UNIVERSITY FOR DEVELOPMENT STUDIES

EFFECTS OF WASH INTERVENTIONS ON ACCES TO CLEAN DRINKING WATER AND SANITATION PRACTICES IN THE LAWRA AND NANDOM DISTRICTS OF THE UPPER WEST REGION OF GHANA

BY

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DECLARATION

Candidate's declaration

I hereby declare that this dissertation is the product of my own research and that no part of it has been presented for another degree in this university or somewhere else.

Signature.....date.....

Candidates name: ALHASSAN HUMEIRU.

Supervisor's declaration

I hereby declare that the preparation and presentation of this dissertation was supervised in accordance with the laid down regulations and guidelines by the University for Development Studies (UDS).

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Supervisor's name: Professor Amin Alhassan (PhD)

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Abstract

This study assesses Water, Sanitation and Hygiene (WASH) interventions in the Lawra and Nandom Districts in the Upper West Region of Ghana. The objectives included the examination of the type of WASH interventions programme in the two districts; the effects of WASH intervention on water usage among households; the factors that influence the adoption of WASH recommendations among households as well as examine the willingness of households to pay for improved drinking water and sanitation facilities. Descriptive survey research design was used. The questionnaires and interview guide were complemented with focus group discussions. A sample size of 230 respondents was adopted for the study. Probability and non-probability sampling techniques were used to define the scope of the field work. In the selection of communities for the programme in both districts for the study, purposive sampling technique was used. Data was analyzed using descriptive statistics such as frequencies and percentages. Boreholes were identified to be the main source of drinking water while pit latrine was the most commonly used latrine facility in both districts. The research revealed that among factors that influenced the adoption of WASH recommended practices, community participation was the most predominant. Other factors that influenced the adoption of WASH recommended practices in the study area included one's income or educational level and information on WASH practices. With regards to willingness to pay for improved water and sanitation services or facilities, many households were willing to pay but could not afford. In order to reduce crowding and distance covered by households in carting water from source to the house more boreholes should be constructed. Sanitation officers must intensify campaigns on the need to keep the latrine facilities neat. It is also recommended that community participation in the execution of projects must be increased. As many households could not afford to pay for improved services the district assemblies should consider granting subsidies to community members in respect of services aimed at improving access to improved facilities.

Dedication

This work is dedicated to the memory of my late parents, Alhassan Adam Daballi and Fati Napari, my wife Ibrahim Sumaya and to my children Saha, Tahama, Nasara and Suglo.

Acknowledgement

I owe a lot of people for the diverse and immense support which they rendered towards the completion of this project work.

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I could not have gone through the administration of the questionnaire in a most successful manner without the able support of Mr Richard Gyinia and Mr. Jerry Sabogu of the Lawra and Nandom district assemblies respectively.

List of abbreviations

1. UNICEF: United Nations Intentional Children And Education Fund
2. WHO: World Health Organization
3. UNCHS: United Nations Conference On Human Settlement
4. CWSA: Community Water And Sanitation Agency
5. KVIP: Kumasi Ventilated Improved Project
6. WASH: Water Sanitation And Hygiene
7. USAID: United States Agency For International Development
8. NCWSP: National Community Water And Sanitation Programme
9. NGO: Non-Governmental Organization
10. NEPAD: New Partnership For Africa's Development
11. SEA: Strategic Environmental Assessment
12. GPRS: Ghana Poverty Reduction Strategy
13. JPM: Joint Monitoring Programme
14. WTP: Willingness To Pay
15. CLTS: Community Led Total Sanitation
16. DHMT: District Health Management Team
17. EHSU: Environmental Health And Sanitation Unit
18. SHST: School Health And Sanitation Team
19. NSD: National Sanitation Day
20. APDO: Afram Planes Development Programme
21. NORST: Northern Region Small Towns
22. UNDP: United Nations Development Programme
23. MLGRD: Ministry Of Local Government And Rural Development
24. WSC: Water Services Commission

25. WSSP: Water Sector Strategic Plan
26. UNESCO: United Nations Education Scientific and Cultural Organization
27. CARE; Co-operative Assistance for Relief Everywhere
28. CIKOD; Centre For Indigenous Knowledge
29. MDG: Millennium Development Goals
30. SDG: Sustainable Development Goals
31. MMDAs: Metropolitan, Municipal and District Assemblies
32. MoSWR: Ministry of Sanitation and Water Resources
33. CONWAS: Coalition of NGOs in Water and Sanitation

Definition of terms

Improved Drinking Water Source: Improved drinking water source is defined as one that by nature of its construction or through active intervention is likely to be protected from outside contamination in particular from contamination with faecal matter.

Improved Sanitation Facility: Improved sanitation facility is one that hygienically separates human excreta from human contact.

Sanitation market; defined as a field that applies social and commercial approaches to scale up the supply and demand for improved sanitation and water facilities.

Sanitation credit; is the application of micro credit to provide loans to small enterprises and households in order to increase access to an improved water source and sanitation facilities.

Trigger: triggering a community refers to the process of creating dissatisfaction with current practices in a community to understand and realize the negative effects of poor sanitation.

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CHAPTER ONE

BACKGROUND

1.1 Introduction

This chapter contains the background of the study, the problem statement, research objectives, research questions, scope of the study, significance of the study, limitations of the study and organization of the chapters.

1.2. Background of the study

The issues regarding access to safe drinking water, good sanitation and hygiene practices have been a major concern globally. Water and sanitation play a crucial role in the lives of humankind and as such these sectors have received a number of interventions from governments across the world in an effort at addressing concerns on water and sanitation. The water and sanitation sector has been considered critical components for development. For example, United State Agency for International Development USAID, (1993) report on water sanitation and Hygiene, (WASH) revealed that one of the most important sectors for development has been the provision of potable water supplies, sanitation and hygiene education to urban, peri-urban and rural communities. The report stressed that improvements in these areas are essential to promoting health for the general population and for child survival and are also fundamental for the development of many industries and business and overall urban expansion.

It is in light of this immense importance of access to safe drinking water and improved sanitation practices that the sector attracted so much international concern. The United Nation's Children Fund and the World Health Organization UNICEF/WHO, (2008) joint monitoring progress report on drinking water and sanitation estimated the global populations who have had

access to safe drinking water to be 89 percent. The report observed that 780 million people were still without access to improved drinking water source. On the issue of sanitation the report revealed that only 63 percent of global populations have access to improved latrine facilities. UNICEF, (2010) progress report on water and sanitation observed that progress was recorded with regard to safe drinking water and basic Sanitation with a global rate of access to safe drinking water increasing from 77% to 87% from 1990 to 2008. In spite of the progress recorded as reported by UNICEF, there are still serious concerns with access to both drinking water and sanitation facilities particularly in sub-Saharan Africa as the area still lags behind most of the rest of the world. The UNICEF progress report estimated for example that only 60% of the populations have access to an improved drinking water while two-third of the people in sub-Saharan Africa lack access to improved sanitation facilities. The report further observed that of those who lack sanitation facilities more than one billion globally must practice open defecation with a population of 224 million of these in sub-Saharan Africa. Also UNICEF/WHO, (2012) revealed that though an estimated 89% of the global population now use improved drinking water sources, 780 million people remained unserved. The report indicated that 4 out of 10 people who are without access to improved drinking water lives in sub-Saharan Africa and that the number of people in rural areas using clean drinking sources was five times greater in urban areas. With regard to sanitation, the report observed that 2.5 billion people are without access to improved sanitation facility; it revealed further that the number of people resorting to open defecation globally has increased by 271 million since 1990. The report further showed following an analysis of data from 25 countries in sub-Saharan Africa that women and girls bear the primary responsibility for water collection at considerable loss in time.

In its report on the situation of access to clean drinking water and improved sanitation facilities, the United Nations Development project UNDP, (2002) estimated that 20% of households in

Ghana do not have access to any form of toilet facility and may resort to open defecation whereas 31% percent of households rely on public toilets. The report further indicated that only 22% have access to pit latrines. 7% of households use the Kumasi Ventilated Improved Project (KVIP) and 9% have access to water closets and that about four percent of households still use pan latrine despite its health threatening implications.

The report further revealed that at the household level, poor hygienic practices by individuals and communities are compounded by insufficient and ineffective hygiene education, a practice that has a serious health impact as more than half of all reported diseases are related to poor environmental sanitation with attendant social and economic cost. Kosek M, Bern C, Guerrant RL, (2003) observed that diarrheal diseases which are frequently transmitted by contaminated water remains the leading cause of morbidity and mortality among children under 5 years of age in developing countries. Their estimation of annual total mortality from diarrheal diseases ranges from 2.5 to 3.5 million and that more than 80% of this is among children under 5 years. In their study, Pruss A, David K, Fewtrell L, and Bartram J, (2002) observed that about 4% of the global burden of diseases is attributed to water, sanitation and hygiene and that globally diarrhea kills more children compared to malaria and tuberculosis together. On their part, Annaamraju S, Calagues B, and Gutierrez E, (2001) observed that Part of the problem with the lack of sustainable access to safe drinking water and sanitation facilities has been inadequate investments in water and sanitation by governments particularly in the developing countries. It has been estimated for example that in Africa only 12% of the money invested in water supply and sanitation went specifically to fund sanitation while Latin America and the Caribbean spent 38% on sanitation. (UNICEF/WHO, 2008) In their review of global evaluation of sanitation programme, Fewtrell et al, (2001) observed that investment in sanitation was inadequate and

often misdirected due in part to lack of funds. They hold that most decision makers are not clear about an overall strategy for sanitation programming.

In Ghana the community water and sanitation agency report that government administrative budget support to the sub-sector in terms of running cost of the agency has been quite low over the years. For instance the agency observed that in the 2004 fiscal year, government budgetary allocation was 12.5 billion cedis out of 18 billion requested, in 2005, a total of 5.7 billion was approved out of 13.6 billion while 4.7 billion was approved out of 11.0 billion requested for the 2006 fiscal year (CWSA, 2013)

1.3 Problem Statement

Access to safe drinking water and proper sanitation practice is quite crucial for sustained human development. Despite the recognition of the important role access to safe drinking water and good sanitation practice play in the lives of communities, there still remains some serious challenges for many developing countries particularly Africa on access. In Africa sanitation coverage still remains low. In their report UNICEF/WHO, (2012) observed that despite significant progress on sanitation, 2.5 billion people did not have access to an improved sanitation facility. It further indicated that of those that lack sanitation, more than 1 billion must practice open defecation with a population of 224 million of those in South Saharan Africa. The UNDP, (1993) also observed that in the Lawra and Nandom districts access to safe drinking water and sanitation facilities remain a serious concern as 66.4% of the population drink water from the bore hole while 63.2% do not have toilet facility in their homes and may resort to open defecation with all its attendant health implications. On solid waste disposal 37.2% dispose their solid waste by public dump in the open space while a further 29.1% dispose solid waste indiscriminately.

The Ghana Statistical Service, (2009) observed for instance that only 18% and 7% of the urban and rural populations respectively use improved sanitation facilities and diarrheal diseases are considered a major threat for the age of under-five mortality rate as they are affected more than any other age group.

In an effort towards addressing concerns such as these and also meeting the Sustainable Development Goals which is targeted at ensuring access to clean drinking water and improved sanitation for all by 2030, the government of Ghana through the Community Water and Sanitation Agency (CWSA) and support from international organizations such as the Global water initiatives and partners like CARE and CRS rolled out some interventions targeted at improving access to safe drinking water, promoting hygiene education as well as ensuring good sanitation practices in some selected communities in the upper west region.

Among communities that were selected to benefit from interventions were the Erimo Zonal Council in the Lawra district and some other selected communities in the Nandom District. While this move was praised for the intended benefits members of the communities could derive, some reservations were raised as to whether it could achieve its expected outcome due to the demand on the beneficiary communities. In its national water sector assessment report Water-Aid, (2008) observed for example that district assemblies were expected by CWSA to take up 5% of the project grant of 90% while the remaining 5% was expected to be provided for by the beneficiary communities. This was considered as a move to encourage beneficiary communities of projects to adopt a demand response approach to their needs. However Water-Aid observed that the effects of this requirement on the communities could worsen the plight of the poor people as it could make them depend on unsafe water source with all its health complications.

A concern such as that observed by Water-Aid is proper and genuine. This is because the Erimo Zonal council in the Nandom district and the other selected communities in the Lawra district were considered to benefit from the WASH intervention programme on grounds that such communities were considered to be among poor communities that needed the intervention. The possibility that such communities could face some challenges with regard to fulfilling their part of the deal could exist. Since the Ghana government through the CWSA and its partners rolled out the intervention, there has not been any assessment on the effects of the intervention on access to improved drinking water supply and sanitation practices. A study of this nature is necessary to assess the effects on the intervention on access to clean drinking water and improved sanitation practices among the beneficiary communities.

Again the World Bank (1997) for example observed that little is known about household's behavior in securing water for domestic purposes and how much they are willing to pay for improved water and sanitation facilities. As demand for water is growing than the facilities can meet, there has cause for concern about cost recovery. A review by the Bank on the international decade of drinking water and sanitation revealed that financial constraints were the single most serious obstacle to the progress of the decade's goal on sanitation and hygiene. Willingness to pay therefore had a significant role in determining acceptable water and sanitation facility charges to users upon which water policy could be made. An assessment of 0communities to pay for improved water and sanitation facilities.

1.4 Research Questions

1.4.1 General research question

What are the effects of the WASH interventions on access to clean drinking water and sanitation practices in the Lawra and Nandom districts?

1.4.2 Specific Research question

1. What water and sanitation interventions were carried out in the lawra and Nandom districts?
2. What factors influence the adoption of WASH recommendations in the Lawra and Nandom districts?
3. What are the effects of WASH interventions on sanitation practices among households in the Lawra and Nandom districts?
4. What are the effects of the WASH interventions on water usage among households in the Lawra and Nandom districts?
5. What is the level of willingness among households in the Lawra and Nandom districts to pay for improved water and sanitation facilities?

1.5 Objectives

1.5.1 General objective

To evaluate the effects of WASH interventions on clean drinking water and sanitation services in the Lawra and Nandom districts.

1.5.2 Specific Objectives

1. To assess the type of water and sanitation interventions in the Lawra and Nandom districts
2. To assess the effects of WASH interventions on water usage among members in the Lawra and Nandom districts.
3. To assess the effects of WASH interventions on sanitation practices among households in the Lawra and Nandom districts.

4. To assess the level of willingness of households in the Lawra and Nandom districts to pay for safe drinking water and latrine facilities.

1.6 Theoretical Framework

The theoretical framework adopted for the study was the hygiene improvement framework. This framework is a comprehensive approach developed to prevent diarrhea. The framework addresses the critical concerns of access to necessary hardware or technologies, promoting healthy behavior as well as support for long-term sustainability. Its three core components are

(a) Improving access to water and sanitation hardware

(b) Promoting hygiene and

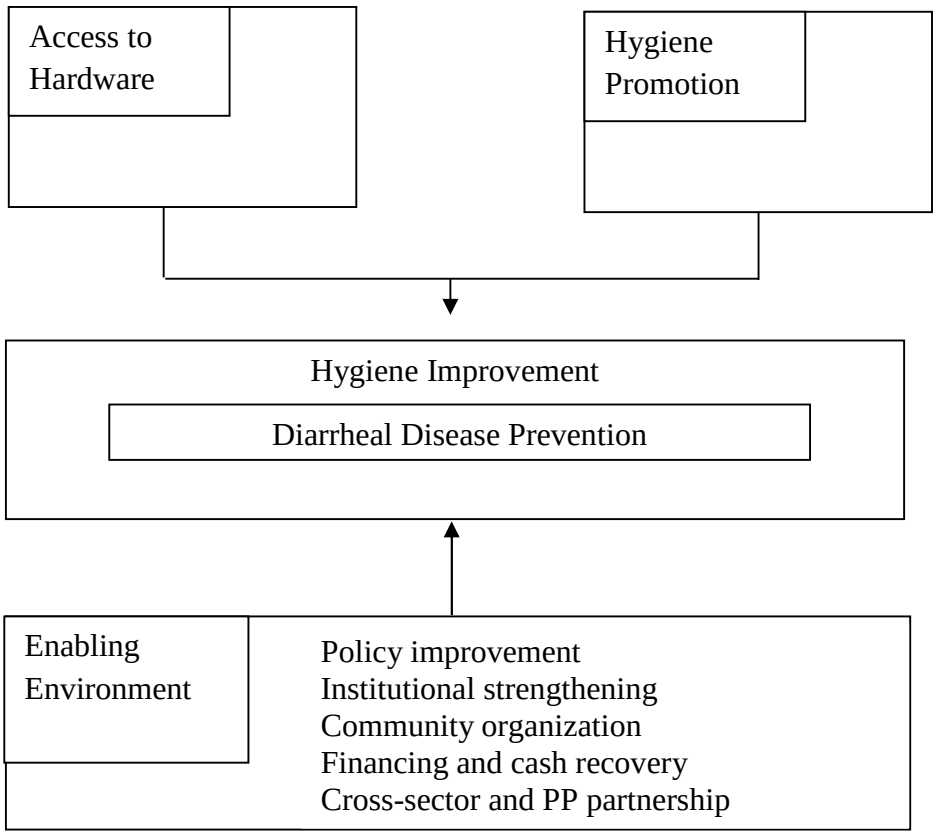
(c) Strengthening the enabling environment.

It has been observed by Curtis V et al (1985) that the most important efforts to prevent diarrhea involves interventions to improve sanitation, improve water quality, increase water quantity, and increase hand washing all of which have conclusively shown to reduce diarrheal disease incidence in developing countries. They observed further that a single hygiene practice of hand washing with soap is able to reduce diarrhea incidence by over 40% and intestinal infections (cholera, dysentery, hospitalized diarrhea due to other causes) to over 50%. In an analysis of 21 controlled field trials related to point of use water treatment and safe water storage of households. Classon, T. et al (2006) observed that there was a 42% reduction in diarrheal diseases compared with other groups. On increasing access to hardware, Aziz, K. et al (990) observed that water supply systems must address both the issue of water quality and water quantity which accordingly reduce the risk of contamination of food and drinking water. They observed that providing more water to a household or a community leads to greater health benefits than simply providing safe water.

The provision of sanitation facilities as observed by UNICEF (2004) enables the disposal of human excreta in ways that safeguard the environment and public health. Sanitation coverage they indicated is important because fecal contamination can spread from one house to another. Access to sanitation facilities can open doors for girls and reduce drop-out rates since girls often stay away from school because of the indignity of having no privacy. UNICE further observed that hygiene promotion is a planned approach to preventing diarrheal diseases through widespread adoption of safe hygiene practices and that it begins with and is built on what local people know, do and want.

The components in the hygiene improvement framework are therefore designed to encourage key household behavior that reduce the incidence of childhood diseases namely safe disposal of feces, washing of hands correctly at the right time and using safe water for drinking and cooking . The framework is illustrated below

Figure1.1: The hygiene improvement framework



Source; (EHP, UNICEF/WES, USAID, World Bank/WSP, WSSCC, May, 2004)

1.7 Scope of the Study

Geographically the research is conducted to cover some selected communities in the Erimo Zonal Council in the Lawra district and some other communities in the Nandom district of the upper West region. These communities were selected for water, sanitation and hygiene interventions by the government of Ghana with support from some international Non-Governmental organizations.

1.8 Justification

This research work is significant in many ways. It will serve as a basis for which further research in the area of water and sanitation can be done. It will also provide significant information for government and the international Non-governmental organizations working in the sanitation and water sector. The research findings will also be useful for the purpose of formulating policies aimed at addressing concerns in the water and sanitation sectors.

1.9 Organization of the work

The study is organized into five chapters. Chapter one covers the introduction and this includes the background of the study, problem statement, research questions, the research objectives(both general and specific) scope of the study, justification of the study and the organization of the study. Chapter two reviewed literature relevant to the study and this includes a global perspective on the situation of access to safe drinking water and sanitation facilities, sub regional, national as well as local perspective on access to water and sanitation facilities. Chapter three contains the methodology which describes the sample size determination, data gathering instruments and tools for analysis. Chapter four contains data discussions and analysis while the fifth chapter contains the summary of finding, conclusions and recommendation with attached appendices.

1.10 Limitations of the Study

This study was conducted in some few selected rural communities in the Nandom and Lawra Districts of the Upper West Region. Findings from the study cannot therefore be generalized as a reflection of water, sanitation and hygiene conditions in the region.

Since the survey used the cross-sectional approach, its reliability could not be tested as this will require the comparison of data from more than one surveys. As such, for the purpose of testing reliability another survey could be conducted.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section looked at water supply and sanitation issues from the global, sub-regional and local perspectives. It considers the usefulness of access to safe drinking water and good sanitation practices as well as the effects the lack of access have on development. The issue of access to safe drinking water, good sanitation and hygiene practices has been a major concern globally.

2.2 Global Perspective of Water Supply and Sanitation Coverage

Many studies have revealed the significant role of access to drinking water and good sanitation practices in many ways. The USAID (1993) report on water sanitation and Hygiene (WASH) observed that one of the most important sectors for development has been the provision of potable water supplies, sanitation and hygiene education to urban, peri- urban and rural communities. The report maintained that improvement in these areas are essential to promoting health for the general population and for child survival and are fundamental for the development of many industries and businesses. In spite of this recognition, access to safe drinking water and good sanitation practices still remains a serious challenge. In its joint progress report on water and sanitation UNICEF/WHO (2008) estimated the global populations who have access to safe drinking water to be 89%. It observed that 780 million people were still without access to improved drinking water source. Despite the fact a large majority of the global populations have still no access to improved drinking water source, records show this represent an increase in the population with access to improved drinking water source. Drinking water coverage has been found to be increasing since 1990 in developing regions and now stands at 87%. It revealed that Eastern Asia, South Asia, South Eastern Asia, Latin America and the Caribbean all reduced their populations without access to improved drinking water source by more than

50% achieving their Millennium Development Target ahead of time. Despite the strong overall increase, 748 million people still did not have access to improved drinking in 2012. The report showed that of the number of populations without access to improved drinking water 325 million live in Sub-Saharan Africa (UNICEF/WHO, 2012)

On sanitation, the report observed that 63 percent of global population has access to improved latrine facilities. Similarly UNICEF (2010) observed that gains were recorded with regards to safe drinking water and basic sanitation with a global rate of access to safe drinking water increasing from 77% to 87% from 1990 to 2008. Despite the progress observed by the UNICEF globally, sub-Saharan Africa still lags behind most of the rest of the world as only 60 percent of the populations have access to an improved drinking water. On sanitation, the report observed that two- thirds of the people in sub- Saharan Africa lack access to improved sanitation facilities. It further indicated that of those who lack sanitation, more than one billion must practice open defecation with a population of 224 million of these in sub-Saharan Africa.

2.3 Water supply in Ghana

This section did an overview of water supply and sanitation situation in Ghana with a particular reference to the historical background and the situation with regards to national coverage of both improved drinking water sources and sanitation facilities.

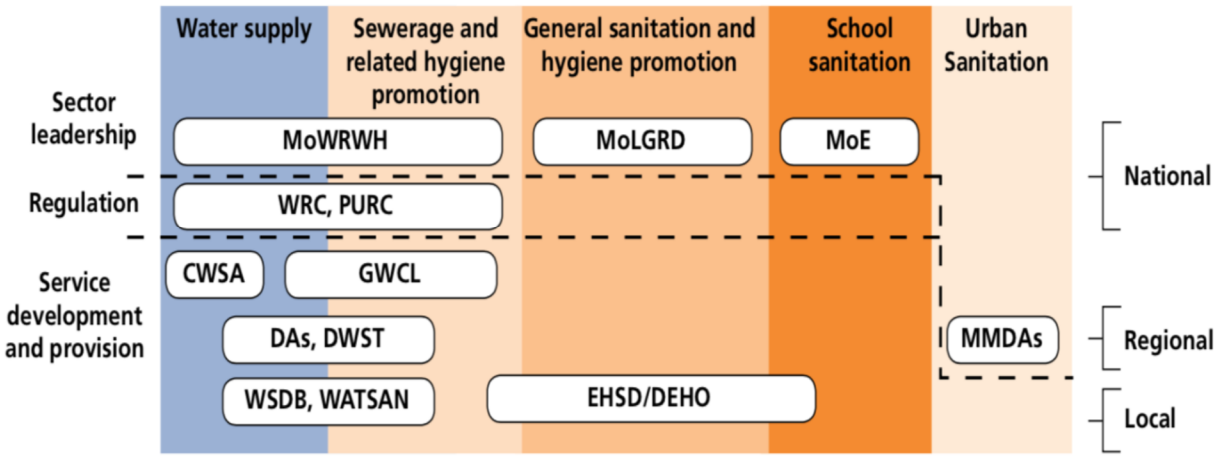
2.3.1 Historical Background

Until the early 1990s the responsibility for urban and rural water supply rested on the Ghana Water and Sewerage Corporation (GWSC). A responsibility the corporation has executed since 1963. From 1965 to 1985 it is observed that not much attention was paid to rural water supply. It was estimated for example that 2.2 million (28 %) of the rural population had access to improve water whilst urban coverage was over 60% . This led to the creation of the rural water department within the GWSC in 1986 to focus more attention to the provision of

water and sanitation to the rural populations. Though some facilities were provided, this could not be sustained due to nonpayment of tariffs by the beneficiary communities resulting in little OR no maintenance of the facilities by the centralized maintenance units of the GWSC.

Following the declaration of the period between 1981-1990 by the United Nations General Assembly as the international drinking water and sanitation decade, a move was made to ensure that nations made a significant progress in the delivery of water and sanitation facilities to their populations by the end of the decade. The Ghana government in line with the agenda for the decade initiated a review of its policies on water and sanitation provision to keep pace with the changing conditions in the country and on the international scene. Upon series of meetings by stakeholders and consultations, a national Community Water and Sanitation Programme (NCWSP) were launched in 1994 in line with the government's decentralization policy. This culminated in the creation of the Community Water and Sanitation Division (CWSD), a semi-autonomous unit of the Ghana Water and Sewerage Corporation (GWSC) to manage rural water and sanitation delivery. This unit gain autonomous status after four years of its existence and subsequently the division was transformed into the Community Water and Sanitation Agency (CWSA) by an act of parliament, Act 564 in December 1998 with the mandate to facilitate the provision of safe drinking water and related sanitation services to rural communities and small towns in Ghana. It has since been facilitating the implementation of the National Community and Sanitations Programme (NCWSP) using the decentralized structures of the districts and community levels as prescribed by the Act (WSA, 2007). Figure 2.1 shows Institutional Roles and Relationships in the Water Supply and Sanitation Sector.

Figure 2.1: Institutional Roles and Relationships in the Water Supply and Sanitation Sector



Source: AMCOW Country Status Overview 2015

2.3.2 Water and sanitation coverage in Ghana

The CWSA (2014) observed that national water coverage in Ghana has been in the rise since 2004. For instance it reported that in 2007, the national water coverage in Ghana stood at 54.86%. This further increased to 58.97% in 2009. As of 2010, only 14% of the total population had improved sanitation facility, and in 2014, national water coverage stood at 64.47%. In its assessment on water and sanitation coverage in Ghana, the UNDP (2002) estimated that 20% of households in Ghana do not have access to any form of toilet facility and may resort to free ranging. It revealed that 31% of households rely on public toilets while only 22% have access to pit latrines. It indicated that 7% of households use KVIP and only 9% have access to water closets. It will appear that there are some variations in the percentage of coverage reported by the sector players. For instance UNICEF/WHO (2012) joint monitoring programme (JMP) for Ghana put the use of improved drinking water source at 82% of the population as of 2008 meaning that Ghana had already exceeded its water supply MDG target of 77% coverage. However, the percentage of coverage as reported by the Community Water and Sanitation

Agency during that same period stood at 57% while the Ghana water company limited also reported 58%.

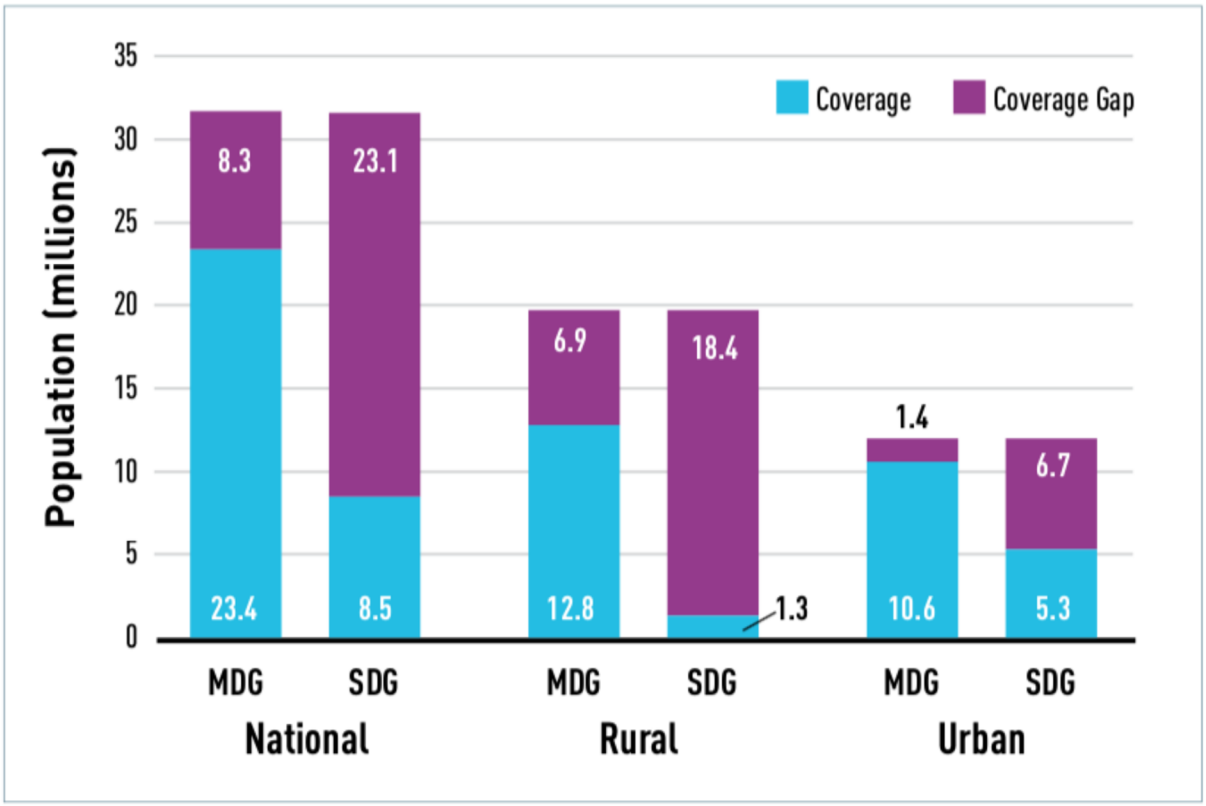
Table 2.1: Estimates of Access to Improved Sources of Drinking Water

	Ghana(Total)	Ghana(Urban)	Ghana(Rural)
1990	56.0%	84.0%	39.0%
2015	89.0%	93.0%	84.0%

Source: UNICEF/WHO, 2015

Table 2.1 shows the estimates of access to improved sources of drinking water in Ghana in 1995 and 2015. It showed that as of 1990, access to improved sources of drinking water in Ghana stood at 56.0%. Out of this estimates for access in urban Ghana was 84.0% while that of rural Ghana stood at 39.0%. In 2015, access to improved sources of drinking water increased to 89.0% countrywide. The estimates of coverage for urban Ghana as of 2015 stood at 93.0% while that of rural Ghana was estimated to be 84.0%.

Figure 2.1: Drinking Water Coverage and Coverage Gap in Ghana



Source: Safe Water Network, Ghana Sector Review 2017

In its effort at achieving the reduction of poverty and to ensure sustainable development, the United Nations launched the millennium development goals in 2000 and nations have since identified with the said targets. One core target has been improvement in the provision of water supply and sanitation services. The government of Ghana as part of its commitment endorsed the principles for water which include:

1. Improving access to safe water supply and sanitation to reduce the proportion of the population without access to basic water supply and sanitation by 50% by 2015 and by 75% by 2025.
2. Promoting sufficient and efficient use of water to address food security and income generation, helping to half the number of malnourished people by 2015 through investment in irrigated agriculture focusing on economic development as well as food self-sufficiency.
3. Acting to prevent, mitigate as well as manage water related diseases by developing preservation based culture, strengthening capacity to monitor and mitigate the effects of climate change variability and to manage disasters.
4. Focusing empowerment and capacity on improving equity and gender sensitivity and promoting pro-poor water governance and water policies.

Ghana's water vision for 2025 has the main objective to; promote an efficient and effective management system and environmentally sound development of all water resources in Ghana; and in 2002, following a series of brought consultation a draft Ghana water policy was prepared by the water services commission under the auspices of the then ministry of water, works and housing. It was later updated following a broader consultation that witnessed the incorporation of specific policies on on urban water supply and community water and sanitation services.

The guiding principles of the policy include

1. The principle of fundamental right of all people without discrimination safe and adequate water to meet basic human needs.
2. The principle of meeting the social needs for water as a priority while recognizing the economic value of water and the goods and services it provides.
3. The principle of recognizing water as a finite and vulnerable resource given the multiple uses.
4. The principle of improving equity and gender sensitivity and
5. The principle of integrating water resources management and development in order to ensure the sustainability of water resources in both quantity and quality among others.

The overall goal of the National Water Policy is to achieve sustainable development, management and use of Ghana's water resources to improve health and livelihoods, reduce vulnerability for present and future generations (Ministry of Water Resources Works and Housing, 2014).

Table 2.2: 2014 Potable water coverage by regions

Region	No. of communities	Total population	No. of boreholes	No.of hand dug wells	No. of small communities	NO.of small towns	Limited mechanized systems	Rain harvest	GWCL connections	Total population served	% coverage
Ashanti	2903	3,461,012	6,501	859	5	32	23	3	50	2,502,501	72.31%
Brong Ahafo	2,999	2,164,011	3,159	441	-	48	46	-	-	1,337,363	61.80%
\Eastern	3,377	2,227,446	2,919	1,140	-	32	3	15	-	1,283,511	57.62%

Greater Accra	1,O82	827,357	484	103	12	3	-	-	51	501,078	60.56%
Northern	3,964	2,428,279	4,370	598	-	42	80	-	54	1,561,558	63.01%
Upper East	2,015	1,339,272	2,621	512	-	20	3	-	-	856,346	63.04%
Upper West	925	687,644	1,686	-	1	17	-	-	-	524,374	76.28%
Volta	3,271	2,083,322	2,471	56	75	56	23	9	175	1,354,541	65.02%
Western	1,774	1,631,371	1,452	454	26	29	-	-	-	900,336	5.19%
Central	3,394	2,181,310	1,888	450	11	48	1	83	187	1,390,375	63.73%
Total	25,595	19,081,524	27,551	4,613	130	327	179	110	525	12,212,073	64.00%

Source: (CWSA, 2014)

Table 2.1 shows the distribution of potable water coverage in Ghana by regional basis as of 2014. It revealed that the Upper West region recorded the highest coverage of 76.26%, followed by Ashanti region with a72.31%, Volta region (65.02%), Upper East (63.94), Central (63.73%). For the Northern region, it showed a figure of (63.01), Brong Ahafo (61.80%), Greater Accra (60.56%), and Eastern (57.62%). The lowest coverage was recorded in the Western region (55.19%)

2.3.3 Water and sanitation coverage in the Upper West Region

Water and sanitation coverage has been on the increase in the Upper West Region. The United States Agency for Internal Development USAID (1993) report on water and sanitation observed for instance that 66. 4% of the population in the Lawra district drink water from the borehole while 63.2% do not have toilet facility in their homes and many resort to open defecation with all its attendant health implications, on solid waste disposal, 37.2% dispose their solid waste by public dump in the open space while a further 29.1% dispose solid waste indiscriminately. In the Nandom district, 72.1% drink water from boreholes while 70.5% do not have toilet facility

in their homes. 49.7% dump solid waste indiscriminately while a further 21% dispose their sold waste by public dump in the open space. As at the end of December 2014, water coverage in the entire Upper West region stood at 76.26% while sanitation coverage was estimated to be low.

2.3.4 Highlights of water and sanitation interventions in the Upper West Region

The CWSA in the Upper West region facilitated the implementation of various WASH projects covering boreholes, sustainable rural water and sanitation projects among others. Table 2 shows the interventions or projects in the region.

Table 2.3: Status of Upper West Region WASH projects (2014)

Name of project and funding source	Amount GHC;	Overall project target	Cumulative achievement(since project inception	Reporting year's target	Reporting year's achievement	Remarks/challenges
GoG 20,000 borehole project	208,000.00	No. of boreholes to be drilled(122)	No. of boreholes successfully drilled(112)	To be drilled(20)	22 successful boreholes drilled out of 26 attempts, 80 pads constructed with 47 hand pumps installed	Project ongoing
		300 boreholes to be drilled and installed with hand pumps	286 boreholes drilled with 226 successful, 96 concrete pads completed	230 boreholes to be drilled	268 boreholes drilled with 212 successful, 96 concrete pads constructed	Borehole drilling and associated works to continue in the quarter of 2015
Sustainable rural water and sanitation project(SR	9,664,037.72	Ten(10) Small Towns piped water	Eight(8) Small Towns water supply system constructed	Ten(10) small Town water supply	1 Small Town piped system complete	Construction of Small Town water system to continue in the 2015

WSP)		supply system to be construct ed;	out, 1 completed and handed over, 7 under construction	system to be constructe d out, 4 to be completed	d and handed over	
		Hygiene and sanitation in 7 rural towns and 290 rural communi ties	Hygiene and sanitation promotion ongoing in 7 rural towns and 290 rural communities	50% of communit ies' triggered. 50% of WSMTs formed. 30% of trained.30 % of WSMTs bank accounts opened.	95% of communi ties triggered, 75%of SWMTs formed. 25% of WSMTs reformed . 85% of WSMTs trained. 65%of WSMTs bank accounts opened.	Second WSMTs training to be done by quarter2 of 2015
UNICEF-Assisted WASH project	734,277. 20	50 boreholes to be drilled and installed with hand pumps in 4 districts	56 boreholes drilled with 44 successful and 12 are dry	50 boreholes drilled with 21 hand pumps installed	56 boreholes drilled with 44 successfu l and 12 dry, 21 hand pumps installed	Borehole drilling and associated works to continue in the year 2015. Unfavourable weather conditions, difficulty in accessing some communities.
		40 communi ties to benefit from hygiene and sanitation promotio n	Hygiene and sanitation promotion ongoing in all 40 communities		Formatio n of WSMTs and initial training complete d in 40 communi ties	Second WSMTs training to be by quarter 2 of 2015.

Source: (CWSA, 2014)

Table 2.4: District Overview of Hand Pump Water Services in the Upper West Region

District	Number of hand pumps	Functionality	Providing basic services	Proportion of functional hand pumps meeting the standard				
				Reliability	Non-crowding	Distance	Quality	Quantity used, dry season
Daffiama-Bussie Issah	152	78%	16%	85%	66%	55%	87%	66%
Jirapa	363	88%	2%	87%	59%	18%	96%	64%
Lambussie-Karmi	212	90%	5%	89%	49%	32%	97%	58%
Lawra	250	87%	1%	94%	51%	13%	96%	35%
Nadowli-Kaleo	336	82%	5%	87%	48%	22%	96%	66%
Nandom	276	86%	4%	89%	58%	33%	91%	57%
Sisala East	191	79%	7%	74%	72%	54%	98%	53%
Sisala West	247	83%	6%	84%	57%	39%	95%	50%
Wa	136	82%	1%	93%	63%	20%	94%	56%
Wa East	276	70%	7%	81%	68%	33%	94%	55%
Wa West	391	83%	1%	80%	56%	12%	95%	52%
Grand Total	2830	83%	4%	86%	58%	27%	95%	56%

2.3.5 Sanitation and hygiene interventions

The Community Water and Sanitation Agency (CWSA) approach to hygiene promotion focuses on processes which are aimed at promoting conditions and practices that help to promote healthy water and sanitation related behavior. Its focal areas of hygiene promotion include

Disposal of Fecal Matter

The targets of the agency on the disposal of fecal matter among others are

- Proper disposal of fecal matter
- Promotion and construction of latrines
- Proper use and management of latrines

- Proper hygiene after defecating/hygiene practices

Hand Washing and Food Handling

Hand washing with soap and water at critical times such as

- After the use of toilet
- After cleaning a baby
- Before handling food

Safe Water

- Sources of safe water
- Sources of unsafe water
- Keeping source of water clean
- Keeping water safe during transportation from the source
- Keeping water safe at home
- Proper use of water and maintenance of water facilities

Water Borne Diseases

- Type of water and sanitation related diseases
- Causes of transmission routs of diseases
- Symptoms of the diseases
- Prevention of the diseases

Environmental Cleanliness

- Importance of the environment
- Effects of lack of care of the environment
- Methods of refuse disposal
- Management of water from latrine and bathrooms

2.3.6 Technology Options for Water and Sanitation Delivery

Aside the hygiene campaign, the CWSA and its partners such as the district assemblies and international Non-governmental organizations also seek to embark upon interventions or projects in the area of technology and tools that will promote access to safe water and proper sanitation facilities. WASH technology according to UNICEF/WHO (2014) refer to the specific technologies, hardware, tools or devices that support consumption of safe drinking water, effective containment and or deactivation of human faeces or improved hand washing practices. The technology option for water and sanitation delivery under the CWSA include

Small /rural communities

Water

- Protected communal hand dug well with hand pump
- Communal bore hole equipped with hand pump
- Protected spring source with or without a simple distribution network and storage
- Rain water harvesting system
- Piped system with limited distribution network

Sanitation

- Ventilated improved pit latrine
- Kumasi ventilated improved pit latrine

B Small Towns

Water

1. Mechanized bore hole with overhead tank, limited distribution network and communal stand pipe with or without household connections
2. Surface water supply based on slow sand filtration as treatment process

Sanitation

1. Kumasi ventilated improved project (KVIP)
2. Flush toilets
3. Water closets
4. Shared septic tanks

2.3.7 Water Treatment and Storage

Water is essential for the survival of living beings. It is an important requirement for natural processes such as plant growth, photosynthesis, greenhouse effect, global wind patterns. International geological surveys, showed that about 71% of the Earth's surface is water covered by the oceans containing 96.54% of all the Earth's saline undrinkable water and the rest of the 3.46% located at places such as icebergs, groundwater, lakes, soil water, atmosphere - and among them only 1.42% is fresh water available for use by living beings (Samarasiri, 2015).

Considerably, most world proportions collect, transport and store their own water for drinking, cooking, personal and home hygiene needs (Kindhauser, 2003). To reduce the global burden of waterborne disease, effective point-of-use devices for providing safe drinking water are more than ever required. Treatment of water at the point of use and proper handling of water at the household level have been considered very crucial in attempts at reducing contamination of water. According to WHO (2005) that unsafe drinking water, along with poor sanitation and hygiene practices have been identified to be the main contributory factors for an estimated 4 billion cases of diarrheal diseases annually, causing more than 1.5 million deaths mostly among children under 5 years of age. On his part, Wright (2004) observed also that diseases associated with contaminated water puts a very heavy economic load on developing countries, both at the public and at private levels as it affects public treatment, exerts a toll on persons affected,

reduces productivity and in many ways affect school attendance and performance. In spite of considerable efforts at expanding the coverage of improved water supplies such as protected wells and springs, boreholes and piped connections, studies show that serious challenges still remain. In a study of drinking water samples from boreholes and household connections, it was reported that 31% of the samples exceeded WHO's guideline value (GV) and national drinking water standards in the pilot countries.

Wright (2004) further been observed that at the household level, contamination of stored water is even more common. In one of the pilot countries, it was reported that only43.6% of samples from stored water were in compliance with the WHO's guideline value and national standards and more than half of household samples showed post-source contamination. This makes household treatment of water a viable alternative. In a review of 15 intervention studies for the World Bank, in their study Fewtrell et al (2005) found that household based water treatment and safe storage was associated with a 35% reduction in diarrheal disease compared to statically insignificant 11% for conventional source based interventions. In another study covering 19 countries, Clason (2006) found that household based interventions were about twice as effective in preventing diarrheal disease (47%) than in improved wells, boreholes and community stand pipes (27%).

The World Health Organisation estimate that over 1billion people lack access to improved water sources. Contaminated drinking water contributes substantially to the 3-5 billion episodes of diarrhea that occur annually, 80% of which occur among children aged five years and below (Ford, 1999). This has been observed by Kosec et al. (2003) to kill over two million people. In 1992, the centers for disease control and prevention and Pan-African Health Organisation and the World Health Organisation developed a safe water system to prevent diarrhea through the

promotion of household water treatment, safe water storage and behavior change communication.

Safe water storage and handling have also been found to reduce faecal contamination as well as improve health conditions of humans. Esrey et al. (1985) observed that there are health benefits of providing household level piped water and sanitation services on diarrhea and respiratory illness. It has also been observed for many households in developing countries that individual water and sanitation services are out of reach for the foreseeable future as 87.0% of the world population is classified as having access to improved water supply by the World Health Organisation and that 54% of this have piped water connections in their homes (WHO, 2008). An estimated 2.2billion persons are thought to obtain for their needs from shared point sources such as taps, boreholes and wells. Even when such water points deliver relatively high quality supply they are located at some distance from users dwellings providing opportunities for recontamination of water supplies during transport and storage.

There have been efforts to improve and maintain the quality of stored water in the homes. This, as observed by Wright (2004) include the development of many safe water storage and point-of-use water treatment technologies. Several of which have been shown to be effective for reducing contamination by faecal indicator bacteria in experimental settings.

2.3.8 Water Treatment Technologies and Systems

A large variety of treatment methods ranging from simple to complex processes have been employed over the years to make water suitable for consumption at the household level. These methods may be adopted depending on considerations such as availability of resources, simplicity and convenience. Boiling for example is probably the oldest and simplest method used to remove pathogens from water. Some authorities recommend that to remove pathogens,

water should be boiled up to 10 minutes. These requirements are likely to be well in excess of heating conditions needed to dramatically reduce most waterborne pathogens, but observing a rolling boil assures that sufficiently high temperatures have been reached to achieve pathogen destruction" (Sobsey, 2002)

Another of the treatment methods is chemical disinfection. Chemical disinfection of drinking water is recognized as a safe and effective method of destroying pathogenic and other microbes in drinking water. Chemical disinfection is promoted and practiced at the community level as well as at the point-of-use (household level). Chlorine has been widely used for decades for disinfecting drinking water, at the community but also at the household levels. Chloramines, ozone, and chlorine dioxide are also frequently used as disinfectants, but essentially at the community level. Due mostly to difficulties in preparation and/or in use, they are not recommended for household water treatment and are thus rarely met at this level.

Chlorination is the most widely used method for disinfecting drinking water. Several different sources of chlorine exist for water treatment, including liquids (bleach and sodium hypochlorite) solid (purpose-made HTH tablets (calcium hypochlorite) or powders (bleaching powders (chloride of lime, a mixture of calcium hydroxide, calcium chloride and calcium hypochlorite).

Purification of water at point-of-use using tablets or powders combining a coagulant-flocculent and a chemical disinfectant has also been described. These systems utilize a similar approach to that employed in conventional municipal water treatment facilities, namely coagulation, flocculation, sedimentation and disinfection for the removal of microorganisms. When used in combination for community water treatment systems in developed countries, these processes

have been shown to dramatically reduce microbial contaminants in drinking water and produce water that meets international guidelines. (Sobsey, 2002)

The UNCHS (1997) report indicated that the problem with poor sanitation and hygiene facilities or the lack of sustainable access to water supply will become serious going forward as city population continue to grow rapidly. The report projected that by year 2030, urban population growth will reach as high as 3.3 billion people and that over 90 per cent of which will come from cities in developing countries. The concern as expressed by the report was that the situation may worsen given the fact that investment in sanitation and water was at a low. To avoid this worrying situation, the need for an increased investment in sanitation and water supply must be considered a topmost priority. In a report UNICEF/WHO (2008) estimated that "in Africa only 12% of the money invested in water supply and sanitation went specifically to fund sanitation. In Asia the figure was higher by 15%, while Latin America and the Caribbean spent 38% on sanitation".

In their review of sanitation programmes Fewtrell et al (2001) found that investment in sanitation was inadequate and often misdirected; due in part to a lack of demand and that most developed institutions were not focus on responding to a demand led approach. The study observed that "most decision makers are not clear about an overall strategy for sanitation programming, have not reached a consensus on the definition of sanitation and differ on the optimal role of government, NGOS, communities, private sector and donors in programme implementation". This difference on the role government should play on the provision of water and sanitation facilities was what led to the serious debates on whether the issue of water and sanitation should be considered as public goods or private goods.

2.4 Factors that influence adoption of WASH recommendations

In his study on sanitation Dittmer (2009) observes that though studies have been done on WASH issues, many of them do not always explain why some people still resort to open defecation or use unsafe water long after their communities have been provided with water points and learned about latrine and hygiene practices.in their report UNICEF/WHO (2010) observed that in the developed countries almost everybody is accessing safe water and sanitation services. This is different in the developing countries particularly Africa, while 89% of the global population had access to improved water sources representing an increase of 13% over 1990 levels and above the millennium development goal (MDG) target set for 2015, most of the countries in sub-Saharan Africa are not on track to meet the MDG targets. It has also been observed that Progrees under sanitation targets has also been low in sub-saharan Africa and South Asia with stake holders in the water and sanitation sectors observing that Social-Cultural factors such as religion,gender,belies,attitude,education, poverty among others having strong influence on peoples lives and that also include,water use, sanitation and hygiene.(UNICEF/WHO, 2014)

2.4.1 The Gender Factor

The world health organization (WHO) defined gender as the socially constructed characteristics of women and men such as norms, roles and relationships of /and between groups of women and men. Gender plays a crucial role in the adoption of WASH recommendations. It is observed for instance that the whole community women, men and children experience the negative effects of inadequate supply and services through poor health, nutrition and emotional and physical devastation of recurrent water and waste related diseases. However participation of women alongside men in planning, design, maintenance and management has brought distinct benefits to the functioning and use of (water) systems and created more equal chances for planning and functions of women and men (Christine Van Wijk Sijbesma, 1998). Accordingly

approaching water and sanitation and hygiene from a gender and development perspective is crucial to ensure balance and control of the resource and facilities in order to facilitate successful projects. Also Billig (1998) observe that the key elements for success are strengthened through the full participation of women and men.

Citing of water points for example has an impact on gender. Its impact on women is immense particularly on their time and health. In collecting and transporting water over long distances, loss of energy and time to undertake other roles. In situations where water had to be bought, men usually provided money but the management of water remains the work of women. This according to Billig reinforces the argument that water use issues are gender related and its use is socially and culturally categorized. Its use is usually controlled by the person who fetches, and it is usually women who fetch the water.

This possibly explains why Christine Van Wijk Sijbesma (1998) observed that if adoption of WASH promotion is to have any impact at all on health and wellbeing of a community, men and not just women and children need to change their existing hygiene and sanitation behavior and practice and in many respects this is currently the biggest challenge for the water supply and sanitation sector. Hygiene and sanitation promotion is ripe for the facilitation of new approach centered on gender.

2.4.2 Belief and Norm's Factor

Beliefs, Norms, culture and values are critical components that shape the lives of people including the use of water. Awareness programmes such as WASH promotion that takes into consideration the values, culture and beliefs of communities as well as their indigenous knowledge could lead to desired outcomes. It is observed that many behaviors and attitudes of the people are drawn from traditional beliefs and cultural values which in certain circumstances resist the use of latrines (Water Aid, 2009). In a study of four West Africa countries it was

realized that inadequate or nonexistent latrine facilities and lack of dedicated areas for disposal of rubbish site which pollute the water sources are present yet the communities were associating illness as a result of poor environmental sanitation with witchcraft.

In some communities particularly in Africa, is has been observed that children feces is not perceived as harmful, some people will practice open defecation because they are afraid to share toilet to avoid being bewitched. Some communities also feel it is a disgrace for the father-in-law to use a toilet used by the daughter-in-law.

Studies have revealed that in other to estimate the diarrheal disease burden attributable to water, sanitation and hygiene, it is necessary to assess coverage, and to collect information about WASH knowledge, attribute and practice within the community of interest. Monitoring changes in access to and use of improved water and sanitation system as well as improvement in hygiene behavior are essential to track growth or decline in access and use. In many rural communities of the developing countries, the practices of open defecation and use of unsafe water persist because the conditions that cause them have not been adequately analyzed or taken into consideration before projects are started as observed by (Dittmer, 2009).

2.4.3 Educational Factors

Educational factors including training, advocacy, capacity building and access to information on WASH and its related issues greatly influence the adoption rate of recommendation. In their study on willingness to pay improved water and sanitation services, Himayatullah K, Faiza I, Imranullah S, and Inayatullah K, (2010) observed that formal education and exposure to mass media of the head of households significantly affected their willingness to pay. They indicated that education of the household's decision maker significantly determined their willingness to pay as compared to their income levels. Ineffective promotion and law public awareness,

ignorance of people, lack of capacity building, lack of hygiene education and training will result in law adoption of WASH recommendations.

2.4.4 The Poverty Factor

Social factors such as poverty alleviation and improvement of living conditions of communities could motivate people to adopt WASH recommendation. As safe drinking water and sanitation facilities have a cost component access and use of safe drinking water and sanitation facilities could be boosted depending on the income and living condition of the people. Walking long distances to collect and transport water usually from unprotected sources by communities is mostly a result of poverty as many of the individuals cannot afford to have safe drinking water connections in their premises. Unemployment, low income, poor living conditions have great influence on the adoption of WASH recommendations given the fact that most of these interventions even requires monetary commitment from the beneficiary communities.

2.5 Willingness to Pay For Improved Water and Sanitation Facilities

Financing domestic water supply is important for livelihood of the poor. Water supply in general have been observed to be done publicly under some regulation. In the world, of every 10 people, 2 lack access to safe water supply, 5 have inadequate sanitation and 9 do not have their waste water treated to any degree (World Bank, 2004). A number of empirical studies on willingness to pay for improved water and sanitation services indicate that income, household size, education, distance from existing water and gender influence willingness to pay for improve water services (Kanya, 2001). For instance, in a study, Wang et al. (2008) found that there is a positive relation between household income and willingness to pay. That means households with higher income showed more willingness to pay than those with low income. Is also been observed by Ifabiyi (2011) that households with more educated members were moere willing to pay for improved water and sanitation services. Similarly, Asthana (1997) in a study in India found that higher literacy of women affect the water consumption. It has also been

observed that one of the obvious reasons for the low stage development in Africa is lack of effective and sustainable utilisation of available natural and human resources (Fissha, 2006). Access to clean and safe water has been observed by Abebaw et al (2010) to be integral part of development in general and is one of the services which highly affects the economic progress of a country and the health of its people. This according to them is at the heart of the poverty trap especially for women and children who suffer in terms of illness, drudgery in collection of water and loss of opportunities because of the time water collection consumes. Due to lack of clean and safe water, there is high mortality and morbidity rate and the number of working days lost are all major problems (Mirajul et al., 2012).

The difficulty in sustainable supply of improved drinking water and access to improved sanitation facilities has pushed governments in developing countries to consider more innovative ways of meeting the demands of clean drinking water and sanitation infrastructure. To that effect private participation has been advocated by some in the area of water financing. While some have suggested that attention to even the rural areas should be pursued as an additional source of state revenue, others are not in support of this position. In their toolkit on private participation in water services for developing countries, the World Bank (1997) observed that little is known about households' behaviour in securing water for domestic purposes and how much they may be willing to pay for improved water and sanitation facilities. It is no secret that the demand for water is growing faster than the existing facilities can meet, thereby giving cause for concerns to be raised about cost recovery. A review by the World Bank on the international decade of drinking water and sanitation revealed that financial constraints were the single most serious obstacle to the progress of the decade's goal on sanitation and hygiene. Willingness to pay therefore had a significant role in determining acceptable water and sanitation facility charges to users upon which water policy could be made.

The Bank maintains that willingness to pay could promote the pricing of water as a means for public water utilities to manage the allocation of existing water supplies more effectively. The bank therefore supports the economic concept of willingness to pay for water. Its approach to estimating levels of WTP is by application of the 5% rule, a rule which is premise on the grounds that there is an elastic demand for the purchase of water with a cost of less than 5% of a household's income and an in inelastic demand where the cost exceeds 5% of the household's income. This in the view of some, represent broad approach to assessing willingness to pay and may be problematic. On his part Winpenny (1994) for instance held that such an approach does not allow for varying values of water through time and space. He maintained that establishing whether people at different settings are ready to support financially the system for improving and maintaining the quality of services is quite crucial.

In their study on estimating WTP for improvements in drinking water quality. Also Himayatullah et al (2010) observed that formal education and exposure to the mass media of the head of households significantly affected their WTP for the different water purification methods and indicated that education of the household's decision maker significantly determined their willingness to pay as compared to their income level. They cited a similar study conducted by Hartono and Harahap (2007) which showed "that households economic and social condition such as age, number of family members, breadwinner's education and expenditure per capita influenced the availability of drinking water facilities in the form of piped water or pumped water, sanitation facilities in the form of toilet with septic tank and garbage handling facilities".

It is in this context this study sought to examine the situation of water usage by households, as well as sanitation and hygiene situation practices following campaigns on water, sanitation and hygiene in Nandom and Lawra Districts of the Upper West Region of Ghana. Aside the fact that

very little is known about household behaviour in securing water for domestic purposes, little is also known about how much they may be willing to pay for improved services; a condition that partly informed this study.

2.5.1 Sanitation and Water as Private Goods

Some advocates of water and sanitation as private goods recognized the past failure of many developing countries, governments, and municipal bodies at ensuring adequate and equitable access to key public goods and suggested that these failures could be overcome by sufficient and affirmative programs like small loans. They contended for instance that microfinance could help increase the level of services for individual households and communities within a shorter time span than would have happened if the groups had to rely solely on public resources or their own savings (Mehta, 2008).

According to Yunus (2003) the provision of water and sanitation facilities should be considered as private goods. He observed that government should pull out of most things except for the maintenance of law and order, the justice system, national defence, and foreign policy, and allow the private sector to perform the role of providing improved sanitation and water infrastructure.

In their study Mehta and Knapp (2004) also supported water and sanitation as private good. Viewing sanitation and water under the microfinance model as a private good, they indicated for instance that the micro finance models had a promise of extending access to crucial goods, believing that through the private credit system provided through microfinance institutions and privately used by household the credit would offer poor people an opportunity to finance their own access to water and sanitation. They expressed fear in the use of subsidies for household water and sanitation since that could crowed out potential private sector resources.

It may be said that treating water and sanitation as a private good could possibly yield some profitable outcome in terms of ensuring sustainable supply of quality water and sanitation infrastructure. However the fact that the possibility also existed that certain customers may be excluded for non-payment may have dire consequences on the general public. This therefore made a strong case for those who viewed water and sanitation as a public good. On their part Hall and Lobina (2006) observed that "Household water for example had been observed to be network good with merit characteristics. Any system of supplying clean potable water and sanitation to multiple households represented a merit good in that there are significant benefits for the general public from each additional household's access". They maintained for instance that a household with access to clean drinking water and sanitation facilities is less likely to contract and spread water-borne diseases and will thus be spared of the effects of such diseases.

They maintained further that water services depend on an extensive network of pipes, pumping stations, treatment plants and reservoirs. As a result, a very high percentage of the cost of water system is channelled to this network making the provision of water a very capital intensive sector. Extending water services to all require a lot of capital to finance the new networks, which is very expensive. Additionally they held that those still needing connections are the poor, and the resources required to connect them cannot be provided by the poor themselves.

They further argued that "central government has the broadest and most equitable tax base, and that it is not surprising central government plays an important role in many countries. It continues to play a significant role even in high income countries and following the failure of private concessions". They discouraged the use of private equity as a source of finance as attempts to involve local contractors were not likely to affect desirable change. Small scale local enterprises in developing countries they observed were even less likely to provide capital to finance investment required than multinational companies.

People who advocated for water and sanitation to be considered as a merit good are possibly influenced by the codification of water and sanitation as a human right under the international covenant on economic, social and cultural rights in 2002 by the Economic and Social council of the UNO.

According to Bluemel (2004) observed that the understanding of the human right to water must be that of an unconditional and entitlement-based, independent of political and economic circumstances and irrespective of peoples, capacity to pay. He held that "categorizing a right to water as a human right means that fresh water is an entitlement, rather than a commodity or service provided on a charitable basis"

As the debate as to whether water and sanitation should be treated as a public good or otherwise rages governments particularly those in the developing world are yet to fully come to terms with the very crust of the matter and thus take full responsibility for the provision of clean water and sanitation facilities or do this in partnership with profit oriented enterprises. This debate thus presents government with the issue of making suitable policies regarding provision of improved drinking water and sanitation infrastructure.

2.5.2 Effects of WASH interventions on access to improved water and sanitation facilities

According to a World Health Statistics (2004) the poor access to water supply is a prevalent issue in over 850 million people worldwide with over 2.5 billion limited by access to sanitation facilities, attempts to roll out interventions that will address this trend have been high and varied due to the devastations that the lack of access to water and sanitation facilities may cause, it has been observed for example that the global burden of disease and mortality rates could be

reduced by about 9/1% and 6;3% respectively, if rapid access is attained in facilitating access to water, sanitation, and hygiene facilities (Pruss A. Bonjour S. and Carvalan C, 2008) According to Boschi C. Velebit B, and Shaibuyu K, (2008) a large proportion of the diseases related to the mortality rate is about 91 million and new diarrhoea cases estimated at 4 billion annually especially among children under five years old and sanitation and water interventions to increase access will help address this incidences greatly. Water and sanitation interventions have also been found to be critical component in the reduction in infant mortality. According to Lenman S, Sheperd D. amd Cash R. (1985) the leading cause of infant mortality and health related expenditure has been attributed to diarrheal incidences among children. Similarly it has been observed that diarrheal incidences in children during the first few years of life have been shown to limit their growth by 8cm and IQ point reduction when they progress to about 7 or 8 years of age. (Guerrand R. L Deboer M.D Moore S.R. Schort RJ and Lima A. A, M 2013). Sustainable access to improved water and sanitation facilities' have also been found to reduce absenteeism in school among children and also lead to increase productivity and according to Lan G Springton E, E. Shon M.W et al, (2012) about 75% of all school absence are illness related and information regarding absenteeism from middle and higher income countries has shown that poor academic and social development, high dropout rates and reduced learning performance are attributed to school absence in children.

2.5.3 Hand Washing

Hand washing has been found to be an important health behaviour associated with reducing respiratory and diarrhoea illness. Hand washing with soap for instance has been estimated to reduce the risk of diarrhoea by 47.0% (Curtis, 2003). It has also been observed that hand hygiene improvement could reduce both the transmission of pathogens through interpersonal

contact as well as the risk that stored water and food will be contaminated through handling (Perez et al, 2008).

CHAPTER THREE

METHODOLOGY

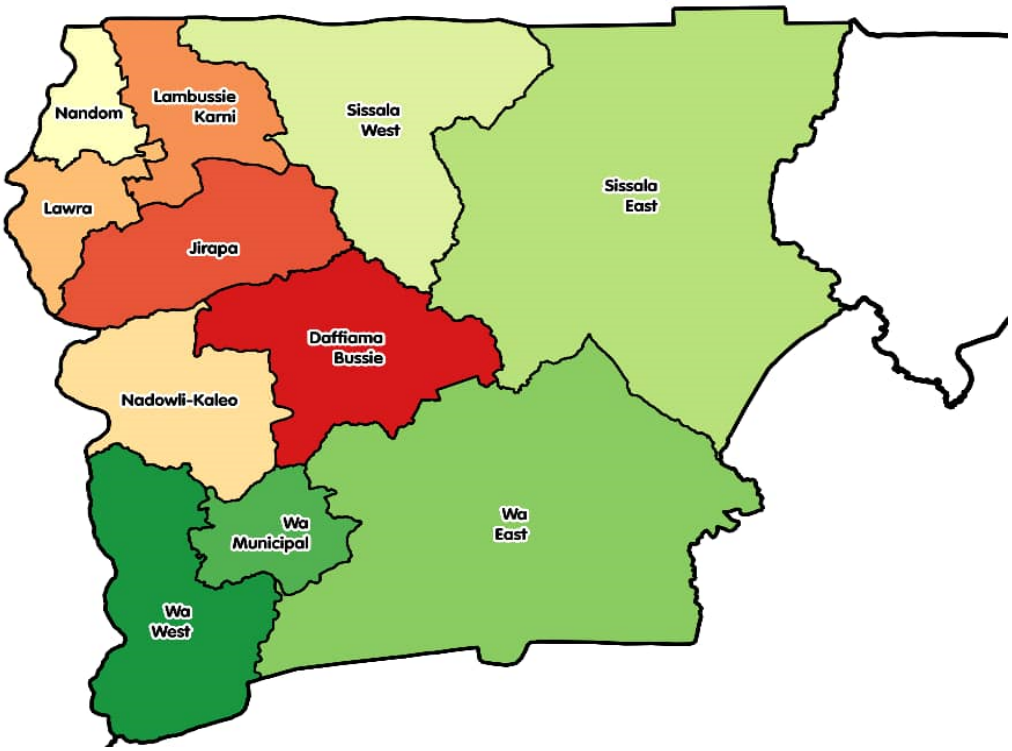
3.1 Introduction

This chapter describes the research procedure that was adopted in the collection, analysis and presentation of data, it includes the profile of the study area, the research design, data collection instruments, sampling technique, method of data analysis and presentation.

3.2 Profile of the Study Area

This section profiles both Lawra and Nandom Districts in the Upper West Region where the study was conducted. Households from various communities in these two districts constituted investigative units for the research.

Figure 3.1: Map of Upper West Region



3.2.1 Profile of Nandom District

Background

The Nandom District is one of the eleven Districts that make up the Upper West Region. The Nandom District Assembly was established by LI 2102, with Nandom as the district capital. The District was carved from Lawra and forms part of the new districts and municipalities created in the year 2012. The District however was inaugurated on the 28th June, 2012.

Location and Size

The Nandom District lies in the north western corner of the Upper West Region of Ghana between Longitude 2°25 W and 2°45W and Latitude 10°20 N and 11°00 S. It is bounded to the East and South by the Lambussie and Lawra Districts respectively and to the North and West by the Republic of Burkina Faso. The total area of the District is put at 404.6 square km. This constitutes about 3.1% of the Region's total land area. The District is constituted by 84 communities with 86% of the inhabitants living in rural areas. The population density is approximately 114 per square kilometre. It is the most densely populated District in the region. Below is a map showing location of the District in Ghana. Its closeness to Burkina Faso offers it a strategic location for international interactions and exchanges. It however poses a challenge related to the influx of Fulani herdsmen into the district from the Sahel.

Climate and Vegetation

The district falls within the Guinea Savannah vegetation belt. The vegetation consists of short grasses with scattered fire resistant trees such as the Shea trees, acacia and Baobab trees. The vegetation is very congenial for livestock production, which contributes significantly to household incomes in the district. The greatest influence on the vegetation is the prolonged dry season. During this period, the grass becomes dry and subsequent bush burning leaves the area patchy and almost bare of vegetation.

Human activities particularly indiscriminate tree felling for fuel wood, charcoal and other purposes, early torrential rain and poor animal husbandry practices have continuously decreased the vegetation cover and increasing soil erosion and depletion of soil fertility. Moreover, inappropriate farming practices such as shifting cultivation, road construction, sand and gravel winning increase land degradation.

Climatically, the District is tropical continental as experienced in the northern regions of Ghana. Throughout the year, temperatures are high with a minimum of 230C at night and a maximum of 420C during the day. This favors plant growth. The mean monthly temperature ranges between 210C and 320C. The highest monthly maximum temperature rises up to 400C before the rainy season usually in May with lowest minimum temperature falling to about 120C in December when the Harmattan winds from the Sahara dry up the vegetation.

As a result of the single maximum rainfall season prevailing in the district, crop production is mostly done during the rainy season (May to September/October). The dry season is a 2 Potential for the preservation industry that could use the sunshine as a natural preservative. By implication, however, since farming is the major occupation of the people, it means that their major sources of livelihood and income are limited during the dry season apparently resulting in the migration of the youth to the south in search of greener pastures. There is thus, the need to have adequate irrigation facilities to promote and enhance agricultural activities in the dry season.

Relief and Drainage

The topography of the district could be described as gently undulating. Generally, the district is located about 180 meters above sea level with a few isolated hills. The rock formation in the

District is essentially birimian with dotted outcrops of granite. Some research work done indicates the presence of minor occurrences of manganese, traces of gold and diamond, Iron ore and clay. As a result of a well- developed fracture pattern in the rocks, the potential for obtaining ground water in the District is very high which makes it suitable for all year farming. The relative plain topography is suitable for road construction, distribution of utility lines and general construction works.

The District is poorly endowed with water bodies. The only natural water bodies are a few interconnected streams flow into the Black Volta which cuts through the district. The Black Volta River is considered by the district as a potential for aquaculture. There are a number of dams and dugouts which provide water for irrigation, domestic chores, construction, and animals on graze. The interconnected water bodies in the district facilitate storm water drainage, thus making the district less floodable, except in few low lying areas. A significant characteristic of most of these rivers and streams is the perennial nature of their flows. Many of these water bodies are reduced to intermittent pools in the dry season while others completely dry up. Many of these streams could be developed to support dry season farming.

Geology Minerals and Soils

With a gently undulating topography, the district is bound with fresh granite. The main soil types in the District are sandstone, gravel, mudstone, alluvium, granite and shale that have weathered into different soil grades. Due to seasonal erosion, soil types emanating from this phenomenon are sand, clay and laterite ochroslols. The availability of these soil types have contributed to housing development which have resorted to the use of local building materials such as sand, gravel and clay.

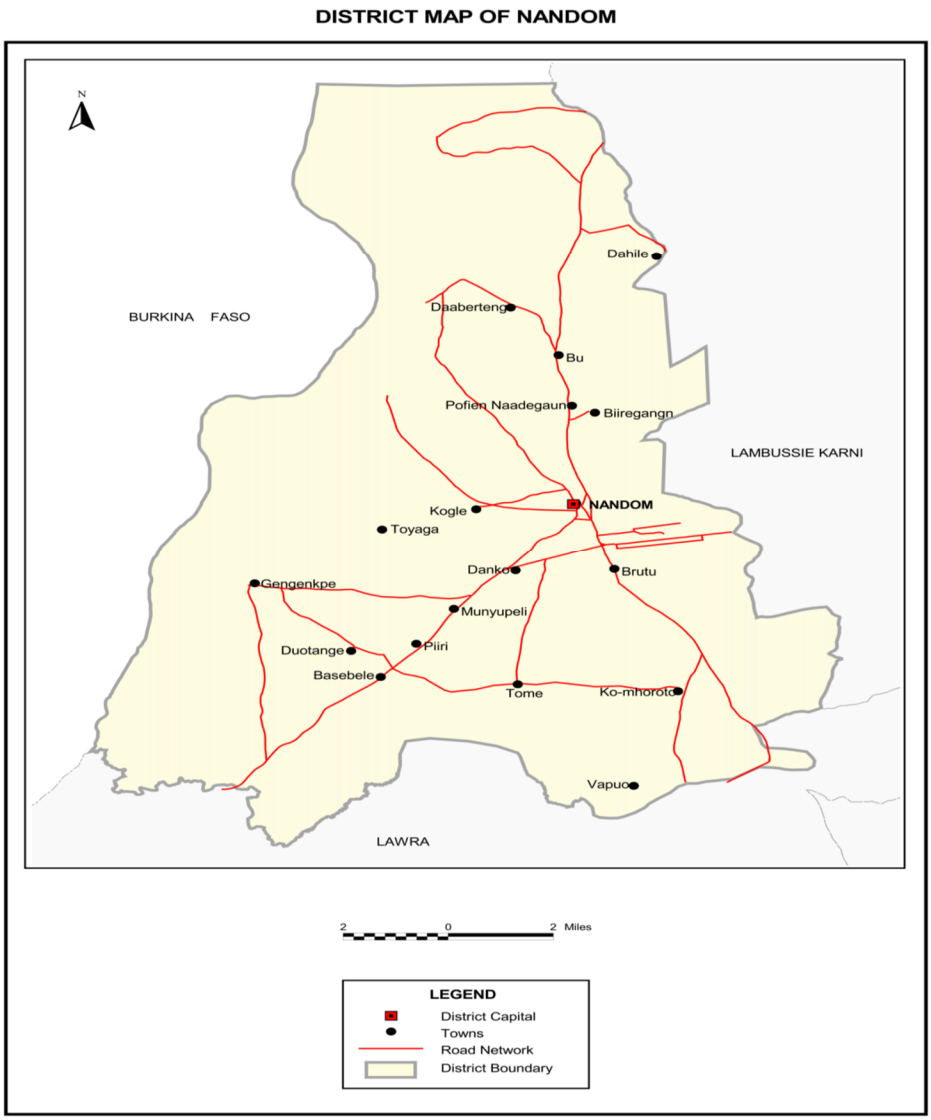
These soil types are better suited for the cultivation of cereals and root tuber crops including millet, maize, sorghum and yam. They respond well to the application of organic manure and

commercial fertilizers to give high yield. With adequate rains and good farming practices, these soils have the potentials of improving agriculture production.

Political and Administration

The Nandom District Assembly, which is the highest political and administrative body in the District, is charged with the responsibility of formulating and executing plans, programme, projects and strategies for the overall sustainable development of the people in the District (Ghana Statistical Service, 2009).

Figure 3.2 Map of Nandom District



The Nandom District is made up of Thirty eight (38) Assembly persons. Out of this total, twenty seven (27) of them are elected members while sixteen (16) are government appointees. This together with the Honourable District Chief Executive and the Member of Parliament, who are ex-officio members, gives a total of thirty eight members. Out of this figure, there are only six (6) females and thirty two (32) males. The Nandom District, administratively, is made up of one (1) Town Council, Three (3) Area Councils and Twenty-two (22) Unit Committees.

Religion and Ethnicity

A greater majority of the population (46,040) persons in the Nandom district profess the Christian faith (85.7%) with only a small proportion of the population being Muslims (6.6%). On the other hand, Traditionalist constitutes (1.0%) of the while 2.0 percent of the population of Nandom belonged to no religion at all. Generally, more females (86.4%) than males (85%) are reported Christians. The most predominant tribe in the District is the Dagaabas. There are other minor tribes such as the Hausa, Mossi, Sissala, Asante etc.

Traditional Authorities

Alongside the decentralized governance system is a supportive traditional governance system which appears to be in harmony with the District Assembly System thereby promoting development in the local area. The District has one paramountcy, that is, the Nandom Paramountcy headed by the Nandom Naa. He is supported by Seventeen Divisional Chiefs and several Sub-Division Chiefs.

Tourism

The most significant tourism potential in the Nandom District is the *Kakube* Festival .The rich cultural heritage of the people exhibited during this festival (*Kakube*) has the potential to bring in a lot of foreigners and investors. The proposed restoration of the Slave Centre located at

Gengenkpe and Zimuopare has been selected for construction. This when completed will also boast both local and international tourism investments into the District. The Assembly in collaboration with the church is also looking forward to maintaining the Church Stone which can also attract both local and foreign tourist into the District. The Church which prides itself as the largest stone building in West Africa and among the three Minor Basilicas in West Africa has the potential of attracting tourists including spiritual pilgrims.

Industry and Commerce

Agriculture, which is the major activity that engages about 80 per cent of the population, is cantered on crops and livestock production. The crops mainly grown by the farmers are corn, millet, maize, cowpea and groundnut; of these the District has comparative advantage in groundnuts and cowpea production.

Agriculture is the chief activity in the Nandom District and as such the private sector of the economy would only assert itself with the existence of an industry that is closely linked to the agricultural potentials of the District. The growth of these industries is therefore intimately 5 linked to the development of the agricultural sector of the district. As a result more often than not a lot of these industries in the private economy of the district are agro-based and small in size

These small scaled industries serve as outlets of raw materials from the agricultural sector. In addition to this, it absorb surplus labour in the District, help farm-based households to spread risks, offer more remunerative activities to supplement or replace agricultural income, offer income potential during the agricultural off-season and also provide a means to cope or survive when farming fails.

Social Infrastructure and Amenities

The Energy sector in the district has received a tremendous transformation as many more communities have been connected to the national grid while others are currently being hooked on. An estimated percentage of households which have access to electricity currently stand at 30.5.

The massive extension works in the area of electricity has greatly improved the quality of life of the people as the facility is being used for other industrial works such as carpentry shop, blacksmithing, welding, vulcanizing, and fitting shops and agro processing (Shea butter and groundnut extraction).

It is however also worth that, most people in the District still resort to the use of fuel wood for the domestic chores due to their inability to afford electricity resulting in a further degradation of the land.

3.2.2 Profile of Lawra District

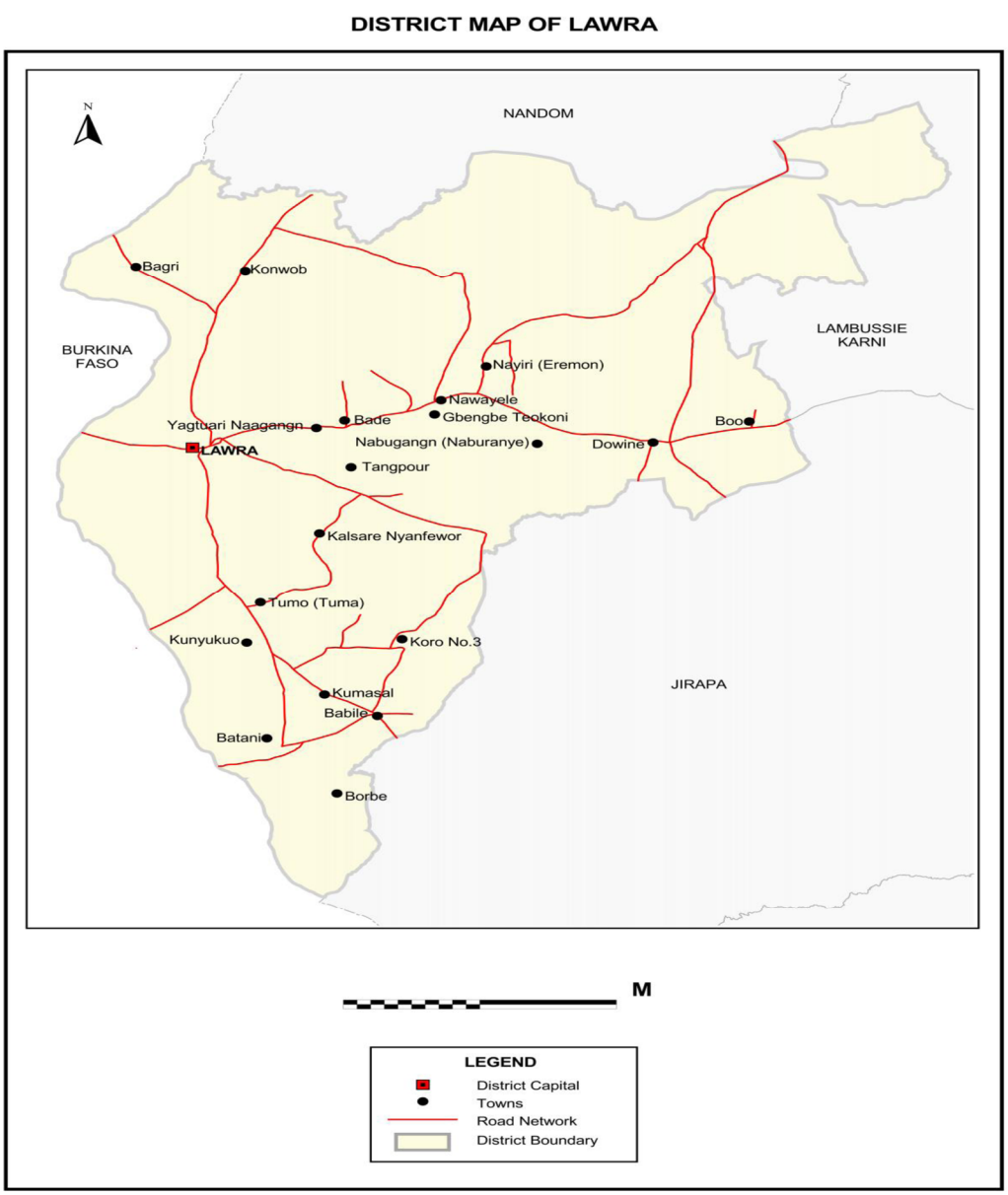
Location and Size

The Lawra District is one of the eleven districts that make up the Upper West Region and derives its legal existence from Legislative Instrument (L.I) 1434 of 1988 (PNDCL 207, Act 462).It lies in the north-western corner of the Upper West Region in Ghana. It is bounded to the north by Nandom District, to the east by Lambussie-Karni District to the south-west and west by the Republic of Burkina Faso.

It lies between Latitude $10^0 35^0$- $10^0 40^0$ North and $2^0 50^0$-$2^0 53^0$ West. The total area of the district is 527.37 square kilometres. This constitutes about 2.8 percent of the Region's total land area, which is estimated at 18,476 square kilometres. The Lawra District has over 80.0 percent

of the inhabitants living in the rural areas. The population density of the district is 104.1 per square kilometre. (2010)

Figure 3.3: Map of Lawra District



Source: Ghana Statistical Service, GIS 3

Relief and Drainage

The district is gently rolling with a few hills ranging between 180 and 300 metres above sea level. It is drained by the Black Volta River, to the west forming a boundary between the district and the Republic of Burkina Faso. The Black Volta River has several tributaries in the district; notably amongst them are the Kamba/Dangbang, Nawer and Duodaa. These water bodies if utilized for irrigation could offer an agro-based employment for the youth who migrate to the south in search of non-existing jobs during the dry season.

Vegetation and Climate

The district lies within the Guinea Savannah Zone which is characterized by short grasses and few woody plants. Common trees in the District consist of drought and fire resistant trees such as Baobab, Dawadawa, Shea trees and Acacia. The vegetation is very congenial for livestock production, which contributes significantly to household incomes in the District. The greatest influence on the vegetation is the prolonged dry season. During this period, the grass becomes dry and the subsequent bush burning leaves the area patchy and mostly bare of vegetation. Consequently, the torrential early rains cause excessive soil erosion. Bush burning reduces the vegetative cover and transpiration; and this affects average annual total rainfall resulting in low agricultural yields as farmers depend mostly on rain-fed agriculture.

The climate of the district is the tropical continental type with the mean annual temperature ranging between 27°C and 36°C. The period between February and April is the hottest. Climatic changes of late, however affects the weather pattern. Between April and October, the Tropical Maritime air mass blows over the area which gives the only wet season in the year. The rainfall pattern is a major determinant in the migration of the youth which in turn is associated with the underdevelopment of the human resource base of the district

Geology and Soils

The rock formation in the District is essentially Birimian with dotted outcrops of granite. The District mineral potential is largely unexplored. There are indications of the presence of minor deposits of manganese, traces of gold and diamond, iron ore and clay. As a result of a well-developed fracture pattern in the rocks, the potential for obtaining ground water in the district is very high which makes it suitable for all year-round farming.

The soils in the district consist mostly of laterite soils. These are developed from the Birimian and granite rocks which underlie the area. There are also strips of alluvial soils along the flood plains of the Black Volta as well as sandy loamy along some of its tributaries. The general nature of the soils, coupled with the traditional land use practices and the rainfall pattern, tend to have adverse effect on crop production resulting in persistent shortfall in food production. This forces the youth to look for sustenance elsewhere, a situation that clearly undermines the development of the entire northern Ghana.

The Natural Environment

The Lawra Station Forest Reserve which is currently the only reserve in the district is situated in the north-eastern part of Lawra. The Lawra District has a total of 127 hectares of forest reserves, out of which 39.5 hectares have been converted into a protected area with an overall perimeter of 5.2 kilometres. The environment has undergone considerable degradation largely attributed to human activities. This has resulted in the dwindling of the vegetative cover and poorer soil fertility. The degrading human activities span from felling of trees for fuel wood 4

And charcoal production, bush burning, inappropriate farming practices, and soil erosion, to overgrazing by livestock.

The reasons for this practices range from cultural beliefs to sustenance and the search for sustainable livelihoods. To address this issue the government in 2010 directed the Forestry Commission to set-up plantations in their respective jurisdictions. The communities that benefited from this intervention in the Lawra District are: Dikpe, Tanchara, Naburyinye, Eremon-Dazuri, Zambo, Bazing, Lyssah, Eremon-Bure Eremon-Yara and Bonpare-toto.

Political Administration

The Lawra District Assembly is the highest political and administrative body in the district. Under Section 10 of the Local Government Act, the Assembly exercises deliberative, legislative and executive functions. It is the local government authority responsible for the overall development of the district through the formulation and implementation of development plans, programmes and projects. The district administrative system comprises of the District Assembly, Secretariat, Departments of the District Assembly, four sub-districts; (namely, Lawra Town Council, Babile, Zambo and Eremon Area Councils) and the Unit Committees. Traditional administration is under the Lawra Traditional Council.

The District Assembly is made up of 44 members out of which 29 are elected and 13 are Government Appointees. One out of the 29 elected members is a female (3.5%) and out of the 13 government Appointees, five are females (38.5%). The District Chief Executive (DCE) and the Member of Parliament (MP) add up to the number 44.

Traditional Authority

Traditional administration in the district is under the Lawra Traditional Council. Another important institution, which plays a crucial role in promoting good governance, is the traditional authority. The district has one paramountcy namely the Lawra paramountcy headed by the Lawra Naa. The paramount chief is supported by eight divisional chiefs, 16 sub-chiefs and 32 herdsmen.

Traditional Festival

The annual festival celebrated by the people in the Lawra District is the 'Kobine' festival. The festival is celebrated in acknowledgement of a bumper harvest and as a sacrifice of thanksgiving to the gods and ancestors. 'Kobine' festival is observed during the months of October and is mainly characterized by drumming, dancing and merry making.

Tourism

The Lawra District has some unique tourist attractions, which serve as prime destinations for tourists and opportunities for investors. The crocodile pond at Eremon, about 10 kilometres from the district capital, is one of the natural attractions. These reptiles are the totems of the people of Eremon who rear them. The crocodiles are generally harmless and come out of the pond during the dry season to visit homes for food. Other tourist sites include the detention camp of the late President Dr. Kwame Nkrumah and the residence of the British Colonial Administrator and the Black Volta Basin in Lawra that has a beach-like environment; and an atmosphere for relaxation and recreational activities. There is also the natural spring in Brifo, 5

Which flows all year round from a grove at the top of a hill. It is considered a sacred treasure endowed by nature to the Brifo community.

Agriculture

Agriculture is the major economic activity in the district, employing about 78.0 percent of the working population. About 80.0 percent of the farmers are into subsistence agriculture, producing mainly maize, millet, groundnuts, soya bean and cowpea. Animal production is a major agricultural activity undertaken by the people to supplement incomes from crop farming. The local agricultural sector is confronted with depleting soil fertility, unreliable rainfall pattern, limited investment capital and skills, pests and diseases, inadequate access to extension service and low access to market. These challenges have resulted in very low agricultural productivity in the district, thereby rendering farming unattractive. Majority of the active population therefore, migrate to other parts of the country to farm or search for other opportunities.

3.3 Research Design

According to Kerlinger (1986), a research design is a plan, structure and strategy of investigation to obtain answers to research questions or problems.

The study adopted a cross sectional survey approach which according to Schmidt et al (2008) is a type of observational study that analyzes data from a population or a representative subset at a specific point in time. This design was based on the selected communities in the two districts (sample) where the data relevant to the study were collected and analyzed in response to the stated objectives. The cross sectional approach was appropriate in respect to the fact that the study had a certain durational limitation. Cross sectional survey is not costly to perform and does not require a lot of time. Cross sectional survey also has the advantage in that findings and outcomes can be analyzed to create new theories or studies or in-depth research.

3.4 Target Population and sampling

The target population was obtained by using the sampling frame which constitutes twenty five communities each from the Lawra and Nandom districts in the Upper West Region. These communities were selected for water and sanitation campaign programme by the Government of Ghana through the Ministry of Local Government and Rural Development.

3.4.1 Sample Size Determination

According to Yin (1993), sample size is meant to be used to generalize or make inferences based on the parameters of population from which the samples are taken. The size of a sample should neither be excessively large, nor too small – it should be optimal. This, however, according to Kumar (1997) should be at the discretion of the researcher. The sample size selected for the study was 230.The determination of the sample size selection is illustrated in the Tables 3.1 and 3.2 below

The method which was used for the purpose of the sample size determination was Yamane Method as shown below

$$n = \frac{N}{1 + N(\alpha)^2}$$

Where:

n = sample size

N = Sampling frame (442)

α = margin of error (0.05)

Therefore:

$$n = \frac{442}{1 + 442(0.05)^2}$$

$$n = \frac{442}{2.105}$$

$$n = 209.9$$

The sample size obtained following the application of the Yamane method was 209.9, this was rounded up 210 and an additional 20 households selected to obtain a sample size of 230. The additional 20 households were added to increase the data size.

3.4.2 Sampling Procedure

In this study, both probability sampling procedure and non-probability sampling procedure were used. In the non-probability sampling procedure, purposive sampling technique was employed in the selection of the target communities in both districts. The target communities were grouped into two strata with each stratum consisting of 25 communities each from the two districts with the 25 communities from each of the two districts being communities that were selected to benefit from WASH intervention campaigns. Names of all the communities were written on equal sheets of papers, folded and put into a closed basket. A seven year old boy was then asked to randomly pick five folded papers from the basket. The same process was repeated for the second district and their respective selected communities are shown by Table 3.1 and Table 3.2 Below

Table 3.1: Name of selected communities in Lawra

Name of Communities in Lawra	No. of Households in Community	No. of Questionnaires
Dazuur	76	38
Bonpare	36	18
Yagra	54	27
Danko	43	21
Nayirbog	23	11
	Total=232	Total=115

Source: (Field study, 2014).

$$Sample\ Size\ per\ Community = \frac{No.\ of\ Household\ in\ the\ Community}{Total\ Number\ of\ Households} \times Total\ Sample\ Size$$

Table 3.2: Names of selected communities in Nandom

Name of Communities in Nandom	No. of Households	No. of Questionnaires
Turbogru	24	13
Betaglu	21	12
Walateng	16	9
Newtown	129	70
Doropuo	20	11
	Total=210	Total=115

Source: (Field study, 2014).

A proportionate sample size determination technique was then employed to decide the number of households to be involved in the study from each selected community. By this approach, communities with large number of households had proportionately higher number of households in the sample (see Table 3.1 and Table 3.2). Through this process, 115 households were selected from each district to be part of the study – making it 230 total number of households for the study sample.

Thereafter, a systematic random sampling technique was used to select the households. With this, all the potential participants in the study were placed in a list. A starting point was then determined and from there every 2nd household was considered as a participant, so the 2nd , 4th, 6th households respectively were considered as participants , and this was followed through until the desired number of participants for the study was obtained. With regards to the selection of respondents from the sample, the target respondents were household heads or any random adult among all those in the household roaster.

3.5 Data Collection

Both structured questionnaires (Appendix A) and an interview guide (Appendix B) were used. The structured questionnaires were employed to elicit response from households on issues related to WASH campaigns and recommendations in the study area while the interview guide were administered on staff in the selected districts working within the water and sanitation sectors. Focus group discussions were also organized in four communities to further obtain some information relevant to the study objectives. To further equip the researcher with relevant information that might not be gotten from the administration of the questionnaires and the interview guide, personal observation was employed. The study was conducted in the Lawra and Nandom districts of the Upper West Region. The Lawra and the Nandom districts were chosen because those districts were part of some districts that benefitted from the WASH campaigns partly supported by CARE international Ghana. As part of a collaboration with the UDS, the organization needed a study of this kind to assess the effects of the interventions, hence the selection of the two districts. A representative sample was purposively selected from five communities in each district for the study area.

3.5.1 Data Collection Tools

Two data collection instruments; questionnaire was used to collect the quantitative data while interview guide was also used to collect the qualitative data. The questionnaire consisted of both opened and closed ended questions. This was used to interview the 230 households while the interview guide was used to interview six sanitation workers in the two district assemblies and two Non-Governmental Organization practitioners working in the water and sanitation sectors. Focus group discussions were also guided by the interview guide. Table 3 shows the distributions of focus group distributions held with four separate groups in some selected communities in the study area.

Table 3.3: Focus Group Discussions in four Selected Communities

Community	No. of Groups	Total No. of Participants in Groups	
		Male	Female
Dazuur	2	6	6
Bonpare	2	6	6
Turbogru	2	6	6
Betaglu	2	6	6
Total	8	24	24
Grand Total			48

Source: (Author's Construct, 2014).

Focus group discussion which is also referred to as group interviewing is essentially a qualitative research methodology. It is based on structured, semi-structured or unstructured interview and offers qualitative researchers the opportunity to interview several responds systematically and simultaneously (Bobbie, 2011). It has also been observed by Krueger (1988) that focus group discussion is mainly used because of its strength of convenience, economic advantage, high face validity and speedy results.

Focus group discussion was employed in the study to further obtain information relevant to the study objectives. In all four group discussions were done with 48 members made up of 24 males and 24 females in the study community. There was one group discussion which solely consisted of pito brewers. This was done purposively in that the group was considered as those who use water most in their trade. The aim therefore was to assess the challenges they encounter in their business with respect to access to water. The other group discussions consisted of other professions.

3.5.2 Sources of Data Collection

Both primary and secondary data were collected for the study. (Bristol, 2011) describes primary data as a methodology used by researchers to acquire data first-hand rather than being gathered solely from published sources or past. Some of the ways to collect primary data consist of surveys, interviews and focus group discussions. On the other hand, secondary data are published and unpublished articles, books and survey reports. For the purpose of this research questionnaire was administered to elicit response or views of households whereas data collected from non-governmental organizations on the various issues under investigation was achieved primarily by means of interview guide.

3.5.3 Data Collection Quality Assurance and Ethical Considerations

In order to reduce the possibility of getting the answer wrong, attention was paid to reliability and validity (Saunders et al, 2003).Two sanitation workers of the Assemblies were recruited and trained. The researcher took respondents through the data collection instruments after an introduction of the issues to seek consent as a prerequisite for the study. Having assured respondents the confidentiality of their personal information they agreed and answered all the questions as well as provided other useful information for the study.

3.5.4 Validity

Validity is concerned with whether the findings are really about what they appear to be about. (Saunders et al, 2003). Validity is defined as the extent to which data collection method or methods accurately measure what they were intended to measure. The number of steps which were used to ensure the validity of the study include: Data was collected from respondents who were qualified to participate in the study, survey questions was based on literature review and frame of reference to ensure the validity of the result; questionnaire was pre-tested in Lawra and Nandom Districts with 30 respondents. It emerged from the pretesting that some specific wordings in the questionnaires had problems in eliciting the anticipated response from the

selected respondents. Again some of the respondents were reluctant in responding to questions. The researcher then rephrased some of the questions to attain a standardized questionnaires. The support of the district environmental health workers and other officers working in the water and sanitation area were then enlisted to assist in eliciting response from the respondents.

3.5.5 Reliability

According to Saunders et al (2003), reliability refers to the degree to which data collection method or methods will yield consistent findings. While Cooper and Schindler (2003) defined reliability as many things to many people, but in most contexts the notion of consistency emerges. A measure is reliable to the degree that it supplies consistent results Again, the researcher has duly acknowledged all references.

3.5.6 Method of Data Analysis

Data analysis describes facts, detect patterns, develop explanations, and test hypotheses. The administered data collection instruments were subjected to editing, coding and entry into the analytical software (SPSS). Editing was done by reading through the answered interviews to get rid of unwanted materials and double entry. This was done to eliminate errors in the administered interviews to ensure accuracy and uniformity in interpretations. Coding was the next stage whereby responses to questions or issues were classified into meaningful categories in order to bring out essential patterns as a basis for analysis. The open-ended responses were put into similar categories in order to reduce the information to a more limited attributes and finally the coded data were entered for analysis. The quantitative data were analyzed using descriptive statistics such as frequencies and percentages, while the focus group data, mainly qualitative data analyzed based on themes, patterns and relationships.

3.5.7 Data Presentation

Data was presented using pie chart, bar chart and frequency tables. The qualitative data were later used to shed light on the outcome of the quantitative analysis.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter provides an analysis on WASH intervention on some selected communities in the Lawra and Nandom districts. The results was generated based on a thorough discussion on the following thematic areas; the socio-demographic characteristics, water and sanitation interventions, willingness and ability to pay for improved water and sanitation among others.

4.2 Socio-Demographic Characteristics of Respondents

This section presents an analysis of some socio-demographic characteristics of respondents for the study. These include gender, age, level of education, occupation, marital status, household size, property ownership.

4.2.1 Gender of Respondents

The researcher sought to establish the gender of the respondents. This was important to the study as it assisted the researcher to establish gender composition of the respondents the first consideration for selection as a respondent was for a person to be a household head or in the absence of the household head, any adult member of the household was considered. This household heads could either be male or female. For it has been observed by Billig (1988), that the key elements for success in the adoption of innovations are strengthened through the full participation of women and men.

Table 4.1: Gender of respondents

Gender Of Respondents	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Male	21.7%	29.6%	25.6%
Female	78.3%	70.4%	74.4%
Total	**100%**	**100.0%**	**100%**

Source: (Field Survey, 2014)

It has been observed by Van Wijk (1998) that participation of women alongside men in planning, design, maintenance and management has brought distinct benefits to the functioning and use of water systems and created more equal chances and planning functions for women and men, tables 4.1 demonstrates the gender distribution of respondents in the Lawra and Nandom district. It revealed that out of the 230 respondents interviewed, 78.3% were women while the males constituted 21.7%.

The Nandom district had a similar situation of percentage with 70.4% of the respondents being female while the male respondents constitutes 29.7%. While the percentage of male respondents in the Nandom district appreciated as compared to the Lawra district, that of the female percentage in Nandom reduced. The gender distribution might not have any significance in the study area. The explanation behind the sample being disproportionately women was simply that women were the ones mostly at home at the time of visit.

4.2.2 Age of Respondents

The researcher was interested in the age categorization of the respondents as this enabled the researcher to establish the age grouping that needed to participate in the interview. This was significant to the study as the target respondents were household heads or their representatives, a certain age requirement that demonstrate the level of maturity of the respondents was therefore necessary.

Table 4.2: Age of respondents

Age of Respondents	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
18 – 23	6.1%	8.7%	7.4%
24 – 29	24.3%	27.8%	26.0%
30 – 35	63.5%	53.0%	58.3%
36 and above	6.1%	10.5%	8.3%
Total	**100.0%**	**100.0%**	**100.0%**

Source: (Field Survey, 2014)

Tables 4.2 present age distribution of respondents in selected communities in the Lawra and Nandom districts respectively. The table revealed that 6.1% of the respondents fell within the age group from 18 – 23 while 24.3% were from the age group of 24 – 29, majority of the respondents, thus 63.5% were within the ages of 30 – 35, for the respondents who were 36 years and above, only 6.1% fell under this age group.

In the Nandom district, the majority of respondents, thus 53% fell within the age grouping of 30 –35 while 10% of the respondents were from the age grouping of 36 and above. Comparatively both districts had a similar percentage of respondents within the age grouping of 30 – 45, though the figure in Lawra district was greater than that in Nandom.

Considering both districts, the table revealed that the majority of respondents, thus 58.3% came from the age grouping within 30-35. The least was 7.4% and this came from the grouping within 18-23. The second highest of the respondents came from within the age grouping of 24-29 with a 26.0% while 8.3% came from the age grouping of 36 and above.

4.2.3 Occupation of Respondents

The researcher was interested at establishing the occupation of the respondents. This was important to establish the economic activities the respondents the study area were engaged in.

Table 4.3 Occupation of respondents

Occupation Of Respondent	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Farming	49.6%	67.0%	58.3%
Pito Brewing	30.4%	23.5%	27.0%
Butcher	0	1.7%	0.8%
Dress Making	15.7%	0.9%	8.3%
Student	4.3%	6.9%	5.6%
Total	**100.0%**	**100.0%**	**100.0%**

Source: (Field Survey, 2014)

Table 4.3 shows the occupation distribution of respondents from Lawra and Nandom respectively. It revealed in the Lawra district that the majority of respondents, which is a total

49.6% were farmers. Pito Brewers constituted 30.4% of the respondents. 15.7% of the respondents were interviewed while dress makers while 4.3% of the respondents were students

In the Nandom district the majority of respondents just like the Lawra district were farmers, thus 67.0%, while Pito Brewers were the second highest with a 23.5%. Whereas in the Lawra district none was engaged in butcher enterprise. Nandom district had a 1.7% of the respondents who were butchers. The percentage of dressmakers who responded in the Nandom district dropped as compared to that of the Lawra district while that of students appreciated in the Nandom district. Significantly, the percentage of farmers in the Nandom district was far higher than the In the Lawra district. While that of dressmakers from the Nandom district also reduced significantly as compared to that of the Lawra district.

Considering the distributions in the two districts together, it showed 58.3% of the respondents constituting the majority were farmers. With a 27.0%, pito brewers were next in terms of the number of respondents. Dress makers constituted 8.3% while 13 students constituted 5.6%. Of those who responded, only 0.8% were butchers.

4.2.4 Educational Level of Respondents

The researcher sought to find out the level of education of the respondents as this was necessary to enable the researcher establish the capacity of community members to appreciate the wash innovations.

Table 4.4 : Educational level of respondents

Level Of Education Of Respondents	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Primary	44.4%	46.6%	43.5%
Secondary	4.3%	7.8%	6.1%
Non-Formal Education	51.3%	49.6%	50.4%
Total	**100%**	**100.0%**	100%

Source: (Field Survey, 2014)

Table 4.4 shows the educational distribution of respondents in the Lawra and Nandom districts respectively. It revealed that 51.3% of the respondents had no formal education, while 44.1% had primary education. Only 4.3% of the respondents had Secondary education. In the Nandom district just like the Lawra district, majority of the respondents constituting 42.6% had primary education while 7.8% had secondary education.

Comparatively the percentage of respondents without formal education was higher, that is 51.3% in the Lawra district. While that of respondents with secondary education was higher in the Nandom district. That is 7.8% as compared to 4.3% in the Lawra district. For the respondents with primary education, the respondents in Lawra were a little higher, that is 44.7% as compared to that of Nandom which recorded 42.6%.

Considering the two districts as a whole, it revealed that the majority of respondents, that is 50.4% had no formal education, while only 6.1% of the respondents had secondary education. A combine 43.5% had primary education.

4.2.5 Marital status of Respondents

The researcher was interested in establishing the marital status of respondents as this enabled the researcher to determine the decision making process among the households.

Table 4.5: Marital status of respondents

Marital Status of Respondents	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Married	60.0%	70.4%	65.2%
Single	5.2%	8.7%	7.0%
Widowed	27.8%	16.5%	22.2%
Divorce	7.0%	4.4%	5.6%
Total	**100.0%**	**100.0%**	**100%**

Source: (Field Survey, 2014)

Tables 4.5 show the distribution of marital status of respondents in the Lawra and Nandom districts respectively. In the Lawra district, the table revealed that 60.0% of the respondents were married, while 5.2% were single. Of the respondents, 27.8% were widows. While 7.0% of the respondents were divorced.

In the Nandom district, it revealed that majority of the respondents with a 70.4% were married, while 8.7% were single. The respondents who were widows stood at 16.5% while respondents who were divorced constituted 4.4%.

Comparatively the Nandom district recorded a higher percentage of respondents who were married, thus 70.4%. The percentage of respondents who were widows was lower in the Nandom district that is 16.5% as compared to 27.8% in the Lawra district. Also the percentage of respondents who were divorced was lower in the Nandom districts as compared to the Lawra district.

Jointly the two districts had 65.2% of respondents who were married while 7.0% were single. Only 5.6% were divorced 22.2% were widows.

4.2.6 Household Size of Respondents

The researcher sought to find out the household size of the respondents. This was important to the study as it assisted the researcher to establish composition of the households.

Table 4.6: Household size of respondents

Household Size Of Respondents	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Men	49.8%	37.4%	39.0%
Women	43.5%	52.2%	48.0%
Children Under 5 Years	7.0%	10.4%	13.0%
Total	**100.0%**	**100.0%**	100%

Source: (Field Survey, 2o14)

Tables 4.6 show the distribution of household size of respondents in the Lawra and Nandom districts respectively.

In the Lawra district, the table revealed that the Male were the dominant household members, registering a 49.5% whilst 34.5% of the household members were female. Children under 5 years in the Lawra district constituted 7.0%. In the Nandom district the female constituted the majority of the household size with a 52.2% while 37.4% were male. Comparatively the household size of respondents in the Nandom district had greater female population 52.2% as compared to that of Lawra which had a 43.5%. Female population.

Considering the two districts as a unit, the distributions of the size of households of respondents revealed that women household members constituted with a 48.0% while 39.0% were men.

4.2.7 Type of Household

The researcher sought to establish the type of household head of the respondents. This was important as it enabled the researcher to establish the dominant household head type.

Table 4.7: Type of household head

Household Size Of Respondents	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Men	42.6%	64.3%	53.5%
Women	52.4%	32.7%	46.5%
Total	**100.0%**	**100.0%**	**100%**

Source: (Field Survey, 2014)

Tables 4.7 show the distribution of type of household head in the Lawra and Nandom Districts. In the Lawra district it revealed that 57.4% were female while 42.6% were male. However In the Nandom district, 64.3% of the household heads were male while 35.7% where female. Comparatively, the percentage of female household heads who responded was higher in the Lawra district. While the Lawra district recorded 57.4% of female household who responded,

that of Nandom recorded 35.7%. However with the male category, the percentage of male respondents in Nandom was higher, that is 64.3% while that of Lawra was 42.6%

The distribution of the gender of household head in both districts showed that 53.5% were men while 46.5% were women. This distribution present an interesting situation with regards to household heads in the Upper West Region. The 2010 population census showed that in the region while heads of households are predominantly male, temporary heads are mainly females. The proportion of female temporary heads in the region is 82.1% while the proportion of male heads is 81.7%

4.2.8 Property Ownership of Respondents

The researcher sought to establish the financial status of the respondents. This was important to find out the capacity of the community members to adopt WASH technologies as Watson (1995) observed that weak financial position of local communities not only reduce their capacity to participate in development projects but also affect their ability to pay for water services.

Table 4.8: Property ownership of respondents

	Lawra N=115	**Nandom N=115**	**Total N=230**
Property	**Frequency**	**Percentage**	**Percentage**
Land	40.0%	36.5%	38.3%
House	53.0%	51.3%	52.2%
Others	7.0%%	12.2%	9.5%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.8 show the distribution of property ownership of respondents in the Lawra and Nandom districts. In the Lawra district, the table revealed that 40% of the respondents said they own land while 53.0% had a house. Of those who own properties other than land constituted 7.0%. In the Nandom district, 40.0% indicated they have land while 51.3% said they own a house. A total of 12.2% had properties other than a house and land. Comparatively, the figure

for respondents who own a house was higher in the Nandom district while that of those who own a land was higher in the Lawra district. This could imply there was a higher income level among the respondents in the Nandom district than in Lawra.

Of the two districts it revealed that 38.3% of the respondents said they own land while 52.2% which constituted the majority had land. A total figure of 9.5% had properties other than a house and land.

4.3 Respondents Awareness of WASH interventions

This section sought the views of respondents on whether they were aware of WASH campaigns and projects executed under the campaigns in the sampled communities in the Lawra and Nandom Districts.

4.3.1 Awareness of WASH interventions

The study was interested in finding out the level of awareness of community members of WASH campaigns in the study area. This was important in the study to establish how deep the WASH campaigns was disseminated.

Table 4.9: Respondents Awareness of WASH interventions

	Lawra N=115	**Nandom N=115**	**Total N=230**
Availability	**Percentage**	**Percentage**	**Percentage**
Yes	87.8%	86.9%	87.4%
No	12.2%	13.1%	12.6%
Total	**100%**	**100%**	100%

Source: (Field Survey, 2014)

Table 4.9 shows the distribution of respondents' awareness of executed WASH interventions in the Lawra and Nandom Districts. It revealed in the Lawra district that 87.4% said they were aware of WASH interventions/projects in the district while 12.6% said they were not aware of WASH interventions or projects. With regards to the Nandom district, it showed that 86.9%

said they were aware of WASH interventions/projects in the district while 13.1% said they were not aware of WASH interventions or projects.

These views of the respondents implies that the WASH campaigns made some gains in light of creating awareness on issues relating to water and sanitation among members of the study area as high number of respondents acknowledged their awareness on the prevalence of WASH interventions in their communities.

Of the two districts, it revealed that 87.4% had information on WASH interventions in the sampled communities under study. 12.6% said they had no knowledge of water, sanitation and hygiene interventions in the communities.

4.3.2 Executed water projects

The study sought to find out from the respondents the type of water projects that were executed. This was important to find out the most widely used water technology in the study area.

Table 4.10: Executed water projects

	Lawra N=115	**Nandom N=115**	**Total N=230**
Projects	**Percentage**	**Percentage**	**Percentage**
Piped Connections	0.0%	7.2%	3.6%
Bore Holes	57.1%	71.4%	64.3%
Hand Dug Well	42.9%	21.4%	32.1%
Total	**100%**	**100%**	**100%**

Source: (Lawra District Assembly, 2014)

Tables 4.10 show information from the Lawra and Nandom districts on some water projects executed in the course of the WASH campaigns. It showed that in the Lawra district bore holes constituted 57.1% of projects that were executed in the sampled communities, while hand dug wells constituted 42.9% of facilities which were constructed. There were no piped connections in the Lawra district. In the Nandom district, 71.4% of the facilities reported to have been constructed were bore holes. There was only 7.2% piped connection in the sampled communities in the Nandom district. The findings implies that some progress was made in

ensuring secure access to safe drinking water among the people in the sampled communities as bore holes were prominent in the study area.

In both the Lawra and the Nandom districts, it revealed a combined 3.6% of piped connections in the study area while a 64.3% of bore holes were realized. Hand dug wells constituted 32.1% of projects that were executed.

4.3.3 Source of Drinking Water

The study was interested in establishing the source of drinking water for members of the study area. This was important in the study as it enabled the researcher to identify the main source of drinking water and to establish whether community members have a safe and reliable drinking water source.

Table 4.11: Source of Drinking Water

	Lawra N=115	**Nandom N=115**	**Total N=230**
Source of Drinking Water	**Percentage**	**Percentage**	**Percentage**
Borehole	97.3	92.2%	97.0%
Protected Spring	1.7	1.7%	1.7%
Hand dug well	1.0	6.1%	1.3%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.11 show the respondents views on the source of drinking water for inhabitants in the selected communities in the Lawra and Nandom districts under study. In the Lawra district, it revealed that 97.3% mentioned bore holes as their main source of drinking water while 1.7% mentioned protected spring. Only 1% mentioned bottled water. In the Nandom district, the situation was not different as 92.2% mentioned bore hole as their main source of drinking water. Also 1.7% mentioned protected spring while 6.1 mentioned bottled water.

It showed that 97.0% in the two districts mentioned borehole as the main source of drinking water, while 1.7% mentioned protected spring. Only 1.3% of the respondents mentioned hand dug well as the source of drinking water. It implies from the distribution that the main source of drinking water for the people in the Lawra and Nandom districts is the bore hole, A similar report on water coverage in the Upper West region by the USAID (1993) observed that 66.4% of the population in the Lawra district drink water from the bore hole while 72.1% drink water from the bore hole in the Nandon district

4.3.4 Distance to Water Source

The study sought to establish the distance to the water source for members in the study area. This was very important as it enabled the researcher to find out the distance inhabitants in the study area cover to collect water.

Table 4.12: Distance to Water Source

	Lawra N=115	**Nandom N=115**	**Total N=230**
Distance to Water Source	**Percentage**	**Percentage**	**Percentage**
100 – 500m	39.1%	30.4%	34.8%
500 – 1000m	57.4%	62.6	60.0%
1000 – 1500m	3.5%	7.0	5.2%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.12 show the distributions of distance to the source of water in the Lawra and Nandom districts. It revealed that in the Lawra district, 57.4% of the respondents mentioned the distance of between 500-1000m while 39.1% mentioned a distance from between 100-500m. Only 3.5% of the respondents mentioned a distance from between 1000-1500m. In the Nandom district, the table showed that 30.4% of the respondents mentioned a distance from between 100-500m while 62.6% of respondents mentioned a distance from between 500-1000m.only 7.0% mentioned a distance from 1000-1500m.

With the two districts, it revealed a combine figure of 60.0% as the respondents who mentioned they cover a distance from within 500-1000 meters. A further 34.8% mentioned a distance from within 100-500 meters. Only 5.2% mentioned a distance within 1000-1500 meters.

4.3.5 Category of People who Fetch Water

The researcher was interested at establishing the category of persons in the household who collect water for the members of the household. This was necessary to establish the persons who carry the burden of collecting water for the household.

Table 4.13: Category of People who Fetch Water

	Lawra N=115	**Nandom N=115**	**Total N=230**
Category of People who Fetch Water	**Percentage**	**Percentage**	**Percentage**
Women	74.0%	76.5%	75.2%
Men	2.6%	4.3%	3.5%
Female Children under 15	13.0	12.2%	12.6%
Male Children under 15	10.4	7.0%	8.7%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.13 show the distributions of the category of household members who fetch water in the Lawra and Nandom districts. In the Lawra district, it revealed that majority, constituting 74.0% said it was women who fetch water while 2.6% said it was men who fetch water. Some 13.0% said female children under 15years fetch water while 10.4% said it was male children under 15years. In the Nandom district, it equally revealed a higher figure of 76.5% being respondents who said it was women who fetch water while 4.3% said it was men who fetch water. 12.2% of the respondents said it was female children under 15years while 7.0% said male under 15 years fetch water.

Of the sampled communities in the two districts, a combine figure of 75.2% of the respondents mentioned women as the category of household members who fetch water. Only 3.5%

mentioned men, while a further 12.6% mentioned female children under 5 years. A figure of 6.7% of the respondents identified male children less than 5 years as category of household members who fetch water.

The distribution gives an indication that women in particular have the burden of transporting water from the source to the household, an observation that is supported by (Fuest, 2005) who observed that in many parts of Ghana, women often spend a greater part of their time usually five hours per day fetching water from unimproved sources, often walking over long distances (10 or even 20 kilometers) particularly during the dry part of the year. This situation he maintains is more pronounced in the North of Ghana where there are acute water shortage in the dry season.

4.3.6 Water Treatment Methods

The study sought to establish the water treatment methods available for members in the study area. This was necessary as it enabled the researcher to establish the prevalent water treatment methods for inhabitants in the study area.

Table 4.14: Water Treatment Methods

Water Treatment Methods	**Lawra N=115**	**Nandom N=115**	**Total N=230**
	Percentage	**Percentage**	**Percentage**
Boiling	9.6%	8.7%	9.1%
Chlorine	57.4%	51.3%	54.3%
Water filter	20.0%	26.0%	23.1%
Allow to settle	13.0	14.0%	13.5%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.14 show the distributions of water treatment methods among the respondents in the Lawra and Nandom districts. In the Lawra district, the table shows that 7.0% of the respondents identified boiling while 21.7% mentioned chlorine. For water filtration, 7.8% said they used it while 63.5% of the respondents said they usually allow water to stand and settle. In the Nandom

district, 8.7% mentioned boiling as the method while 45.2% mentioned the use of chlorine. A total figure of 23% of the respondents said they use filter while 14% said they usually allow water to settle.

The table showed that in the two districts, 54.3% of the respondents said they use chlorine, and this was the most widely used method by households whiles was the least used method was boiling with only 9.1%. Of the respondents. A total figure 23.1% mentioned filtration while 13 .5% said they usually allow water to stand and settle.

The distribution demonstrates that among the households in the study area, chlorination and filtration are the widely used methods of water treatment.

4.3.7 Water Storage Methods

The researcher sought to establish the water storage methods among the inhabitants of the study area. This was important as it enabled the researcher to establish if those storage methods supported in the avoidance of recontamination of water at the point of use.

Table 4.15: Water Storage Methods

	Lawra N=115	**Nandom N=115**	**Total N=230**
Water Storage Methods	**Percentage**	**Percentage**	**Percentage**
Earthen Pot	69.6%	61.7%	65.6%
Metal pot	18.2%	22.6%	20.4%
Plastic container (covered)	3.5%	8.7%	6.9%
Plastic container (uncovered)	8.7%	7.0%	7.0%
Total	**100%**	**100%**	100%

Source: (Field Survey, 2014)

Tables 4.15 show the distributions of water storage facilities in the Lawra and Nandom districts. In the Lawra district, the table shows that 69.6% of the respondents said they store water in earthen pots while 18.2% mentioned metal pots. A total 8.7% of the respondents said they use uncovered plastic containers while 3.5% said they use covered plastic containers. In the

Nandom district, 61.7% said of the respondents said they use earthen pots while 22.6% mentioned metal pots. Only 8.7% of the respondents identified covered plastic containers as the storage facility they use while 7.0% said they use uncovered plastic containers.

With regards to the distribution on the two districts together, it revealed that majority of the respondents, thus 65.6% mentioned earthen pot as their water storage facility whiles the least used storage facility was plastic containers which recorded 6.9% a total of 20.4% mentioned metal pots as the main water storage facility while 7.0% mentioned uncovered plastic containers.

The distribution of water storage methods among the households in the study area above gives an ample indication that water is largely stored in locally made storage facilities like the earthen pot and containers with wide openings which are usually uncovered. A situation that could lead to water contamination at the point of use. A study by Karen and Jun (2002) in Kenya established a similar situation, as they observed that drinking water was stored in locally made clay pots with wide openings. They maintained that as high as 90% of households used these pots to store drinking water.

4.3.8 Availability of Water all year round

The study sought to establish the availability of water from the water sources. This was important as it enabled the researcher to find out if inhabitants have access to secure water supply throughout the year.

Table 4.16: Availability of Water all year round

	Lawra N=115	Nandom N=115	Total N=230
Availability of Water all year round	**Percentage**	**Percentage**	**Percentage**
Yes	98.2%	96.5%	97.4%
No	1.8%	3.5%	2.6%
Total	**100%**	**100%**	100%

Source: (Field Survey, 2014)

Tables 4.16 show respondents' views on whether there was water in the facilities all year round. It revealed in Lawra that of ta greater 98.2% of the respondents said water was available all year round. Only 1.8% of the respondents said water was not available all year round. In the Nandom district, a similar figure of 95.5% of the respondents said there was water all year round while 3.5% said water was not available year round.

With regards to the figures for the two districts combined, the table revealed that 97.4% of the respondents said water was available at the source all year round while only 2.6% said water was not available at the source all year round. The distribution above demonstrates that in the study area water is available from the main source of drinking water among the inhabitants which is largely the bore hole.

4.3.9 Problem with Water Source

The researcher sought to establish the problems with the sources of water for members in the study area. This was important in the study to enable the researcher establish the problems of the source of water supply to inhabitants in the study area.

Table 4.17: Problem with Water Source

	Lawra N=115	Nandom N=115	Total N=230
Problem with Water Source	**Percentage**	**Percentage**	**Percentage**
Yes	87.8%	74.7%	81.3%
No	12.2%	25.3%	18.7%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.17 show the views of respondents on whether there were problems with the water source of water supply. In the Lawra district, it showed that 12.2% of the respondents said there were no problems while 87.2% of them said there were some problems. In the Nandom district, 25.3% said there were no problems while 74.7% said there were problems.

On the situation regarding figures for both districts, the table showed that majority of the respondents that is 81.3% said there were problems while 18.7% said there were no problems.

4.3.10 Type of Problem

The study was interested at identifying the kinds of problems with the water sources. This was also important as it enabled the researcher to establish the challenges to secure domestic water supply to inhabitants in the study area.

Table 4.18: Type of Problem

	Lawra N=115	**Nandom N=115**	**Total N=230**
Type of Problem	**Percentage**	**Percentage**	**Percentage**
Frequent breakdown	74.0%	78.2%	76.0%
Distance	18.2%	14.0%	16.2%
Crowd	7.8%	7.8%	7.8%
Total	**100%**	**100%**	100%

Source: (Field Survey, 2014)

Tables 4.18 show the distributions of problems with the water facilities in the Lawra and Nandom districts. In the Lawra district, it showed that 74.0% of the respondents mentioned frequent breakdown in the facility as the problem usually encountered while 18.2% mentioned long distance to the source of the water facility. Only 7.8% said thick crowds at the facility were the problem. In the Nandom district it showed that 78.2% of the respondents mentioned frequent breakdown of the facility while 14.0% mentioned long distance to the water source. Just like the Lawra district, 7.8% of the respondents mentioned thick crowds at the facility as the problem they encounter.

It is clear from the table that a combine 76.0% of respondents in the study area mentioned frequent break down of the water facility as the major problem while 16.2% mentioned security concerns as the problem at the facility. Only 7.8% mentioned crowding at the facility as the problem. The above distribution implies that the inhabitants in the study area just like many other rural areas in Ghana are faced with the problem of frequent break down of water facilities, distance to the facility and overcrowding among others. In a survey commissioned by the (Center for Indigenous Knowledge (CIKOD), 2017 on the water and sanitation situation in the Lawra and Nandom districts, the findings were similar as long period of queuing to access water due to inadequate water facilities, inability of community members to contribute promptly towards maintenance and repairs and distance to water facilities were some of the problems identified.

4.3.11 Awareness of existence of sanitation interventions

The researcher sought to establish the level of awareness of sanitation interventions among the inhabitants in the study area. This was necessary as it enabled the researcher to establish the strength of the WASH campaigns in the study area.

Table 4.19: Respondents' awareness of existence of sanitation interventions

	Lawra N=115	**Nandom N=115**	**Total N=230**
Respondents' awareness of existence of sanitation intervenions	**Percentage**	**Percentage**	**Percentage**
Yes	96.5%	95.6%	96.0%
No	3.5%	4.4%	4.0%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.19 show respondents' views on Sanitation campaigns in the Lawra and Nandom districts. In the Lawra district, it shows that 96.5% of the respondents said there were sanitation campaigns in the district. Only 3.5% said there were no campaigns. In the Lawra district, just

like the Nandom district 95.6% equally said there were campaigns while 4.4% said there were no campaigns.

Considering the views of the respondents among the sampled communities in both the Lawra and the Nandom districts together, the table revealed that 96.0% of the respondents said they had knowledge on campaigns on sanitation in the communities while 4.0% said they were not aware. The above distribution demonstrates that the WASH campaigns in the study area had been wide spread as a good number of respondents (96%) indicated their awareness on the campaigns

4.3.12 Type of Sanitation Project/Intervention

The study sought to find out the type of sanitation interventions in the study area. This was important as it assisted the researcher to establish the sanitation projects that were rolled out during the campaign.

Table 4.20: Respondents' awareness of existence of sanitation interventions

	Lawra N=115	**Nandom N=115**	**Total N=230**
Type of Sanitation Project/Intervention	**Percentage**	**Percentage**	**Percentage**
Sanitation Credit	10.5%	14.7%	12.6%
Sanitation Market	8.6%	3.6%	6.1%
CLTS	80.9%	81.7%	81.3%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.20 show the distribution of sanitation projects or interventions in the Lawra and Nandom districts. In the Lawra district, it revealed that 10.5% of the respondents identified sanitation credit as the intervention, 8.6% said there were sanitation markets. 80.9 of the respondents mentioned the Community Led Total Sanitation (CLTS). In the Nandom district, it showed that 81.7% identified the CLTS as the sanitation intervention. With 14.7% identifying sanitation credit while 3.6% mentioned sanitation market

When the two districts are considered as a whole, the table revealed that majority of the respondents that is 81.3% mentioned the community led total sanitation program while 12.6% mentioned sanitation credit for the construction of latrine facilities. A further 6.1% mentioned sanitation market. The distribution above implies that the community Led Total Sanitation (CLTS) has been common WASH intervention in the study area as majority (81%) of the respondents mentioned the CLTS as the main intervention.

4.3.13 Usage of Facility

The researcher sought to find out the level of usage of the facilities that were initiated following the campaigns. This was necessary as it enabled the researcher to establish the rate of adoption of the sanitation technologies.

Table 4.21: Usage of Facility

	Lawra N=115	**Nandom N=115**	**Total N=230**
Usage of Facility	**Percentage**	**Percentage**	**Percentage**
Yes	91.3%	95.6	93.4%
No	8.7%	4.4%	6.6%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.21 shows the respondent's views on whether or not the communities use the facilities. In the Lawra district, it revealed 91.3% of the respondents said the facilities were in use while 8.7% said the facilities were not in use. In the Nandom district, there was a percentage increase in the respondents who said the facilities were in use as 95.6% of them said the facilities were in use. Only 4.4% of the respondents said the facilities were not in use.

The figures for the two districts showed that 93.4% of the respondents acknowledged that members of the communities were utilizing the facilities effectively while 6.6% said the facilities were not effectively being utilized. The distribution demonstrates that the adoption rate

of the WASH facilities among the communities is high as most of the respondents indicated the facilities were in use

4.3.14 Kind of Latrine Facility

The study was interested at establishing the kind of latrine facilities in use among the inhabitants in the study area. This was important as it enabled the researcher to establish the most widely used latrine facility among the inhabitants in the study area.

Table 4.22: Usage of Facility

	Lawra N=115	**Nandom N=115**	**Total N=230**
Kind of Latrine Facility	**Percentage**	**Percentage**	**Percentage**
Flash	0.0%	0.9%	0.5%
Piped sewage system	0.0%	0.9%	0.5%
Septic Tank	3.5%	5.2%	4.3%
Pit latrine	82.6%	73.0%	77.8%
Improved Ventilated Latrine	13.9%	20.0%	16.9%
Bucket	0.0%	0.0%	00.0%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.22 show the distributions of the kind of latrine facilities in the Lawra and Nandom ditricts.in the Lawra district none of the respondents mentioned flush, piped connections and the bucket as latrine facilities that were prevalent in the district. For septic tank, 3.5% of the respondents mentioned this kind as what they use. Majority of the respondents, that is 82.6% mentioned pit latrine as the latrine facility they use while 13.9% mentioned improved ventilated latrine. In the Nandom district, only 0.9% of the respondents mentioned flush and piped sewage connections. There was however a decrease in percentage in the number of respondents who use pit latrine as compared to the Lawra district as 73.0% mentioned pit latrine. With regards to the use of improved ventilated latrine, it was 20.0% of the respondents who said they use this kind of facility. Only 5.2% mentioned septic tank. The above distribution demonstrates that the most

commonly used latrine facility among the inhabitants in the study area is the pit latrine as 73% of the respondents said they use the pit latrine.

The table showed that in the study area, the most common latrine facility is the pit latrine as 77.8% of the respondents identified the pit latrine as the latrine facility they use. Beside the use of the pit latrine, it was revealed that the improved ventilated latrine was also prevalent among members of the study communities as 16.9% of the respondents identified this kind of facility as what they use. The respondents who use septic tank stood at 4.3% while a figure of 0.5% represented the respondents who mentioned flash and piped sewage system. None of the respondents identified the bucket method. The distribution demonstrates that most members of the communities under study use pit latrine.

Table 4.23: Whether Household Share the Latrine Facility with Other Households

	Lawra N=115	**Nandom N=115**	**Total N=230**
Whether Household Share the Latrine Facility with other Households	**Percentage**	**Percentage**	**Percentage**
Yes	18.0%	15.2%	17%
No	82.0%	84.8%	83%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Table 4.23 shows respondents' views on whether or not the household share latrine facility with other households. In the Lawra District it revealed that 18.0% of the respondents indicated that they share their latrine facility with other households. The table revealed similar situation in the Nandom District as 15.2% of the respondents reveal that they share latrine facility with other household members while 84.0% of the respondents said they do not share latrine facility with other households.

With regards to the two districts as a unit, the table revealed that 17.0% of the respondents in the two districts share latrine facility with other household while 83.0% do not share latrine facility. The table show that there were more respondents who share latrine facility in the Lawra District than in the Nandom District.

4.3.15 Washing Hands after Visiting Latrine Facility

The researcher sought to establish whether respondents wash their hands after using the latrine facility. This was very important as it enabled the researcher to establish the rate of adoption of the WASH campaign messages.

Table 4.24: Whether Respondents Wash Hands after Visiting Latrine Facility

	Lawra N=115	**Nandom N=115**	**Total N=230**
Whether Respondents Wash Hands after Visiting Latrine Facility	**Percentage**	**Percentage**	**Percentage**
Yes	87.2%	88.6%	90.8%
No	12.8%	11.4%	9.2%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.24 represent the views of respondents on whether they wash their hands after visiting a latrine facility. In the Lawra district, it showed that 87.2% of the respondents said they wash their hands after using a latrine facility while 12.8% said they do not wash their hands. In the Nandom district, the table shows that 88.6% of the respondents said they wash their hands after using the latrine while 11.4% said they do not wash their hands after using a latrine facility.

Considering the distributions in the study communities as a whole it is clear that most of the members adopted the WASH recommendations on hand washing after using a latrine facility as 90.8% of the respondents said they wash their hands after using a latrine facility. It showed that only 9.2% of the respondents said they do not wash their hands after using a latrine facility. This implies that a good number of people in the sampled communities have adopted the WASH recommendations on washing hands after latrine use. However through observation it

was realized that there were no hand washing facility close to the latrine facility. Similarly in a survey commissioned by the Centre for indigenous knowledge on the water and sanitation situation in the Lawra and Nandom districts in 2017, it was reported that the use of pit latrines were high among respondents, however adherence to the hygiene component was very low as majority of the facilities have no hand washing facilities in place.

4.3.16 Mode of Hand Washing after Toilet

The study sought to find out the mode of hand washing methods of inhabitants in the study area. This was necessary as it assisted the researcher to establish the extent of adoption of WASH campaign messages.

Table 4.25: Mode of Hand Washing after Toilet

	Lawra N=115	**Nandom N=115**	**Total N=230**
Mode of Hand Washing after Toilet	**Percentage**	**Percentage**	**Percentage**
Washing hands before eating	3.5%	7.0%	5.2%
Water only after latrine use	40.0%	36.5%	38.3%
Soap and water after latrine use	30.4%	41.7%	36.1%
After contact with child feaces	14.0%	8.6%	11.3%
Not at all	12.1%	6.0%	9.1%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Tables 4.25 Show the distributions of respondent's views on hand washing method among the sampled communities under study. In the Lawra district, it revealed that only 3.5% of the respondents said they usually wash their hands with soap and water before eating. Of the respondents who said they wash their hands with water only after latrine use constituted 36.5% while 41.7% said they wash their hands with water and soap after latrine use. Only 14.0% said they wash their hands with water and soap after contact with child's faeces while 12.1% did not wash their hands at all after latrine use. In the Nandom district, it showed that 7.0% of the respondents said they wash their hands with soap before eating while 36.5% said they wash

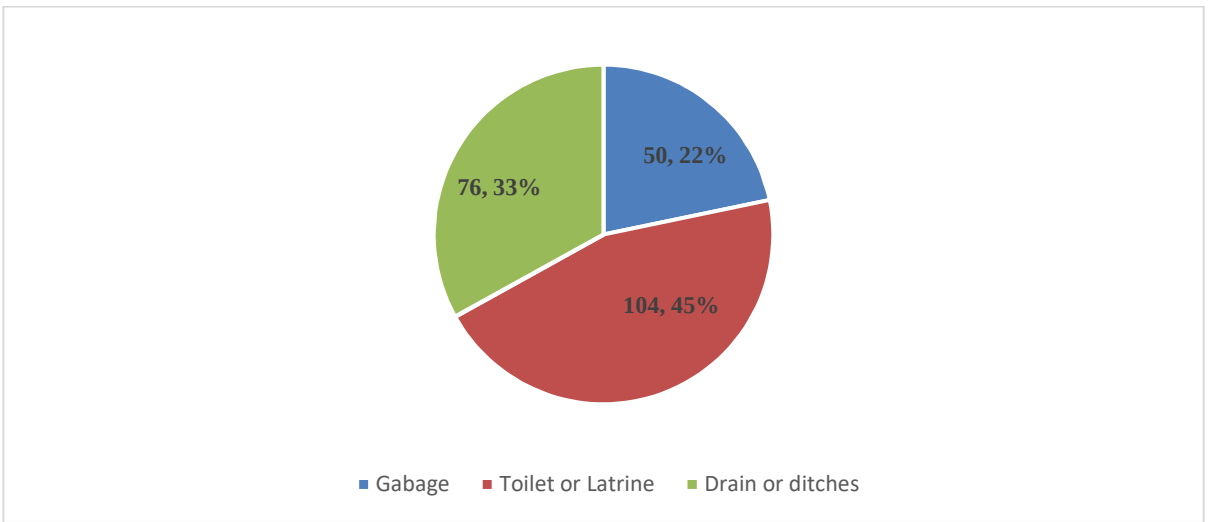
their hands with water only. Majority of the respondents that is 41.7% said they wash their hands with water and soap and a further 8.6% said they wash their hands after contact with child's faeces while 6.0% did not wash their hands at all after latrine use.

It showed with regards to a combine figures of the two districts that 38.3% of the respondents said they wash their hands with water only after latrine use while 36.1% said they wash their hands with water and soap. Only 5.2% said they wash their hands with water and soap before eating while 9.1% did not wash their hands at all after latrine use. A total figure of 11.3% said they wash their hands with water and soap after contact with child's faeces. The distribution implies that the practice of washing hands with soap after latrine use and contact with faeces among the respondents is low.

4.3.17 Mode of disposal of children faeces

The study was interested in finding out how children's faeces were disposed of. This was important as it allowed for the study to establish whether WASH recommendations on the disposal of children's faeces were put to practice in the study area

Figure 4.1: Mode of Disposal of Children Faeces



Source: (Field Survey, 2014).

Figure 4.1 represents respondents' views on the method of disposal of children stool. It reveals that among the 230 respondents interviewed, 104 which represents 45.22% of the respondents said they dispose into toilet or latrine, 76 which represents 33.04% of the respondents dispose into drain or ditch and 50 which represents 21.74% of respondents threw in to garbage. The distribution on the disposal of children stool among inhabitants in the study area demonstrates that a good number of people in the study area do not dispose their waste in a more hygienic way as 54.8% indicated they either disposed children stool in the drains or garbage. A similar report by the USAID (1993) on the disposal of solid waste in the Lawra and Nandom districts observed that 37.2% of the population dispose their solid waste by public dumps in the open while a further 29.1% dispose solid waste indiscriminately.

Table 4.26: Does Household Have a Washroom Facility?

Does Household Have a Washroom Facility?	**Lawra N=115**	**Nandom N=115**	**Total N=230**
	Percentage	**Percentage**	**Percentage**
Yes	96.0%	98.0%	95.0%
No	4.0%	2.0%	5.0%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Table 4.26 shows respondents views on whether the household have a washroom facility. It revealed in the Lawra District that 96.0% of the respondents indicated that they have a washroom facility while 4.0% said they do not have. In the Nandom District, the table show that 98% of the respondents said they have washroom facility while 2.0% said they do not have.

Considering the two districts as a unit, the table revealed that 95.0% among households in the study area have washroom facility while 5.0% do not have and may be bathing in the open.

Table 4.27: Is Washroom Floored?

Is Washroom Floored?	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Yes	46.3%	51.0%	48.0%
No	53.7%	49.0%	52.0%
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Table 4.27 shows respondents view as to whether the washroom facility was floored or not. It revealed in the Lawra District that 46.3% of the respondents said the facility was floored while 53.7% said their washroom facility was not floored. In the Nandom District, the table revealed that 51.0% of respondents indicated washroom facilities were floored while 49.0% said the washrooms were not floored.

As a unit, the study revealed that 48.0% of washrooms in households in the study area were floored while 52.0% of washrooms were not floored.

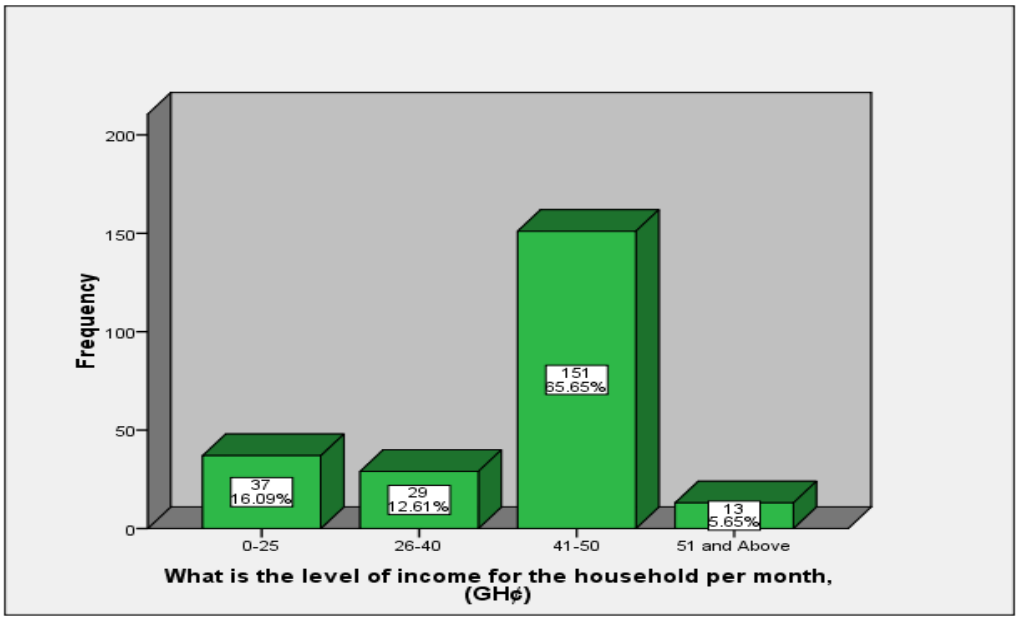
4.4 Willingness and ability of inhabitants to pay for improved water and sanitation facility

The provision of water and sanitation facilities in communities constitute important social service in every country. Water and Health are among the basic necessities of life. In view of this, many people are willing to have access to good sanitary and hygienic conditions and clean drinking water, however, the cost for such opportunities and facilities are not affordable, even though many may be willing to patronize. Low income levels and poverty prevent people to enjoy portable water and hygienic conditions. Many rural and peri-urban areas are not able to pay for this facility hence the need for government and Non-Government Organizations to support the less privileged, poor and deprived areas to have access basic facilities.

4.4.1 Income levels for households per month

Many households have low income levels, whereas others are wallowing in abject poverty. This unfortunate situation denied many households access to clean drinking water and good sanitation facilities. Many are not able to afford the cost of these facilities even though they are willing to have them.

Figure 4.2: Levels of households' income per month



Source: (Field Survey, 2014).

Figure 4.2 represents the distribution of respondent's views on the income levels of households per month. It reveals that overwhelming majority (65.65%) had between GH¢41-50 Ghana cedis as the household monthly income. 16.09% of the respondents had income level between GH¢0-25 while 12.61% of the respondents had household income level per month ranging between GH¢26-40 Ghana cedis. Only 6.65% fell under the highest income level per month among the respondents with their income level falling between GH¢51 and more. From the views of the respondents, it showed that the monthly income levels of most respondents is low and this may influence the kind of water and sanitation services they use as safe drinking water and sanitation facilities have a cost component. Similarly in a survey commissioned by the

(Centre for Indigenous Knowledge (CIKOD), 2017 on the water and sanitation situation in the Lawra and Nandom districts, it was revealed that poverty situation in the two districts was at worse situation as average earnings of respondents was found to be below the national average of GHC.445.00.

Figure 4.3: Expenditure patterns of households per month

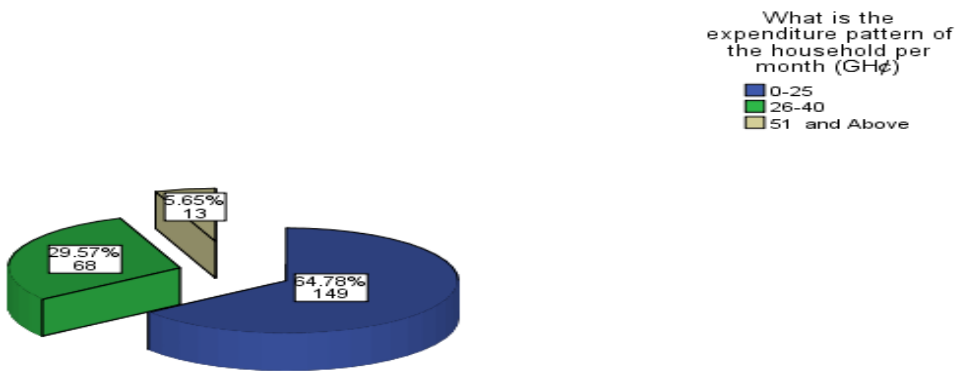


Figure 4.3 represents the views of respondents on the question of expenditure pattern of the household. It shows that a good number of respondents, thus 149 representing 54.78% had a monthly expenditure falling between 0-25 Ghana cedis. For the respondents whose monthly expenditure ranges between 26-40 Ghana cedis, they were 68 in number representing29.57%. Of the 230 respondents, 13 of them representing 5.65% had their monthly expenditure exceeding 51 Ghana cedis.

4.4.2Willingness to pay for improved drinking water and sanitation facilities

The researcher sought to establish the willingness of the respondents to pay for water and sanitation services. This was important to the study as it enabled the researcher to determine the readiness of the inhabitants to adopt WASH recommendations.

Table 4.28: Households are willing to pay for improved water and sanitation facilities.

	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
Strongly agree	78.0%	82.6%	80.4%
Agree	22.0%	17.4%	19'6%
Strongly disagree	Nil	Nil	Nil
disagree	Nil	Nil	Nil
Total	**100**	**100**	**100**

Source: (Field Survey, 2014)

Table 4.28 show the distribution of respondents' views on their level of willingness to pay for good drinking water and sanitation improved facilities. In the Lawra district, it showed that 78.0% strongly agreed to the question of how willing they were to pay for good drinking water, while 22.0% agreed to the question of their level of willingness. None of the respondents either strongly disagreed or disagreed. In the Nandom district, as high as 82.6% of the respondents said they strongly agree while 17.4% said they agree. Equally none of the respondents demonstrated a disagreement on the question of whether they were willing to pay.

Considering the two districts together, it revealed that majority of the respondents (80.4%) said they strongly agree while 19. 6% said they agree when the question of willingness was posed to them. The implication on the above distribution is that most of the respondents demonstrated a willingness to pay for improved sanitation and water survives, according Hartono et al, (2007) household economic and social condition such as age, number of family members, breadwinner's education and expenditure level influenced the availability of drinking water facilities.4.4.3 Respondents affordability for improved water and sanitation facilities

The researcher sought to find out if respondents could afford for sanitation and water services. This was necessary as it enabled the researcher to establish the extent at which inhabitants in the study area could afford WASH recommendations.

Table 4.29: level of affordability of households to pay for improved drinking water and sanitation services

	Lawra N=115	Nandom N=115	Total N=230
	Percentage	**Percentage**	**Percentage**
50 -90	29.0%	20%	24.8%
100 -190	70.5%	80%	75.2%
200 -290	nil	nil	nil
300 and above	nil	nil	nil
Total	**100%**	**100%**	**100%**

Source: (Field Survey, 2014)

Table 4.29 show the distributions of respondents' views on the level at which they could afford to pay for improved drinking water and sanitation facilities. In the Lawra district 70.5% said they could afford to pay at a range of 100 Ghana cedis and 190 cedis while 29.5% said they could afford to pay when it is in the range between 50 Ghana cedis to 90 cedis. None of the respondents demonstrated an affordability level below 200 Ghana cedis. In the Nandom district, 80.0% said they could afford within 90 Ghana cedis to 190 cedis while 20.0% said they could afford in the region of 50 -90 Ghana cedis.

It showed that 75.2% of the respondents said they could afford to pay in the region of 90 Ghana cedis to 190 cedis while 24.8% said they could afford to pay in the region of 50 Ghana cedis to 90 cedis. The distribution on affordability clearly gives an indication that level of affordability among households is does not go beyond 200 Ghana cedis mark. This may be a reflection of the the economic and social conditions of households in the study area and Hartono and Harahap, (2007) observed that household economic and social condition influenced the kind of water and latrine facilities they use.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This research sought to assess and evaluate the effects of the WASH interventions in the Lawra and Nandom Districts of the Upper West Region, Ghana. In order to achieve this, the research assessed in the two districts, the type of water and sanitation interventions; factors that influenced adoption of WASH recommendations; effects of the programme on water usage by households and an assessment of the willingness of households to pay for improved water and sanitation facilities and services.

In respect of water and sanitation, the results of showed that WASH projects were available in both districts. The major water projects found in the communities were bore holes and Hand dug wells. Bore holes were the main source of drinking water for households in both districts (used by over 90.0 % of households in each district). The results showed that more than half of the sampled households from each of the districts walked a distance of 500 to 1000m to fetch water with Nandom having more households (62.6%) which covered a distance of 500 to 10000m. In Lawra the households that covered similar distance was (57.4%). In both districts, women dominated the category of people who fetch water for the households, accounting for 74.0% in Lawra and 76.5% in Nandom and less than 5.0% of men in each district. Water treatment methods used by households were boiling, filtration, chlorination and allowing the water to settle. The most widely used treatment method was chlorination method. Aside frequent breakdown, in some instances attributable to poor handling, of water facilities being the most dominant challenge associated with water facilities, issues of distance covered by households and crowding at these facilities were also issues of concern to the households.

Storage of water was achieved by means of earthen pots, metal pots, covered and uncovered plastic containers. It was found that Pit Latrine was the most widely used latrine facility in both Lawra and Nandom districts recording up to 82.6% and 73.0% respectively. The second commonest household latrine facility was improved ventilated latrine with 13.9% for Lawra and 20.0% for Nandom. None of the sampled households from the two districts used bucket as latrine facility. Septic tank, flash and piped sewage connections were least used by households. More than half of households in each of the districts at least washed their hands after visiting latrine facility. However more households in Nandom (41.7%) washed their hands with soap after visiting latrine facility than in Lawra (30.4%). Sanitation interventions identified were sanitation credit, sanitation market and CLTS.

With regards to the question of how willing members in the study community to pay for improved water and sanitation facilities, the study showed that community members expressed varied level of willingness to pay however, the level of affordability for most of them was rather on the low..

5.2 Conclusions

The study concluded that campaigns on WASH in the study area was successful as many households had knowledge about the existence of such campaigns. It also established that members of the communities understudied adopted most of the WASH recommended practices. Boreholes were found to be the commonest source of water for domestic use whiles pit latrine was the dominant latrine facility among households. The study also established that women in particular spend so much time at the water source due to overcrowding. It also established that there was frequent breakdown of the water facility due to pressure on the facility. Most water storage facilities were uncovered and were mostly earthen pots. Open defecation was found to

be still common among households despite the availability of latrine facilities. However, there were mostly no hand washing facility close to the latrine facilities. Though households were willing to pay for improved water and sanitation facilities, they were unable to afford.

5.3 Recommendations

In order to reduce the distance covered by households in carting water from source to the house, more bore holes should be constructed by the district assemblies. Some community members should be trained to build local capacity in the maintenance of water facilities especially bore holes. This will help reduce the effects of frequent breakdowns. The District Assemblies should make it a point to provide funds readily required for maintenance purposes as and when the need arises. The Assemblies should partner with the communities to explore improved and hygienic water storage methods in order to minimize the use of uncovered plastic containers which exposes water for contamination.

Although the WASH intervention succeeded in making many households adopt the use of pit latrine facilities, some households still resorted to open defecation. This research recommends intensification of sanitation and hygiene campaigns in the communities with special emphasis on washing of hands after visiting toilet facilities as less than 50.0% of sampled households from each of the districts washed their hands after visiting toilet. This in part could be as a result of lack of washing facilities by toilets. It is therefore recommended that the district assembly and the agencies engaged in the education should encourage and support households to have hand washing facility by the latrine facilities to enhance the practice of hand washing after use of latrine facility. Existing interventions such as sanitation credit, sanitation market which were found to be low must be intensified alongside the CLTS to enable households appreciate the need more to have access to improved facilities.

Projects or interventions that involve or require cost sharing between sponsors/implementing agencies and communities, should acknowledge and take into consideration the income levels of households as results of this research revealed that most households were willing to pay for improved water and sanitation facilities but could not afford as the use of safe drinking water and sanitation services have a cost component. The district assembly and all the major stakeholders in the water and sanitation sector must take up the percentage of the 5% cost component required of the beneficiary communities to foot as the study showed these beneficiary communities are poor and funding aspects of the projects could be a burden

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APPENDIX A

QUESTIONNAIRES ON AN ASSESSMENT WATER, SANITATION AND HYGIENE (WASH) INTERVENTIONS IN THE LAWRA AND NANDOM DISTRICTS IN THE UPPER WEST REGION.

SECTION 'A': DEMOGRAPHIC CHARACTERISTICS

1. District……
   …….
2. Community……
   ……..
3. Sex of respondent (a) Male( ) (b) Female( )
4. Age of respondent (a) 10 - 25 ( ) (b) 26 - 36 ( ) (c) 37- 47 ( )
   (d) 48 and above ( )
5. Level of educational (a) primary ( ) (b) secondary ( ) (c) college ( ) (d) no formal education ( )
   (e) Others
   (specify)……..……
   …….
6. What is your main occupation?
   Farming ( ) Pito brewing ( ) Butcher ( ) Dress making ( ) Student ( )
   Others (specify
   ……
   ……

SECTION 'B': HOUSEHOLD CHARACTERISTICS

7. What is the size of the household? (a) Men ( ) (b) women ( ) (c) children under five years ( )
8. Is the head of the household male ( ) or female ( )?
9. Does the household own land ( ) house ( ) personal property ( )?
10. Is the respondent the household head? Yes ( ) No ( ) I don't know ( )

SECTION 'C': SANITATION AND HYGIENE CAMPAIGNS

11. Are there any sanitation and hygiene campaigns in this community?

    Yes ( ) No ( ) Don't Know ( )

12. Which agencies/organizations are embarking upon these campaigns?

    District assembly ( ) Non-governmental organizations ( ) don't know ( )

    Other (specify)

    ……

    …….

13. What form do the campaigns take? Giving information on radio ( ) Given information at community gatherings ( )

    House to house visits ( ) others

    (specify)……

14. What do they usually tell you? Construct toilet facility ( )Wash hands after visiting toilet ( ) Wash hands after visiting toilet ( ) Keeps surrounding clean ( ) Keeps surroundings clean ( ) Observe good personal hygiene( )

    Others (specify)

……

……

15. Do they (agencies/organizations') establish any water projects in the community? Yes ( )
No ( ) Don't Know( )

16. If yes what are some of these projects? Piping ( ) Hand Dug Wells ( ) Dugout excavation ( )

Others

(specify)…….

17. Do they establish any sanitation project? Yes( ) No ( ) Don't know ( )

18. If yes what are some of these projects? Sanitation credit( ) Sanitation market ( ) CLTS ( )

Others (specify)

……

…….

19. Are the people using the facilities? Yes ( ) No ( ) Don't Know ( )

20. Are there any reasons why some people are not using the facilities? Yes ( ) No ( ) Don't know ( )

21. If yes, what are the reasons

……

……...

……

……

……

……

22. In your opinion, are the campaigns yielding any good result? Yes( ) No ( ) Don't Know ( )

23. If yes how? Please explain

……

….

……

……

24. How do members of the household usually obtain information on issues of water, good hygiene and sanitation practices?

From friends ( ) Radio ( ) Community gatherings ( )

Other

(specify)……

……..……..

25. What in your opinion is the major challenge facing the campaigns? Lack of involvement of community members( )

Lack of frequent visits by officers ( ) Lukewarm attitude on the part of some community members ( )

Others (specify)

……

……

26. What in your opinion needs to be added onto the campaigns? Credit facilities( )Frequent visits( )Rewards for adopters( )

Punishment for those who adamant to change ( ) Community members must be involve in the project ( )

Others (specify)

……

……..

SECTION 'D': WATER AND SANITATION SITUATION IN THE STUDY AREA.

27. What is the main source of drinking water for members of your household? Piped water into dwelling( ) Public tap/standpipe ( ) Borehole ( ) Protected dug well ( ) Unprotected dug well( ) Protected spring ( )

Unprotected spring ( ) Bottled water ( ) Dugout/Dam ( )

Others

(specify)……

……

28. What is the main source of water used by your household for other purposes, such as cooking and hand washing?

Piped water into dwelling ( ) Public tap/standpipe ( ) Borehole ( ) Protected dug well ( ) Unprotected dug well ( )

Others (specify)……..……

29. What is the distance from your house to the water source? 100 -500metres ( ) 500-100m ( ) 100-1500m ( )

Other (specify)

……

……..

30. How long does it take to go there, get water and come back? Number of minutes( ) Water on premises( ) Don't know( )

31. Who usually goes to this source to fetch water? Adult woman ( ) Adult man ( ) Female child (under 15years) ( )

Male child (under 15years) ( ) don't know

32. Do you treat your water in any way to make it safer to drink? Yes ( ) No ( )Don't Know ( )

33. If yes what do you usually do to the water to make it safer to drink? Boil( ) Chlorine ( ) Water filter ( )

Let it stand and settle ( )

Other

(specify)……

……

34. How do you usually store water in the household? ( ) Eathen pot ( ) Metal pot( ) Plastic container (covered) ( )

Plastic container (uncovered) ( )

Others

(specify)……

……

35. Is water at the source available year round? Yes ( ) No ( ) Don't know ( )

36. Are there problems with the water source? Yes ( ) No ( ) Don't know ( )

37. If yes what are these problems? Frequent break of the facility ( ) Long distance to the facility ( ) Too many people at the facility ( ) other (specify)

……

..

38. What kind of toilet facility does members of your household use? Flush ( ) Piped sewer system ( ) Septic tank ( ) Pit latrine ( ) Ventilated improved latrine ( ) Bucket ( ) other (specify)……..

39. Do you share this facility with other households? Yes ( ) No ( ) I don't know ( )

40. If yes how many households use this facility? 1( ) 2( ) 3 ( ) 4( ) others (specify) ……

41. Can any member of the public use this toilet? Yes( ) No ( ) I don't know ( )

42. Is there a hand washing facility by the toilet? Yes( ) No ( )I don't know ( )

43. Do you wash hands after visiting the toilet? Yes ( ) No ( ) I don't know ( )

44. What do you wash hands with after visiting the toilet? Water only ( ) Water and soap ( ) Water and ash

Others (specify)

…… …….

45. The last time (name of youngest child) passed stools, what was done to dispose of the stools? Child use toilet/latrine( )

Put/rinsed into toilet or latrine ( ) Put/rinsed into drain or ditch ( ) Thrown into garbage ( ) Left in the open ( )

Other

(specify)…… ……..

46. Do you practice open defecation? (yes) (no)

47. Does the Household Have a Washroom Facility?

48. Is the washroom facility floored?

SECTION 'E': Willingness and Ability of inhabitants to pay for improved clean water and sanitation facility.

49. What is the level of income for the household per month (GH¢ ? 0 – 25 ( ) 26-40 ( )41-50( ) (51 and above)

Others (specify)

……

……

50. What is the expenditure pattern of the household per month (GH¢)? 0-25 ( ) 26 – 40( ) 41 – 50 ( )

Others (specify)

……

…….

51. Does the household incur any cost in the collection and transportation of water to the household? Yes ( ) No ( ) don't know ( ).

52. If yes how much does the household spend on collection and transportation of water per month (GH¢)? 0 – 5( )6 – 10 ( )

10 – 15( ). Others (specify)

……

53. Whose responsibility is it to provide clean drinking water to inhabitants in the district?

District assemblies( )

Non-governmental organizations ( ) Private individuals ( ) Shared responsibility

Other

(specific)……

……

54. Do you agree that the provision of water should be privatized? Yes ( ) No ( ) Don't know( )

55. Households are willing to pay for improved drinking water and sanitation facilities strongly agree ( ) agree ( ) strongly disagree ( ) disagree

56. Within what range can the household afford to pay for improved (clean) drinking water and sanitation facilities? 50 to 59 Ghana cedis ( ) 100 to 190 Ghana cedis( ) 200 to 290 Ghana cedis 300 Ghana cedis and above

57. Does the household do savings out of the earnings? Yes ( ) No ( ) Don't know

58. Do you at times borrow? No ( ) Yes ( ) Don't know( )

APPENDIX B

INTERVIEW GUIDE FOR DISTRICT ASSEMBLY OFFICERS

1. How would information and attitude determine adoption of water, sanitation and hygiene recommended practices?

   ……

   ……

2. How can community participation influence adoption of water, sanitation and hygiene practices?

   ……

   ……

3. What are the commonly used water sources in the community?

   …….....

   .....

4. In your opinion how safe are these sources of water for drinking?

   ……

   ……

5. In your opinion, how best are the community members informed about the risks associated with WASH related diseases?

   ……

   ……

Thank you for your cooperation