews were held with government representatives in the District Departments of Planning and Infrastructure Services, coordinators of local NGO partners and WaterAid staff working in the province, to explore which factors they found important for attaining sustainability based on their experiences.

Key factors from the findings that influence water system sustainability came under four main areas: policy, capacity, community management models and external support. The case for improved implementation of the National Water Policy was an important issue as, despite its strong and effective nature, it was clear that it had been inconsistently applied. Other important factors included dissemination of the policy, implementation of a Demand Responsive Approach, effective planning, sector coordination, spare parts availability and clarity on the definition of capital costs. However, for all of these factors to be effectively implemented the study argued for a strong and effective capacity of all stakeholders involved in rural water supply service provision.

The study by Gebreegzabher (2018) used the participation theory to explain the participation of women in water resource management. The study is titled women's Participation in Water Resource Management: the case of Enderta District, Tigray Region, Ethiopia. The study used both qualitative and quantitative methods. Semi structured questionnaire, FGDs and semi structured interview were used for data collection. The study used a cluster sampling technique. The study noted that women's participation in every activity of a country is crucial. The study shows that, to achieve the sustainable development goals, participation of girls and women is critical. According to the study, women are considered as nation builders as women are family leaders and caregivers for family members. However, participation, interaction, and contribution of women outside of their houses are not substantial. Above all, in science and technology-related matters, their participation is very weak.

The study indicated that the role of women in water management is high, especially at the domestic level and the willingness to participate in external water issues. However, the study stated the decision-making power has not reached parity between men and women. Even though there are few women in the water committees of the local community and the water resource management sector, their participation in decision making is insignificant. As a result, the policy at national levels, as well as the regional level which emphasised on women's participation in water resource management, has become vague in its implementations. The study explains, there are different barriers to women's participation in the management of water systems. The most frequently mentioned barriers are socio-cultural barriers, women's low educational success and access and the low number of women in the office as managerial staff. Therefore, measures should be taken to enhance women's participation in management positions.

The study by Boateng and Kendie, (2015) used participation theory to explain the barriers to women participation in rural water supply projects. The study discusses factors influencing the participation of women in the Asante Akim South District in the Ashanti region of Ghana. Using a multi-stage sampling technique, eight communities from four out of seven clustered circuits operating under Phase III of the Rural Water Supply Project (RWSP) were selected. Interview schedules and focus group discussions (FGDs) were the instruments used for data collection. The Afrobarometer sampling technique of household selection and the lottery method of the simple random sampling technique were employed for the study. Data were collected from 256 household respondents in the communities under study.

The study identified two factors that influence the poor participation of women in decision-making in the RWSP project in the district. These were male domineering and socio-cultural norms that inhibit women to participate actively in decision-making fora in the district. The study suggests that to ensure active participation of women in the district, there is the need to develop a gender awareness system whereby the different interests and knowledge of men and women are included in the design and management of water supply systems. Precisely, there is a need to promote the involvement and inclusion of all members of the community in such development projects.

Etongo *et al*., (2018) conducted a study to assess participation and capacity development. The study used institutional and participation theory. The study used both qualitative and quantitative methods. The shared dialogue workshop (SDW) with opinion leaders and other stakeholders (particularly women) on water was used for data collection. The study employed the purposive sampling. The study revealed water user committees should also be a vehicle for empowering communities while bringing about greater equity of use. However, water user committee members do not acquire the knowledge and skills they need by default but require different types of training. The study sought to evaluate community participation and capacity development in water user committees in relation to community-managed water supply systems.

A shared dialogue workshop (SDW), as well as 642 randomly selected households across 17 villages in two Parishes in Lwengo district, southern Uganda was considered. Results indicated that 41.7% of surveyed households used an unprotected source while up to 30% had a member in a WUC. Fifty-

two percent of households had never made any financial contributions to the water user committees, while 34.6% made contributions on an ad hoc basis. This paper examines the relationship between participation, mobilisation, and financial contributions. The chi-square test indicated mobilisation has no impact on household financial contributions to a WUC. However, the majority of even those households that were mobilised made a payment only occasionally, and specifically when the source broke down.

Additionally, the test result revealed that there is no difference between better off and relatively poor households in their contributions to a WUC, an indication that other factors influence such decisions. Training activities, especially on the operation and maintenance of water points and to undertake minor repairs, were mostly provided by non-governmental organisations (NGOs)/project staff. Abandoned boreholes, lack of rehabilitation activities, and loss of enthusiasm are all indications that the technical, financial, and institutional performance of community-managed water supply systems needs improvement.

The study by Singh (2006) applied the institutional theory to explain how institutional framework responds to rural water governance. The participation of local stakeholders in the governance of water resources is regarded as inalienable for ensuring efficiency, effectiveness, and sustainability. To enhance gender balance in the water governance process, institutions are being designed and executed globally to elicit enhanced participation of women. This paper contends that in the context of local communities, the new institutional framework is divorced from the traditional

social institutions that in turn operationalise their resource management systems.

Based upon empirical evidence from the rural Indian setting, the study interprets the paradoxes between the two sets of institutional paradigms and illustrates how these paradoxes at the 'interface' between the local community context and the development strategy led to problems with effective women's participation. The finding argues that the institutional paradigm for achieving equitable gender participation in local water governance does not represent a truly bottom-up approach. It further raises the concern that if the institutional paradigm for participation is contradictory to local institutions, then how can the objectives of participation founded thereupon be seen as achievable. The study proposes the need to design participatory paradigms that are more realistically rooted in community-based institutional frameworks so as to enhance the effectiveness of the endeavors.

The study by Naiga and Hogl (2017) used both the institutional theory and the participation theory to explain the role of women in community water systems. The study used a mixed methods approach and a gender-sensitive collective action analytical framework. Key informant interview and FGDs were used for data collection. The study stated that operation and maintenance of communally owned water sources still pose challenges regardless of the transfer of water management from the state to user communities. The study identified the role of women in drinking-water governance and barriers to participation.

The findings show that women not only are more willing to contribute but have also stated higher actual contribution than their male counterparts.

The study outlines the institutional and individual attributes constraining women's effective participation in water management and suggests how to enhance women's participation in water governance. The study argued that a strategy built on water users' collective action has to be built on women's participation through effective rules and monitoring mechanisms, as well as on long-term sensitisation and awareness creation on gender stereotypes that hitherto hinder women's participation.

Legal and Institutional Framework for Water Supply

Ghana's National Water (NWP) Policy provides a framework for the sustainable development of Ghana's water resources. The NWP is targeted at all water users, water managers, water-related development practitioners, investors, decision makers and policy makers in Central Government, and decentralised structures such as the MMDAs, NGOs and international agencies. Cognisant that water use intersects with other issues, the NWP forge links with other relevant sectoral policies (CWSA (2014).

The National Water Policy of Ghana is intended to provide a framework for the sustainable development of Ghana's water resources. It is targeted at all water users, water managers and practitioners, investors, decision- makers and policy makers within the central Governmental and decentralised (district assemblies) structures, non-Governmental organisations and international agencies. The main principles and challenges include the fundamental right of all people without discrimination to safe and adequate water to meet basic human needs and ensuring a minimum water requirement for the maintenance of health and well-being is assured.

The Water Resources Commission was set up under article 269 of the 1992 Constitution of Ghana to be the agency responsible for coordinating water policy in Ghana. Act 522 established the Commission. The Commission is responsible for the regulation, management and co-ordination of policy in connection with water (Section 2 of Act 522). It must develop comprehensive plans for the utilisation, conservation, development and improvement of water resources in Ghana. It has the mandate to initiate, control and co-ordinate activities connected with the development of water resources. **(**DFID, 1999).

The Community Water and Sanitation Division was created to facilitate the provision of water to rural areas in Ghana. By Act 564, the Community Water and Sanitation Agency became an institution. Among the objectives of the CWSA is to facilitate the provision of safe water and sanitation services to rural communities and small towns (Section 2 of Community Water and Sanitation. Agency Act, 1998, Act 564). The CWSA must support District Assemblies in promoting sustainable safe water and sanitation services in rural areas. It must also support the District Assemblies to encourage the participation of communities, especially women, in the management and construction of water and sanitation facilities (DFID, 1999).

Every village or community that is part of the programme must form a water and sanitation (WATSAN) committee. The WATSAN is responsible for all operations connected with the control and maintenance of the water and sanitation facility. It organises hygiene and environmental education. It is also responsible for the revenue collection. Contractors construct the water and sanitation facilities for the WATSAN. Mechanics also provide spare parts for repairing the water and sanitation facility. A District Water and Sanitation

Team (DWST) which is part of the local government assist in facilitating the provision of water and sanitation. Members of the DWST are residents of the district and have skills in hygiene education and water and sanitation issues.

The District Assembly supervises the DWST to ensure that they provide the services required by the WATSAN. The District Assembly maintains a dialogue with the CWSA (Community Water and Sanitation Agency) and other bodies that deal with the provision of water in the district. The Regional Water and Sanitation Team (RWST) is responsible for implementing the CWSP in the region. Their most essential duty is to assist District Assemblies to form and train the DWST. It is the responsibility of the RWST to determine the specific character of the water and sanitation programme in a particular region. They decide the districts and communities that would benefit from the programme in any particular year (DFID, 1999).

In order to sanitize borehole drilling and ensure efficiency in the management of groundwater resources in an organized and coordinated manner the Drilling License and Groundwater Development Regulations (LI 1827) was promulgated. The situation in the country is that borehole drilling costs are high and highly variable. Some of the boreholes are poorly constructed worsened by lack of oversight by the District Assemblies and non-compliance of the Drilling License and Groundwater Development Regulations (LI 1827). The role of Community Water and Sanitation Agency (CWSA) as the technical backstop to the District Assemblies in the provision of rural water supply for local communities and small towns appears to have been weakened due to lack of capacity and accountability at the District Assembly levels.

The responsibility of geoscientists as consultants to lead the scientific location of sites for drilling and as supervisors of groundwater development projects is being eroded by the non-compliance of LI1928 and the procurement Act at the Assembly. NGOs, churches and governmental organisations, who through their own efforts, secure funding for groundwater supply projects, do not work through CWSA but place their own adverts to procure turn- key consultants/ and contractors to execute such projects. They work independent of the law or any existing protocol for the provision of groundwater supply to their intended targets. Ghana, therefore, does not benefit from the use of qualified hydrogeologists to provide good quality data and geological logs to help update the country's geological maps and hydrogeological data required by LI 1827.

Community Ownership of Water Supply Systems

Historically, the changes in rural water supply were directed toward rural communities to take responsibility for their water concerns, with external support through community ownership and management (COM). COM of water and sanitation facilities is derived from the principle of subsidiarity which emphasises assigning responsibility according to capability (DeGabriele, 2002; Kokor, 2001). The Community Water and Sanitation Agency (CWSA) adopted this concept as a means of ensuring sustainable supply of water to rural communities and small towns in Ghana. The genesis of COM strategies may be traced to the fact that community water systems that were centrally provided and managed have proved unsustainable (World Bank, 1982, 1993, 1994). The success of the COM concepts depends on the establishment of institutions to manage the water systems. These concepts

became operational in Ghana through the adoption of the water sector policy to ensure sustainable water supply through a demand-responsive approach in 1993. A study by Braimah and Jagri (2007) maintains that the COM concept of rural water supply adopted had the following features:

i. A popularly elected WSMT of 5-9 members in every community. Rural communities should have WSMT and water and sanitation development boards (WSDB) at larger community levels (small towns).
ii. Community expression of demand for facilities through their commitment.
iii. Community choice of type, number and site of facilities and in small towns an initial design of piped systems (within limits of options available).
iv. Community preparation and implementation of facilities and management plans which outline how communities will raise funds for capital cost and organisation and management to ensure the continued functioning of facilities and improved hygiene practices.

The adoption of COM implied a shift from dependence on government toward greater self-reliance on user communities. Regarding rural areas, the policy focuses on the provision of services through community participation, not only in project conception and implementation but also in terms of ownership and management of the facilities. The policy framework seeks to de-link rural water supply from the urban water supply, with the management of rural water supply being placed under the responsibility of beneficiary districts and communities.

The National Community Water and Sanitation Programme (NCWSP) was proposed to address the problems of rural water supply. The strategies adopted in the NCWSP included, among others, beneficiary communities' contribution of 5% toward the capital cost of water and sanitation facilities which must be responsible for all operation and maintenance cost of the facilities as well as their participation in planning, design, sitting, construction and management of facilities.

It also included the integration of water, environmental sanitation and hygiene education activities. The NCWSP also requires that the supply of water to rural communities should be demand-driven and community-managed. The major principle of the NCWSP is based on the principle of DRA, which regards water as an economic and social good to be managed at the lowest appropriate level. The DRA recognises the inherent capacity of communities in taking greater responsibility for identifying and solving their water supply problems. The DRA broadens the scope of evaluation and problem-solving based on partnerships (Narayan, 1995).

There is the allocation of a significant role to the private sector in the provision of goods and services, with the public sector playing a coordinating and facilitation role (Kleemeier, 2002). Debates on private sector participation became prominent after the completion of the water sector reform in 1998 (Eguavoen & Youkhana, 2005; Fuest & Haffiner, 2007). Yeboah (2006) gives many reasons to justify the involvement of the private sector in Ghana's water supply. The foremost is to cut down government spending to safeguard the loans given by international institutions. The second is the conformity with the divestiture plan that the government was undertaking by divesting state-owned

businesses. The third is to instill competitiveness for efficiency to provide for low income and unserved areas. The NCWSP uses institutional support such as the CWSA, DAs, Development Partners and the WSMTs. Gbedemah (2010) shows the relationships that exist between the actors.

According to Gbedemah (2010), the WSMTs are to be supervised by the Districts and the CWSA through the DWST. The WSMTs are to account to the water user groups, area/town/unit committees and the DWST. The water user groups, area/town/unit committees also interact with the WSMTs. The WSMTs, on the other hand, can interact or provide feedback to the DWST, Districts, and the CWSA only when the situation demands, but normally, this should be done through the DWST during the quarterly visits. The Districts provides the communities with water and sanitation facilities; however, most Districts do not have the financial capacity.

This financial challenge brings in the development partners to provide funds and technology to provide water and sanitation needs of the communities. Development partners similarly demand the commitment from the communities to ensure that the use of facilities that will support in providing water is maximised and sustainable. For effective O&M, the Districts serve as a link between the communities and the development partners by organising the communities to form Water and Sanitation Management Teams (WSMTs) for villages and Water Boards for small towns. Their capacities are built and strengthened to be able to manage the facilities sustainably. The Districts play an overall supervisory role by supporting the team members to manage the facilities in their communities effectively.

Sustainability and Rural Water Supply

Sustainability focuses on meeting the needs of both current and future generations (WCED, 1987). Development is sustainable if it meets the needs of the present without compromising the ability of future generations to meet their own needs. Since the Brundtland report of 1987 (WCED), sustainable development has become the focus of discussions and debates throughout the world (Barrow, 1998; Engelman & LeRoy, 1993; Falkenmark, 1988; Flyvbjerg, 1996; Gleick *et al*., 1995; Simonovic, 1996; Stout, 1998; World Bank, 1994).

Loucks (2000) maintain that it is difficult to define sustainability in more specific terms than those suggested by the Brundtland Commission. Loucks (2000) further states that, while the word 'sustainability' can mean different things to different people, it always includes a consideration of the future. This knowledge has been applied in many fields, including water and sanitation projects. Safe and clean drinking water supply is sustainable when water consumed is not overexploited but naturally replenished in facilities maintained in a condition that ensures reliable and adequate potable water supply.

The benefits of water supply should continue to be realised over a prolonged period of time (David & Brikke, 1995). Richard (1999) cited that sustainability is the continuous delivery of a particular service. Richard emphasised the need to involve all stakeholders in consumption and cost recovery strategies to ensure delivery of high-quality services and sustainable development projects. Frind and Middleton (2014), views the sustainability of water projects as a continuous flow of water at the same rate and quality, as

when the supply system was designed. Therefore, operation and maintenance in water projects cannot be discounted (Kasiaka, 2004).

Kimberly (1998) described sustainability in water projects as when water supply services and interventions continue to operate satisfactorily and they generate benefits over time as expected. He further indicated sustainability is all about the ability to operate and maintain initial project service standards. However, to achieve this, it has to be planned from the start of the project, so as to ensure conditions for long-term sustainability and strategies are in place and working. It has been estimated that 30 to 60 percent of existing rural water supply systems are defective at any given time (Brikke & Bredero, 2003).

The challenges of sustainable rural water projects are complex and varied. There is evidence that increasing the sustainability of projects, which is undoubtedly necessary, would also significantly improve progress. The proportion of sustainable projects is still quite low (Mathew, 2005), with many development initiatives being abandoned even before completion. Water contributes immensely to the idea of sustainable development and poverty reduction. Safe drinking water is a basic natural and human need which sustains life and also provides for various social and economic needs.

Sustainability in the rural water supply context has been defined as the maintenance of an acceptable level of services throughout the design life of the water supply systems (Katz & Sara, 1998). Musonda (2004) explains the sustainability of rural water supply as the maintenance of water supply facilities such that they remain in a condition that guarantees reliability and adequacy of potable water supply and further benefits of water supply

continue to be realised over a prolonged period of time. Water resource systems that are managed to satisfy the changing demands placed on them, now and into the future, without system degradation can be described as sustainable (Loucks, 2000).

Harvey and Reed (2003) suggest that the achievement of water target will be hard in rural Africa due to the low levels of existing coverage unless sustainability levels can be improved. Sustainable water resource systems are those designed and managed to fully contribute to the objectives of society, now and in the future, while maintaining their ecological, environmental, and hydrological integrity (UNESCO, 1999). The study of Mays (2006) concludes that factors of sustainability depend on the policy context, institutional arrangement, technology, natural environment, community and social aspects, financing and cost recovery, maintenance, and training and capacity building. Many researchers have combined two or more of these factors in sustainability studies of community water projects. According to Marcus and Onjala (2008), sustainable management of water resources is dependent on economic factors and financing, legal and regulatory frameworks.

On the contrary, using multi-criteria analysis and measurable indicators for technical, social/environmental, financial, and institutional factors, Peter and Nkambul (2012) and Juwana *et al*., (2012) concluded that technical and social factors were more important than financial and institutional factors. The study by Gebrehiwot (2012) is informative for an integrated approach in the sustainable management of rural water supply system. It first examined the different understanding of what sustainability means in relation to community-managed rural water projects in Ethiopia. One

view sees sustainability only in economic terms such as cost recovery and financial self-sufficiency. Other respondents cited integration of institutional factors such as the ability of government or other external agencies to provide management support long after project completion. Others focused on environmental dimensions such as biophysical sustainability of water supply and the natural system on which the source depends.

The study then integrated those factors and operationalised them in a sustainability study in two ways: pre-project and post-project analysis, and within the community (capital and education, social cohesion, fee collection), and outside the community (follow-up support, skilled technicians, supporting policy environment, regular flow of clean water). Sustainability in this study refers to the ability of project beneficiaries to maintain and sustain project activities, services and any measure initiated by a project so as to last long after the expiring of the funding period.

Gender in the Management of Rural Water Supply Systems

The first systematic concern with women and water began with the United Nations Water Conference in 1977 in Mar del Plata, Argentina (Lundquist & Gleick, 1997). It was at this conference that women's role as providers and managers of water was acknowledged. That conference led to the UN General Assembly declaring the 1980s as the International Drinking Water Supply and Sanitation Decade (IDWSSD). This recognition was given prominence during the International Conference on Water and Environment (ICWE) held in Dublin, Ireland, and in January 1992, at the United Nations Conference on Environment and Development (UNCED), known as the Earth Summit held in Rio de Janeiro, and the World Conference on Women

organised by the UN in Beijing in 1995 (Agarwal, Delos-Angeles & Bhatia, 2002).

At these conferences, concerns were raised on the need to take due cognisance of those who depend on natural resources for livelihood, by facilitating their active involvement and participation in all decision-making processes, particularly, indigenous people in rural areas and women (Verhasselt, 1998; World Bank, 1993). The Dublin Conference, for instance, gave rise to four principles that have been the basis for much of the subsequent water sector reforms on water management. These principles introduced a new approach known as the Integrated Water Resources Management (IWRM). The IWRM acknowledged freshwater as a finite and vulnerable resource and the central role women play in its provision and management (GWP, 2005). Acceptance and implementation of this principle require positive policies to address women's specific needs, equip and empower them to participate in water resource programmes at decision-making and implementation (ICWE, 1992).

In many cases, studies on water supply discuss various issues related to community participation on water treatment, water quality or willingness to pay (Kendie, 1994; Nielson *et al*., 2009; Padangwangi, 2009; Rodrigue & O'Neal, 2004). Only very few studies have addressed the gender aspect in community participation (Bediako, 2006; Boateng, Brown & Tenkorang, 2013; Opare, 2005; Sam, 2006; WHO & UNICEF, 2009). Women in rural developing areas are traditionally the main managers of domestic water supply at the local level. They traditionally play a major role in managing and

maintaining the communal water supply, regulating and controlling its social use and safe maintenance (SIDA, 1994).

These socially-constructed gender roles which are evident everywhere are common features in domestic water management practices, and Ghana is no exception. The study by Oheneba-Sakyi *et al*., (1996) cited that the level of autonomy of women in Ghana is inextricably linked with their socio-economic status in the community. This is because, while men and women share household tasks, women, in general, tend to carry a significant part (Yelbert, 1999) especially, when it comes to water collection as well as the support of the family through the pursuit of multiple occupational roles.

To avoid being labelled and stigmatised as a social deviant, the traditional Ghanaian woman has always sought to comply with some socially-constructed roles which have placed them close to knowledge regarding natural resource management. Women protect, conserve and enhance water supply and access within and across the contexts of household, community, culture and subsistence livelihood conditions (Agarwal, 1992; Leach, 1992). These, therefore, show that, for improved water supply, women must be involved in its management.

In Africa, women became engaged in projects related to water supply and sanitation as early as the 1970s. In Ghana though women have increasingly influenced communal decision-making, especially in deciding when new wells are to be drilled, in Africa, socially-constructed norms and beliefs have shaped patterns and roles played by men and women in the management of water supply (SIDA, 1996). A generally cited case of cultural description of roles is the collection of water which is considered the

responsibility of women (Regmi & Fawcett, 1999). Theoretically, men and women participate in water and sanitation projects equally at all levels but in practice, women still tend to be the implementers and men the decision-makers at the rural level (Chachange, 1991).

According to IRC (1994), men have traditionally been responsible for making decisions, and have dominated the processes which affect the management of water supply. In support, Dayal, Wijk-Sibesma and Mukherjee (2000) maintain that, while women are involved, the nature of their involvement relative to that of men is biased toward voluntary physical work, such as cleaning and greasing hand pumps and collecting payments. Men handle management decisions such as the use of collected payments.

A study by Onyango (2003) gives indications that the subordinate positions of women in rural water supply management have been strongly contested. This is because even when women occupy positions of some authority, in practice, their participation and decision-making appear to be subordinated to male authority (Hemson, 2002). Hemson (2002) further shows that the non-participation of women in decision-making on the design, planning, implementation and management of water supply projects in developing countries is a major obstacle to the improvement of their well-being (World Bank, 2011) and long-term sustainability (PRB, 2001).

Studies have shown that many women realise how crucial their involvement in the management of water and sanitation work is but they are very conscious about how they state their demands because they may be termed as social misfits (Binamungu, 1993; Singh, 2006; Tam, 2012). According to Green and Baden (1994), the partial involvement of women in

water management is attributed to the fact that governments and donor agencies usually see women's involvement in water supply management primarily from the perspective of their roles in social reproduction, such as the provision and management of water for use by the family. Wijk-Sibesma (1998) maintains that such social roles have created the assumption that women fit the treasury position better in water committees than men.

However, UNDP (1990) has revealed that the question of women's involvement in water supply and management mainly depends on their attitude. This is because some donor-aided projects provided equal training opportunities to both women and men but, unfortunately, women attended poorly as a result of poor motivation (Makule, 1997). The project outlines specific guidelines requiring that, at least, one-third to 40% of the available leadership positions in the water and sanitation committees must be allocated to women. This specified quota represents a clear and significant departure from earlier projects where communities were only appealed to and sensitised on the need to include more women in their local committees and then left to decide how they would do it and how far they wanted to reach out to women and elect them as leaders (Opare, 2005).

Since non-compliance with the guidelines invariably meant exclusion from water projects, the guidelines were largely adhered to. However, Djegal, Price and Acquaye (1996) found that this did not always result in meaningful involvement of women in the decision-making process in some communities, because very few women were given the role of secretary or treasurer and, hardly, chairperson. This assertion is highlighted by Opare (2005) that, although some communities were willing to accept a predetermined quota of

women in leadership positions on the user committees in order to qualify for project assistance, they still assigned the key posts involving higher responsibilities to men, while women remained ordinary members with minimal influence (Saeed, 2003).

According to Danquah (2003), during community meetings, women were grouped behind men or at the blind side of the main facilitators. Thus, despite concrete efforts to promote women's greater involvement in decision-making in community projects, the belief that men should predominate remains entrenched in people's minds. Women's participation is, therefore, seen as a challenging issue in infrastructure projects in Ghana, which are traditionally considered a concern socially targeted to men, despite the fact that, in reality, women and children were more vulnerable to bad sanitation conditions and lack of water (Kendie, 2002).

According to the findings of Chachange (1991) and Mbughuni (1993), women empowerment and water advocacy at the village level are crucial to the continued operation of water supply, and their empowerment will greatly improve their participation to ensure the effectiveness of sustainable development strategies. Until recently, women in many parts of the world were not involved in decision-making in matters concerning them. However, men have traditionally been responsible for making decisions and have dominated the processes which affect the management of water supply (IRC, 1994). This is because when women are involved, the nature of their involvement relative to that of men is biased toward voluntary physical work, such as cleaning and greasing hand pumps and collecting payments.

From the discussions, it can be conceptualised that for effective management of rural water supply system management there is the need for stakeholders to perform certain functions. The conceptual framework shows the interaction between stakeholders in rural water supply facility management. The stakeholders have their defined indicators of performance which influence their operations. Figure 1 shows the conceptual framework for the study.

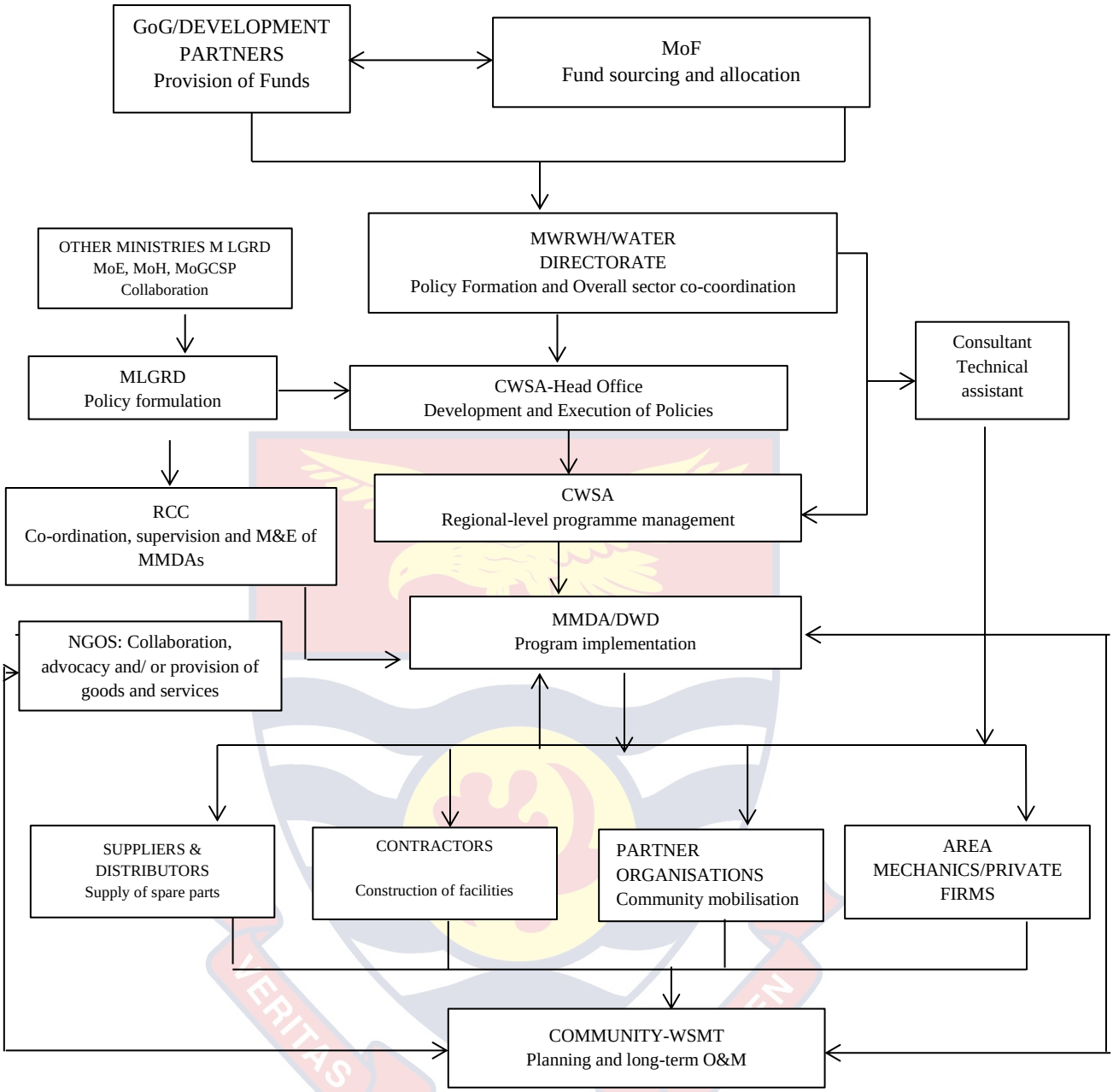


Figure 1: Conceptual Framework of the Study

Source: Adapted from CWSA Project Implementation Manual (2014)

The conceptual framework explains the structure for rural water management and the interrelationship that must exist for effective performance. The government provides the policy framework and the appropriate ministries and authorities such as the Ministry of Local Government and Rural Development (MLGRD), Ministry of Water Resources

and Work and Housing (MWRWH), Ministry of Finance (MoF) and the Community Water Sanitation Agency (CWSA). At the national level, the MWRWH is responsible for policy formulation, coordination, and monitoring of the provision of safe water to rural communities and small towns.

The MWRWH harmonises the inputs of other ministries and actors in water, sanitation and hygiene. The CWSA at the national level is the principal agency in the sub-sector which is responsible for the general facilitation of water supply in small towns and rural communities. CWSA head office offers technical support and set rural water supply standards for DWSTs, Environmental Health and Sanitation Unit, Works Department, Development Partners, research institutions and area mechanics. The CWSA's head office coordinates the institutions at the national level and also provides a supervisory role for CWSA regional offices.

The Regional stakeholders perform administrative and technical work for the management of the boreholes. At the regional level, the regional coordinating council and the regional office of CWSA provide administrative and technical support to the District stakeholders. They also perform monitoring and evaluation of the stakeholders at the local level. Necessary data for planning and policy formulation for rural water supply for the local level are harmonised and forwarded to the national institutions for appropriate actions. The local function focuses on the stakeholders at the local level in managing rural water supply systems. The District Assemblies serve as a link between the national and regional stakeholders. The District Assembly Works Departments, Water and Sanitation Units and the DWSTs provide technical, financial and administrative support for the WSMTs. At the community level,

the Water and Sanitation Management Teams (WSMTs) must comprise of a gender-balanced team that is democratically elected. Drawing its membership from a beneficiary community, the WSMTs are responsible for the management of the water supply systems.

The District Assemblies in consultation with the community forms the WSMTs. The WSMTs are responsible for the repair, maintenance, organisation of meetings, prepares accounts, collects levies and hygiene and sanitation promotion and acquire additional boreholes. Local partners such as community leaders, community members, unit committees and other groups and individuals must collaborate with the WSMTs to ensure the successful management of the water facilities. External partners must educate and empower the WSMTs to manage the water supply systems when the external partner's exit.

For effective rural water supply, there should be effective interaction between CWSA regional, the state agencies, development partners, and the local level stakeholders. When all the stakeholders perform their responsibilities well, then there will be effective management of RWS system; hence, sustainable rural water supply systems. This implies the boreholes will supply water to meet the standard of 345 days per year for the communities. This will consequently improve the economic and health wellbeing of the community members. Women will be able to save time for other productive activities and children will also be present at school; hence, the increase in school enrolment.

The flow of feedback and experiences among the stakeholders is very important to ensure a continuous review of the theory and practice in

sustainable rural water supply systems. The feedback from monitoring and evaluation at all levels informs what works and what do not work; the overview of progress and how things can be done differently to achieve sustainable rural water supply goals and objectives. It is expected that there should be effective interaction from the bottom to the top and from the top to the bottom. Information, feedback, and experiences must be shared among the stakeholders for modification for effective rural water supply practices to ensure a reliable supply of water and maintenance of the facilities. Because the final beneficiaries are the community members, their perception and interest must be paramount in the sustainability of their water supply systems.

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter discusses the methodological considerations that were employed in collecting and analysing data. Gray (2014) cited that a methodology to use in research is determined by what the researcher accepts as reality or truth, and how to search for it. The knowledge that is produced in any scientific field, primarily, depends on the methodology that is used; therefore, the research procedures used by researchers in a subject field to acquire and generate new knowledge and validate knowledge are pertinent.

It is important for researchers to use the right methods and tools to generate knowledge (Chauvel & Depres, 2002) in order to deepen the understanding of the investigation for validation. The research methods cover the description of the research settings, the research philosophy, the research design, target population, sample size and sampling approach, sources of data, data collection instruments, data collection procedure, data analysis and processing, pre-testing of data collection instruments, and ethical considerations.

The Study Area

The study was conducted in the Eastern Region of Ghana, specifically, in the Akuapem North Municipality and Upper Manya Krobo District. The two districts were selected randomly. The study selected the bottom ten of the District Assembly with the least rural water coverage in the Region. From the ten District Assembly two were selected randomly using the lottery method with replacement. The Akuapem North Municipality is located in the south-

eastern part of the Eastern Region. It covers an area of 859.1 square kilometers, constituting 4.6 percent of the total land area of the Eastern Region of Ghana (19,323km^2). The Akuapem North Municipal shares boundaries to the northeast with Yilo Krobo, north with New Jauben Municipal, southeast with Dangme West, southwest with Akuapem South District, and in the west with Suhum/Kraboa/Coaltar District. The population of Akuapem North Municipality, according to the 2010 Population and Housing Census was 136,483, representing 5.2 percent of the Eastern Region's total population of 2,633,154. Females constituted 53.1 percent and males represent 46.9 percent. Close to two-thirds (63.9%) of the population in the Municipality resides in rural localities (GSS, 2010).

Household drinking water in the Municipality is obtained from six main sources: public standpipe (4.1%), pipe-borne water outside the dwelling unit (21.1%), borehole or pump tube well (26.1%), pipe-borne water inside the dwelling unit (12.2%), sachet water (10.2%), and rivers and streams (14.1%). The Municipality has 106 boreholes, 101 hand-dug wells, and 6 rain harvesting facilities. There were 142 communities with Water and Sanitation Management Teams (WSMTs) as of 2013 (Akuapem North District Annual Progress Report, 2015).

The Upper Manya Krobo District Assembly was carved out of the old Manya District on 1st November 2007 with its capital as Asesewa by Legislative Instrument 1842 of the Government's decentralisation policy. Its capital, Asesewa, is a historic trading point. The district capital is about 45km from Koforidua, the regional capital of the Eastern Region. The population of Upper Manya Krobo District, according to the 2010 Population and Housing

Census, is 72,092, representing 2.7 percent of the Region's total population. Males constitute 50.6 percent (36,500) and females represent 49.4 percent (35,592).

Nearly ninety percent (87.2%) of the population, which is about 62,903, live in rural areas while 9,189 of the population live in the urban areas (GSS, 2010). The district has a household population of 71,227 with a total number of 13,111 households. The average household size in the district is 5.8 persons per household (District analytical Population Report, 2014). Children constitute the largest proportion of the household structure accounting for 44 percent. Spouses form about 11 percent. Nuclear households (head, spouse(s) and children) constitute 33.0 percent of the total number of households in the district (Ghana Population Census, 2010).

Out of the population 11 years and above, 66.7 percent is literate and 33.3 percent are non-literate. The proportion of literate male is (77.0 %) and female (56.4%). Six out of every ten people (58.8%) indicated they could speak and write both English and Ghanaian languages. Of the population aged 3 years and above (66,091) in the district, 29.6 percent has never attended school, 38.2 percent are currently attending and 32.1 percent have attended in the past.

The district shares common boundaries with the following towns: from the north, Afram Plains; to the south-east, lower Manya Krobo District; to the south-west, Yilo Krobo District; to the east, Asuogyaman District; and to the west, Fanteakwa District. The four main sources of water in the district are boreholes, river stream, public taps, and pipe water. About forty percent of households (37.7 %) drink water from boreholes (DMTDP of Upper Manya

Krobo District Assembly, 2010-2013). The district economy is dominated by agriculture, which employs about 73 percent of the population of the district (GSS, 2013). The average number per household is 8.5. Most of those engaged in agriculture are into crop farming while the rest are into livestock rearing, fishing and marketing of agricultural produce. Almost all the farmers in the district are subsistence farmers, with few commercial ones. The farmers produce food crops such as maize, cassava, plantain, cowpea and vegetables. Mango and oil palm are also cultivated on a large scale. Livestock reared in the district include poultry, sheep, goats, pigs, cattle and non-traditional animals such as grass cutters. Figure 1 shows the location of the eight communities in the Akuapem North Municipality and the Upper Manya District

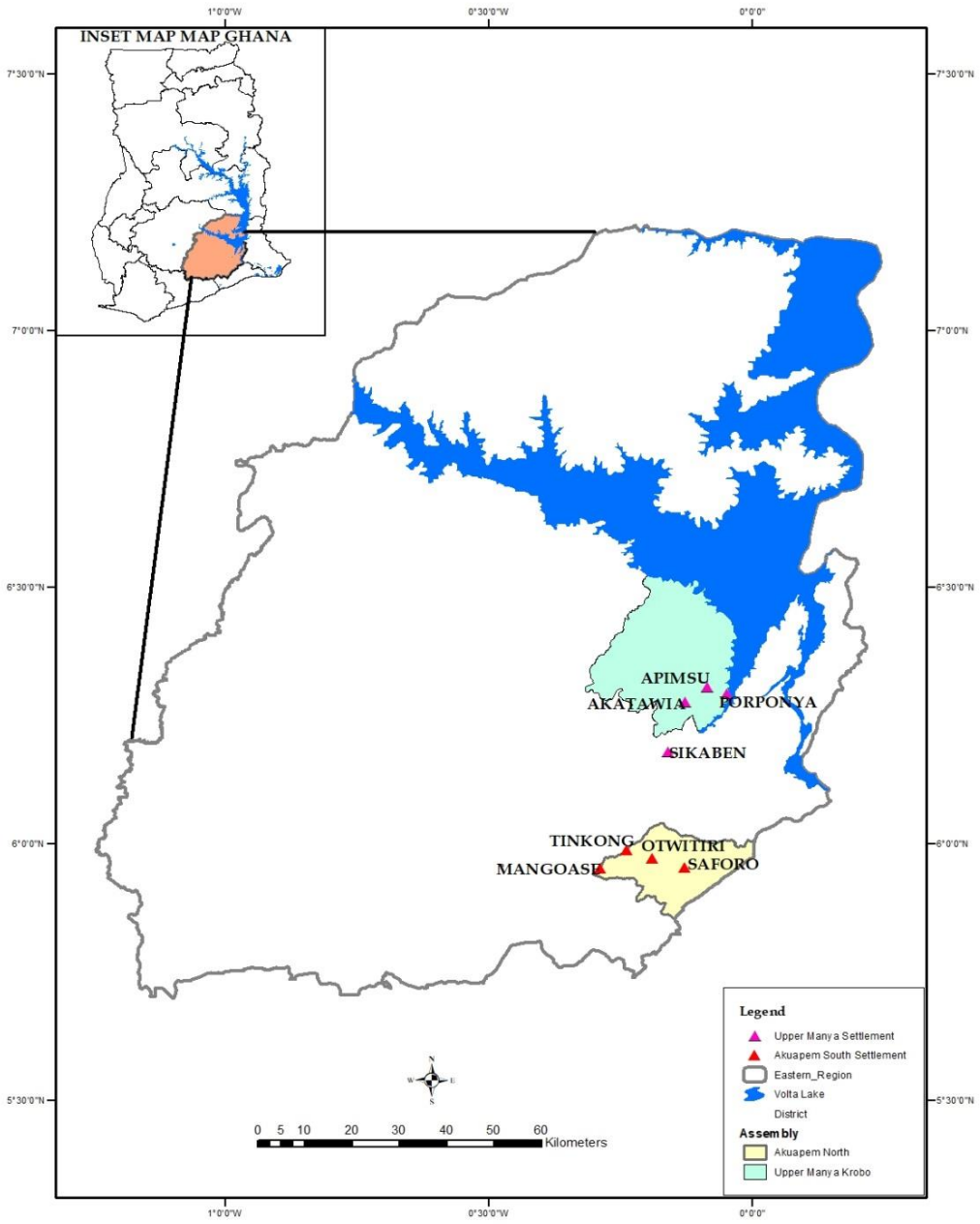


Figure 2: Regional Map showing the studied Districts

Source: CSIR-INSTI (2019)

Description of Rural water Supply System Management in the Districts

Rural water supply systems are very important in the management of rural water supply facilities. The stakeholders in the management of rural water supply are located at the national, regional, District and local levels. The rural water supply system management institutions at the national level

comprise of the CWSA, MLGRD, MWRWH, MoF and GoG development partners. The regional level rural water management institutions in the study region include the regional office of the CWSA and RCC and Non-governmental Organisations (NGOs).

Institutions at the District responsible for rural water system management of the study area include the Environmental Health and Sanitation Unit, the Works Department and the District Water and Sanitation Teams. The WSMTs, area mechanics, spare parts dealers and the community members are stakeholders at the community level of the study communities responsible for the management of rural water supply systems. The arrangements at the national, regional and the community are to coordinate their activities to deliver sustainable rural supply systems in the study communities.

Research Philosophy

The philosophical underpinning is very essential in the search for knowledge for this study. The nature of knowledge and the existence of reality (ontology), what constitutes that knowledge and ways of knowing (epistemology) denote the philosophical foundation of the study. The research philosophy assisted the study in choosing the problems of the study, the questions to ask and the theories to use to understand sustainable rural water supply systems (Creswell, 2013; Saunders, Lewis & Thornhill, 2009). Creswell (2014) refers to these philosophical assumptions as worldviews, Guba and Lincoln (2005) as paradigms, and Sarantakos (2013) as ontological, epistemological and methodological prescriptions of social research which guide everyday research. The methodology in the search of knowledge can be

categorised into positivism and interpretive. These two broad frameworks guided the conduct of this study. The positivists explain that knowledge is independent of human consciousness while the interpretive explains that knowledge is within the human mind; hence, knowledge is constructed by the people.

The study used both the positivist and the interpretive paradigms called "paradigm triangulation". The paradigm triangulation was to improve the strength of each paradigm while minimising their weaknesses to guarantee quality study findings. The positivist paradigm was used to analyse the relationship between variables for explanations and the interpretive paradigm was used to generate the meaning or interpretation constructed by the people in their rural water supply system management. The interpretation of the investigated phenomena from the respondents gave a comprehensive meaning and understanding to the positivist data generated from the study.

Research Approach

In the search for knowledge, an appropriate research approach is essential to conceptualise the research problems and to describe the phenomena that are being investigated. There are two basic research approaches: quantitative and qualitative approaches (Boumar & Atkinson, 1995) which are derived from positivism and interpretive. Scholars have suggested alternative terms to quantitative and qualitative terminologies. Guba and Lincoln (1981) prefer rationalistic (quantitative) and naturalistic (qualitative) paradigms and Evered & Louis (1981) choose "inquiry from the outside" for quantitative and "inquiry from the inside" for qualitative. In some respects, qualitative and quantitative researches are viewed to have competing

views about the ways in which reality ought to be investigated. They are essentially divergent clusters of epistemological assumptions of what should pass as valid knowledge.

The study used a mixed method. The study aimed at generating both quantitative and qualitative data to explain and understand the phenomenon of the study. The mixed-method research (Brannen, 1992) used by the study is referred to as triangulation (Denzin, 1970), multi-method research (Brewer & Hunter, 1989), or linking data (Webb *et al*., 1966). The study sought to answer the 'what', 'why,' and 'how' questions which require the use of both quantitative and qualitative methods to collect and analyse data for objective description and explanations of the phenomenon. The mixed-method research was used because it combines the strengths of the qualitative (interpretive) and quantitative (positivist) methodology to produce broad-based research findings that are relevant to address contemporary water supply challenges. The mixed approach assisted the study to expose the different aspects of the perceived social reality by ensuring that "the flaws of one method will be the strengths of another" (Denzin, 1970).

The macro research approach used for the study was the qualitative approach and the micro approach used was the quantitative approach. The use of the mixed-method approach for the study improved the accuracy of the judgments made. Limiting the study to the use of only one method would have amounted to placing a restriction on the conduct of the study. The study exploited the assets of the two methods while neutralising their liabilities for improved findings. The use of both quantitative and qualitative research also offered the study the use of different methods for corroboration. The study

used the qualitative approach to explore how the respondents interpreted the output of Water and Sanitation Management Teams (WSMTs), rural water institutional support, community involvement in the management of the water systems, and why they arrived at such interpretations. The social reality of planning, implementation, and sustainability of water supply systems were investigated as a dependent phenomenon from the knowledge of the users and also as a social reality independent of the mind of the respondents. The rural people selected for the study had thought processes of their water supply systems which they shared in the study. These processes are part of conscious experiences that influence the people's behaviour towards the sustainability of their water supply systems.

The study techniques used enabled the respondents to make their meaning of the world by explaining what accounts for their perceived views on the sustainability of water supply and what can be done to ensure that. The study aimed to discover meanings that involved both the construction and a critical approach to the social world of sustained rural water systems from the study's natural settings. The overarching purpose of the use of the qualitative approach, therefore, is to understand and analyse subjective interpretations and their consequences on sustained water systems for a continuous flow of clean water. From the quantitative viewpoint, the study seeks to establish relationships and explain the causes of social facts. People actively create social reality through social interaction, which then takes on the appearance of existing independently and is perceived as influencing the same people's behaviour from the outside.

The qualitative aspect of the study assumed that multiple social realities are subjective and socially-constructed. Additionally, the epistemology of the study assumes that knowledge is significant only if it reflects what people are thinking and feeling. Qualitatively, the study focused on what people feel and think individually and collectively concerning sustained rural water system and the supported institutional frameworks. Fundamentally, the study attempted to understand and explain the different experiences of the study population of their WSMTs and external causes and fundamental theories to explain their behaviour. The overall goal for using the qualitative approach was to examine the issue of sustainable rural water supply systems through the "eyes" of the research objects (Schwandt, 2000). It is against this background that Orlikowski and Baroudi (1991) indicate that interpretive research attempts to understand phenomena by assessing the meaning that respondents assigned to them.

The qualitative approach to research uses different methods (Lupton, 1963) for enhanced results. The study used different data collection methods such as semi-structured questionnaire, interviews, text analysis and focus group discussions (FGDs). The methods used were measured for their suitability and reliability in data collection procedure and analysis for the study. The study, quantitatively, gathered numerical data and applied statistical analysis to determine whether there are some relationships among the data. Thus, the study sought to study relationships and explain the social facts using a set of research processes, methods and procedures to avoid bias. Quantitative analysis was used to measure and quantify the qualitative issues that emerged from the research. The complementary role of the qualitative

analysis gave a wide-ranging meaning to the investigated phenomenon of rural water supply systems for appropriate policy action.

Study Design

The case study approach was used for the study. Case study research has been used within both the positivist and the interpretivist philosophical traditions. The case study approach was perceived in this study as the most useful compared to other strategies. As defined by Yin (1994), a case study approach investigates a contemporary phenomenon within its real context. Benbasat *et al*. (1987), also mentions that the case method allows much more meaning question of why, rather than just what and how, to be answered with a relatively full understanding of the nature and complexity of the phenomena.

Specifically, the multiple case study approach was used for the study. Multiple-case designs allow cross-case analysis and comparison, and the investigation of a particular phenomenon in diverse settings. The study used 8 community water and sanitation teams. A multiple case study approach was used in the study because conclusions from multiple cases are considered to be of quality. The replication of the study enhances the reliability of the conclusions. Multiple cases were used for the study to either predict similar results or to show contrasting results.

Target Population

The target population is the entire population that a researcher uses to draw the sample to study a phenomenon. In this study, the target population includes the community members, staff of the Works Department at the DAs, Community Water and Sanitation Management Teams (WSMTs), management staff of Community Water and Sanitation Agency (CWSA), the

District Water and Sanitation Management Teams, Regional CWSA Director, spare parts dealer's and area mechanics.

Sample Size and Sampling Approach

An ideal sample is one that provides a fair representation of a population, with all the relevant features of the population included in the sample in the same proportions (Blaikie, 2003). Hence, the selection of the sample for the study was made to ensure that the sample is representative of the total sampling population, mirrored the characteristics of the population and also large enough to ensure confidence in the results (Blaikie, 2003; Gomm, 2004; Hall & Hall, 1996). The population for the study included WSMTs, Community Water and Sanitation Agency (national and regional), Works Department, District Water and Sanitation Teams, Community members, spare parts dealers and area mechanics.

The multi-stage sampling technique was employed for the study. The multi-stage sampling uses different sampling techniques to ensure fair representation of the respondents. It allowed for the use of both probability and non-probability sampling techniques. The Eastern Region of Ghana was selected purposively for the study. The region is the second-lowest in rural water coverage and bedeviled with severe water-related typhoid fever and diarrhea diseases due to unreliable rural water supply, delayed water system repairs, unwillingness to pay and poor functionality of the institutional arrangements.

Precisely, two Districts, namely, the Akuapem North Municipality and the Upper Manya Krobo Districts were selected using simple random sampling. Eight rural communities with WSMTs from the two Districts (four

from each District) were also selected through the simple random sampling for the study. The selection of the respondents for the FGDs was based on persons who have stayed in the community for more than 3 years. The assumption was that, people who have stayed in the community for more than 3 years might have adequate understanding of the water supply systems. Through the Assembly men, an announcement was made in the eight communities' concerning the FGDs.

The groupings for the FGDs were numbered from 1-3 and placed in a bowl for the respondents to pick them randomly. The groupings number the respondents picked determined their groups for the focus group discussion. This was done to ensure objectivity in the formation of the groups. The FGD focused on the work of the WSMTs and participation of the community members in the management of the facilities. The FGD involved the WSMTS, women and the community members. Three focus group discussions were organised in each community. Minimum of nine and maximum of thirteen community members were used in each group.

The key informant's respondents from the CWSA (Planning and Investment Department and Technical Services Department), CWSA regional director, the Works Department head, and area mechanics were sampled purposively for the study. Key informant could be aware of information that other respondents may not be aware of. The data collected from the key informants were used to complement and test for consistency of data collected from the other sources. The study used the Krejcie and Morgan sample size determination table to determine the sample size from the total population of the eight communities. The systematic sampling procedure was used in the

selection of the households to determine the community respondents. From Table 4, a total of 398 respondents were used for the study. The sampled population comprised of 331 community members, 54 WSMTs and 13 key informants. Table 5 shows the systematic sampling procedure used for the study.

Table 4: Distribution of sample size

Respondent/ Category	Total Population	Sampled Population used for the study
Tinkong	1,600	31
Saforo	1, 034	32
Otwitiri,	790	32
Mangoase	2, 346	87
Apimsu	1,014	29
Porponya,	980	46
Sikaben	790	32
Akatawia	934	42
WSMTs	90	54
Area Mechanics	4	2
CWSA	3	1
Works Department	6	4
DWSTs	6	4
Water and Sanitation Engineer	2	2
Total	9,599	398

Source: Field Survey, (2018)

Table 5: Systematic Sampling Table

Community	Total household	Sampled household	Interval	Random number
Tinkong	250	83	3.012	2
Saforo	150	50	3	2
Otwitiri	100	33	3.030	2
Mangoase	350	117	2.991	2
Apimsu	180	60	3	2
Porponya,	120	40	3	2
Sikaben	110	37	2.973	2
Akatawia	108	36	3	2
Total	1,368	456		

Source: Field Survey, (2018)

Total household = N

Sample household = n

Interval (r) = N/n

Random number (a number between 1 and the interval) =2

Residence Sampling= 2, $r+2=a^1$, $a^1+r=a^2$, $a^2+r=a^3$……, until the sampled household is reached.

The Evaluation indicators of Rural Water Supply Systems

This section presents the evaluative indicators used to measure the performance of rural water supply systems management. The institutions used for the study include the Community Water and Sanitation Agency (CWSA), the District Water and Sanitation Team and the Works Departments of the Districts, Non-Governmental Organisations (NGOs) and the Water and

Sanitation Management Teams (WSMTs). The WSMTs were assessed based on the District Operation Manual, (2014) of the Community Water and Sanitation Agency. It shows the following as the performance indicators:

Management indicators of the WSMT

i. Composition of WSMT and Operating staff
ii. Record keeping
iii. accountability
iv. Changes in the WSMT membership should not be due to political or chieftaincy interferences

Operational indicators of the WSMT

i. Spare parts supply
ii. Technical services
iii. Corrective maintenance
iv. Routine maintenance
v. Water quality testing

Financial management indicators of the WSMT:

i. Revenue/expenditure balance
ii. Financial management
iii. Tariff setting

According to the District Operational Manual (DOM, 2014), the regional office of CWSA plays the lead role in providing technical support to the Metropolitan, Municipal and District Assemblies (MMDAs) and building the capacities of regional and district stakeholders for the effective implementation of Water, Sanitation and Hygiene activities in the region. The MMDA is responsible for rural water service delivery. Accordingly, the DA

has a leading role as an implementer of water and sanitation projects and programmes under the National Community Water and Sanitation Programme (NCWSP). The DA serves as the technical advisor to the RCC on regional WASH activities

The functionality of the water systems was assessed based on the following indicators (DOM, 2014):

i. Functioning water system: water flows out of the spout within 5 strokes
ii. Partially functioning water system: water flows out of the spout after more than 5 strokes
iii. Nonfunctioning water system: no water flows out of the spout or cannot pump at all (i.e. broken down)
iv. Reliability of the water system: The facility must provide water for at least 95% of the year, interpreted as at least 345 days of regular service, without interruption

The District plays the lead role in providing services directly to the WSMTs. Specifically; the Works Department must monitor the physical facilities, functionality status and the performance of the WSMTs. The Works Department provides technical support to the WSMTs. Accordingly; the DWSTs must deliver administrative and monitoring roles to WSMTs. The Works Department must check the administrative function of the WSMTs and provides skills training on the best practices of rural water system management to WSMTs.

Sources of Data

The study used both primary and secondary data. The primary data were collected on the routine management of the water supply systems by the WSMTs. The primary data collected include reports, records, operation and maintenance schedules, sanitation and hygiene promotion reports, minutes of meetings, how information was shared and reports on minor and major repairs. Consultation with community members on major decision-making; methods of revenue collection, measures in managing revenue, motivation for user committees, and the relationship between WSMTs, CWSA, RWSTs, and the Districts was used. Secondary data from reports, books, published articles, and unpublished thesis was used extensively at various stages of the study. Both secondary quantitative and qualitative analysed data were used.

Data Collection Instruments

The use of appropriate data collection instruments contributes significantly to the validation of any scientific study. The reliability and validity of the data collection instruments are essential in the search for knowledge. For improved quality of findings, the study used the method triangulation in the data collection process. Triangulation allows for the use of different data collection instruments in the research of knowledge. The study used the semi-structured questionnaire, focus group discussions guide, and the semi-structured interview guide for the data collection.

The semi-structured interview guide was used to collect data from the key informants such as the DWSTs, Works Department, CWSA (Planning and Investment Department and Technical Services Department), spare parts dealers and the area mechanics. Researchers are often faced with the task of

collecting detailed information about actions and events across a large number of communities, and key informants can play a crucial role in providing such data (Claude *et al*., 2000). The logic underlying the use of the key informants in the study is based on the assumption that, there are specific individuals who, by virtue of their formal positions in both the private and public sectors, are especially knowledgeable about rural water issues and the regulatory institutional frameworks. The interviews with the key informants provided the study with the opportunity to explore issues in greater depth. It also gave the study the benefit to observe the non-verbal behaviour of the respondents, which helped in gathering additional data for the study.

Notwithstanding the advantages, interviews are limited by some factors. Compared with other methods of data collection, the interviewing process was time-consuming and it affected the anonymity of the respondents. It was difficult to arrange and meet the key informants for the conduct of the interview; however, the study succeeded and had in-depth discussions with them. Interviews are less effective when sensitive issues are to be discussed; hence, the researcher was very careful about how and when those questions were asked.

The study administered a questionnaire, specifically, the semi-structured questionnaire, for data collection from the community members. The mode of administration was the researcher administered-questionnaire. According to the study by Sarantakos (2005), the main characteristic of a questionnaire, whether administered to respondents by mail or personally by the researcher, data are offered by respondents, with limited interference by the researcher. The questionnaire used was detailed, precise, and ordered for

easy administration. It was a structured series of questions on the study topic which the respondents were assumed to have knowledge about. The questionnaire comprised both closed- and open-ended questions. In deciding on the structure of the questionnaire, the study chose between providing sufficient control and structure so that respondents produce comparable data and open questions to allow the respondents to construct their own subjective responses. It provided the study with a degree of a structure while retaining flexibility.

A major criticism against questionnaires is that they normally have a low response rate (de Vaus, 1991) and this raises the problem of data quality which can affect the validity of the research findings. The quality of data gathered depends upon several factors and the ability of the researcher to take care of those factors will go a long way in improving the quality of the data collected (Babbie, 1989; Sarantakos, 200). In adopting this method of data collection in the study, measures were taken to ensure that the disadvantages of the questionnaire were minimised while their advantages were maximised in order to improve the quality of the data collected. In minimising the effects of the problem, the study constructed simple sentences, avoided too many questions and the few questions were precise and concise.

Focus group discussions (FGDs) were also used to support the other data collection instruments in order to increase the reliability of the study findings. The focus group discussion guide was used to collect data from the community members. The focus group generated socially constructed meanings shaped by the dynamic interactions of the group members. The FGDs were conducted by trained facilitators. Focus group discussions provide

an exploratory research method, bringing together four to eight respondents to discuss questions framed by a trained facilitator (Krueger & Casey, 2009). FGDs are common methods of data collection because of their key characteristics, especially, the insight and interaction generated between the respondents. The focus group discussion guide was used to gain an understanding of the information obtained from the other sources. The focus group discussions did not only generate data for the study but also promoted awareness on issues and encouraged action in the communities of the study (Hopkins, 2007).

The FGD guide was used to collect data from the community members. The data collected was specifically on the work of the WSMTs and participation of the community in the water and sanitation situation of the communities. During the FGDs, the respondents learned from one another, thought critically about important issues of water, sanitation, and hygiene which transformed their understandings about certain phenomena and also gave the study communities opportunities to explore issues, explain their opinions, negotiate and interpret them collectively.

The discussions for the study did not generate data from individuals but rather generated socially-constructed meanings shaped by the dynamic interactions of the group members on their water systems. The limitations of "group think" and respondents guarding their views because of fears of disagreement with others and unexpected conflicts, power struggles, and other group dynamics were minimal because the discussions were facilitated by trained facilitators. The facilitators also made sure the necessary conducive

environment was created since an unfriendly environment could have a negative impact on the responses.

Data Collection Procedure

The field data was collected from 25th September, 2018, to 20th November, 2018. This period was used for the administration of the questionnaire, the focus group discussions, and the interviews. The data collection teams were formed and orientation on the purpose and methods employed for the data collection was held. During the orientation, the objective of each question of the study was discussed to help all the team members to have a common understanding. This was to help the team to determine whether the responses from the respondents were cut out of the objectives. It gave research team the opportunity to decide on appropriate follow-up questions in case the initial responses were not adequate.

During the orientation, mock translation (from English to local dialect) of questions into the local dialect was done to check for clarity in the translation. The group was divided into four teams of two members each. Two groups engaged the respondents in the FGDs and the other two groups administered the questionnaire concurrently in the two Districts. The respondents granted the researcher permission to record the focus group discussion. The facilitators also wrote notes on the discussions. The main researcher engaged the key informants. The key informants granted the researcher permission to record the interview. The researcher also wrote notes on the discussions.

Daily fieldwork was concluded with discussions to compare field notes and discuss difficulties that were encountered in the field. The researcher also

supervised the process by moving between the teams as the process advanced. On community entry, the team first located the Assembly member. The purpose of the study was discussed and permission was sought to carry out with the data collection. After that, the Assembly members led the team to the community leaders to seek permission for the team to begin work in the community.

Data Processing and Analysis

Both qualitative and quantitative methods were used to analyse the data. The responses for the open-ended questions were carefully studied for coding. The data collected were processed and analysed using the Predictive Statistical Software (PSS) (version 20.0). The completed semi-structured questionnaire and the responses from FGDs and interviews were edited for consistency. The software was used to quantitatively analyse the data obtained. Qualitatively, questions generated from tape recording during the focus group discussions and face-to-face interactions were transcribed. Descriptive statistics such as frequencies and percentage distributions of responses with regard to the demographic characteristics and the rest of the variables were generated through this process.

With regards to the open-ended items, a shortlist grouping into general themes were prepared from the master list of responses in order to get the key responses that were provided by the respondents. The whole set of data was coded before data entry using the Predictive Statistical Software. The steps in the analysis included: (i) preliminary exploration of the data by reading through the transcripts and writing memos; (ii) coding the data by segmenting

and labelling the text; (iii) connecting and interrelating the themes pertinent to the focus of the study; and (iv) constructing a narrative (Patton, 2001).

Pre-Testing of Data Collection Instruments

After the design of the instruments, a rigorous test was done to ensure that it was adequate, feasible, and ethically defensible (Stufflebeam *et al*., 1985). First, several wordings of the questions were prepared to remove ambiguity in order to achieve a degree of precision which was necessary to ensure that the respondents understood exactly what they were being asked. The instruments were checked to ensure that the language was jargon-free, to decide on which question type to use as well as to ensure that the responses could be classified and analysed (Bell, 1999).

After this exercise, the draft was given to some colleagues and the researcher's supervisors to review and offer some comments. The pre-testing lasted for two days; the responses were checked against the objectives of the study to understand whether they answered the research questions adequately. The pre-test gave the study the opportunity to ensure that the items on the instruments yielded the desired responses and to determine the best method of administration.

The pre-test established whether respondents were accessible, whether the sites were convenient, and whether the instruments were appropriate and would generate reliable information for valid deduction. The pre-test evaluated and determined the validity and the reliability of the instruments, as emphasised by Best and Khan (2006). The feedback received was evaluated based on how long it took the respondents to complete the questionnaires, how

adequately the questions were answered, and the general impressions of the respondents about the questions and the instructions.

The pre-test provided the study of the expected time frame and helped to eliminate ambiguous and irrelevant questions. Vague questions were rephrased to make them more meaningful to the respondents. The study employed the services of eight research assistants who spoke the local dialects. Orientation was organised for them to help them understand the purpose of the research to maintain objectivity, precision and a high level of integrity to ensure the confidentiality of the respondents. During the orientation, the purpose of the survey and the usefulness of the results to the community and the individuals involved were discussed.

Ethical Considerations

During the process of planning and implementation of the study, ethical issues were considered. The study by Chilisa (2005) described research ethics as the protection of the respondents from physical, mental, and/or psychological harm. The codes of conduct to protect the respondents comprise of ensuring anonymity of the investigated and confidentiality of the responses. Ethical issues arose at different phases of the study affecting various stakeholders; hence, measures were put in place to minimise the negative effects. The study activities were approved by the Institutional Review Board, and local permission was also sought from the leadership of the study communities before the study started. The sensitive needs of the vulnerable group in the study areas were consciously involved.

The study was conscious of the implications of duress and especially the need to respect their private information. This was discussed during the meeting with the research assistants. Respondents were informed about the overall purpose of the study as well as the possible risk for participating in the study. The respondents were not duty-bound to participate in the study. They were informed about the use of audio recording and the publishing of the results of their views as an academic exercise. Nonetheless, they were assured of their anonymity to hide their identity in peculiar instances.

Respondents were informed that they could refuse to answer any question they felt they were uncomfortable with, and permission was taken before pictures were taken. To ensure privacy, the key informants were assured that no information given would be shared with any other person. In reporting, care was taken not to disclose the identity of the respondents because anonymity was agreed on. The study outcomes were shared with communities that hosted the study, other interested groups, institutions, and individuals.

Limitations of the Study

The study should have used all the Districts in Ghana. It was difficult to conduct an interview with some of the officials in the District and the area mechanics. Few of the respondents were interviewed through telephone calls. This prevented the study from making meaning from their facial expression and body gestures. The facial expression and body gestures could have added some more value to their responses. The study administered a detailed questionnaire. Detailed follow up questions for clarifications was also emphasised. Most of the rural communities used for the study are highly

dependent on farming. This made the focus group discussion difficult as most of them could not make the time arrangement for the first request. Although the researcher met these challenges, measures were taken to minimise their negative effect on the findings. After extensive discussions with some opinion leaders of the communities, appropriate dates were set for the FGDs.

CHAPTER FOUR

INSTITUTIONAL SUPPORT IN THE MANAGEMENT OF RURAL WATER SUPPLY SYSTEMS

Introduction

This chapter focuses on the characteristics of the respondents and the institutional support in the management of rural water supply systems. The analysis is based on the performance of the CWSA regional office, the works department and the DWSTs. Effective institutional support contributes to reliable rural water supply system.

Characteristics of the respondents

The study used 398 respondents. The respondents comprised of Area Mechanics, CWSA director, Works Department, community members, DWSTs, and the Works Engineer. The sex distribution of the respondents showed that the male constituted 221 (55.5 percent) and the female were 177 (44.5 percent). The educational status of the respondents indicated that 84 (21.1 percent) had primary, 98 (24.6 percent) had SHS, 17 (4.3 percent) had vocational, 13 (3.3 percent) had first degree and above, 21 (5.3 percent) diploma and 165 (41.5 percent) had no formal education. The occupational status of the respondents showed that farming and trading are the dominant occupations representing 65 percent and 32 percent respectively. The minimum age was 19 and the maximum age was 65.

The study shows other respondents had occupation such as mason, nursing, decorating and civil servants. Christianity forms the dominant religious group constituting 95 percent. The other religious groups identified by the study were Islam (4%) and the Traditional religion (1%). The WSMT

members and the community members as respondents used for the study had stayed in the community for more than three years. It is based on the assumption that the 3 years stay would make the respondents have adequate knowledge on the WSMTs and the management of the water systems. The study focused on the institutional arrangements for rural water supply systems, community participation and the operations of the DWSTs in the management of rural water supply systems.

The Monitoring Role of the DWSTs

The use of institutions in the provision of services is essential for the improvement in efficiency (Asthana, 2003). According to the District Operational Manual (DOM, 2014), the regional office of CWSA plays the lead role in providing technical support to the Districts and building the capacities of regional and district stakeholders for the effective implementation of Water, Sanitation and Hygiene activities in the region. The Districts are responsible for all developments at the local level, including WASH service delivery. The Works Department and the District water and sanitation teams at the District have a leading role as implementers of water and sanitation projects. The District Water Sanitation Team (DWST) is a multi-disciplinary team. The DWSTS work directly with the community WSMTs for the sustainable management of the water systems. The DWSTs monitor the operation and maintenance of rural water systems in terms of financial, technical and administrative.

The DWST must consistently check what the WSMTs have been mandated to do in order to correct deviations to improve the work of WSMTs. The DWSTs deliver financial, technical and administrative support to enhance

the work of the WSMTs and the water supply systems for uninterrupted water supply. Table 6 shows responses from the WSMTs respondents on the monitoring role of the DWST.

Table 6: DWSTs Monitoring Role of the WSMTs

Community	Visited for Monitoring		No Monitoring Visit		Visits sometimes to monitor		Total Freq
	Freq	Percent	Freq	Percent	Freq	Percent	
Mangoase	2	3.70	4	7.41	1	1.85	7
Apimsu	1	1.85	5	9.26	2	3.70	8
Porponya	1	1.85	6	11.11	0	0	7
Sikaben	0	0	5	9.26	1	1.85	6
Akatawia	0	0	5	9.26	0	0	5
Otwitiri	0	0	6	11.11	1	1.85	7
Tinkong	0	0	7	12.96	0	0	7
Saforo	0	0	7	12.96	0	0	7
Total	4	7.4	45	83.33	5	9.26	54

Source: Field Survey (2018)

Due to the growing importance of monitoring and evaluation all over the world, many projects establish it in their operations (Baker, 2011). According to the study, majority of the respondents (83.3 percent) indicated that the District does not monitor the activities of the WSMTs. Most of the respondents (WSMTs) showed dissatisfaction of the work of the DWSTs. A member of the WSMT remarks that:

> ‘‘*…the District does not visit us very often to listen to our water and sanitation problems. I am a WSMT member, I*

> *do not remember the last time the District engaged us on our water and sanitation problems. We sometimes try to solve some of our problems with the little money we get. However, it is the responsibility of the government to provide us with water and it is our responsibility to pay and have access.''*

The monitoring by DWSTs is to ensure that WSMTs work according to the laid down procedures of the CWSA and the DA. The Works Department supports the Water and Sanitation Management Teams (WSMTs) in fulfilling their operations and maintenance (O&M) roles. A teacher respondent of a WSMT stated that the DWST are always absent. He further indicated that the DWST must be well resourced to perform their duties. According to a member of a DWST, they only rush to the community when there is a reported case or an emergency in the communities.

The Regional Director of the CWSA mentioned that the monitoring roles provide the Districts the opportunity to collect data at the local level to either eliminate or modify existing strategies used to improve the functionality of the water systems. The role of the DWSTs is very essential since it has a direct relationship with the effective management of the water facility. A DWST respondent maintained:

> ''*…we are aware of our monitoring duty however, the main problem is, we are not provided the needed funds to monitor and evaluate the activities of the WSMTs. We have to update the WSMTs on current trends in the management of rural water supply systems. Unfortunately, we only give*

> *them training after the formation of the WSMTs and that ends it. We are not able to do follow up to check whether they are applying what we taught them at the training or not.''*

According to the study the WSMT respondents acknowledged the importance of the monitoring role by the DWSTs. The WSMTs emphasised that the effective performance of the monitoring role will bring closeness between the WSMTs and the DWSTs for good collaboration. They further indicated that the closeness will facilitate easy exchange of knowledge between the WSMTs and the DWSTs. A respondent described the work of the DWST as very important in the management of the water systems. He stated that the DWST must visit the community regularly to know the recent condition of the water supply systems.

The study indicated that for sustainable water supply system to last there should be collaboration to maintain, repair the broken down systems and protect those functioning. Monitoring is a way of improving efficiency and effectiveness of a project, by providing the management and stakeholders with project progressive development and achievement of its objectives within the allocated funds (World Bank, 2011). Harvey *et al*., (2004) report that, monitoring, evaluation and reporting are important to ensure water supply and hand pump standardisation, effectiveness, efficiency, reliability and equity in the communities.

The District Water and Sanitation Plan

According to the CWSA manual (2016), the District must prepare a water and sanitation plan. It must be prepared with the active participation of

all the relevant stakeholders. The DWST supports the water section in report preparation and in the update of the water component of the District Water and Sanitation Plan (DWSP). The DWSP show the intentions of the DAs in water, sanitation and hygiene. According to the study, the Districts have a water and sanitation plan in their medium-term development plan. However, the heads of the Water and Sanitation Units could not show evidence of full participation of all the concerned stakeholders, especially the communities in the preparation of the DWSP.

According to the head of a DWST he cannot deny the importance of stakeholder's involvement especially the users in the District water and sanitation plan preparation. However, he stated it is very expensive to involve the entire stakeholders. The study shows that the wide spread of the rural communities in the DAs makes it extremely difficult to move them to the District Assembly for effective engagement. The study again revealed that the DAs attempt to involve the few that are very close to the process. Regardless of the problems encountered, the DWSP is prepared and updated annually. The study identified inadequate funds from the District for a holistic preparation of the District Water and Sanitation Plan.

The District water and sanitation plans are used to influence and control the activities of the WSMTs. According to the Regional Director of the CWSA, the WSMTs derive their plans from the District Water and Sanitation Plan. This is to ensure that the undertakings of the WSMTs are consistent with the DWSP. According to the study, all the 54 WSMT respondents explained that they are not aware of the District Water and Sanitation Plan. A secretary of a WSMT reported that this is the first time he is hearing of the District

Water and Sanitation Plan. She stated that the WSMT do not have the District Water and Sanitation Plan. The study revealed that the WSMT try to protect the water systems but not in uniformity with the District water and sanitation plan you are talking about.

Another respondent who was a hygiene and sanitation educator reiterated that:

> ‘‘*…this District Water and Sanitation plan is not prepared in consultation with us. Without us it will be very difficult for us to understand the issues agreed in the plan for effective implementation. I will prefer that at least the chair of our WSMT should be part of the plan preparation so that he will present our issues. I think next time when the District is preparing this plan we have to be involved to make contributions because we are closer to the problems and the solutions than the District Assembly.’’*

A member of DSWT explains that there is low attention of the District engineer on water and sanitation issues in the District. He indicated that the engineer is well informed about all road projects in the District because there is a lot of money in road projects than water. The study shows that the commitment of the engineers to road projects is very high compared to the District water and sanitation issues. A respondent reiterated that commitment to road projects is very high because it gives the District more money than water and sanitation issues. According to the study, the Districts have not employed water and sanitation engineers to actively solve the water and sanitation problems.

The study showed that the engineers in the two Districts of the study are not water and sanitation engineers. This partially explains the minimal commitment of the Districts on water and sanitation concerns of the rural communities. A hand pump caretaker of a WSMT described his opinion as the District workers rarely come to their community on sanitation and water-related issues. According to the study during national elections, there are many of the party people and the Municipal Chief Executive (MCE) who often go to the communities to make promises to solve their water and sanitation predicaments. However, after their election they do not fulfill the water and sanitation promises to the communities.

Initial Training and Retraining of WSMTs

According to Hassenforder and Barone (2019), institutional arrangements shape water-related decision making and water policies, and drive behaviours related to water sharing and use. It is therefore crucial that water researchers, policy makers and managers understand institutions. According to the institutional structure of rural water supply in Ghana, the Districts are to coordinate with rural communities to implement water projects, train and retrain the WSMTs and also to help the communities in major repairs. This is done to equip the WSMTs with basic technical, financial and administrative techniques to manage the water systems. In the case that the training and the retraining are not organised, it poses many challenges to the water systems which hinders continuous flow of water. Table 7 shows responses on initial training by the DWSTs for the WSMTs.

Table 7: Initial Training by DWSTs for the WSMTs

Community	Initial Training Organised		No Training		Total
	Frequency	Percent	Frequency	Percent	Frequency
Mangoase	4	7.41	4	7.41	8
Apimsu	5	9.26	1	1.85	6
Porponya	6	11.11	2	3.70	8
Sikaben	5	9.26	2	3.70	7
Akatawia	4	7.41	1	1.85	5
Otwitiri	4	7.41	3	5.56	7
Tinkong	4	7.41	3	5.56	7
Saforo	4	7.41	2	3.70	6
Total	36	66.67	18	33.33	54

Source: Field Survey (2018)

From Table 7, 66.7 percent of the WSMTs respondents acknowledged that initial training was organised for the WSMTS before taking over the water systems. A care taker of a WSMT acknowledged that:

> *''...the WSMT was formed before the commencement of the water project. After the completion of the water project, we were given training on the operation and maintenance of the water systems. The training was organised by officers from the District.''*

The study shows that training was organised in simple accounting, book keeping, writing of minutes and appropriate ways of writing letters, minor repairs, hygiene and sanitation promotion, revenue mobilisation and basic

techniques in community mobilisation. The training is organised to enhance the capacity of the WSMTs to operate and sustain the water systems. However, 33.3 percent of the respondents of the WSMTs mentioned that no initial training was organised for them. The study showed that the 33.3 percent are newly nominated WSMT members who have not been given initial training.

According to the DWST, the new nomination occurred as a result of the influence of the chief's or the Assemblymen, worker transfer, voluntary exit, interference from work and to avoid derogatory remarks from the community. These occurrences bring new members to join the WSMT who usually do not get the initial training. A member of the DWST maintained that sometimes the trained WSMT members who are very difficult and are reluctant to release money to the local chief are removed from the WSMT. She specified that the exited WSMT members are replaced with other members who are not trained but will do the desire of the chief. The chiefs desire to maximise their satisfaction through their involvement in community water systems supports the rational choice institutionalism. The study indicated that because the chiefs are very powerful and the DWSTs want to protect their jobs, they are unable to react to the actions of the chiefs.

The absence of initial training has a high tendency to adversely affect the management and sustainability of the water supply systems. The study identified that communities with very low initial training and other factors accounted for the frequent breakdown of the water systems. A respondent explained that the District only organised a durbar with the community and handed over the boreholes to the community. She explained that DA promised

to come back and give them training but they never came back. She stated that they were only excited about the project; little did they know that it will not last without the training of the WSMTs. A respondent further reiterated that the breakdowns of the boreholes are very frequent because the community WSMT was not given the necessary training to manage the water supply systems.

A member of the WSMT reiterated that:

> ‘‘*…I have realised that the WSMT is doing its best to sustain the water systems, however, if we were given proper initial training before taking responsibility for the boreholes we would have performed better in the management of the water systems’’.*

A sustainable community water project requires internal cohesion and supportive external relationships (Barnes *et al*., 2011; Kamruzzaman *et al*., 2013). Community stakeholders and external agencies must collaborate to manage and improve water systems in rural communities. The study revealed that the District could not perform all the initial training because the Districts could not provide funds and the needed logistics for the exercise. The study identified inadequate funds as a major setback to the duties of the Works Department and the District Water and Sanitation Teams. Table 8 shows response on the retraining of the WSMTs.

Table 8: Retraining by DWSTs for the WSMTs

Community	Retraining Organised		No Retraining Organised		Retraining Organised Sometimes		Total Freq
	Freq	Percent	Freq	Percent	Freq	Percent	
Mangoase	1	1.85	3	5.56	3	5.56	7
Apimsu	1	1.85	3	5.56	3	5.56	7
Porponya	0	0	4	7.40	3	5.56	7
Sikaben	1	1.85	3	5.56	3	5.56	7
Akatawia	0	0	3	5.56	2	3.70	6
Otwitiri	1	1.85	5	9.26	1	1.85	7
Tinkong	0	0	4	7.40	3	5.56	7
Saforo	0	0	7	12.96	0	0	6
Total	4	7.4	32	59.26	18	33.34	54

Source: Field Survey (2018)

Retraining for the WSMTs is important for the sustainability of rural water systems. The retraining is purposed to continuously build the capacity and also to equip the WSMTs with new trends in the management of the water systems. The retraining provides the opportunity to assess current methods used in the management of the water systems. From Table 8, 59.3 percent of the respondents said no retraining has been organised for them. A chair of a WSMT revealed that apart from the first training the WSMT received during the implementation of the project, they have not been given any retraining on the management and maintenance of the water supply systems. He further mentioned if it had not been this study he did not know that the WSMT are to

be given periodic training on the best practices to maintain the water supply systems.

The study revealed in an interview with a member of the DWST:

> ''*…the DWST is not able to organise retraining for the WSMTs due to lack of commitment from the WSMTs and inadequate funds and logistics to undertake the retraining. The WSMTs are not committed to their work; hence, we are not motivated to visit them for the retraining exercise. The DWST is under-resourced, the moment funds are released we will perform our required duties for the communities to have sustainable water systems and uninterrupted flow of drinking water.''*

According to the findings a member of the DWST indicated that previously government prioritised rural water and sanitation issues because appreciable level of funding came from the international donor community. She stated that the current decline in rural water supply system projects is due to the drop in funding from the international community. The respondents additionally stated this is the time government must perform its rural water supply responsibility to the rural people.

A head of the water and sanitation unit indicated the District Assembly and the state must take rural water supply issues seriously. He further stated that the lip service to rural water supply is deteriorating rural water and sanitation in the District. A respondent stated the necessary measures must be taken to provide adequate funds to save the water supply systems from its bad conditions. Another DWST respondent mentioned the main reason why

retraining is not carried out is because of inadequate commitment of funds from the state and the District. He further indicated since water is not the priority of the District even when money comes, the water and sanitation departments do not get their share to perform their responsibilities.

Hygiene and Sanitation Education and Support for Major Repairs

Hygiene and sanitation education is important for sustainable flow of drinking of water. Hygiene and sanitation promotion is focused on the potential health benefits of quality water and sanitation. Effective hygiene promotion needs a good knowledge base and understanding of the possible barriers and resistance to behavioural change, as well as factors that may facilitate the adoption of new behaviours. Table 9 shows responses from the WSMTs on the hygiene and sanitation promotion education of the DWSTs.

Table 9: Hygiene and Sanitation Education (HSE) by the DWST for the WSMTs

	Organised HSE		No HSE		Total
Community	Frequency	Percent	Frequency	Percent	Frequency
Mangoase	1	1.85	7	12.96	8
Apimsu	0	0	6	11.11	6
Porponya	1	1.85	7	12.96	8
Sikaben	0	0	7	12.96	7
Akatawia	0	0	5	9.26	5
Otwitiri	0	0	7	12.96	7
Tinkong	1	1.85	6	11.11	7
Saforo	1	1.85	5	9.26	6
Total	4	7.4	50	92.58	54

Source: Field Survey (2018)

According to the CWSA, (2016), the hygiene and sanitation educator of the WSMT must be given annual training on the current and best practices on hygiene and sanitation issues. The hygiene and sanitation educator of the WSMT has to use the knowledge acquired to educate community members on the best practices of hygiene and sanitation practices. Table 9 shows that 6 out 8 hygiene and sanitation educators of the WSMTs had not been trained by the DWSTs on hygiene and sanitation education for the past three years. A hygiene and sanitation educator respondent pointed to the fact that after the initial training, there had not been any training for her. She indicated the DWST only visit the community when there is an imminent danger, outbreak of a disease or a reported case. A female hygiene and sanitation promoter stated:

> *''... I have been the hygiene and sanitation educator of my WSMT for the past 3 years; however, I have not received any training for the whole period. I only try my best by using my own acquired knowledge from other sources like the internet to educate the community on how to protect their water from contamination; good sanitation practices and good hygiene practices. I think the District should begin to work with me to improve the hygiene and sanitation state of the community''.*

According to the CWSA report (2014), DAs must support the community financially with major repairs. The study shows that all the eight WSMTs over the last three years have requested support from the District for major repairs; however, the WSMTs did not get any financial support. In Apimsu, Porponya and Mangoase, the water systems received some support

from non-governmental organisations (NGOs) in the form of major repairs and maintenance. A member of the WSMT indicated the District Assembly has done very well for providing them the water systems but anytime there is a major breakdown the District Assembly does not help in the repairs. The study revealed the money collected from water services is not enough to purchase the expensive parts of the water system, hence the District Assembly must provide resources for the major repairs.

A chair of a WSMT noted that:

> ''*…as the chair of the WSMT, I sometimes go to the District myself to tell them about our water and sanitation predicaments. They give me many promises but I don't hear from them after I get back to the village. Occasionally I send the information through the Assemblyman to the District but I do not get any material feedback. The concern of the District about our water problems is not good and something needs to be done about it.*''

According to the District Operation Manual (2014), minor maintenance is defined as repair that is within the financial capability of the users of the facility, and can be covered by their user fees. Major maintenance is repair that is beyond the financial capability of users, and cannot be fully covered by user fees, therefore requiring external support from the DA, central government or other sources.

External Audit of the WSMTs Account and change of Water System Management.

External assessment of the duties of the WSMTs is a supervisory role by the DWSTs. External inspection is important in rural water supply system sustainability. External appraisal is carried out by the DWSTs to determine whether the WSMTs are working in accordance with the laid down accounting standards. The appraisal of the accounts enables effective interaction between the WSMTs and the DWSTs which provides a platform for data collection for decision making. The interaction helps the District to identify the problems and potentials associated with the financial arrangements for the management of the water systems.

Table 10 shows the responses from the WSMTs on the audit of accounts of the DWST.

Table 10: Auditing of the WSMT Accounts

Community	Auditing Carried out		No Auditing Carried out		Auditing Carried out Sometimes		Total Freq
	Freq	Percent	Freq	Percent	Freq	Percent	
Mangoase	2	3.70	3	5.56	2	3.70	7
Apimsu	0	0	7	12.96	1	1.85	8
Porponya	1	1.85	5	9.26	1	1.85	7
Sikaben	1	1.85	6	11.11	0	0	7
Akatawia	1	1.85	4	7.40	0	0	5
Otwitiri	0	0	7	12.96	0	0	7
Tinkong	2	3.70	5	9.26	0	0	5
Saforo	2	3.70	3	5.55	1	1.85	6
Total	9	16.65	40	74.07	5	9.26	54

Source: Field Survey (2018)

Table 10 shows that 16.7 percent mentioned that auditing of accounts is carried out and 74.1 percent of the respondents said there is no auditing performed by DWSTs. The study shows that the District Water Sanitation

Teams (DWSTs) sometimes visit the communities to audit the accounts of the WSMTs. However, the study revealed that auditing is not carried out regularly. The study mentioned that the 16.7 percent referred to account auditing that was conducted last 3 to 4 years before the study was conducted. A head of the DWST stated:

> ‘‘...*we visit the communities to inspect the accounts of the WSMTs from time to time. The accounts must be audited by the District internal auditor quarterly. My brother there is nothing in the accounts when we go to the WSMTs of communities. The accounts books are empty and all accounting activities are not backed with source documents.’’*

The study found out that the WSMTs do not have proper accounting records for the sales of the water and other accounting activities. Although 16.7 percent of the respondents indicated auditing of accounts is done, they could not show material evidence of audited accounts of the WSMTs. According to the findings of the study, a DWST member cited that, there is a high possibility that the respondents who mentioned auditing is carried out by the District are the illegitimate beneficiaries of the money that are collected from the sales of the water. The poor accounting records imply the WSMTs do not render accounts on the sales of the water and other funds committed into water and sanitation issues to the community members. This has the tendency to affect the financial credibility of the WSMTs.

Faulty WSMT credibility negatively affects revenue mobilisation from the sales of the water and other sources. A respondent mentioned the DWSTs rarely come to the communities to examine water and sanitation issues. He

mentioned the last time they visited their WSMT was 3 years ago. He revealed that anytime the DWST visited, they actually do not meet the whole WSMT so they are not able to do a thorough assessment of the accounts. They could not inspect the accounting books because the treasurer was absent.

The study examined a change of management of the water systems from the WSMTs to the CWSA. Based on the several challenges identified, the study examined respondent's views on whether they supported a change in management of the water supply systems from the WSMTs to the CWSA. Table 11 shows responses on takeover of the water systems by the CWSA from the WSMTs.

Table 11: CWSA to take over the Operation and Management of Rural Water Systems

Comm	Take over by CWSA		No take over by CWSA		I don't know		Total
	Freq	Percent	Freq	Percent	Freq	Percent	Freq
Mangoase	44	11.42	28	7.2	23	5.97	95
Apimsu	28	7.2	1	0.26	6	1.56	35
Porponya	23	5.97	17	4.42	14	3.64	54
Sikaben	20	5.19	12	3.11	7	1.81	39
Akatawia	25	6.49	14	3.64	8	2.08	47
Otwitiri	25	6.49	3	0.78	11	2.86	39
Tinkong	19	4.94	7	1.82	12	3.12	38
Saforo	24	6.23	12	3.12	2	0.52	38
Total	208	54	94	24	83	22	385

Source: Field Survey (2018)

From Table 11, 94 (24 percent) of the respondents (both community members and WSMTs) maintained that CWSA should not take over the operation and management of the water supply systems and 208 respondents (54 percent)

approved of a takeover of the systems by CWSA. A respondent emphasised that the WSMTs can work properly when community leaders and the District are committed to the management of the water supply systems.

A secretary of a WSMT further reiterated that the solution is not the takeover but rather, a little monetary motivation for the WSMT will go a long way to improve the management and sustainability of the water systems. In private discussions, some of the WSMTs members reiterated the monetary motivation. A chair of a WSMT specified that:

> ''*…the WSMTs are not motivated financially, however, a monthly allowance for the WSMTs will go a long way to increase the commitment level of the WSMTs. I strongly believe that the staff of the CWSA that will take over the management of the water systems will be paid monthly, however, over the past years they have refused to pay any allowance for our commitment to the management of the water supply systems.''*

Monetary motivation has been mentioned by most WSMTs as a stimulus that will improve meeting attendance, revenue mobilisation, proper record keeping and other functions of the WSMTs. However, King *et al*., (2012) stated that the gradual monetisation of the rural economies in Ghana was impinging upon the effectiveness of voluntary groups formed to champion community development. Members' unwillingness to invest their time into the works of the committees was partly because there was no incentive for them to participate in the committees' work.

According to a head teacher who was a member of the WSMT there should be a careful thought about the takeover because it can lead to an

increase in the price of water services. He stated when there is a takeover the new management will charge realistic fee which the community will not be able to pay because of the low income levels. According to the study, a collective thought of a FGD mentioned that although poverty level is very high, if the Government can subsidise the water fee then the CWSA can take over the management of the water systems.

The Regional Director of the CWSA stated:

> ''the *motivation of the WSMTs to continue with the management of the water facilities is a result of the unjustified financial rewards some WSMT members and some chiefs get from the revenue of the sales of the water. Individuals who unduly benefit from the water revenue will prevent a take-over by CWSA. I think this is the time to take that bold decision. We have started the takeover with the small town water systems and we hope we can replicate it with the rural community water systems.''*

A chair of a WSMT indicated that he has been doing this work for many years but there had not been an improvement. He said may be the takeover will improve the water systems since it is the duty of the government to provide water to its citizenry. He further stated he is confident lessons have been learnt to prevent repetition of past mistakes. A chair of a WSMT also mentioned that things that are free or almost free are generally not managed well. He further reiterated that when the government or private person takes over, although water prices might go up, water services will improve

significantly. Rural water management systems must change overtime based on situational analysis.

Summary

The chapter shows that there are structures at the regional and the Districts to support sustainable rural water system. However, their functions are not well performed and coordinated for sustainable rural water supply. The DWSTs are not able to provide technical, administrative and financial support to the WSMTs. The DWSTs are not adequately provided with the logistics and funds to fully function to support the work of the WSMTs. Inadequate funds affected the work of the Works Department and the DWSTs.

Monetary motivation is identified as a major factor that affected the work outcomes of the WSMTs. The regional CWSA provided some level of technical support for the DWSTs annually. Inadequate work visit of the DWST has also affected the work of the WSMTs and data collection to improve the existing water systems. Majority of the respondents indicated a take-over of the water system by the CWSA for sustainable water supply. The state and its agencies and the private sector must renew its commitment to the management of rural water supply systems.

CHAPTER FIVE

THE WATER AND SANITATION MANAGEMENT TEAMS AND COMMUNITY PARTICIPATION IN THE MANAGEMENT OF THE WATER SYSTEMS.

Introduction

This chapter presents the work of the WSMTs in the management of the rural water systems. The WSMTs are very important in the provision of reliable rural water system. The chapter focused on the technical, administrative and the financial duties of the WSMTs. The chapter assessed the participation of the community in the management of the water systems. The participation of women in the management of sustainable rural water systems is assessed in the chapter.

Formation of the Water and Sanitation Teams

All small communities and small towns requesting for water and/or sanitation facilities nominate community members to form the WSMTs. The nomination of the WSMTs is done by the community members at a community gathering. The community members must nominate respected people in the community, very reliable people and two of the nominees should be able to read and write to occupy the positions of the secretary and the treasurer. The positions of the WSMTs includes, the president, secretary, treasurer, Sanitation and hygiene educator and the hand pump caretaker. However, a DWST member stated:

> ‘‘*…although the nomination must be done at a community gathering, it is not done that way. The chief’s and the opinion leaders nominate their favourite into the WSMTs and present*

them to the community. The community members and the DWSTs are not able to question the act because the chiefs are powerful and considered the landlords of the communities''.

The WSMT adopts a constitution and relevant bye-laws, in accordance with the District Assemblies Model bye-laws for the establishment and operations of WSMTs. The DA, then, must publish an announcement of the acceptance of the WSMTs. The WSMT membership list is submitted to the DA for recognition, and the subsequent authorisation of its members to operate in the area. The DA formally inaugurates and introduces its composition to the District members and unit committees. According to the study, the Districts water and sanitation teams confirmed that all the due regulations were followed in the formation of the WSMTs. The Regional Director of CWSA stated WSMT must have a minimum of 5 and a maximum of 9 members.

Gender Composition of WSMTs

The study maintained that the WSMTs used for the study had membership ranging from five to nine. According to the District Operation Manual (2014), a gender balanced (minimum 30% women) WSMT is required, consisting of 5-9 members before the implementation of the water system. Table 12 shows the gender representation of the WSMTs. According to the study, Tinkong, Saforo and Porponya WSMTs satisfied the gender requirement. As at the time of the study, the remaining 5 of the WSMTs had not satisfied the gender requirement of the WSMT composition.

Table 12: The Number of Women in the WSMTs

CWST	Total membership WSMTs	Number women	Percent of women
Otwitiri	7	2	29
Tinkong	7	3	43
Saforo	6	3	50
Mangoase	8	2	23
Apimsu	6	1	16
Porponya	6	3	50
Sikaben	8	2	25
Akatawia	6	1	16

Source: Field Survey (2018)

The WSMTs mentioned that the gender requirement is satisfied before the implementation of the water systems but it is not given the needed attention when the communities want to reconstitute the WSMTs. Since the reconstitution of the WSMTs is not monitored by the DWSTs, the local leaders do not adhere to the required gender representation. The study revealed that all the 8 WSMTs have been reconstituted. According to the study, the reconstitution of the WSMTs occurred as a result of the influence of the chief's or the Assemblymen, worker transfer, voluntary exit, interference from work and to avoid derogatory remarks from the community. A female respondent of WSMT stated:

> ''*...we had to change the WSMTs because 3 workers from the community who worked at the District had been transferred and 2 members (the chair and a member) also notified the elders of the community that they should be replaced. Among the 5 people, 2 were women but only one*

woman was considered for the replacement. In this case, the gender requirement was not applied to ensure fair gender representation.''

According to the study, a member of the WSMT stated that sometimes the community want to deliberately add women that are effective to the WSMT but unfortunately the women refuse. He added that the community then have to convince some men to join the WSMT.

The non-participation of women in decision-making on the design, planning, implementation and management of water supply projects in developing countries is a major obstacle to the improvement of well-being (World Bank, 1998) and long-term sustainability. A focus group discussion revealed that low education, reproductive role, cultural issues, ignorance of the WSMT formation requirement and poor involvement in the project planning and implementation are the reasons for the absence of women from the WSMTs. According to Laryea *et al*., (2008), women were reluctant to take up positions in water and sanitation committees. Participation of gender in planning and implementation of water and sanitation is very important. A female respondent in a FGD indicated:

''*I have many things to do from morning to evening. I have to prepare for the children to go to school, I go to the farm and return around 3:00 pm and continue with my household duties to end the day. I do not think I will be committed to the water and sanitation work. Since the men have some time to spare let us allow them to do the work*

for the community. Even if we are part of the WSMT it is the men who will do everything, our presence will not change anything in the WSMT.''

Another female respondent in a FGD stated that women are to be part of the WSMTs. She indicated women should have been told deliberately to select some of their colleague women to be part of the WSMT. She mentioned that the WSMT is dominated by the men; however, the addition of women will help in keeping the funds generated from the fetching of the water. She stated *''I was in the community when all the water systems were implemented. However, if you ask me the processes before the implementation of the water project I will not be able to tell you.''* Communities that are privileged to have access to water facilities cannot always boast of a thorough knowledge about events preceding the provision of the facilities as well as ensuring their sustainability (Dzisi & Obeng 2013).

The positions of women in the WSMTs determine their influence and control of the rural water supply systems. Although education, culture, reproduction role and other factors inhibit women active participation in rural water supply system management, it is important that deliberate attempts are made to position women in WSMTs to improve the sustainability of the water systems. Table 13, shows the positions women held in the WSMTs.

Table 13: Position of Women in the WSMT

Response	Women in WSMT Positions	Men in WSMT positions
Chair	0	8
Treasurer	5	3
Secretary	2	6
Caretaker	1	7
Organiser	1	7
Hygiene Promoter	4	4
Member	4	4
Total	17	39

Source: Field Survey (2018)

The minimal representation of women in the WSMTs showed in the positions held by women in the WSMTs. The study shows that all the WSMTs used in the study do not have a woman as a chair. From Table 13, the study revealed that there is no woman chair for any of the WSMTs. Five women were treasurers, 4 hygiene and sanitation educator and 4 members of the WSMTs were women. These positions are considered reserved positions for women because of their reproductive role.

The study shows that, the important positions of the WSMTs are occupied by men. This reflects the popular norm that men are natural leaders. Khosla and Ahmed (2006), identified lack of confidence, lack of leadership and lack of support from husbands or family as hinders of women taking leadership roles. According to the study, a chair of a WSMT described the reasons for the inability of women to hold high positions as the men always try to push the women to higher positions in the WSMT, but they always give many excuses when they make the attempt. He stated that for his community

any time the women are ready for any position in the WSMT, the community and the WSMT are ever ready to give it to them. He further mentioned that for his community they do not discriminate against women.

According to the study, a community woman reiterated that:

> ‘‘*some of the positions are very demanding. Sometimes it calls for travelling and I am not ready to make those travels because of my family. If I am made a chair, I will have to travel very often to the District office. In my absence from home who will take care of my children when they come back from school. Moreover, am not educated to go for meetings and have very fruitful discussions with the educated at the District. I know that the official language for the meetings is the English language and possibly writing which I cannot do.’’*

Higher level of education is an important requirement for participation (Nisha, 2006; Helliwell & Putnam, 2007). According to the study by Glaeser, Ponzetto, and Shleifer (2007), education exerts strong positive impact on social and political actions like taking part in community-based projects, attending seminars, writing letters or contacting public officials, and registering to vote. The required percentage of women in the WSMT is a basic requirement for the selection of a community and subsequent implementation of the water system. Rural communities are required to satisfy this requirement before the implementation of the water facility. Since non-compliance with the guidelines exclude communities as beneficiaries of the water systems, the guidelines were largely adhered to. However, Djegal, Price

and Acquaye (1996) noted that this does not always result in meaningful gender representation in the decision-making process in some communities because very few women are given the role of secretary or treasurer and hardly chairperson.

The inadequate representation of women in positions of the WSMTs affects the decision-making processes of water supply in rural communities. Wijk-Sibesma (1998), maintained that assumption has been created that women fit the treasury position better in water committees than men. However, UNDP (1990) has revealed that the question of women's involvement in water supply management mainly depends on their attitude. This is because some donor-aided projects provided equal training opportunities to both women and men but unfortunately, women attended poorly as a result of poor motivation (Makule, 1997).

According to a respondent of a focus group discussion, contrary to the views of the men in the WSMTs, she stated the women are prepared and ready to take part in the WSMTs and even take positions but the men have occupied all the positions. She further stated the men are always in the majority so whatever they say becomes the final decision. Studies have shown that many women realise how crucial their involvement in the management of water and sanitation work is, but they are very conscious about how they state their demands or else they may be branded as social misfits (Binamungu, 1993; Singh, 2006; Tam, 2012).

Women representation is important for rural water supply management systems. Females protect and maintain water resources and determine water storage and use, which affects the health of children and other family members

(Asiimwe & Naiga, 2015; Asingwire, 2008; Mpalanyi, Kabonesa, & Staines, 2015; Upadhyay, 2004). Compared to men, women bear the burden of insufficient water access, as they are not only expected to walk long distances in search of water, which puts their safety at risk but are also expected to care for the sick family members as a result of waterborne diseases and their other domestic tasks (Mpalanyi, Kabonesa & Staines, 2015; Mugumya, 2013).

Initial Motivation before the acceptance to be part of the WSMT.

Motivation has been discussed as a reliable means to encourage people to work. The motivation to be part of a group and work to achieve required outcomes of the group varies from person to person. Table 14 shows what motivated the nomination community members to be part of the WSMTs.

Table 14: Motivation to be a Member of the WSMT

Response	Freq	Percent
water supply for the community	2	3
As a service to the community	24	44
To ensure water supply, service to community and for respect	9	17
To ensure water supply and service to the community	2	4
For respect	10	19
To help reduce water diseases	7	13
Total	54	100

Source: Field Survey (2018)

Table 14 shows that WSMTs members have different reasons for accepting their nomination into the WSMTs. The study shows that 24 respondents (44 percent) specify their reason as service to the community, 10 respondents (19 percent) mentioned respect and 7 respondents (13 percent) indicated their desire to reduce water-related diseases.

According to Kwashie (2007), user committees improve in their work when they are motivated. The motivation of WSMTs is a very critical issue in the management of rural water supply systems. The study revealed that most of the community members accepted to join the WSMT because of the initial expectation of monetary reward. Although the respondents did not show money as a motivation, most of them mentioned monetary reward during personal discussions with them. They stated that monetary reward was an initial expectation before they became members. According to the findings of the study a DWST member cited that some WSMTs secretly pay themselves allowances from the revenue generated from the sales of the water. In a personal discussion with a WSMT member, he described his opinion as:

> *''...I became disappointed when after 6 months I did not get any money for my commitment. I invest a lot of time in the work so I expect some small cash. Now I will not allow my work as a hand pump caretaker to interfere with my personal activities. Since I am not given any monetary reward, I only use my spare time to work on the water systems. My brother, my colleagues also share the same opinion in this reward issue*''.

Members who were disappointed in their monetary expectation reduce their commitment level which normally affects the management of the systems of the boreholes. According to the study by Katakweba (2001), most projects based solely on voluntarism were not sustainable. The study by Scott (2001) shows that the reduced commitment will manifest in non-functional user committees, inability to collect fees, meetings being hardly held or held irregularly, and records not being properly kept and maintained.

According to the study, a hygiene and sanitation educator stated that her motivation as a WSMT member is to provide services to the community. She said the communities she lives in must also benefit from her. She added she is providing service in the WSMT as her little effort to ensure regular flow of water to the community. She further stated as a teacher and the hygiene and sanitation educator in the community, she uses her knowledge to educate people on how to keep their bodies and their environment clean. She confirmed that her hygiene and sanitation education will go a long way to improve the well-being of the people in the community.

A WSMT member mentioned that:

> ‘‘*…some years back, water-related diseases dominated in this village. This made a lot of people sick and some even died. As a member of the WSMT, I am helping to provide sustainable water supply so that people do not fall sick. This means I am not wasting my time but rather investing it into the welfare of the community.’’*

The Work of the WSMTs in the Management of Rural water Supply Systems

The work of the WSMTs is very important in the sustainable management of rural water systems. The work of WSMTs is carried out through effective collaboration with other stakeholders. The community members are given the chance to nominate people at a community durbar to form the WSMT. The WSMT must comprise of 30 percent mandatory female representation. The function of the WSMTs are setting of tariffs, collection of fees for water services, fixing minor repairs, routine maintenance, keeping

financial records, promotion of hygiene and sanitation, organising of meetings, serves as a link between the community, development partners and the Districts on water and sanitation issues. WSMTs must also use the surplus from the fees collected to redevelop additional water systems to serve the water needs of their communities.

Maintenance of the Water Supply Systems and User fees

Operation and maintenance of the water systems are very critical. According to the CWSA (2016), the WSMT must prepare a work plan and budget for Operation and Maintenance (O&M). The construction consultant must prepare system-specific O&M manuals, which have to be submitted to the community/WSMT. Routine maintenance must be carried out in accordance with the O&M manuals prepared by the construction consultant of the water facility. The manual also provides technical information on routine maintenance and other relevant information that the WSMTs must know for effective management of the water supply systems. The maintenance schedule of the project manual must help the WSMTs to prepare a contextual maintenance schedule for the water systems. A well-followed maintenance schedule reduces frequent breakdown and also improves the lifespan of the water project.

The study revealed that all 8 WSMTs do not have the project manual. The WSMTs could not show any material prove of the project manual and maintenance schedule for the management of the water system. A respondent expressed the following on the maintenance schedule:

> ‘‘*we only deliberately do maintenance when there is a breakdown or when we notice early signs of breakdown. I*

think a maintenance schedule would have made the boreholes to stand the test of time. We have also not received any manual from anybody or institution to help us in the maintenance of the boreholes. The manual is very important because there is a manual for every new product. Products mostly last long when used based on its manual. The presence of the manual would have given us some clue in the use, management and maintenance of the boreholes''.

The study followed up to check at the Works Department and the DWSTs whether the water projects manual existed. The study shows that the Works Department and the DWSTs maintained that the project manuals are prepared. However, the Works Department and the DWSTs could not prove the material existence of the manuals. The Districts must make the project manual available to the WSMTs to enable them to have adequate information on the water systems. The manual helps the WSMTs to prepare contextual maintenance schedule plan for the water systems. In the situation that the project manual does not exist, the Works Department can prepare a generic manual for the WSMTs. The Works Department and the DWSTs must also provide effective monitoring to ensure the use of the manuals.

Although the project manual is very important, the generation of funds to maintain the water systems cannot be understated. The study shows that all the eight WSMTs do not make enough money to cover the cost of repairs for the water systems. The high poverty level in rural communities does not allow for a realistic levy on water services. This has encouraged shadow pricing for

water services. User committees are forced to adopt what Bannock *at el.*, (1987) described as shadow pricing. This is a concept applied to situations where the actual price cannot be charged or where actual prices do not reflect the real costs of a specific activity. According to Brikke (2000), the capability to pay for water services is principally a function of income and cost of living, which in turn is a function of employment. The WSMTs are forced by the prevailing circumstances to charge lesser amounts that barely covered the high operational and maintenance costs in the management of the rural water systems.

According to the study, refusal to pay water fee by some members of the community, inability to ensure payment from water users from prominent families, poor systems to ensure payment and deferral of payment are the major payment issues affecting revenue mobilisation. The study by Baum and Tolbert (1985) specified full cost-recovery in rural areas is particularly problematic. The study further states full cost recovery for rural water supply is an unrealistic goal because most of the rural communities cannot afford to pay for the capital costs in the context of communal models (Harvey, 2007; Maganga *et al*., 2002; Rukunga *et al*., 2007). A respondent acknowledged that:

> ‘‘*the maintenance schedules are very important but if we have a maintenance schedule in place and there is no money how can it be done. Mr. Angmor (the name of the researcher), the problems about the water systems can be minimised when enough money is generated for their maintenance. Currently, the majority of the people fetch the*

water for free and those who pay are not many to generate enough revenue to cover the expenses''.

The ability of water projects to serve community water needs for a long period is relevant in rural water sustainability discourse. According to CWSA (2016), a sustainable rural water project must function for at least seven years. This is probably more achievable when the local committees formed for the management is provided with the appropriate tools to work. The proper function of the committee is sometimes dependent on the leadership skills of the chair and the commitment level of the chief in the community. When these two major individuals are motivated enough, it trickles down to the performance of the WSMTs. A respondent revealed that a community without a chief cannot manage water and sanitation issues appropriately.

The respondent indicated that the involvement of the chief motivates the whole community to participate fully in the water and sanitation concerns of the community. The study revealed the chief is a role model so his commitment to the water systems can positively affect the community's commitment. A chair of a WSMT stated that community leaders are very important in ensuring that the teams work effectively for continuous water supply. The Regional Director of the CWSA indicated that communities with dynamic chiefs do not often encounter problems with the operation and maintenance of their water systems because they are committed and closely linked to the work of the WSMTs. The study by Braimah and Fielmua (2011), supports the assertion that chief's and elders are important in community water and sanitation management.

Organisation of Meetings and Records Keeping by the WSMTs

The WSMTs must organise meeting among themselves and with the community to discuss issues about their water and sanitation. This makes the community to be part of the process for collective decision making. Table 15 shows the number of times the WSMTs meet in a month to discuss water and sanitation issues of the community.

Table 15: Average Meeting Times in a Month

WSMTs	Response
Otwitiri	2
Tinkong	1
Saforo	1
Mangoase	2
Apimsu	1
Porponya	1
Sikaben	1
Akatawia	2

Source: Field Survey (2018)

WSMTs must organise meetings to deliberate on water and sanitation challenges and opportunities of the community. The WSMTs must also organise meetings with the community to update them on the current water and sanitation issues.

Proper records of the WSMT meetings must be kept and be up to date. The records are examined by the DWSTs during monitoring to ensure that the administrative records of the WSMTs are well prepared and kept. Table 15 shows that the highest number of meeting times per month of the WSMTs is twice. A respondent noted that:

> ‘‘we *call for meetings twice in a month but it is only one of the meetings that we get about half of the WSMT members. Poor meeting attendance is one of the major problems of the WSMT. People give a lot of excuses when it is time for meetings. Without the meeting, we cannot take major decisions and hence it is difficult to find solutions to the community water and sanitation problems.’’*

A chair of a WSMT revealed that the WSMT only make deliberate attempt to organise meetings when any of the water systems break down. This is not very helpful for the maintenance of the water systems. He stated if the WSMT meets regularly most of the problems would have been solved. He specified that because the WSMT do not meet to discuss issues, minor problems that could have been solved easily develop into major problems which require more funds to repair. A member of the WSMT reiterated that because the WSMT do not meet and minute books are not kept up to date, issues discussed are not followed to a logical conclusion. He stated sometimes the WSMT duplicate effort on already discussed issues. The study identified that this is happening because the WSMT do not have proper records on already discussed issues. The study identified that sometimes people assigned to do certain work argue that such responsibilities were not given to them at the previous meeting.

Since membership of the WSMTs change overtime, documentation must be prepared and kept to maintain easy continuation of the work of the previous WSMTs. A secretary of a WSMT stated their WSMT was reconstituted in 2017. She indicated a request to her predecessor to transfer the

necessary documents to her but never received any document. The study shows that transition processes were congested with many problems hence the necessary documents were not transferred to the newly nominated persons to continue with the record-keeping. All the WSMT respondents indicated that there is a secretary in their WSMT. According to the study, all the WSMTs did not have proper records of their meetings. A frequent change in the membership of the WSMT is a major setback. Chieftaincy and political interference are major influence in the formation and changes in the WSMTs.

A former chair of a WSMT remarks:

> ‘‘*…the dissolution of the WSMT was as a result of interference from the chief of the community. The chief thought the WSMT was generating plenty of money. Because of that he deliberately dissolved the WSMT and put his favourites there so that they can have access to the money collected from the sales of the water. WSMT is not motivated and sometimes we have to use our own money to top up the money generated from the sales of the water in order to do minor and major repairs. We were even happy when we were told to halt operation for new people to take over’’.*

The Regional Director of the CWSA reiterated that a chief stopped all funeral rites in the community because the WSMT refused to give him the money he demanded to perform funeral rites in the community. This assertion was emphasised by a DWST as local chiefs demand money from the WSMTs. She

indicated that refusal to release the money mostly leads to a change in the membership of the WSMTs through the influence of the chief.

Repair of Broken-down Water Supply Systems, Water Quality Testing and Bank Accounts.

The rate at which broken down water systems are repaired is very important for uninterrupted flow of water. According to the CWSA (2016), broken down water systems should be repaired within 3 days. In all the study areas, broken-down boreholes take more than 3 days before they are repaired. The study shows that it takes longer days to acquire spare parts. Therefore, it takes longer than 3 days to repair faulty water system. Table 15 shows that all the WSMTs could not meet the requirement in the number of waiting days of borehole repair.

Table 16: Waiting days to Repair Faulty Water Systems

WSMTs	Days
Tinkong	84
Saforo	90
Otwitiri	63
Mangoase	48
Apimsu	24
Porponya	23
Sikaben	25
Akatawia	95

Source: Field Survey, (2018)

According to Table 16, the waiting period for the last repairs of broken down water system of all the communities exceeded the 3 days waiting period. This means that the community members might use unsafe alternative water sources. This implies that the health status of the communities might not be

sustainable. The use of clean water must be continuous to prevent the contamination of the human body. There must be readily available spare parts dealers and well-motivated area mechanic to carry out speedy repair request from WSMTs. An Area Mechanics is a specialised trained person who undertake repair of broken down boreholes.

A respondent of the WSMTs indicated that the spare parts dealers are in the district capitals; hence it is very difficult and expensive to move them to the rural community to work on their water system. The study revealed that the cost of the travel, spare parts and service are high. The WSMTs are not able to mobilise enough funds to pay for the overall cost. A hand pump caretaker of a WSMT stated that:

> ‘‘*we have disappointed the spare parts dealers and the mechanics several times. Because of that, currently they do not take us seriously. We call them and they promise to come but we never see them. Others tell us to send them money to cover their travelling, the spare part and the service they will render before they come.*’’

A respondent who is a chairperson of a WMST reported the money generated from the boreholes cannot even meet the cost of repair halfway. The respondent stated the money charged for a bucket of water is 20 pesewas. The respondent further specified that it takes a long time to even generate 1,000 Ghana cedis to replace the expensive parts of the water system.

Water sampling and testing is a very important activity in the management of rural water systems. This is carried out after the construction to determine the cleanliness level of the water. Water sampling and testing

must be conducted annually to determine the suitability of the water source. Table 17 shows information on water quality testing during construction and the annual testing

Table 17: Water Quality Sampling and Analysis

Response	During implementation		After implementation	
	Frequency	Percent	Frequency	Percent
Performed Water quality testing	54	100	5	9
No Water quality testing	0	0	42	78
Sometimes Water quality testing	0	0	7	13
Total	54	100	54	100

Source: Field Survey (2018)

According to the CWSA (2016), water quality sampling and analysis are performed yearly by recognised institutions and paid for by the community. Water quality testing of small communities' water supply systems is performed at least once a year after commissioning. Water quality testing is done during implementation and after implementation. This is done to monitor the consistency of the cleanliness of the water from the water system every year.

The study showed 54 (100 percent) respondents stated water quality testing is carried out during the implementation of the water systems. The study showed 42 respondents (78 percent) maintained the annual water quality testing and analysis are not done and 5 respondents (9 percent) indicated water

quality is done. The 9 percent of the respondents stated that although they stated that the water quality testing was done, the study observed that the water quality testing was done about 4 to 6 years ago. Community members indicated that some of the water systems are functioning but are not used because the water from those water systems is not potable. The inability to conduct water quality testing has contributed to why although some of the water systems are functioning, the community members are not using them. A community member respondent indicated that:

> ''…we *prefer the water from our stream in the village because the taste and the smell of the water from the stream are better than some of the boreholes in the community. We cannot drink water that does not taste good and has a bad smell. My son (the respondent referring to the researcher) we have told the WSMT several times that they have to do something about the situation but nothing has changed. We have now found our reliable source of water and we are fine''*

A check from the Works Department revealed that the annual water quality testing is not carried out because of the inadequate funds generated from the sale of the water. The WSMTs are not able to raise enough funds to support the annual testing of the water quality. According to the study a head of the Works Department mentioned that water quality testing is expensive; therefore, the District must fund it. He revealed that the communities do not have the financial capacity to undertake water quality testing. He further stated

the money collected from fetching the water is too low to fund the yearly water quality testing.

According to the CWSA (2016), the WSMT must own a bank account to keep the funds generated from fetching water from the water systems. The WSMT must have an up-to-date cash book, and the WSMT is required to render account on an annual basis to the community. The WSMT must open and manage three bank accounts. The operational account; weekly payments are made into this account from water sales and other receipts and regular operation and maintenance costs are paid from this account. The second account is the capital account.

It is used for major repairs, extension and rehabilitation. It must receive a monthly payment of not less than 20% of the net monthly revenue (after regular O&M has been paid). The Districts may allocate funds annually through its regular budgetary allocation to the capital fund. The third account is the sanitation account. It is used to promote sound sanitation and hygiene practices. It receives a monthly payment of at least 10% of the net monthly revenue. The Districts may allocate funds annually through regular budgetary allocation to the account.

Auditing must also be carried out by the DWSTs quarterly to ensure accountability in the use of the funds. According to the study a bank account has been opened, but no proper accounts are kept. The study revealed that all the WSMTs only acknowledged having the operational account. The accounts were opened at the rural banks. A check at the District shows that all the accounts were opened before handing over the water systems to the WSMTs. The study shows all the accounts were opened thus the operational, capital and

the sanitation accounts; however, they are not operational. The study requested a proof of the opened accounts but all the WSMTs could not show material evidence. A member of a WSMT specified:

> ‘‘…*before the handing over of the project we were required to open all the bank accounts but all these accounts have become dormant because we could not generate funds into them. I am convinced all the accounts we opened might have been closed by now. My brother it has been a long time we check the accounts, if I am not incorrect it is over 6 years’’.*

A DWST member stated that the accounts with the rural banks are always empty. The money the WSMTs collects for fetching the water do not go through the banking systems which makes accountability difficult.

Functionality and Reliability of the Water Supply Systems

Accountability of the WSMTs to community members on the functionality and reliability of the water systems is very important for the continuous flow of water. The WSMT must account for their operations and the management of the water systems to the community. The constant flow of water and the dependence of the flow are very important in the improvement of the well-being of the rural people. The regular flow depends on the effective management of the water systems. The systems must be managed very well through the efforts of all the stakeholders. Table 17 shows the total number of water systems, those that are functional, partially functional and non-functional.

Table 18: Functional Status of the Water Systems

Community WSMTs	Number of water supply systems	Functional	Partially functional	Non-functional
Otwitiri	4	1	1	2
Tinkong	4	1	2	1
Saforo	3	1	2	0
Mangoase	4	2	0	2
Apimsu	3	2	0	1
Porponya	3	0	2	1
Sikaben	2	1	0	1
Akatawia	3	2	0	1
Total	26	10	7	9

Source: Field Survey (2018)

The study by Sun *et al*., (2010) reported that households exhibited high satisfaction on the reliability and functionality of their water supply systems due to the presence of the water committee. The functionality and reliability of the water supply systems are very important in measuring the sustainability of rural water systems. According to the CWSA (2016), functional boreholes are the water systems that produce water from the spout after 5 strokes. Partially functional boreholes are the boreholes that produce water from the spout after more than 5 strokes and non-functional boreholes do not produce water from the spout regardless of the number strokes.

Table 18 shows that, in all the 8 communities, there were 26 boreholes. Out of the 26 water boreholes, 10 are functional, 7 were partially functional and 9 were not functional. From the situational figures presented by the study, there might be pressure on the few functional water systems in the communities. The pressure on the few performing water systems can

negatively affect the resilience and the long term functionality of the water systems. The high number of faulty water systems presented in Table 18 implies that the existing functional boreholes might not be able to meet the domestic and commercial water demands of the community population.

The number of partially functional and non-functional boreholes suggests that the institutional arrangements for the management and sustainability of the water systems are not working to expectation. Validation of the data from the Works Department on the functionality of the boreholes shows that the Departments in the Districts are not privy to the current situation of the water supply systems. A member of the DWST attributed it to inadequate funds and logistics to visit the communities and update the data of the District. The engineer of the Works Department stated:

> *''...yes I will not challenge you on the level of breakdown of the water systems. I can only challenge you if the District has adequate data on the water systems. Genuinely we have severe problem with data collection. Sincerely as the Engineer of the District because we do not get enough funds for water and sanitation issues, we find it difficult to visit the systems to fix the problems.''*

The heads of the water and sanitation unit attributed the inability to complete the District profile on water and sanitation to inadequate funds and logistics to visit the communities. They indicated more resources were needed to work with the rural WSMTs because the communities were scattered in the Districts. According to a chief, since most of the boreholes are not functional, some of the community members have now decided to use alternative sources

of water that are not clean for drinking and for other uses. The reliability of the water system is very essential in community development. Rural water systems must continue to function to provide the required quantity and quality of potable water for community use. Table 19 shows the number of days the boreholes serve the communities in a year.

Table 19: The Reliability of Water Flow through the Year

CWST	Number of Boreholes	Number of boreholes that provided 345 days of services within the year 2018.
Otwitiri	4	1
Tinkong	4	1
Saforo	3	1
Mangoase	4	2
Apimsu	3	2
Porponya	3	0
Sikaben	2	0
Akatawia	3	2
Total	26	9

Source: Field Survey (2018)

According to the CWSA (2017), the accepted reliability standard of water system is 345 functional days per year. Regular flow of rural water supply is very crucial in the health status of the people. Long interruption of the flow of water may compel community members to use unsafe water sources. The study revealed that only 9 out of the 26 water supply systems supplied water for 345 days last year (2018). According to Table 19, Saforo, Porponya and Sikaben do not have a water system in their communities that supplied water for 345 days. In these communities, the certainty of water flow is low; hence, there is the use of unapproved water sources as an alternative.

The chair of the Porponya WSMT indicated that:

> *''...I am very convinced that all the water systems in the community cannot meet 345 functional days per year. Our water systems are too old, they have to be replaced. I know the WSMT must mobilise funds for the development and replacement of the water systems but unfortunately not much money has been raised for that. The District must come to our aid to support the WSMT to repair, develop and replace the water systems for us''.*

The reliability of the water supply systems is very much dependent on the effective functioning of the head office of the CWSA and the CWSA regional offices, WSMTs, and the DWSTs. There are disconnections among these major stakeholders within the institutional arrangement, which negatively affects the reliability of the water systems. Although the coordination that must exist to make WSMTs operational is documented they are not practiced.

Frequent breakdown of boreholes is a major setback to the reliability of boreholes in rural communities. Table 20 shows the rate of breakdown of the water system in a year.

Table 20: The Number of Times the Water Systems Break down in a year

CWST	Break down per year
Otwitiri	4
Tinkong	5
Saforo	7
Mangoase	5
Apimsu	4
Porponya	3
Sikaben	8
Akatawia	5
Total	41

Source: Field Survey (2018)

According to Hunter *et al*. (2010) it is relatively easy to increase coverage through construction of water supply systems, but it is much more difficult to ensure that such systems continue to provide service over the long term.

According to the study, most of the breakdowns are caused by excessive pressure on the water systems, old water system, and poor routine maintenance. According to a respondent the borehole close to her home is always broken down which mostly happens during the dry season when water is very scarce.

It makes the season very difficult as the rains do not come during those seasons. This situation puts much pressure on the other two boreholes that are functional during those periods. According to the study, most of the breakdowns are in Saforo and Sikaben. The respondents maintained that there are regular breakdowns because the existing boreholes are old and not adequate to serve the communities. A community member noted that this has put pressure on the few partially functional boreholes in the communities. A female respondent in a focus group discussion described the cause of the frequent breakdown as the existing boreholes in use are very old. The functional boreholes are few hence there is much pressure on them. She stated the need to repair those that are broken down to support the functional boreholes. She said this is the only way we can sustain the water supply systems for the regular flow of water.

The study investigated the availability of spare parts to repair boreholes. Table 21 shows respondents' responses to availability spare parts to maintain the boreholes.

Table 21: Availability of Spare Parts for Repairs

	Spare parts available		Spare parts not available		Sometimes available		Total Freq
Community	Freq	Percent	Freq	Percent	Freq	Percent	
Mangoase	2	3.70	3	5.56	2	3.70	7
Apimsu	0	0	5	9.26	3	5.56	8
Porponya	1	1.85	4	7.40	2	3.70	7
Sikaben	0	0	3	5.56	4	7.40	7
Akatawia	0	0	5	7.40	0	0	5
Otwitiri	0	0	4	0.78	3	5.56	7
Tinkong	2	3.70	3	5.56	2	3.70	7
Saforo	3	5.56	3	5.56	0	0	6
Total	8	14.81	30	55.56	16	29.62	54

Source: Field Survey (2018)

From Table 21, 55.6 percent of the respondents agreed that spare parts were not readily available for repair works. The head of the water and sanitation planning analyst at the CWSA (Head office) stated that individuals are trained in the districts for the manufacturing of simple spare parts to service rural community water systems. The study shows that the area mechanics play dual roles as the manufacturers and the area mechanics.

An area mechanic mentioned that most of the rural communities he sells spare parts to, do not have the funds to pay for his services; hence, he does not give them urgent attention. He further stated that, sometimes, he has to provide services on credit for them, which they hardly pay and even sometimes do not pay. A chair of a WSMT stated that:

> ‘‘*mostly the spare parts are readily available but the fund to pay for them to be fixed is the main problem. I think if we are able to generate enough money from the water services,*

we will be able to pay the spare parts dealers. If we begin to pay them on time, anytime we call them they will be ready to provide them because they know when they travel and come, they will get their money for the spare parts and the services they will provide''.

Table 22: The Duration it takes an area mechanic to go and fix faulty water systems

CWST	Response (in months)
Otwitiri	3
Tinkong	4
Saforo	2
Mangoase	2
Apimsu	3
Porponya	6
Sikaben	8
Akatawia	6

Source: Field Survey (2018)

According to Mazango and Munjeri (2009), quick response to broken down facilities in ensured continuous supply of water. From Table 22, most of the rural communities in the Akuapem North Municipality have a shorter time in accessing spare parts, compared with the communities in the Upper Manya District. According to the WSMTs respondents in the Akuapem North Municipality, their proximity to Accra and Koforidua is an advantage in terms of access to spare parts.

The study shows that the communities have mechanics at Accra and Koforidua who they rely on for repair services and purchase of spare parts. Porponya, Sikaben, Akatawia and Tinkong repair works take more months for

the water facility problems to be solved. The study shows that, in this situation, there will be much pressure on the other boreholes. Other community members use other unsafe options available to them in the community. These unapproved sources may have water-borne health implications on users.

Community Participation in the Management of Rural Water Systems.

The involvement of the community is very important and contributes to sustainable rural water systems. The ability of the WSMTs to properly account to the community goes a long way to ensure the sustainability of rural water systems. In order to ensure accountability, the community must know the operations of the WSMTs. Community awareness of the functions of the WSMTs improve the commitment level of the community members to the WSMTs and the water systems.

Community responsiveness to the functions of the WSMTs influences the community to provide the needed support to the WSMTs to make them function effectively. According to the CWSA manual (2016), the WSMTs are responsible for repairs, hygiene promotion, water and sanitation, development of new water system and organisation of community meetings to discuss water and sanitation issues, collection water levy, sharing water accounts with the community members and collaboration with District on water and sanitation issues. Table 23 shows community knowledge of the functions of the WSMTs.

Table 23: Community Knowledge on the Functions of the WSMTs

Response	Frequency	Percent
Organise clean up	20	6.04
Help in providing clean water	103	31.12
Maintain a clean environment	40	12.08
Repair of borehole	8	2.41
collaborate with the DWST	2	0.60
Collection of water levy	73	22.05
Organise meetings with community	22	6.65
Hygiene and sanitation promotion	35	10.57
Construct additional boreholes	20	6.04
Prepare and post accounts on community notice board	8	2.42
Total	331	100

Source: Field Survey (2018)

From Table 23, 20 (6.04 percent) respondents indicated that WSMTs organise clean-up, 103 (31.12 percent) respondents said WSMTs help to provide clean water, 40 (12.08 percent) of the respondents indicated that WSMTs ensured clean environments, 8 (2.41 percent) of the respondents mentioned WSMTs repair the borehole, 2 (0.60 percent) of the respondents mentioned collaborating with the DWST and 73 (22.05 percent) respondents cited collection water levy and 22 (6.65 percent) respondents mentioned organisation of meetings with the community.

Additionally, 35 (10.57 percent) respondents stated hygiene and sanitation promotion, 20 (6.04 percent) said construction of additional boreholes and 8 (2.42 percent) respondents stated preparation and posting of account on community notice board. A respondent who is a teacher noted:

> *''I came to stay in this community 5 years ago. I know one of the duties of the WSMTs is hygiene and sanitation promotion. I also know that there is a person in charge of hygiene and sanitation education. Sincerely for the past 5 years this duty of the WSMTs had not been performed. I think the WSMT must function if we expect good outcomes.''*

The study by Singh (2007), reported that the participation of local communities in water systems is important for ensuring sustainability. Low community knowledge of the duties of the WSMTs negatively affects community monitoring and evaluation of the activities of the WSMTs. When local people do not know the functions of the WSMTs, they are not able to know whether the WSMTs are performing to expectation or not. A respondent stated that the WSMT is responsible for the boreholes and sanitation problems in the community. Unfortunately, the focus of the WSMT is only on water excluding the sanitation duty. This is occurring because the water system gives the WSMT money whilst the sanitation does not bring in any revenue. The study shows WSMT must expand its work to cover the sanitation issues since it is part of their work.

Community water and sanitation issues are interrelated. Low achievement in one may cause a decline in the achievement in the other. In most rural water projects there is an overemphasis on water to the neglect of sanitation concerns. Rural water supply without the consideration of the effects of sanitation on its sustainability is very challenging. The total neglect of the sanitation component of rural water supply over a period of time can

contaminate water sources. This will inhibit community's efforts from the full benefits of quality water supply. A female respondent explained that although the WSMT is not fully functional they have been able to keep 2 boreholes partially functional out of the 5 boreholes provided. She mentioned if it had not been the WSMT, the 2 boreholes currently supporting the community would have been broken down just like the other three boreholes. She appreciated the efforts of the WSMT.

A respondent in one of the FGDs described there is always a woman at the borehole collecting money from people who fetch water from the water facility. So, for the collection of revenue he said was good but when it comes to repair work, it takes a very long time to fix the problems. The discussions showed there is generally no money to buy spare parts and also pay the area mechanic. Most community water project committees collect regular fees for the maintenance of water projects, but not enough revenue is generated to support the maintenance plan of rural water projects. Rural communities are mostly a hub for poor people; therefore, most water users are not able to pay for the realistic price for water.

This situation compels the managers of rural water projects to use shadow pricing. Since the fee is not realistic, it is not able to cater for the cost of the frequent rural water breakdowns. The unrealistic charges prevent water project user committees from fixing broken water systems within the 3 days maximum allowed time. The study shows that the communities do not have adequate information on the challenges of revenue mobilisation. It is important the WSMTs provide

adequate information to the community to help bring different innovative ways to mobilise revenue to sustainably manage the water systems.

There was a common response in all the focus group discussion that, for the past three years, there were no records posted on the community notice board. According to the CWSA (2014), financial records of the water system should be published quarterly on the community notice board for community members to know the current financial status of the water systems. The report should comprise technical, administrative and financial issues. The report must be presented to the community for discussions and posted on the community notice boards. The finding of the study shows that account and administrative records were not shown to the community members.

The findings of the study maintained that 93 percent of the community members were not aware that it is mandatory for the WSMTs to present financial accounts to them. According to a community respondent the community notice board is present in the community, however, anytime there are rather other notices. The respondent added this is the first time he hearing that financial accounts must be prepared and posted on the notice board for community members to read and ask questions. According to Braimah and Fielmua (2011), Accountability is important for successful management of rural water systems. Since the introduction of the demand-driven approach in water supply and management, community members have been involved in the sharing of information and financial commitments to make the water systems sustainable. However, the main issue is that communities do not have much influence on the management of rural water projects.

Summary

The chapter examined the work of the WSMTs in the management of rural water supply systems. The poor performance of the DWSTs and other factors negatively affects the work of the WSMTs. The WSMTs are not able to raise funds to pay for repairs of the water systems. The people are unwilling to pay for water services because of the high poverty level. Although some community members appreciate the work of the WSMTs, the majority of them do not know the functions of the WSMTs.

There are poor financial accountability, poor records preparation and storage, no maintenance schedule, long waiting time to repair water systems and the domination of men in the WSMTs. There is also overemphasis on water to the neglect of sanitation issues in the communities. The reproductive role of women and low educational status adversely affected women's desire to join the WSMTs. The study identified a lack of monetary compensation to the WSMTs as a major setback to the work of the WSMTs.

To conclude, the DWSTs should build the capacity of the WSMTs to work effectively. Community members must be educated on the functions of the WSMTs. It will help the community to determine whether the WSMTs are working to expectation or not and a better appreciation of the work of the WSMTs. During the formation of the WSMTs, the chiefs and the leaders of the communities should be made to know that the sustainability of the WSMTs and the water systems is partly dependent on their commitment. Modalities should be developed to ensure payment of allowance to the WSMTs as a motivation. The WSMTs must improve on their revenue

mobilisation to enable effective repairs and development of more water systems to support the existing water systems.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The chapter focuses on the summary, conclusion and recommendation of the research work. First, the chapter presents the main and specific objectives of the study. The major findings are summarised and conclusions from the study, and contribution to knowledge are also presented. Recommendations based on the findings are also presented in this chapter.

Objectives of the Study

The main focus of the research was to assess community water and sanitation teams in the management of rural water systems. The study examined the institutional arrangement, the specified duties of the stakeholder, their relationship and how it has influenced the work of the water and sanitation management teams. Specifically, the study sought to:

i. examine the institutional support for sustainable rural water supply systems.
ii. assess the extent of community participation in the management of the water systems.
iii. analyse the performance of the Water and Sanitation Management Teams in the management of the water systems.
iv. make policy recommendations for sustainable rural water supply systems.

Summary of Findings

Institutional Support for Rural Water Supply

The institutional framework for rural water supply is the context to which stakeholders must act to ensure a sustainable provision of water supply systems. The institutional framework shows the relationship that must exist between the stakeholders. The findings of the study show that there is a well-structured institutional framework that governs sustainable rural water supply. However, the relationship between the Districts and the WSMTs is weak for the sustainable management of rural water systems. Although the DWSTs are involved in the formation and training of the community WSMTs, not much has been done on retraining.

According to the study, most WSMTs are not retrained and this prevents them from acquiring knowledge on best practices in the management of rural water supply systems. The DWSTs did not involve the community in the preparation of the District Water and Sanitation Plan. The plan shows a comprehensive context of water and sanitation issues within the Districts. Since community participation in the plan preparation was very poor, the local people could not relate and, hence, could not show any knowledge of its existence.

The study revealed no financial assistance from the Districts on major repairs of rural water supply systems. The finding shows limited financial support from the District for water and sanitation issues. The poor relationship between the Districts and the WSMTs has affected data collection for well-structured community profile on water and sanitation. The Districts used for the study do not have a very comprehensive profile of their rural water

situation. The pieces of information received during the study at the Districts have not been updated for a number of years. This makes the current information irrelevant for water and sanitation planning purposes.

Community Participation

Community participation provides the platform for stakeholders to be part of activities that affect their lives. Community involvement is very important in the sustainability of rural water systems. Community members must participate in rural water projects from the planning stage to the implementation stage. This will progress into effective management and sustainability of rural water systems.

According to the study, community members are involved in the nomination of Water and Sanitation Teams (WSMTs). The nomination is adhered to because it is a prerequisite for the implementation of the rural water project. However, the study shows that in situations of reconstitution of the WSMTs, community members are not involved in the process. The study shows that the process is influenced by community leaders.

The participation of the community members in the operation of the water and sanitation management is inadequate. Information flow from the WSMT to the communities was very poor, especially information on revenue flow and expenses. The study shows that this has negatively affected revenue mobilisation, as the people have lost trust in the financial management system of the WSMTs. The study shows that the institutional arrangement, regulations and supporting documents for the operation of the WSMTs do not show community contribution. The study shows that the documents were prepared without community engagements.

Monitoring of WSMTs by the District Water and Sanitation Teams

External monitoring of the WSMTs by the water and sanitation teams is very essential in the management of rural water supply. According to the study, external financial auditing was not properly carried out for sustainable rural water supply systems. The Districts must prepare a water and sanitation plan that will direct activities of the WSMTs. The study shows that the Districts do not have a well-prepared water and sanitation plan.

Training and re-training of the WSMTs are not done regularly. Although the study indicated higher response of training, the re-training is not organised by the District water and sanitation team due to inadequate funds. The study revealed poor data collection by the District Water and Sanitation Unit. The departments do not have adequate situational analysis on water and sanitation problems and potentials of their rural communities. The situation, according to the study, is as a result of the poor funding by the Districts.

Financing of Rural Water Supply System Maintenance

The finance of rural water systems maintenance was one of the issues that affected effective sustainable rural water supply systems. Since revenue generated was not enough, the revenue could not meet the cost to maintain the boreholes. The study revealed that WSMTs used shadow pricing which could not cover the cost of maintenance and repairs. The study indicates that there was no financial commitment from the Districts. Although the WSMTs must be self-sustaining in the maintenance of the boreholes, the Districts give financial assistance to the communities on major repairs through the works department.

The study indicates that the Districts Works Department could not give the necessary technical support to the WSMTs because of financial constraints. The Districts could not provide adequate funds to support the communities to solve their water problems. Although NGOs have helped in the construction of some rural water systems, however, their financial commitment for maintenance of the water systems was very minimal.

The Operations of the WSMTs

The Water and Sanitation Management Teams are formed by the community members through the facilitation of the District water and sanitation teams. The study shows that the WSMTs are not able to generate enough funds for minor repairs. The WSMTs are responsible for the management of the boreholes for sustainable water supply. The study shows that WSMTs do not perform routine maintenance of the boreholes. The study shows that there is no evidence of the maintenance plans. Hence the WSMTs do not have the maintenance plan to carry out the routine maintenance schedule for the water systems. This has led to frequent breakdown of the boreholes. It shows in the findings that most of the boreholes are partially functional and non-functional. This situation has increased pressure on the few functional boreholes.

Organised meetings were not frequent according to the findings of the study. WSMTs must organise meetings to deliberate on the water and sanitation situation and possible solutions. Decisions taken thereafter are communicated to the community members for feedback. Although the works of the WSMTs are largely on water and sanitation, the study indicated overemphasis on water to the neglect of sanitation issues of the community.

The study specifies that because sanitation does not attract revenue to the WSMTs, no attention is given to the sanitation situation in the communities. Accountability of the WSMTs to the community is very poor and reliability of the water systems is also low.

Conclusion

In concluding the study, the effort of WSMTs in managing rural water supply is inadequate due to many challenges. The institutional support, although well designed, does not work effectively to support the WSMTs in sustainable management of the water systems. Due to poor monitoring, there is no flow of information from the community to the top for effective decision making. This has adversely affected modification of the rational standards in the management of rural water systems. The District does not have adequate data on water and sanitation of the rural communities. The Works Departments are non-existing in the Districts with regards to towards rural water supply systems.

The Districts do not have water and sanitation engineers to adequately manage rural water systems. The DWST and the WDs are not well-funded to perform their required duties. The DWSTs do not have adequate data on water and sanitation. This was blamed on inadequate logistics and funds. Although training is done for the WSMTs before taking over the water systems, the DWSTs have failed in the retraining of the WSMTs. This has adversely affected the capacity of the WSMTs to sustainably manage the water systems. The DWSTs have failed to present the water systems manual to the WSMTs.

The participation of community members in the delivery of sustainable rural water system is not effective. Community members are not well involved

in the formation of the WSMTs. Community members showed some appreciable level of knowledge of the duties of the WSMTs. Due to the poor involvement of the people; revenue mobilisation has become very difficult. This has adversely affected the speed at which the systems are repaired.

Community access to documents to determine whether the WSMTs are working is not readily available. With regards to gender participation, women participation was noticed. Three of the WSMTs meet the gender requirement for the formation of the WSMTs. However, the communities do not consider the gender requirement when replacing members or in the case of the reconstitution of the WSMTS. The study identified low education, reproductive role, lack of family support and cultural as factors that prevented participation of women in the WSMTs. Communities with dynamic leaders had fewer problems with their WSMTs.

The work of the WSMTs, which is administrative, technical and financial, is not well performed to deliver sustainable rural water supply systems. There is no maintenance plan to guide the routine management of the water systems. The study noted realistic fees are not charged for water services because of the poverty level of the people. The WSMTs have not been able to timely repair major and minor breakdowns of the water systems for continuous flow of water. This has resulted in many partially functional and non-functional water systems in the communities.

Although the work of the WSMT combines both water and sanitation, there is more concentration on water to the neglect of community sanitation. Records on financial and administrative procedures are poorly documented. The WSMTs could not show records of meetings. There are no proper

financial records from the sales of the water. This, in the long run, has affected revenue collection since the people have a perception that money collected from the sale of the water is not properly accounted for. The accounts of the WSMTs, although active, do not have funds for emergency situations. Lack of monetary motivation for the WSMTs has negatively affected the commitment level of the WSMTs

To conclude, the administrative, technical and the financial duties of the stakeholders are well documented in the institutional arrangements but are not implemented effectively. There should be an improvement in the institutional linkages. The DWSTs should build the capacity of the WSMTs to work effectively. Community members should be educated on the work of the WSMTs. It will help the community to know whether the WSMTs are working to expectation or not.

The community will better appreciate the work of the WSMTs. During the formation of the WSMTs, the chiefs and the leaders of the communities should be made to understand that the sustainability of the WSMTs and the water systems is partly dependent on their commitment. The WSMTs should be paid an allowance as a motivation to drive them to work as expected. The WSMTs must improve in their revenue mobilisation to enable them to develop additional water systems to support the existing water systems.

Contribution to Knowledge

The study has contributed to the theoretical application of the institutional theory and the participation theory in the management of rural water supply. The study gives credence to the use of the theories in examining the sustainable management of rural water supply systems. The study

identified stakeholders especially WSMTs and the communities to be involved in the effective management of rural water supply system. The weak linkages show the flaws in the collaborative effort to ensure the effective management of rural water supply systems. The study revealed the weaknesses of the WSMTs in the management of the water systems. The information provided will guide the CWSA to undertake reforms in rural water system management. The study findings will help countries that intend to introduce the WSMT or the user committee concept and countries that are already using WSMTs or the user committees to learn from the many ideas, lessons and experiences from the study for good results.

Recommendations

Based on the findings and the conclusions of the study, some recommendations have been made to enhance the operations of the WSMTs for a sustainable management of the boreholes.

Recommendations for Community Participation

- Community members must be involved in the preparation of rural water and sanitation plans. Preparation of documents for rural water sustainability at the District level should actively involve the local people. This will help to incorporate contextual issues in the preparation of the District water and sanitation plans. This will enhance easy implementation of the plans at the community level.
- WSMTs must be transparent and accountable to the people on their operations, especially on revenue mobilisation and it use. The WSMTs should ensure that all funds collected are accounted to the community. This will help the community members to know the financial status. It

will also present to the community the opportunity to ask questions and clarification on issues.

- Community leadership must be committed to their water systems. Most successful rural water systems were achieved largely on the creativity and the commitment of the local leaders. The chiefs, opinion leaders, family heads, Assemblymen/women and informal leaders should connect their efforts to make the WSMTs effective for sustainable rural water supply.
- Community participation in the re-formation of WSMTs is very important. The DWSTs must be effective in ensuring that, when the WSMTs are to be re-formed, the regulations are strictly adhered to. Gender requirement in the formation and reconstitution of the WSMT must always be observed.
- There must be deliberate attempt to educate the community on the functions of the WSMTs. This will enable the community to evaluate the work of the WSMTs. The education of the community on the functions of the WSMTs improves community appreciation of the work of the WSMTs

Recommendations for WSMTs

- The WSMTs should ensure that the monies collected from the sale of water are accounted to the community. Apart from petty cash that must be handled on a daily basis, all cash generated must be deposited into the appropriate bank accounts.

- The WSMTs must ensure regular meetings. The regular meeting makes it easy for water and sanitation problems to be discussed promptly for quick solutions.
- Effective update of community members on water and sanitation issues plays a very important role in rural water sustainability. The update brings a sense of ownership and also provides the community with the platform to give opinions on the situation.
- Motivation in the form of monetary reward should be considered for the WSMTs. The monetary reward will improve the commitment level of the WSMTs.
- Although the WSMTs do not get the manuals of the water systems and the District water and sanitation plans, the WSMTs should prepare a maintenance schedule. The preparation and use of the maintenance schedule will improve the functionality and the reliability of the water systems.

Recommendations for DWSTs

- Budgetary allocation for water and sanitation at the Districts should be released to the appropriate departments and Units. This would ensure that the DWSTs and WDs provide the necessary technical and administrative support to the WSMTs for sustainable rural water supply systems.
- The WSMTs should provide training and re-training of the WSMTs. This will inform the WSMTs of current and best practices on the management of rural water systems. Re-constituted or new members of

the WSMTs must get the opportunity to be trained for effective management of the water systems.

- The DWSTs should deliberately make regular visits to the rural communities and the WSMTs to collect water and sanitation data. The data would provide adequate information on prevailing situations for decision-making. The data collected will also feed into the medium development plans of the Districts.
- The Districts should employ water and sanitation engineers. The engineers must lead the water and sanitation agenda in the Districts. This will help to improve the sustainability of the rural water supply systems and the sanitation situation of the Districts.

Recommendations for the CWSA

- The Regional CWSA should encourage the DWSTs to prepare the District water and sanitation plans.
- The CWSA must provide justification to the government to improve rural water and sanitation funding.
- Community Water and Sanitation Agency should strengthen collaboration with the DWSTs and the Works Department.
- Instead of the takeover of the rural water systems by CWSA, the WSMTs should be given monthly monetary motivation by CWSA to improve their commitment to the water systems.
- The DWSTs must make regular visits to the WSMTs to educate them on the current water and sanitation best practices.

- The Regional offices of the Water and Sanitation Agency must make random visits to the WSMTs to check whether the DWSTs and the WDs are performing their responsibilities.

Suggestions for further Research

The study suggests further investigation into the study by expanding the scope of study areas to cover more regions. A further study can also be conducted to explore a better or a more sustainable approach to finance rural water supply and the operation and the maintenance of rural water supply systems.

REFERENCES

Agamben, G. (2009). *What is an apparatus?* Stanford: Stanford University Press.

Agarwal, A., Delos-Angeles, M. S., & Bhatia, R. (2002). *Integrated water resources management.* Denmark: Global Water Partnership

Agarwal, B. (1992). Gender relations and food security: Coping with seasonality, drought and famine in South Asia. In L. Benería & S. Feldman (Eds.), *Unequal burden: Economic crises, persistent poverty, and women's work* (pp. 374-378). Boulder, Colorado: Westview Press.

Agnew, C., & Woodhouse, P, (2011). *Water Resources and Development*. London and New York: Routledge.

Agyeman, K. (2007). Privitasation of Water in Ghana: Stopped in its Track or a Strategic Pause? *International Journal of Environmental Studies*, *64*(5), 525-536.

Agrawal, A. & Chadha, S. (2005). Corporate governance and accounting Scandals. .*Journal of Law and Economics. 48*(2), 371-406.

Alan, T., McLaughlin, O., & Kazooba, F. (2015). Improving the effectiveness of Ugandan water user committees. *Development in Practice, 25*(5), 715-727.

Alley, W. M. (2001). Ground Water and Climate. *Ground Water*, *39*(2), 161-161.

Aloyce, R. M., David, W. N., & Yang-Ming, C. (2003). Willingness to pay to improve domestic water supply in rural areas of Central Tanzania: Implications for policy. *The International Journal of Sustainable Development & World Ecology, 10*(2), 119-132

Alston, L., Eggertsson, T., & North, D. (1996). *Empirical Studies in Institutional Change*. Cambridge, UK: Cambridge University Press.

Amenta, E. (2005). *State-centered and political institutionalist theory: Retrospect and prospect*. New York, UK: Cambridge University Press.

Amfo-Otu, R. (2018). *Hospital Solid Waste Management Practices in Eastern Region of Ghana*. (Unpublished Doctoral thesis, University of Cape Coast).

Anahita, K., Statia, E., & Marion, J. (2015). An application of stakeholder theory to advance community participation in tourism planning: the case for engaging immigrants as fringe stakeholders. *Journal of Sustainable Tourism, 23*(7), 1049-1062.

Andrews, M. (2013). *The Limits of Institutional Reform in Development: Changing Rules for Realistic Solutions*. Cambridge, UK: Cambridge University Press.

Arboleda, G. (2015). Participation Practice and its Criticism: Can They Be Bridged? A Field Report from the Guyana Hinterland. *Housing and Society, 41*(2), 195-227

Arku F. S., Akosua, O. L., & Angmor, E. A. (2011). The dilemma of Engaging community-wide in development: Has Konko's (Eastern Region, Ghana) water and sanitation committee taken over decision making at the community's will? *International NGO Journal, 6*(9), 203-210.

Arku, F. S. (2010). Time savings from easy access to clean water: Implications for rural men's and women's well-being. *Progress Development Studies, 10*(3), 233-246.

Arnstein, S. (1969). A ladder of citizen participation. *American Institute of Planners, 35*(4), 216-224.

Asiimwe, G. B., & Naiga, R. (2015). Towards Understanding Challenges to Water Access in Uganda. In *Water is Life*, edited by S. Linnane, K.G. McGuigan, H. Fagan, & A. Rugumayo, 59-72. Rugby: Practical Action Publishing.

Asingwire, N. (2008*). Shifting paradigms in social policy reform: A case of demand versus supply-driven approaches to safe water supply in Uganda*. (Unpublished Doctoral thesis, Makerere University).

Asthana, A. (2003). Decentralisation and Supply Efficiency: The case of Rural Water Supply in Central India. *Journal of Development Studies*, *39*(4), 148-159.

Babajanian, B. V. (2008). Social Capital and Community Participation in Post-Soviet Armenia: Implications for Policy and Practice. *Europe-Asia Studies*, *60*(8), 1299-1319,

Babbie, E. (1989). *The practice of social research* (5th edition). Belmont: Wadsworth Publishing Company

Ball, M. & Colin, B. (1991). *Water supplies for rural communities*. London: Intermediate technology publications.

Bakker, K. J. (2003). A Political Ecology of Water Privatisation. *Studies in Political Economy, 70*, 35-58.

Bannock, G., Baxter, R., & Davis, E. (1987). *The dictionary of Economics* (4th Ed.). London: Penguin.

Barley, S., & Tolbert, P. (1997). Institutionalisation and structuration: Studying the links between action and institution. *Organisation Studies*, *18*(1), 93-117.

Barnes, R., David R.., & Paul, B. (2011). Critical Evaluation of Planning Frameworks for Rural Water and Sanitation Development Projects. *Development in Practice*, *21*(2), 168-189.

Barrow, C. J. (1998). River Basin Development Planning and Management Decision Approaches. *International Journal of Sustainable Development and World Ecology*, *1*(2), 77 - 88

Bediako, P. (2005). Gender, culture and water management practices: The case of Sene District in Ghana. Master Thesis. Retrieved from:www2.lwr.kth.se/publikationer/pdf_files/lwr_ex_04_17.pdf

Bell, J. (1999). *Doing Your Research Project A Guide for First Time Researchers in Education and Social Science* (3rd Ed). Buckingham, UK: Open University Press.

Benbasat, I., Goldstein, K., Mead M. (1987). The Case Research Strategy in Studies of Information Systems Case Research. *MIS quarterly*, *11*(3), 369-386.

Best, J. W., & Kahn, J. (2006). *Research in Education*. New Delhi: Prentice Hall of India Pvt. Ltd.

Binamungu, D. (1993). *Towards Gender-Responsive Planning in the HESAWA Programme.* A Critical Review paper presented at the Workshop on Gender and Water Resources Management. Stockholm, Ireland. 1-3 December, 1993.

Black, M., & Fawcett, B. (2008). *The Last Taboo: Opening the Door on the Global Sanitation Crisis.* London: Earthscan Publications Ltd

Blackburn, J., Chambers, R., & Gaventa, J. (2000). *Mainstreaming Participation in Development*. (OED Working Paper Series 10). Washington: World Bank.

Blaikie, N. (2003). *Designing Social Research*. Oxford: Blackwell Publishing LTD.

Boateng, J. D., & Kendie, S. B. (2015). Factors Influencing the Participation of Women in Rural Water Supply Projects in the Asante Akim South District. *Journal of Arts and Social Science*, *3*(1), 220-242

Boateng, J. D., Brown, C. K., & Tenkorang, E. (2013). Gender and water management practices in Ghana. *Environment and Earth Science*, *3*(5), 871-890.

Bock, J. G. (2001). The Exercise of Authority to Prevent Communal Conflict. *Journal of Peace Research*, *26*(2), 187-203.

Bolt, E., & Fonseca, C. (2001). *Keep it working: a field manual to support community management of rural water supplies*. Water and Sanitation Centre. (Technical Paper Series; no. 36). Delft: IRC International

Bolt, E., Schouten, T., & Moriarty, P. (2001). From Systems to Service: Scaling up Community Management, in Scott, R. (edited), Proceedings of the 27th WEDC conference on *people and systems for water, sanitation and health*, Lusaka, Zambia, December 20 (pp 167-186). Leicestershire: Institute of Development Engineering (WEDC).

Boumar, G. D., & Atkinson, G. B. J. (1995). *A Handbook of Social Science Research* (2nd Ed). Oxford, USA: Oxford University Press.

Brager, G., Specht, H., & Torczyner, J. (1987). *Community Organising*. Columbia, USA: Columbia University Press.

Braimah, I., & Fielmua, N. (2011). Community Ownership and Management of Water and Sanitation Facilities: Issues and Prospects in the Nadowli District of the Upper West Region of Ghana. *Journal of Sustainable Development in Africa, 13*(2), 74–87.

Braimah I., Jagri, E. M. (2007). Institutionalizing Water and Sanitation Committees (WATSAN) for sustainable service delivery in Ghana: the case of Nanumba North District in the Northern Region of Ghana. *Journal of Science Technology 27*(1), 90-101

Brannen, J. (1992). *Mixing Methods: Qualitative and Quantitative Research.* Aldershop: Ashgate Publishing Limited.

Brennan, M.A., Flint, C. G., &. Luloff, A. E. (2008). Local culture and rural development: A neglected relationship. *Sociologia Ruralis, 49*(1), 97-112.

Breslin, E. (2003). *Demand response approach in practice: Why sustainability remains elusive, WaterAid in Mozambique.* Retrieved from http://www.wateraid.org/ documents/ plug in documents/elusives ustainability.pdf

Brewer, J., & Hunter, A. (1989). *Multimethod research: A Synthesis of styles*. Newbury Park, CA: Sage.

Brikke, F., & Bredero, M. (2003). *Linking technology choice with operation and maintenance in the context of community water supply and sanitation.* World Health Organisation and IRC Water and Sanitation Centre.

Brikké, F. (2000). *Operation and maintenance of rural water supply and sanitation systems: a training package for managers and planners.* Delft, IRC International Water and Sanitation Centre; and Geneva, World Health Organization.

Briscoe, J., & Ferranti, D. (1988). *Water for Rural Communities: Helping People Help Themselves.* Washington: The World Bank.

Brock, K., Cornwall, A., & Gaventa, J. (2001). *Power, Knowledge and Political Spaces in the Framing of Poverty Policy.* (IDS Working Paper 143). Brighton, UK: Institute of Development Studies.

Brooks, D. B. (2007). Human rights to water in North Africa and the Middle East: What is new and what is not; what is important and what is not. *Water Resources Development, 23*(2), 227-241

Brown, G., & Chin, S. Y. W. (2013). Assessing the Effectiveness of Public Participation in Neighbourhood Planning. *Planning Practice & Research, 28*(5), 563-588,

Cairncross, S., & Feachem, R. (2006). *Environmental Health Engineering in the tropics* (Second Edition). Toronto, Canada: John Wiley and Sons.

Carlson, L. & Sandström, A. (2008). Network Governance of the Commons. *International Journal of the Commons, 2*(1), 33–54.

Casson, M. C., Giusta, M. D., & Kambhampati. U. S. (2010). Formal and Informal Institutions and Development. *World Development, 38*(2), 137-141.

Castelloe P., & Watson, T. (2000). The Participatory Change Process: A capacity building model from a US NGO. *Development in Practice, 10*(2), 240-244

Chachange, C. S. L. (1991). *Rural water and sanitation programmes in Morogoro and Shinyanga regions: A study of women involvement in the implementation of the programme*. Tanzania: Dares-Salaam University Press.

Chambers, Robert. (1994b). Participatory Rural Appraisal (PRA): analysis of experience, *World Development*, *22*(9), 1253-1268.

Chambers, R. (1983). *Rural development: putting the last first*. New York, USA: Longman scientific and technical.

Chambers, R. (1995). Poverty and livelihoods: whose reality counts? *Environment and Urbanisation*, *7*(1), 173-204.

Chauvel, D. & Despres, C. (2002). A review of survey research in knowledge management: 1997-2001. *Journal of Knowledge Management*, *6*(3), 207-223

Cherlet, J., & Venot, J. P. **(**2013). Structure and Agency: Understanding Water Policy Changes in West Africa. *Water Policy*, *15*, 479–495.

Chilisa, B. (2005). Educational research within postcolonial Africa: a critique of HIV/AIDS research in Botswana. *International Journal of Qualitative studies in Education*, *18*(6), 675.

Chitonge, H. (2011). A Decade of Implementing Water Services Reform in Zambia: Review of Outcomes, Challenges and Opportunities. *Water Alternatives*, *4*(3), 1-19.

Christens, B. (2012). Toward Relational Empowerment. *Community Psychology 50*, 114-128.

Claude, L. P., Bridger, J. C., & Luloff. A. E. (2000). Community well-being and local activeness. Pp. 39-44 in P. V. Schaeffer and S. Loveridge

(eds.), *Small Town and Rural Economic Development*. Westport CT: Praeger.

Cleaver, F. (1999). Paradoxes of participation: Questioning participatory approaches to development. *Journal of International Development, 11*, 567–612.

Cleaver, F. (2002). Reinventing institutions and the social embeddedness of natural resource management. *European Journal of Development Research, 14*, 11-30.

Clemens, E. L., & Cook, J. M. (1999). Politics and Institutionalism: Explaining Durability and Change. *Annual Review of Sociology, 25*, 441-466

Cohen, J. M., & Uphoff, N. (1977). *Rural Development Participation: Concepts and Measures for Project Design, Implementation and Evaluation.* Ithaca NY: Rural Development Committee, Cornell University.

Cohen, J., & Uphoff, N. (1980). Participation's place in rural development: seeking clarity through specificity. *World Development, 8*(3), 213–235

Commonwealth Foundation (1999). Citizens and Governance: Civil Society in the New Millennium. Commonwealth Foundation, London.

Conyers, D. (1981) Decentralisation for Regional Development: A Comparative Study of Tanzania, Zambia and Papua New Guinea. *Public Administration and Development, 1*, 107-120.

Cooke, B., & Kothari, U. (2001). *Participation: the new tyranny*? New York, USA: Zed Books.

Corcoran, K. E., Pettinicchio, D., & Young, J. T. N. (2011). The context of control: A cross-national investigation of the link between political institutions, efficacy, and collective action. *British Journal of Social Psychology*, *50*(4), 575–605.

Cornwall, A. (2002). *Making Spaces, changing places: situating participation in development*. (Working paper 170). UK: Institute of Development Studies

Cornwall, A., & Gaventa, J. (2001). From users and choosers to makers and shapers repositioning participation in social policy. *Institute of Development Studies Bulletin*, *31*(4), 50-62.

CSIR-INSTI (2019). *Regional Map showing the studied Districts*. Council for Scientific and Industrial Research, Institute. Accra, Ghana.

Creswell, J. W. (2013). *Qualitative Inquiry & Research Design: Choosing among Five Approaches.* (3rd ed.). Thousand Oaks, CA, USA: SAGE.

Creswell, J. W. (*2014*). *Research Design Qualitative, Quantitative and Mixed Methods Approaches.* (4th ed.). Thousand Oaks, CA, USA: Sage.

Crow, B., & Sultana F. (2002). Gender, class, and access to water: three cases in poor and crowded delta. *Society and Natural Resources*, *15*(8), 709-724

CWSA (2016). *2016 Annual Report*. Accra, Ghana: CWSA

CWSA (2017). *2017 Annual Report*. Accra, Ghana: CWSA

CWSA (2016). *Akuapem North Annual Progress Report*. Accra, Ghana: CWSA.

CWSA (2015). *2016 Annual Report*. Accra, Ghana: CWSA.

CWSA (2014). *How To Do Guide for Functionality and Service Monitoring*. Accra, Ghana: CWSA

CWSA (2014). *National Community Water and Sanitation Programme District Operation Manual*. Accra, Ghana: CWSA

CWSA (2014). *National Community Water and Sanitation Strategy*. Accra, Ghana: CWSA

Daemane, M. M. (2015). The Analytic Conceptual Framework for Comprehending Factors Essential to Realise Sustainability in Rural Communities' Water Supply Systems. *Global Journal of Human-Social Science, 15*(5), 33-54

Daniel, P. L. (2000). Sustainable Water Resources Management. *Water International, 25*(1), 3-10.

Danquah, J. L. (2003). *The gender agenda: Walking the talk at all levels*. The News Letter of Water Aid-Ghana Programme. Accra, Ghana: Editions Services.

David, J., & Brike, F. (1995). *Making your Water Supply Work: Operation and maintenance of small Water Supply Systems.* The Hague: International Water and Sanitation Centre.

Davis, S., Pocosangre, A., & Hicks, P. (2014). *Six factors for improving rural services in Central America*. Global Water Initiative.

Dayal, R., Wijk-Sijbesma, C. A., & Mukherjee, N. (2000). *Methodology for participatory assessments with communities, institutions and policy makers: linking sustainability with demand, gender and poverty*. USA: Water and Sanitation Programme (WSP).

de Vaus, D. (1991). *Surveys in Social Research* (3rd Edition). London: Routledge.

DeGabriele, J. (2002). *Improving community based management of boreholes: a case study from Malawi*. Madison: University of Wisconsin (Land Tenure Center)

DFID (1999). *Water Law, Water Rights and Water Supply (Africa)*, DFID

Denzin, N. (1970). *The Research Act in Sociology*. London: Butterworth.

Derman, B., & Hellum, A. (2007). Neither Tragedy nor Enclosure: Are there Inherent Human Rights in Water Management in Zimbabwe's Communal Lands? *European Journal of Development Research*, *14*(2), 31-50.

Deverill, P., S. Bibby., Wedgewood, A., & Smout, I. (2002). *Designing Water Supply and Sanitation Projects to Meet Demand in Rural and Peri-Urban Communities, Book 1: Concepts, Principles and Practice*. Water Engineering and Development Centre, Loughborough: Loughborough University.

DiMaggio, P. J. (1991). Constructing an organisational field as a professional project: US art museums, 1920–1940. In W. W. Powell & P. J. DiMaggio (eds.), *The new institutionalism in organisational analysis*. Chicago, USA: University of Chicago Press.

DOM (2014). *District Operation Manual*. CWSA, Accra: Ghana.

Djegal, A., Price M., & Acquaye, G. K. (1996). *Evaluation mission report on rural water and sanitation programme, Eastern region of Ghana project*. Unpublished Report. Accra. Retrieved from http://www.jstor.org/stable/4030170.

DMTDP (2013). Upper Manya Krobo District Assembly DMTDP, 2010-2013.

Dzisi, S. & Obeng, F. (2013). Microfinance and the socio-economic wellbeing of women entrepreneurs in Ghana. *International Journal Business. Society Research (IJBSR) 3*(11):45-62.

Eguavoen, I., & Youkhana, E. (2005). *Small Towns Face Big Challenges: The Management of piped systems after water reforms in Ghana*. Global Action for Women Empowerment (GLOWA) Volta Project working paper. Germany: University of Bonn.

Engelman, R.., & LeRoy, P. (1993). *Sustaining Water: Population and Future of Renewable Water Supplies*. Population and Environment Program, Population Action International: Washington.

Etongo, D., Fagan, H., Kabonesa, C., & Asaba, B. (2018). Community-Managed Water Supply Systems in Rural Uganda: The Role of Participation and Capacity Development. *Water*, *10*(9), 1-18.

Evans, P. (1992). *Paying the piper: an overview of community financing of water and sanitation.* (Occasional Paper 18). The Hague: International Water and Sanitation Centre (IRC).

Evans. P., & Appleton, B. (1993). *Community Management Today: the Role of Communities in the Management of Improved Water Supply Systems*. The Hague: International Water and Sanitation Centre.

Evertzen, A. (2001). *Handbook for Gender and Local Governance*, SNV .Retrieved from http://www.kit.n l/ gcg /assets/ images /Gender _and _Local _Governance.doc.

Falkenmark, M. (1988). Sustainable Development as seen from water perspective. *Stockholm Studies in natural Resources Management*, *1*(6), 71- 84.

Fawcett, S. B., Paine-Andrews, A., Francisco, V.T. *et al*., (1995). Using empowerment theory in collaborative partnerships for community health and development. *American Journal of Community Psychology*, *23*(8), 677-697.

Fielmua, (2011). The Role of the Community Ownership and Management Strategy towards Sustainable Access to Water in Ghana (A Case of Nadowli District). *Journal of Sustainable Development*, *4*(3), 174-184.

Flyvnerg, B. (1996). Practical Philosophy for Sustainable Development: The Phronetic Imperative. In M. Rolen (ed). *Culture, Perceptions and Environmental Problems: Inter-scientific Communication on Environmental Issues*, pp 89-109. Swedish Council for Planning and Coordination of Research: Stockholm. Forum Workshop on Decentralisation and Devolution, Edinburgh, 12–14 June.

Font, N., & Subirats, J. (2010). Water management in Spain: the role of policy entrepreneurs in shaping change. *Ecology and Society*, *15*(2), 25

Foucault, M. (1998). *The will to knowledge*. London, UK: Penguin.

Freeman, R. (1984). *Strategic management: a stakeholder approach*. Boston: Pitman.

Freeman, R. (2010) *Strategic Management: A Stakeholder Approach*. Cambridge, UK: Cambridge University Press.

Freire, P. (1972). *Pedagogy of the Oppressed*. Harmondsworth: Penguin Books Ltd.

Frind, E. O., & Middleton, T. A. (2014). Toward water sustainability for Waterloo Region. *Canadian Water Resources Journal*, *39*(2), 88-94,

Fry, S. (1993). *Helping Communities Manage their Water Finances*. Wash Technical Report No. 93. Water and Sanitation for Health Project, Arlington: USA

Fuest, V. (2005). *Policies, Practices and Outcomes of Demand-oriented Community Water Supply in Ghana: The National Community Water and Sanitation Performance*. Center for Development Research, Bonn: Germany.

Fuest, V. (2006). *Demand-Oriented Community Water Supply in Ghana. Policies, Practices and Outcomes.* ZEF Development Studies. Hamburg: LIT/Transaction Publishers.

Fuest, V., & Haffiner, S. A. (2007). Policies, practices and problems in Ghana's urban water supply. *Water Policy*, *9*(2), 169-192.

Fung, A., & Wright. E. O. (2001). Deepening Democracy: Innovations in Empowered Participatory Governance. *Political Society*, *29*(7), 5-41.

Furlong, K. (2010). Neoliberal Water Management: Trends, Limitation, Reformulations. *Environment and Development*, *5*(1), 46-75.

Gbedemah, F. S. (2010). *Management, Uses and Values of Demand –Oriented Domestic Water Facilities in the Akatsi District of Ghana. (*Unpublished Doctoral thesis, University of Leicester).

Gebreegzabher, A. (2018). Women's Participation in Water Resource Management, in Case of Enderta District, Tigray Region, Ethiopia. *Journal of Water Resource and Protection*, *15*(10), 1047-1060.

Gebrehiwot, M. (2006). *An Assessment of Sustainable Rural Water Supply: The Case of Ofla Woreda in Tigray Region*. (Unpublished Master's Thesis, Addis Ababa University).

Ghana Health Service. (2016). *Annual Health Sector Performance Review, Eastern Region*. Accra, Ghana: GHS

Ghana Statistical Service (2013). *Population and Housing Census National Analytical Report.* Accra, Ghana: GSS

Ghana Statistical Service (2010). *Population and Housing Census National Analytical Report*. Accra, Ghana: GSS

Gillanders, G. (1940). Rural Housing. *Journal of the Royal Institute of Sanitation*, *60*(6), 230-240

Glaeser, E. L., G. Ponzetto., & Shleifer, A. (2007). Why Does Democracy Need Education? *Journal of Economic Growth*, *12*(2), 77-99.

Gleick, P. H., Loh, P., Gomez, S., & Morrison, J. (1995). *California Water 2020: A Sustainable Vision*. Pacific Institute for Studies in Development, Environment, and Security, Oakland: California.

Global Water Partnership (2000). *Integrated Water Resources Management.* Technical Advisory Committee, TEC Background Paper No. 4: Global Water Partnership, Stockholm.

Global Water Partnership (2006). *Implementing Integrated Water Resources Management (IWRM) Approaches.* (4th World Water Forum Framework Theme 2). Mexico: UN Department of Economic and Social Affairs/Global Water Partnership.

Global Water Partnership. (2002). *Dialogue on effective water governance. Stockholm.* Retrieved from www.gwpforum.org /gwp /library /Governance.pdf

Global Water Partnership. (2002). *Dialogue on effective water governance*. Global Water Partnership, Stockholm: Sweden.

Goebbel, A. (1998). Process, perception and power: notes from participatory research in a Zimbabwean resettlement area, *Development and Change*, *29*(5), 277-305.

Goldin, J. A. (2010). Water Policy in South Africa: Trust and Knowledge as Obstacles to Reform. *Review of Radical Political Economics, 422*(15), 195-212.

Gomm, R. (2004). *Social Research*. London: Sage

Gopakumar, G. (2010). Transforming Water Supply Regimes in India: Do Public-private Partnerships Have a Role to Play? *Water Alternatives, 3*(3), 492–511.

Gray, D. E. (2014). *Doing Research in the Real World, London*, UK: SAGE.

Green, C., & Baden, S., (1994). *Water resources management: a macro-economic perspective*, (BRIDGE Report No 21). Brighton, UK: IDS

Greenwood, R., Oliver, C., Sahlin, K., & Suddaby, R. (Eds.). (2008). Introduction. In *the Sage handbook of organisational institutionalism.* London, UK: Sage

Guba, E.G. & Lincoln, Y.S. (2005) Paradigmatic Controversies, Contradictions, and Emerging Confluences. In: Denzin, N.K. and Lincoln, Y.S., Eds., *The Sage Handbook of Qualitative Research*, (3rd Edition), Sage, Thousand Oaks.

Guba, E. G., & Lincoln, Y. S. (1981). *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches.* The Jossey-Bass higher and adult education series and the Jossey-Bass social and behavioral science series. Jossey-Bass.

Guerquin, F., Ahmed, T., Hua, M., Ikeda, T., Ozbilen, V., & Schuttelaar, M. (2003). *World Water Actions: Making Water Flow for All*. Water Action Unit, World Water Council, Marseille: France.

Guppy, L., & Anderson, K. (2017). *Global Water Crisis: The facts*. Hamilton, UNU-INWEH.

GWP (2005). *Global Water Partnership Annual Report*. GWP

GWA (2003). *Advocacy manual for gender and water ambassadors*. WEDC (for GWA), Leicestershire.

GWSSDP (2014). *Water Sector Strategic Development Plan*. Resource Sector network Ghana. Accra, Ghana.

Gyau-Boakye, P., & Ampomah, B. Y. (2003). Water Pricing and Water Sector Reforms Information Study in Ghana. *Water International*, *28*(1), 11-18

Hall, D., & Hall, I. (1996). *Practical Social Research: Project Work in the Community*. London: Sage

Hall, D., & Lobina, E. (2008). Water Privatisation. *Public Services International Research Unit* (PSIRU).

Hall, P. A., & Taylor, C. A. (1996). Political Science and the Three New Institutionalisms. *Political Studies*, *44*(5), 936-957

Hardina, D. (2006) Strategies for Citizen Participation and Empowerment in Non-profit, Community-Based Organisations. *Community Development*, *37*(4), 4-17,

Harrison, D. A. (1995). Volunteer motivation and attendance decisions: Competitive theory testing in multiple samples from a homeless shelter. *Journal of Applied Psychology*, *80*(5), 371-385.

Harvey, P., & Reed, R. (2004). *Rural Water Supply in Africa: Building Blocks for Sustainability*. Loughborough University, UK: Water, Engineering, and Development Centre (WEDC).

Harvey, P. A., & Reed, R. A. (2003). *Sustainable rural water supply in Africa: Rhetoric and reality, in Harvey, P. A. (Edited) -Towards the millennium development goals – actions for water and environmental sanitation*, proceedings of the 29th WEDC Conference, Abuja, Nigeria, pages 115 - 118. Leicester: WEDC, Institute of Development Engineering.

Harvey, P. A., & Reed, R. A. (2007). Community-managed water supplies in Africa: sustainable or dispensable? *Community Development Journal*, *42*(3), 365.

Hassenforder, E. & Barone, S. (2019) Institutional arrangements for water Governance. *International Journal of Water Resources Development*, *35*(5), 783-807

Helliwell, J. F., & Putnam, R. D. (2007). Education and Social Capital. *Eastern Economics Journal*, *33*(1), 1-19.

Hemson, D. (2002). Women are weak when they are amongst men: Women's participation in rural water committees in South Africa. *Agenda, 52*(17), 24-32.

Hirsch, P. (1997). Review essay: Sociology without social structure: Neo-institutional theory meets brave new world. *American Journal of Sociology, 102*(6), 1702-1723.

Hirsch, P. (2006). Water Governance Reform and Catchment Management in the Mekong Region. *The Journal of Environment & Development, 15*(2), 184-201.

Hopkins, P. E. (2007). Thinking Critically and Creatively About Focus Groups. *Area, 39*(4), 528-535.

Hornsey, J., Jetten J., McAuliffe., & Hogg, M. (2006). The impact of individualist and collectivist norms on evaluations of dissenting group members. *Journal of Experimental Social Psychology, 42*(1), 57-68

Hunter PR, MacDonald AM, Carter RC (2010) Water supply and health. *PLoS Med, 7*(11):e1000361. doi:10.1371/journal.pmed.1000361

Hutchings, P. (2018). Community management or coproduction? The role of state and citizens in rural water service delivery in India. *Water Alternatives, 11*(2), 357-374

ICF (2001) *International Conference on Fresh Water*, Bonn, 3-7 December 2001. Conference Report.

ICWE. (1992). *Development issues for the 21st century*. The Dublin Statement Report. January 26-31, 1992. Dublin: International Conference on Water and Environment (ICWE)

ICWE. (1997). The Dublin statement and report the conference on water and the environment, development issues on the 21st centuries, 26th- 31st January (ACC/ISGWR).

ICWE. (1992). *Water and the Environment*. Dublin: ICWE.

IRC, (2004). *Community water supply management: history of a concept*. Delft, the Netherland: IRC International Water and Sanitation Centre.

IRC (1994). *Working with women and men on water and sanitation: An African field guide*. Occasional Paper Series 25. The Hague: IRC International Water and Sanitation Centre.

International Labour Organisation (1989). *Indigenous and tribal people's convention*. Geneva: ILO.

International Research and Sanitation Centre (2012). *Making aid effective at the local level.* (Briefing Note No. 5). Water Services That Last.

International Research and Sanitation Centre. (2013). *Direct support post-construction to rural water service providers.* Briefing Note No. 6.

International Water and Sanitation Centre, (2004). *Community water supply management: history of a concept.* The Hague: IRC International Water and Sanitation Centre.

IRC. (1997). *Water supplies managed by rural communities: country reports & case studies from Cameroon, Columbia, Guatemala, Kenya, Nepal and Pakistan, Project and Programme Papers: (*No. 5-E). The Hague: IRC International Water and Sanitation Centre

Jansz, S. (2011). *A study into rural water sustainability in the Niassa province, Mozambique*. WaterAid

Jensen, A., & Schulz, C. E. (2006). Water Demand and the Urban Poor: A Study of Factors Influencing Water Consumption among Households in Cape Town. *South African Journal of Economics, 74*(3), 593-609.

JMP. (2014). *Progress on drinking water and sanitation*. Geneva, Switzerland: World Health Organisation (WHO) and UNICEF.

Jutting, J. P. (2003). *Institutions and Development: A Critical Review*. (OECD Development Centre Working Papers 210). OECD Publishing.

Juwana, I., N. Muttil, & Perera, B. J. (2012). Indicator-based Water Sustainability Assessment. *Science of the Total Environment, 438*(1), 357-371.

Kamruzzaman, A. K. M., Ilias, S., & Omar, O. (2013). Overview of Management Patterns in Community, Private and Hydrid Management in Rural Water Supply. *Journal of Sustainable Development, 6*(5), 26-36.

Kanter, R. M. (1969). Commitment and social organisations: a study of commitment mechanisms in utopian communities, *American Sociological Review*. *33*(4), 243- 268.

Kasiaka, K. (2004). *Participatory Planning and Sustainability of Water, TASAF Water Project.* Tanzania: UDSM Press.

Katakweba, M. (2001). Community Management and Project Sustainability – Case Study of the Arumera West Water and Sanitation Programme, Tanzania, in Scott, R. (edited), *Proceedings of the 27th WEDC Conference on People and Systems for Water, Sanitation and Health, Lusaka, Zambia, December 2001*. Leicestershire: WEDC, Institute of Development Engineering.

Katz, T., & Sara, J. (1998). *Making Rural Water Supply Sustainable: recommendations from a global study*. World Bank and UNDP.

Kaufman, S., & Poulin, J. (1996). *Community Involvement in Cultural Activities: Theories and Concepts*. Malaysia: International Islamic University.

Kendie. S. B., & Abane, M. (2001). User Committees and Sustainable Development of Drinking Water Services in Rural Northern Ghana In Y. Saka (Ed.), *Regionalism and Public Policy in Northern Ghana*., Ohio, Oberlin College Press.

Kendie, S. B. (1994). *Willingness to pay more for rural drinking water services in Ghana and Togo* (Discussion Paper Series Number 3). Centre for Development Studies, University of Cape Coast.

Kendie, S. B. (2002). Operationalising the paradigm of alternative development in Ghana. *Ogua Journal of Social Sciences, 3*, 54 - 75.

Kendie, S. B. (2009). Survey of water use behaviour in rural North Ghana. *Natural Resources Forum, 16*(2), 126-131.

King, R., Braimah, I., Amponsah, O. (2012) *UNDP/NADMO recovery programming support for northern Ghana*: *terminal evaluation draft report*. United Nations Development Programme, Accra.

Khalil, E. L. (1995). Organisations versus Institutions. *Journal of Institutional and Theoretical Economics, 151*(3), 445-66.

Khazaei, A., Elliot, S., & Joppe, M. (2015). An Application of Stakeholder Theory to Advance Community Participation in Tourism Planning: the Case for Engaging Immigrants as Fringe Stakeholders. *Journal of Sustainable Tourism*, *23*(7), 1049–1062

Khosla, P., & Ahmed, S. (2006). *Mainstreaming gender in water management*. GWA/UNDP.

Kimberley, C. (1998). *Guidance Manual on Water Supply and Sanitation Programs*, London: WEDC.

Kleemeier, E. (2000). The impact of participation on sustainability: An analysis of the Malawi Rural Piped Scheme program. *World Development, 28*(5), 929–944.

Kleemeier, E. (2002). *Rural water sector reform in Ghana: a major change in policy and structure*. Water and sanitation program-Africa Region. Nairobi: The World Bank.

Kokor, J. A. (2001). *Local Governance of Development in Ghana*. Dortmund: University of Dortmund.

Krueger, R., & Casey, M. (2009). *Focus Groups: A Practical Guide for Applied Research*. Thousand Oaks, CA: Sage Publications

Kujinga, K., & Jonker, L. (2006). An analysis of stakeholder knowledge about water governance transformation in Zimbabwe. *Physics and Chemistry of the Earth, 31*(15), 690-698.

Kumar, S. (2002). *Methods for Community Participation: A Complete Guide for Practitioners*. New Delhi: Vistaar Publications.

Kurian, M. (2004). *Institutional analysis of integrated water resources management in river basins. A methodology paper*. Colombo, Sri Lanka: IWMI. 18p. (Working Paper 79)

Kwashie, H. B. (2007). The concept and practice of community management of rural water and sanitation programmes. *Ghana Journal of Development Studies*, *4*(1), 28-45

Kwashie, H. B. (2009). The Management and Sustainability of Water Supply Facilities in Rural Communities: Lessons from the Volta Region of Ghana. *Ghana Social Science Journal*, *6*(2), 188-216

Lammerink, M., & de Jong, D. (1999). *Community Water Management*. London: International Institute for Environment and Development (IIED)

Lammerink, P. M., & Bolt, E. (2002). *Supporting Community Management: A Manual for Training in Community Management in the Water and Sanitation Sector*. The Hague: IRC.

Laryea, N. O., Dotse., F. M., Fiasorgbor, D., & Ampadu-Boakye, J. (2008). *Women, water and sanitation: Challenges and prospects*. 33rd WEDC International Conference, Accra, Ghana, 2008.

Leach, M. (1992). Gender and the environment: Traps and opportunities. *Development in Practice, 2(1),* 12-22

Leftwich, A., & Sen, K. (2010). *Beyond Institutions: Institutions and Organisations in the Politics and Economics of Poverty Reduction, a Thematic Synthesis of Research Evidence*, IPPG Research Consortium on Improving Institutions for Pro-Poor Growth. Manchester: University of Manchester.

Lejano, R., Ingram, M., & Ingram, H. (2013). *The Power of Narrative in Environmental Networks*. Cambridge: The MIT Press.

Lemke, T. (2001). The birth of bio-politics: Michael Foucault's lectures at the College de France on neo-liberal governmentality. *Economy and Society*, *30*(2), 190-207

Lenaerts, L., Dondeyne, S., Breusers, M., Bauer, H., Haile, M., & Deckers, J. (2013). Water for All and All for Water? Governmental Interventions Affecting Property of Natural Resources in Northern Ethiopia. *Society & Natural Resources: An International Journal*, *26*(10), 1300-1313.

Lockwood, H. (2004). *Scaling Up Community Management of Rural Water Supply*. The Hague: International Water and Sanitation Center.

Loucks, P. (2000). Sustainable Water Resources Management. *Water International, 25*(1), 3-10

Loucopoulos, P., & Kavakli, E. (1995). Enterprise modelling and the teleological approach to requirements engineering. *International Journal of Cooperative Information Systems*, *4*(1), 45-79.

Lu. C. (2008). Gender Issues in Water User Associations in China: A Case Study in Gansu Province, *Rural Society*, *18*(3), 150-160.

Luftman, J.N. (2003). Assessing IT/business alignment. *Information Systems Management*, *20*(4), 9-15.

Lundquist, J., & Gleick, P. (1997) *Sustaining our waters into the 21st Century. Scientifically based document prepared for the UN Commission for Sustainable Development's Comprehensive Assessment of the Freshwater Resources of the World*. Sweden: Stockholm Environment Institute.

Lupton, T. (1963). *On the Shopfloor*. Oxford: Pergamon Press

Maganga, F. P., Butterworth, J. A., & Moriarty, P. (2002). Domestic Water Supply, Competition for Water Resources and IWRM in Tanzania. *Physics and Chemistry of the Earth*, *27* (11), 919-926.

Maharaj N., Kusum A., Garcia, V. M., & Richardson, G. (1999). *Mainstreaming Gender in Water Resources Management: Why and How*. Background Paper for the World Vision Process, Paris, World Vision and World Water Council.

Mahoney, J., & Thelen, K. (2010). *Explaining institutional change: Ambiguity, agency, and power*. Cambridge: Cambridge University Press.

Makule, D. (1997). *Water and sanitation for all: Partnerships and innovations: Gender perspective*. Tanzania: Ministry of Water.

Marcus, R., & Onjala, J. (2008). Exit the State: Decentralisation and the Need for Local Social, Political, and Economic Considerations in Water Resource Allocation in Madagascar and Kenya. *Journal of Human Development and Capabilities*, *9*(1), 23-45

Mazango, N., & Munjeri, C. (2009) Water management in a hyperinflationary environment: case study of Nkayi district in Zimbabwe. *Physics & Chemistry Earth Parts*, *34*(2), 28-35. doi:10.1016/j.pce.2008.07.004

Marshall, G. R. (2008). Nesting, Subsidiarity, and Community-Based Environmental Governance beyond the Local Level. *International Journal of the Commons*, *2*(1), 75-97.

Mathew, B. (2005). *Ensuing Sustained Beneficial Outcomes for Water and Sanitation Programmes in Developing World*. (Unpublished Doctoral Thesis, Cranfield University).

Mays, L. (2006). *Water Resources Sustainability*. New York: McGraw-Hill.

Mbata, J. N. (2006). Estimating household willingness to pay for water services in a rural economy: The case of Kanye in southern Botswana. *Development Southern Africa*, *23*(1), 29-43,

Mbughuni, P. (1993). *Country gender analysis for Tanzania*. Paper prepared for Swedish International Development Cooperation Agency (SIDA).

Meinzein-Dick, R., & Zwarteveen, M. (1998). Gendered participation in water management: Issues and illustrations from water users' associations in South Asia. *Agriculture and Human Values*, *15*(6), 337-345

Meinzen-Dick, R. (2007). Going Beyond Panaceas. Special Feature: Beyond Panaceas in Water Institutions. *Proceedings of the National Academy of Sciences*, *104*(39), 15200–15205.

Meinzen-Dick, R., & Zwarteveen, M. (1997). *Gendered Participation in Water Management: Issues and Illustrations from Water Users' Associations in South Asia*. Paper prepared for Women and Water Workshop International Irrigation Management Institute 15-19 September 1997, Sri Lanka.

Mosse, D. (1995). `History, ecology and locality in tank-irrigated South India, *Development and Change*, *28*(3), 505-530.

Mpalanyi, M. J., Kabonesa, C., & Staines, A. (2015). Lived experiences of women as principal gatekeepers of water management in rural Uganda. In *Water is life*, ed. S. Linnane, K. G. McGuigan, H. Fagan, and A. Rugumayo 31–42. Rugby, UK: Practical Action Publishing.

Mugabi, J., & Kayaga, S. (2010) Attitudinal and socio-demographic effects on willingness to pay for water services and actual payment behaviour, *Urban Water Journal*, *7*(5), 287-300.

Mugumya, F. (2013). *Enabling community-based water management systems: Governance and sustainability of rural point-water facilities in Uganda*. (Unpublished Doctoral dissertation, Dublin City University).

Musonda, K. (2004). Issues Regarding Sustainability of Rural Water Supply in Zambia. (Unpublished Master Dissertation, University of South Africa).

Naiga, R., Penker, M., & Hogl, K. (2017). Women's Crucial Role in Collective Operation and Maintenance of Drinking Water Infrastructure in Rural Uganda. *Society & Natural Resources*, *30*(4), 506-520

Najil, P., & Edward, A. (1991). The International Drinking Water Supply and Sanitation Decade in Retrospect and implication for the future. *Natural Resources Forum*, *15*(2), 27-50

Nakano, Y., & Otsuka, K. (2011). Determinants of household contributions to collective irrigation management: The case of the Doho Rice Scheme in Uganda. *Environment and Development Economics*, *16*(5), 27-51.

Narayan, D. (1995). *The Contribution of People's Participation: Evidence from 121 Rural Water Supply Projects*. Washington, DC: World Bank.

Nayar, V., & James, A. (2010). Policy Insights on User Charges from a Rural Water Supply Project: A Counter-intuitive View from South India. *International Journal of Water Resources Development*, *26*(3), 403-421

Nelson, N., & Wright, S. (1995). *Power and Participatory Development: Theory and Practice*. London: IT Publications.

Nielson, E., Giltner, S., Dutton, P., & Donohoe, J. (2009). *Independent evaluation of Australian aid to water supply and sanitation service delivery in East Timor and Indonesia*. Common Wealth of Australia: AusAID. Retrieved from www.ode.ausaid.gov.au/publications

Nisha, K. R. (2006). *Community Participation in Rural Water Supply: An Analysis using Household Data from North Kerala*. Working Paper 173, Bangalore: Institute of Social and Economic Change.

Nishimoto, S. (2003). *Mainstreaming Gender in Water Management: A practical journey to Sustainability. A Resource Guide.* Environmentally Sustainable Development Group. Bureau for Development Policy. UNDP: New York.

Nkonya, E., Pender, J. & Kato, E. (2008). Who know, who cares? The determinants of enactment, awareness, and compliance with community natural resources management regulations in Uganda. *Environment and Development Economics*, *13*(1), 79-101

North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.

Oakley, P., & Marsden, D. (1984). *Approaches to Participation in Rural Development*, Geneva: ILO.

Obeta, M. C. (2013). The Characteristics of Inland Water Transport in Nigeria. *Journal of Humanities and Social Sciences*, *19*(3), 126-191.

Ogujiuba, K.., Ukwueze, E., & Ogbonnaya, M. (2013). Estimating the Willingness to Pay for Water Services in Nsukka Area of South-Eastern Nigeria Using Contingent Valuation Method (CVM):

Implications for Sustainable Development, *Journal of Human Ecology, 41*(2), 93-106.

Oheneba-Sakyi, Y., Awusabo-Asare, K., Abortsu, K. & Aryee, A. (1996). *Female anatomy, decision-making and demographic behaviour among couples in Ghana*, New York, USA: Postdam.

Oliver, A. & Mossialos, E. (2005). An overview of pharmaceutical policy in four countries: France, Germany, the Netherlands and the United Kingdom. *Health Planning and Management, 20*(4), 291-306.

Onyango, M. (2003). *Challenges of weather and climate to African women*. Paper Delivered in the Second Conference on Women in Meteorology and Hydrology. Maseno University, Kenya.

Opare, S. (2005). Engaging women in community decision-making processes in rural Ghana: Problems and prospects. *Development in Practice, 15*(1), 90-99.

Orlikowski, W., & Baroudi, J. (1991). Studying Information Technology in Organisations: Research Approaches and Assumptions. *Information Systems Research, 2*(1), 1-28

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.

Padangwangi, R. (2009) *Community-driven development as drivers of changes: Water supply and sanitation projects in rural Punjab, Pakistan.* Working Paper Series. No.4. Singapore: National University of Singapore.

PRB. (2001). *Women, men and environmental change: The gender dimensions of environmental policies and programs*. Measure Communication, Washington DC.

Page, B. (2005). Paying for Water and the Geography of Commodities. *Transactions of the Institute of British Geographers, 30*(3), 293–306.

Patton, M. Q. (2001). *Qualitative Research and Evaluation Methods* (3rd Edition). Thousand Oaks. CA: Sage Publications.

Paul, J. N., & Dias, C. J. (1982). Introduction: Participation of the Rural Poor in Alternative Approaches to Rural Development, *Third World Legal Studies*: *1*(9), 8-17

Pearce-Oroz, G. (2011). *Rural water supply and sanitation challenges in Latin America for the next decade. Water and Sanitation Program, World Bank. perspective*. Tanzania: Ministry of Water.

Perkins, D., & Zimmerman, M. A. (1995). Empowerment theory, research, and Application. *Community Psychology*, *23*(5), 569-579.

Peter, G., &. Nkanbule, S. E. (2012). Factors Affecting Sustainability of Rural Water Schemes in Swaziland. *Physics and Chemistry of the Earth*, *50*(52), 196-204.

Pierson, P. (2000). Increasing returns, path dependence, and the study of politics. *American Political Science Review, 94*(2), 251–267.

Pippard, J. L. & Bjorklund, R, W. (2003) Identifying Essential Techniques for Social Work Community Practice, *Journal of Community Practice, 11*(4), 101-116.

Pottier, J. (1997). Towards an ethnography of participatory appraisal and research. In *Discourses of development: anthropological perspectives*. Oxford, UK: Berg.

Prokopy, L. S. (2004). Women's participation in rural water supply projects in India: Is it moving beyond tokenism and does it matter? *Water Policy 6*(2), 727-56.

Rahman, M. (1995). *People's Self-Development: Perspectives on Participatory Action Research*. London, UK: Zed Books.

Rahman, M. (2007). Participation. In W. Sachs (Ed.), *The development dictionary: A guide to knowledge as power*. New York: Zed Books.

Rall, M. (1999). The Demand Responsive Approach to Community Water Supply and Sanitation, Mvula Trust Policy Paper, Johannesburg, South Africa.

Rananga, H.T., & Gumbo, J. R. (2015). Willingness to Pay for Water Services in Two Communities of Mutale Local Municipality, South Africa: A Case Study, *Journal of Human Ecology*, *49*(3), 231-243.

Regmi, S. C., & Fawcett, B. (1999). Integrating gender needs into drinking water projects in Nepal. *Gender and Development, 7*(3), 62-72.

Republic of Ghana (1992). *Constitution of the Republic of Ghana*. Tema: Ghana Publishing Corporation.

Reynolds, J. (1992). *Hand pumps: Towards a Sustainable technology*. UNDP/World Bank and Sanitation programme: Washington DC.

Richard C. (1999), Impact and Sustainability of Water Supply and Sanitation Program in Developing Countries. *Journal of the Chartered Institution of Water and Environment Management, 13*(8), 292-296.

Rodrigues, R., & O´Neal, S. G. (2004). Water quality management: North American Development Bank Experience. *International Journal of Water Resources Development, 21*(2), 167- 177.

Rodriguez, F. (2003). *Water resources management and willingness to pay: the case of Cotacachi, Ecuador*. Research Bulletin No. 15, Sustainable Agriculture and Natural Resources Management Collaborative Research Programme (SANREM, CRSP), pp. 1-5. Georgia: University of Georgia.

Rondeinelli, D. A., & Nellis, J. R. (1986) Assessing decentralisation policies in developing countries: a case for cautious optimism. *Development Policy Review*, *4*(1), 3-23.

Rondinelli, D. (1981). Government Decentralisation in Comparative Perspective: Theory and Practice in Developing Countries. *International Review of Administrative Sciences*, *47*(2), 133-145.

Roodt, M. (2001). Participation, civil society, and development. In: Coetzee, Jk; Graaf, J; Hendricks, F & Wood, G (eds) *Development Theory, Policy and Practice*. Cape Town: Oxford University Press Southern Africa.

Rukunga, G., Kioko, T. & Kanyanji, L. (2007). *Operation and Maintenance of rural water services in Kenya.* WELL Country Note 15.1, WEDC.

RWSN, (2010). *A vision for achieving sustainable rural water services for all*. Field Note No 2011-19. RSWN Executive Steering Committee.

Saeed, H. (2003). *The gender agenda: Overburdening women in the name of gender equity?* The Newsletter of Water Aid Ghana Programme, Editions Services: Accra. Retrieved from www.wateraidghana.org.

Salman, S. (2014). Entry into force of the UN watercourse convention - why should it matter? *International journal of water resource development*. doi:10.1080/07900627.2014.952072.

Sam, N. P. (2006). *Gender integration in a rural water project in the Samari Nkwanta community*. New York: United Nations.

Sarantakos, S. (2005). *Social research*. (3rd ed.). New York, USA: Palgrave Macmillan

Sarantakos, S. (2013). *Social Research*. (4th ed.), New York, USA: Palgrave Macmillan.

Schwandt, T. (2000). Three Epistemological Stances for Qualitative Inquiry. Interpretivism, Hermeneutics and Social Constructionism in Denzin, N.K and Lincoln, Y.S (eds), *Handbook of 28 Qualitative Research* (2nd ed.), London: Sage: 189-213

Schouten, T., & Moriarty, P. (2003). *Community water, community management: from system to service in rural areas*. London: ITDG Publishing.

Scott, W. R. (1995). *Institutions and Organisations*. London, UK: Sage Productions.

Scott, W. R. (2001). *Institutions and organisations*, (2nd ed.). Thousand Oaks, CA: Sage.

Scott, W. R. (2008). *Institutions and Organisations, (*2nd ed.). Thousand Oaks, CA: Sage

Segal G. F. (2001). *Navigating the Politics of Water Privatization. The Battles of New Orleans, Atlanta and Stockton*. Reason Public Policy Institute, USA.

Seixas, C. S., & Davy, B. (2008). Self-Organisation in Integrated Conservation and Development Initiatives. *International Journal of the Commons, 2*(1), 99-125

Seppa¨la¨, T. O. (2002). Effective water and sanitation policy reform implementation: Need for systemic approach and stakeholder participation. *Water Policy, 4*(4), 65-88.

Shand, W. (2015). *Exploring institutional change: the contribution of co-production to shaping institutions*. IIED Working Paper. London: IIED.

SIDA. (1994). *Towards a framework for including a gender perspective in water resources management*. Stockholm: Development Assistance Committee Meeting on Water Resources Management.

SIDA. (1996). *Rural village water supply programme*. Botswana: Department for Natural Resources and the Environment.

Simonovic, S. P. (1996). Decision Support Systems for Sustainable Management of Water Resources. *Water International, 21*(40), 223-244.

Singh, N. (2006). The changing role of the water management: myths and realities. *Spring*, 94-113

Smith, B. C. (1998). Local government and the transition to democracy. *Public Administration and Development, 18*(1), 85–92.

Sokile, C.S., & B. Koppen, V. (2003). *Local Water Rights and Local Water User Entities: The Unsung Heroines to Water Resource Management in Tanzania.* A paper presented at the WATERNET/WARFSA 4th Symposium. Gaborone, Botswana.

Starkl, M., Brunner, N., & Stenström, T. A. (2013). Why Do Water and Sanitation Systems for the Poor Still Fail? Policy Analysis in Economically Advanced Developing Countries. *Environmental Science & Technology*, *47*(15), 6102-6110.

Stout, G. E. (1998). Sustainable Development Requires the Full Cooperation of Water Users. *Water International*, *23*(1), 3-7.

Stufflebeam, D. L., McCormick, C. H., Brinkerhoff, R. O., & Nelson, C. O. (1985). Conducting Educational Needs Assessments. Netherlands: Springer

Suddaby, R. (2010). Challenges of Institutional Theory. *Journal of Management Inquiry*, *19*(1), 14-20.

Sun, Y., Asante, F., & Birner, R. (2010). *Opportunities and Challenges of Community-Based Rural Drinking Water Supplies: An Analysis of Water and Sanitation Committees in Ghana*. Discussion Paper. International Food Policy Research Institute.

Swallow, B. (2005). Potential for poverty reduction strategies to address community priorities: case study of Kenya. *World Development*, *33*(2), 301-321.

Swartz, M. (1996). *Sharing in Community- Based Social Services in Rural Tanzania: A Case Study of Mtwara and Lindi Regions*. UNU/WIDER, Research in Progress (R.I.P.).

Tadesse, A., Bosona, T., & Gebresenbet, G. (2013). Rural Water Supply Management and Sustainability: The Case of Adama Area, Ethiopia. *Journal of Water Resource and Protection*, 5(3), 208-221

Tam, T. (2012). Participation of women in rural water supply and sanitation projects: visible or invisible actors? The case of the Sub-District of Mau Bara (Liquica Timorleste). *International Journal of Multidisciplinary Thought*, *2*(4), 149-170.

Tolbert, P., & Zucker, L. G. (1996). Institutional theory. In S. R. Clegg, C. Hardy, & W. R. Nord (eds.), *The handbook of organisation studies*. London: SAGE.

Tsebelis, G. (2002). *Veto Players: How Political Institutions Work*. Princeton, New Jersey: Princeton University.

Turner, J. (1968). The squatter settlement: Architecture that works. *Architectural Design*, *38*(3), 55-60.

UN (2007). *United Nations Declaration on the Rights of Indigenous Peoples*. New York: United Nations.

UN (2016). *The United Nation World Water Development Report*, New York: United Nations.

United Nations. (2010). *United Nations general assembly resolution on the human right to water and sanitation*. A/64/L.63/Rev.1 (26 July 2010)/, Recital 4 of the Preamble to the Resolution.

UNDP (2003). *Mainstreaming gender in water management: a practical journey to sustainability*. New York: UNDP/BDP Energy and Environment Group.

UNDP (2006). *The Human Development Report.* New York: United Nations Development Program

UNDP (1990). *Global Consultation on Safe Water and Sanitation for the 1990's,* New Delhi, India, September 10-14, 1990. Background paper, New York: United Nations.

UNPFII (2004). *The concept of indigenous peoples*. New York: United Nations.

UNESCO (2018). *The United Nations world water development report: nature-based solutions for water; facts and figures*, New York: United Nations.

UNESCO (2019). *United Nations World Water Development Report*. New York: United Nations.

UNESCO. (2003). *World Water Report*. Chapter 1-The World Water Crises. Retrieved from http://www.unesco.org/water/wwap/wwdr/index.shtml.

UNESCO (1999). *World's groundwater resources are suffering from poor governance.* UNESCO natural sciences sector news. Paris, UNESCO.

UNICEF (1990). *Children and women of Ghana: A situation analysis, 1989 – 1990.* UNICEF, Accra.

Upadhyay, B. (2004). *Gender roles and multiple uses of water in North Gujarat*. (Working paper 70). International Water Management Institute (IWMI), Colombo, Sri Lanka.

Van Koppen, B., Giordano, M., Butterworth, J., & Mapedza, E. (2007). *Resource Management Reform in Developing Countries: Rationale, Contents and Key Messages*. Delft: International Water and Sanitation Center (IRC)

Van Koppen B. (ed.). (2007). *Community-based water law and water resource management reform in developing countries*. CABI, UK.

Varis, O. (2007). Water Demands for Bioenergy Production. *International Journal of Water Resources Development*, *23*(3), 519-535.

Vasquez, W. F. (2011). Municipal water services in Guatemala: Exploring official perceptions. *Water Policy*, *13*(3), 362–374.

Vásquez, W. F., & Espaillat, R. (2016) Willingness to pay for reliable supplies of safe drinking water in Guatemala: A referendum contingent valuation study. *Urban Water Journal*, *13*(3), 284-292,

Verhagen, J., James, A. J., van Wijk, C., Nanavaty, R., Parikh M., & Bhatt, M. (2004). *Linking water supply and poverty alleviation: the impact of women's productive use of water and time on household economy and gender relations in Banaskantha District, Gujarat, India*. Delft: International Water and Sanitation Centre (IRC).

Verhasselt, Y. (Ed.). (1998). *Water: Worldwide and worthwhile*. Brussels: United Nations.

Vidya, A., & Mayer, A. L. (2014). Use of the participatory approach to develop sustainability Assessment for natural resource management. *International Journal of Sustainable Development & World Ecology*, *21*(4), 369-379.

Volger, J. (2003) Taking Institutions Seriously: How Regime Analysis Can Be Relevant to Multi-level Environmental Governance. *Global Environmental Politics*, 3(2), 25-39

Wagner, M. L. (2000). The Organisational Ombudsman as Change Agent. *Negotiation Journal*, *16*(1), 99-114

Wallace, R. A., & Wolf, A. (2006). *Contemporary sociological theory* (6th ed.). Upper Saddle River NJ: Pearson Prentice Hall.

Wambu, C. K., & Kindiki, M. (2015). Gender disparities in water resources management projects in Njoro Sub-County, Kenya. *International Journal of Social Sciences Studies*, *3*(2), 123-129.

WASH Sustainability Charter. (2013) [Internet; cited 2014 Oct 10]. Retrieved from http://sustainablewash.org/

Water and Sanitation Monitoring Platform. (2010). *A Directory of Ghana's Water and Sanitation Sector: Who does what, where and how*? Accra: UNICEF.

Water and Sanitation Program. (2002). *Sustainability of Rural Water Supply Projects: Lessons from the Past.* (Discussion Paper No.1), South Asia Region. Washington: Water and Sanitation Programme (WSP).

WaterAid. (2013). *Strengthening WASH Services and Community Resilience Through Community Based Water Resource Management*. Burkina Faso: WaterAid. Retrieved from www.wateraid.org/uk/~/media/ Publications/strengthening-WASH-services-and-community-resilience.ashx

WCED (1987). *Our Common Future*. (The Brundtland Report). Oxford, UK: Oxford University Press.

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechest, L. (1966). *Unobtrusive Measures: Nonreactive Research in the Social Sciences*. Chicago: Rand MacNally

Weick, K. (1996). Drop your tools: An allegory for organisational studies. *Administrative Science Quarterly*, *41*(2), 301-313.

Were E., Swallow, B., & Roy, J. (2006). *Water, women, and local social organisation in the Western Kenya highlands*. CAPRi Working Paper 51. International Food Policy Research Institute: Washington, DC.

Wiek, A., & Larson, K. L. (2012). Water, people, and sustainability: A systems framework for analysing and assessing water governance regimes. *Water Resources Management*, *26*(11), 3153–3171.

Winn, M. I. (2001). Building stakeholder theory with a decision modeling methodology. *Business Society*, *40*(8), 133–166.

Wijk-Sibesma, C. A. van. (1998). *Gender in water resources management, water supply and sanitation: Roles and realities revisited*. Technical Paper 33, International Research Centre for Water and Sanitation. Delft: Netherlands.

UNICEF/WHO. (2006). *Meeting the MDG Drinking Water and Sanitation. The urban and rural challenge of the decade*. World Health Organisation and United Nations Children's Fund, Geneva.

WHO. (2015). *Progress on Drinking-Water and Sanitation*. Geneva: WHO

WHO. (2011). *WHO guidelines for drinking-water quality*. (4th ed.). Geneva: WHO.

World Bank, (2011). *Monitoring & Evaluation Capacity Development*. The world Bank Group.

World Bank (1998). *Community water supply and sanitation conference report*, May 5-8, Washington, D. C: World Bank Water and Sanitation Programme.

World Bank (1994). *World Development Report.* Oxford, OUP/World Bank.

World Bank (1993). *Water resources management: A World Bank policy paper*. Washington: World Bank.

World Bank (1982). *Sanitation and Clean Water*. The World Bank, Washington.

World Health Organization (2015). *Water, sanitation and hygiene in health care facilities: status in low and middle income countries and way forward*. Geneva, Switzerland

WHO/UNICEF. (2013). *Joint Monitoring Programme (JMP) for Water Supply and Sanitation.* WHO/UNICEF

WHO/UNICEF. (2009). *Joint monitoring programme for water supply and sanitation. Meeting the MDG drinking water and sanitation target: mid-term assessment of progress*. WHO; Geneva: UNICEF, New York.

WHO/UNICEF. (2004). *Coverage Estimates, Improved Drinking Water, Kenya*. World Health Organisation/United Nations Children's Fund, Joint Monitoring Program for Water Supply and Sanitation, Geneva, Switzerland.

WHO (1987*). Cost recovery in community water supply and sanitation: report of the second informal consultation on institutional development,* Geneva, 5-9 October. Geneva: World Health Organisation.

Yeboah, I. (2006). Subaltern strategies and development practice: urban water privatization in Ghana, *The Geographical Journal*, *172*(1), 50-65.

Yelbert, J. E. (1999). *Integrated development for water supply and sanitation: Community management practices in Ghana*. Paper presented at the WEDC 25th Conference in Addis Ababa, Ethiopia.

Yin, R. (1994). *Applications of Case Study Research*, London, UK: SAGE Publications LTD.

Young, K. (1993). *Planning Development with Women: Making a World Difference*. USA: Palgrave Macmillan.

Zucker, L. (1987). Institutional Theories of Organisations, *Annual Review of Sociology 13*(5), 443-64.

Zwarteveen, M., & Meinzen-Dick, R. (2001). Gender and property rights in the commons: example of water rights in South Asia. *Agriculture and Human Values*, *18*(1), 11-25.

APPENDICES

APPENDIX A

Questionnaire

University of Cape Coast

School for Development Studies

Data Collection Instruments

INSTRUCTION: This questionnaire is part of a study on ‘‘Making rural drinking water supply programmes work: A study of the Water and Sanitation Management Teams in the Eastern Region.’’.

Participation in the study is entirely voluntary; you can withdraw from the interview at any point in time, without giving a reason for doing so.

Please be assured that the **information you provide will remain strictly confidential and anonymous**.

Answers will be reported so that no individual or organisation will be identifiable from any publication presenting the results of the research. By responding to the questions, your consent to take part in the study is assumed and that you agree to the use of anonymised quotes in publications.

Questionnaire for the WSMTs

A: Bio Data

1. Name of

   Community.....

2. Sex: 1. Male [ ] 2. Female [ ]

3. Age: ……

4. Highest Educational Level: 1. No formal education [ ] 2

   .Primary [ ] 3. JHS/MSLC [ ] 4 .SHS [ ] 5

.Tech/Voc/Commercial [ ] 6. Diploma (Polytechnic, Higher Diploma Ins, Nursing, Teaching etc. [ ] 7. First Degree and above [ ]

5. For how many years have you been in this community?
6. What is your main occupation?

…….....

7. Marital status 1. Married [ ] 2. Single [ ] 3. Divorced [ ] 4. Separated [ ]
8. Religion 1. Christianity [ ] 2. Islam [ ] 3. Traditional [ ] 4. Others (please specify)……..…

B: Formation and Training

9. Which year was the WSMT established?

.....

10. What is the total membership of the WSMT?.....
11. How many women
12. do you have in the WSMTs? .....
13. What is your position in the WSMT member?1. Chair [ ] 2. Secretary [ ] 3. Treasure [ ] 4. Caretaker [ ] 5. Organiser [ ] 6. Assistant Secretary [ ] 7. Hygiene promoter [ ] 8. Member [ ]
14. Does the WSMT work affect your occupation? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
15. If yes or sometimes, how does it affect your work?

.....

16. What are your motivations as a WSMT member? (Tick all that apply)
    1. Continuous water supply [ ]
    2. To help myself [ ]

3. Service to the community [ ]
4. To gain respect [ ]
5. Monetary reward [ ]
6. Others please specify……

17. Has initial training take place? 1.Yes[ ] 2.No [ ]
18. If yes, by who? 1. Assembly [ ] 2. NGO [ ] 3. Other (please state) …….
19. Has retraining been taking place? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
20. If yes, by who? 1. District Assembly [ ] 2. NGO [ ] 3. Other (please state) …….

C: Record Keeping and Accountability

21. Do you meet as a Team? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
22. How many times do you meet in a month? 1. Weekly [ ] 2. Every two weeks [ ] 3. Every three weeks [ ] 4. Once a month [ ]. 6. Others (please state)…….
23. Are minute books kept up to date? 1. Yes [ ] 2. No [ ]
24. If yes, do you see and read the minutes? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
25. Has there been change in the WSMT membership since you became a member? 1. Yes [ ] 2. No [ ]
26. If yes, what do you think was the result of the change? 1. Chief's influence [ ] 2. Political Influence [ ] 3. Worker transfer [ ] 3. Others (please state)……..

27. Has there been interference in the operational issues i.e. tariff setting?

    1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

28. If yes or sometimes answer to question 28, who interfered? 1. Chief's influence 2. Political Influence [ ] 3. Worker transfer [ ] 3. Other (state) ……

29. Do you have a treasurer? 1. Yes [ ] 2. No [ ]

30. What is the gender of the treasurer? 1. Male [ ] 2. Female [ ]

31. Are the account books up to date? 1. Yes [ ] 2. No [ ]

32. Did you see and read the account books? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

33. Are records posted on the community notice board (or communicated in another way to all communities)? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

34. If yes how often? 1. Monthly 2. Quarterly 3. Every six months

    4. Others (please State).....

35. Does your annual revenue obtain per week exceed expenditure per week? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

36. Is there petty cash available for the maintenance of the system? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

37. If yes what is the amount? GH₵.....

38. Is there a dedicated bank account for the system management? 1. Yes [ ] 2. No [ ]

39. If yes which bank?.....

40. If no to question 37, state why?.....

……

……..……

41. What is the amount of cash in hand? GH₵……..

D: Functionality and Reliability

42. In a year does the water flow for 345 days? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

43. On the average, how many times does the borehole breakdown per month? 1. Every week [ ] 2. Every two weeks [ ] 3. Every three weeks [ ] 4. Every month [ ] 5. Others (please state)……

44. Do you get readily available spare parts for repairs? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

45. How many days does it take to obtain spare parts? …… days

46. Do you think that there is a delay? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

47. If, yes or sometimes to question 47, what do you think account for the delay

……

……

48. Is it easy for you to contact the area mechanic when you have problem? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

49. How long does it take the area mechanic to come and assess the problem? ……day(s)

50. Are costs of spare parts and repair services covered by the user fees? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

51. Is support from the private sector for maintenance available? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
52. If yes or sometimes to question 50, how long does it take for technical services from the private sector?..... days
53. Is support from the Assembly for maintenance available? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
54. How long does it take to get technical services from the Assembly?.....days
55. Do the WSMT prepare maintenance schedules? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
56. If yes or sometimes to question 56, does the WSMT undertake routine maintenance according to the maintenance schedule? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
57. Did the construction consultant prepare system specific O&M manuals, which has been submitted to the community/ WSMT?1. Yes [ ] 2. No [ ]
58. If yes to question 58, has WSMT been trained in the effective use of the manuals? 1. Yes [ ] 2. No [ ]

E: Operational and Maintenance

59. Is external auditing carried out by the District Assembly? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
60. Has a tariff been set? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
61. If yes to question 59, who fixed the tariff? 1. WSMT 2. Community members 3. Assembly 4. Donor 5. Others (please state)……

62. How do you collect the user fees? 1. Pay as you fetch 2. Monthly 3. Others (please state)……

63. If it is pay as you fetch, how much is the tariff in Ghana pesewa for 18 litres (size 34 bucket)? …… pesewas

64. If the water users pay on monthly basis, how much each household pays? GH₵ …. ……. pesewas

65. Over the course of last year, has the District Water Sanitation Team (DWST) monitored operation and maintenance of water facilities in terms of financial, technical and administrative performance? 1. Yes [ ] 2. No [ ]

66. If yes to question 64, how many times per year? ……times

67. Has the Assembly been assisting the community in major repairs and rehabilitation? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

F: The Quality and Quantity of water supply

67. Do you clean the water project site?1. Yes [ ] 2. No [ ] 3 Sometimes[ ]

68. If yes or sometimes, how many days do you clean per week?.....day

69. Do you receive hygiene and sanitation education from the DWST? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]

70. If yes or sometimes how many times within a year? ……. times

71. Has water quality sampling and analysis been done by certified institutions? 1. Yes [ ] 2. No [ ] 3. Not sure [ ]

72. If yes to question 71, how many times per year? ……. Times

73. Is water quality testing paid for by the community? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
74. If yes or sometimes to question 73, how much was paid for the immediate past testing…….
75. If no to question 73, who paid? 1. Assembly [ ] 2. Donor [ ] 3. Others (please state)……
76. Do you want CWSA to take over the operation and management of the water project? 1. Yes [ ] 2. No [ ] 3. I don't know [ ]
77. If yes why……
78. If no why……
……

APPENDIX B

Focus Group Discussion Guide

University of Cape Coast

School for Development Studies

Data Collection Instruments

INSTRUCTION: This focus group discussion is part of a study on ‘‘Making rural drinking water supply programmes work in the Eastern Region of Ghana: A study of the Water and Sanitation Management Teams’’.

Participation in the study is entirely voluntary; you can withdraw from the interview at any point in time, without giving a reason for doing so.

Please be assured that the **information you provide will remain strictly confidential and anonymous**.

Answers will be reported so that no individual or organisation will be identifiable from any publication presenting the results of the research.

By responding to the questions, your consent to take part in the study is assumed and that you agree to the use of anonymised quotes in publications.

Focus Group Discussion Guide for Community Women

1. Is water relevant for human survival (they should mention some importance of water to themselves as women)
2. Are you aware of the WSMT?
3. What are their functions?
4. Which of the functions they are not performing or poorly performing
5. How many women are in the WSMT
6. What are their positions in the WSMT?
7. Do you know women are to form 30 percent of WSMT

8. Is it important to have more women in the WSMT
9. If yes why and if no why.
10. What are some of the issues that prevents women from fully participating in WMST
11. What are some of the challenges with the domination of men in the Team?
12. What are some of the things the men do that overshadow their effort
13. Are women involved in decisions making concerning water related issues
14. If yes how, if no why
15. Are women as WSMT members and community women involved from the planning and implementation of the water project?
16. If yes how, if no why
17. Do you think women have the capacity to be the chair of the WSMT?
18. If yes why, if no why
19. If no what can be done to make women capable.
20. Why is it that you don't fetch water from the water project (for women who do not fetch water from the project)
21. Have you complain to the WSMT the reasons you don't use the water project (for women who do not fetch water from the project)
22. Do you trust that money collected is used for the purpose?
23. Do you want CWSA to take over the operation and management of the water project (if yes why, if no why)

APPENDIX C

Questionnaire

University of Cape Coast

School for Development Studies

Data Collection Instruments

INSTRUCTION: Please kindly spend some minutes (30 minutes) of your time to answer the following questions for the study entitled ‘‘Making rural drinking water supply programmes work in the Eastern Region of Ghana: A study of the Water and Sanitation Management Teams’’.

Participation in the study is entirely voluntary; you can withdraw from the interview at any point in time, without giving a reason for doing so.

Please be assured that the **information you provide will remain strictly confidential and anonymous**.

Answers will be reported so that no individual or organisation will be identifiable from any publication presenting the results of the research.

By responding to the questions, your consent to take part in the study is assumed and that you agree to the use of anonymised quotes in publications.

Questionnaire for Community Members

Bio Data

1. Name of Community.....
2. Sex: 1. Male [ ] 2. Female. [ ]
3. Age:
4. Marital status 1. Married [ ] 2. Single [ ] 3. Divorced [ ] 4. Separated [ ]

5. Religion 1. Christianity [ ] 2. Islam [ ] 3. Traditional [ ] 4. Others (please specify)…….
6. Highest Educational Level: 1. No formal education [ ] 2 .Primary [ ] 3. JHS/MSLC [ ] 4. SHS [ ] 5 .Tech/Voc/Commercial [ ] 6. Diploma (Polytechnic, Higher Diploma, Nursing, Teaching [ ] 7. First Degree and above [ ]
7. For how many years have you been in this community?.....
8. What is your main occupation? .....
9. Are you aware of the WSMT? 1. Yes [ ] 2. No [ ]
10. Are you satisfied with the election procedure for the WSMT 1.Yes [ ] 2. No [ ] 3. Not present [ ].
11. If no why (any political/chieftaincy interference)……

    ……

    ……
12. Do you know the functions of the WSMT? 1. Yes [ ] 2. No [ ]
13. If yes please state some of their functions
    a. ……
    b. ……
    c. ……
    d. ……
14. Are you satisfied with the performance of the WSMT? 1. Yes [ ] 2. No [ ] 3. Sometimes [ ]
15. If no why……..…

    ……

    ……

……

……

16. Which of the following functions they don't perform?

    a. Sharing of account with community members [ ]

    b. Organise Sanitation and hygiene promotion [ ]

    c. Organise meeting with community members [ ]

    d. Organise WSMT meetings [ ]

    e. Fixing of minor problems [ ]

    f. Communicates WSMTs decisions to community members [ ]

    g. Accepts the views of community members [ ]

    h. Others (please state)……

17. Does the water flow for 345days in a year? 1. Yes [ ] 2. No [ ]

18. Do the Team involve the community in decision making 1.Yes [ ]

    2. No [ ] 3. Sometimes [ ]

19. Is the water project functioning to your expectation 1.Yes [ ] 2. No [ ]

    3. Sometimes [ ]

20. If no why……

21. If yes do you trust the project can provide water for the coming 7yrs?

    1. Yes [ ] 2. No [ ] 3. Not sure [ ]

22. Do you fetch water from the water project? 1. Yes [ ] 2. No [ ] 3.

    Sometimes [ ]

23. If no or sometimes to Question 22, please explain.....

    …...……..…

    ……...……

24. Are you aware of the challenges of the WSMT? 1. Yes [ ] 2. No [ ]

25. If yes to Question 24, please state some of the challenges.

    a. ……

    b. ……

    c. ……

    d. ……

    e. ……

26. Do want CWSA to take over the operation and management of the water project. 1. Yes [ ] 2. No [ ]

27. What can be done to make the WSMT effective?

    a. ……

    b. ……

    c. ……

    d. ……

APPENDIX D

Interview Guide

University of Cape Coast

School for Development Studies

Data Collection Instruments

INSTRUCTION: This interview is part of a study on ‘‘Making rural drinking water supply programmes work in the Eastern Region of Ghana: An evaluative study of the Water and Sanitation Management Teams’’.

Participation in the study is entirely voluntary; you can withdraw from the interview at any point in time, without giving a reason for doing so.

Please be assured that the **information you provide will remain strictly confidential and anonymous**.

Answers will be reported so that no individual or organisation will be identifiable from any publication presenting the results of the research.

By responding to the questions, your consent to take part in the study is assumed and that you agree to the use of anonymised quotes in publications.

Interview Guide for key informants

Interview Guide Identification

Interview Schedule ID:	Date of Interview:
Name of Interviewer:	
Contact of Interviewer:	Time: Start: End:
First Name of Respondent:	
Contact of Respondent:	

1. What is the institutional framework for rural water supply?
2. What is the role of CWSA/RCWSA/DWST in rural water supply?
3. How are the WSMT formed?
4. Specifically what are they supposed to do as a Team?
5. What are the indicators for monitoring WSMT performance?
6. What are the procedures for corrective and routine maintenance?
7. What is the procedure for water quality testing and who pays for the services.
8. What are the duties of the water and sanitation unit of the works department towards rural water supply?
9. What are the procedures for Development Partners operations and whether they align their projects with the NCWSP principles?
10. Which departments are responsible for data collection on water and sanitation at the local level?
11. What has resulted in the poor performance of the WSMT in sustained water systems?
12. What challenges are you facing as an institution in rural water supply?

The following problems were discussed:

   a. Shadow pricing
   b. Delay Spare parts supply
   c. Main and alternative sources of revenue mobilisation
   d. funds for minor and major repairs
   a. Delay in the response from District mechanics
   b. Training of area mechanic
   c. Monitoring of WSMT

d. Gender power relations

e. Sanitation and Hygiene promotion

f. Water quality

13. How are you coping with the Middle level income status of Ghana with regards to rural water funding?
14. What mechanism is in place to take and integrate community data/concerns into mainstream policies?
15. Are there budget allocation for water and Sanitation at the MMDA?
16. Are there Water and Sanitation Plan at the MMDA? (probe)
17. What are the monitoring and evaluation procedure for CWSA, RWST, and DWST?
18. Do you have any regret for the policy change from Supply Driven Approach (SDA) to the Demand Responsive Approach (DRA) - probe answer?