

**ACCESS TO RURAL WATER AND ITS EFFECTS ON GIRL CHILD
EDUCATION: A CASE STUDY OF BOTI AREA IN THE YILO KROBO
DISTRICT**

BY

MOHAMMED BEN ABDALLAH

(10185188)



**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF
GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF MA DEVELOPMENT STUDIES DEGREE**

JULY, 2013

DECLARATION

I, **Mohammed Ben Abdallah**, hereby declare that this thesis is the result of my research and that except for reference to other related works which have been properly acknowledged, the work has neither in part nor in whole been presented elsewhere for the award of another degree.

.....
Mohammed Ben Abdallah
(Student)



.....
Date

.....
Prof. Ellen Bortei-Doku Aryeetey
(Supervisor)

.....
Date

DEDICATON

I dedicate this work firstly to the Al-mighty Allah, then to my aunt Hasiyat Yakub of blessed memory.



ACKNOWLEDGEMENTS

My utmost gratitude goes to my supervisor, Prof. Ellen Bortei-Doku Aryeetey for her patience and the motherly role she played in getting this work done. I simply could not have reached this far but for the guidance and support I received from my supervisor. I also extend my sincere appreciation to lecturers and some administrative staffs of the Institute of Statistical, Social and Economic Research (ISSER) for their assistance.

To the authorities of Ortekpolu Presby, Huhunya Presby and Boti R/C JHS, I express my gratitude for the immense contribution they offered me during the data collection phase of this research. Achieving this work could not have been realized without their assistance.

Many thanks goes to colleagues, friends and all well-wishers for their prayers which I believe, brought me this far. Without their prayers, the entire exercise would not have been practically possible.

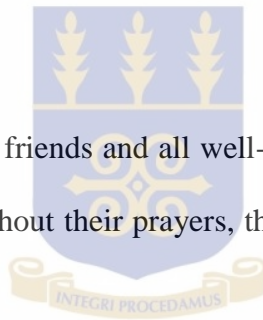


TABLE OF CONTENTS

Content	Page
DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
ABSTRACT	xii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.2 Problem Statement	4
1.3 Research Objectives	6
1.4 Research Questions	7
1.5 Significance of the Study	7
1.6 Organisation of the Study	8
CHAPTER TWO: LITERATURE REVIEW	9
2.1 Introduction	9
2.2 General overview of water supply system	9
2.3 Water Resources of Ghana	10
2.4. Sources of Water Supply	10
2.4.1 Urban Water Sources	10
2.4.2 Rural Water Sources	10
2.5 Access to Water	11

2.6 Seasonal Variations and Access to Water in Rural Communities	13
2.7 Access to Water and Children Educational Status	14
2.8 Obstacle to Children Education	17
2.9 Household Income and Financial Circumstances	17
2.10: Socio-Cultural Attitudes towards the Education of Girls	18
2.11 Explaining Birthorder Effects on the Education of the Girl Child	19
2.12 Model of Intra-household Allocation.....	20
2.13 Conclusion	22
2.14: Conceptual framework.....	23
CHAPTER THREE: METHODOLOGY	26
3.0 Introduction	26
3.1 Research Design.....	26
3.2 Study Population and Sample Size	27
3.2.1 Sample Size and Selection Procedure	27
3.3 Sampling Procedure	29
3.4 Sources of Data Collection.....	29
3.5 Methods of Data Collection	30
3.5.1 Data Collection Instruments.....	30
3.6 Data Presentation and Analysis.....	31
3.7 Ethical Consideration	31
3.8 Profile of the Study Area.....	31
3.8.1 Employment and Health.....	31
3.8.2 Water Sources and Access	32
3.8.3 Pipe Borne: Bore-Hole Water	32
3.8.4 Wells	33
3.8.5 Surface Water.....	33

3.8.6 Educational facilities in the district.....	33
3.9 Justification for the Study Area.....	34
CHAPTER FOUR: FINDINGS AND DISCUSSION	36
4.1 Introduction	36
4.2 Bio-social characteristics of school children.....	37
4.3: Potable Water Supply Systems Characteristics and their Effects on Girls’ Participation in School	43
4.3.1 Household Main Source of Water and its Effects on School Participation	43
4.3.2 Schools’ main source of water	49
4.3.3 Water flow pattern and its Effect on School Participation in Boti Area.....	51
4.4 The Means of Water Supply to the Household and Girls Participation in School.....	51
4.4.1 Effect of Fetching Water before Going to School on Pupils in Boti Area.....	56
4.4.2 Home Work.....	58
4.5 Domestic Water Use Patterns in the Household and Girls’ Participation in School	60
4.6 Methods of Water Storage in the Household and School Participation.....	60
4.7 Responses from Teachers.....	63
4.8 Water Supply Systems Characteristics (distance to water supply points, water user fee, and pattern of flow, operating times, and management structure).....	64
CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS	69
5.1. Introduction	69
5.2. Summary of Findings.....	70
5.2.1 Potable Water Supply Systems Characteristics and their Effects on Girls’ Participation in School	70
5.2.2 Means of Water Supply to Households and Girls’ Participation in School.....	70
5.2.3 Domestic Water Use Patterns in the Household and Girls Participation in School...	70

5.2.4 Methods of Water Storage in the Household and Girls Participation in School.....	71
5.3 Conclusion	71
REFERENCES.....	73
APPENDIX.....	81

LIST OF TABLES

Table 1.1: Sources of drinking water in Ghana	5
Table 4.1: Age of Respondents	38
Table 4.2: Birth Order of Respondents	38
Table 4.3: Birth Order and Responsibility for Fetching Water among Pupils in Boti Area	39
Table 4.4: The Size of Households to which Children belong	40
Table 4.5: Proportion of Children who live with Parents	41
Table: 4.6 Occupations of Both Parents of the Respondents	41
Table 4.7: Level of Education of Respondent's Parents	42
Table 4.8: Household Main Source of Water and School Participation among Pupils in Boti	44
Table 4.9 Effects of Fetching Water on Punctuality of Pupils in Boti Area	45
Table 4.10 Effects of Fetching Water on School Attendance among Pupils in Boti Area	45
Table 4.11 Effects of Fetching Water on the Completion of Assignments among Pupils in Boti	46
Table 4.12 Effects of Fetching Water on Examination Outcome of Pupils in Boti Area	48
Table 4.13: Schools Main Source of Water and its Effect on School Participation	50
Table 4.14: Time Spent on Round-trip to Water Source and School Participation	50
Table 4.15: Hours of Water Flow and School Participation in Boti Area	52
Table 4.16 Number of Bowl of Water Fetched in a Day and Punctuality in School	52
Table 4.17: Average Number of Minutes Spent in Fetching Water in a Day	53
Table 4.18 Household Member(s) who Spend the Most Time in Fetching Water	54
Table 4.19 Time of Fetching Water for the Household and School Participation	54

Table: 4.20 Negative Impact(s) of Fetching Water before Going to School	57
Table 4.21 Performance in the Last Maths Exam and Fetching Water among Pupils	58
Table 4.22 Performance in the Last English Subjects and Water Fetching among Pupils	59
Table 4.23: Length of Water Storage and its Effect on School Participation	62
Table 4.24: Description of Punctuality at School among Schools in Boti Area	64
Table 4.25: Description of School Attendance and Water Fetching	65
Table 4.26: Rainy Season and School Participation	66
Table 4.27: What Accounts for Punctuality in less than Four Days in the Week	67
Table 4.28: School closing time and fetching Water	67
Table 4.29: What Respondents do often after School	68

LIST OF FIGURES

Figure 4.1 Time of Shutting Down the Water Facility and School Participation	55
Figure 4.2 Reasons for Spending much Time in Fetching Water for Home	56
Figure 4.3 Fetching Water for the Home before School and Respondents Education	57
Figure 4.4 Type of Water Storage Facility	61
Figure 4.5 Length of Stored Water among Households in Boti Area	62

LIST OF ABBREVIATIONS

CWSA -	Community Water and Sanitation Agency
FCUBE -	Free Compulsory Basic Education
ISSER -	Institute of Statistical, Social and Economic Research
JHS -	Junior High School
LEAP -	Livelihood Empowerment Adjustment Programme
R/C -	Roman Catholic
SPSS -	Statistical Package for Social Sciences
UNDP -	United Nations Development Programme
UNESCO -	United Nation Educational Science and Cultural Organisation
UNICEF -	United Nations Children Fund
WATSAN -	Water and Sanitation committee
WHO -	World Health Organisation

ABSTRACT

A number of factors are responsible for the basic educational progress of the girl-child in rural Ghana. Among these factors can be access to potable water by households and basic schools. Lack of potable water or its inaccessibility is likely to hinder the education of the girl-child.

The main objective of the study was to assess the effect of access to rural water on girl child education in the Yilo Krobo area, using 3 communities in Boti Area. The researcher tried to assess some characteristics of water supply systems in relation to girl-child school participation i.e. attendance, punctuality and completion of assignment. The study adopted a variety of sampling techniques including a systematic random sampling in selecting a sample size of 90 girls from JHS 1, 2 and 3.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Water is a basic and essential resource for survival and to secure the good health of a population. It is crucial for poverty alleviation and sustainable development of every country. However, people around the globe face the problem of water scarcity. At the end of 2002, about 1.1 billion people or 18% of the world's population lacked access to safe drinking water. The situation in a decade has seen very little improvement with 783 million people in recent times living without access to clean drinking water (UN, 2013). At the Millennium Summit in 2000, Heads of State pledged to halve the proportion of people who are unable to reach or to afford safe drinking water by the year 2015 (UN, 2004). For instance, in developing countries, an estimated 700 million people in 43 countries live with water scarcity, of this, majority are in Sub-Saharan Africa. The Region represents one-quarter of the global population that faces water scarcity problem (UNDP, 2006). Despite the Millennium Development Goals (MDGs) target of "halving the proportion of people without access to safe drinking water and sanitation by 2015", it is estimated that Sub-Saharan Africa will only reach the MDGs water target by 2040 (Sutton, 2008). Annually, about 4% of the total global disease burden and 2.2 million deaths in women and children in the global south are attributed to the lack of clean and adequate water supply (WHO/UNICEF, 2008). The scarcity of water has forced people around Sub-Saharan Africa to use unsafe water for drinking and other domestic uses (WHO, 2009).

A study conducted by the Ghana Integrity Initiative in 2009 indicates that Ghana needs

1.49

billion dollars for the expansion of water supply to meet national demand by 2020. The study showed that the country required 811 million dollars to meet the Millennium Development Goals (MDGs) on water in 2015. Access to clean water in Ghana is a severe problem, partly due to the neglect of the sector until the 1990s, the low tariffs and the economic inefficiencies experienced in the sector.

In schools and in some public places, there is a popular slogan which states 'water is life' and many schools of thought have argued that the slogan should rather be replaced with 'clean water is life'. This is because every day, many people are dying of water-borne diseases. This emphasizes the important role access to clean water plays in the continuity of the human race.

As water is essential to life, education is an important sector for the development of any country. It is said "Education is a human right and a key factor to reducing poverty and child labour and promoting democracy, peace, tolerance and development" (UNICEF, 2009, p.33). Specifically, it is a human right as guaranteed on the rights of the child. This convention is among the most widely ratified international treaties in the world today.

Education is a human right and an essential tool for achieving the goals of equality, development and peace (UN, 1995). Yet, 'Basic Education for All' is still far from being a reality for many girls, particularly those in the rural communities. In these communities, focus on education is compromised as children have to go long distances in search of water before going to school. It is uncommon for a child to go to school on a regular basis because many factors come to play which hinders school attendance hence their

educational progress. For example, factors such as financial difficulties and tradition (cultural practices) often hinder their access to, and progress in education.

In addition, most households in the study area, especially the 'girl-child' are often engaged in house chores in addition to fetching water. This tends to hinder their progress performance in their various schools.

The Republic of Ghana ratified the Convention on the Rights of a Child and made basic education a constitutional right. The 1992 Constitution of the Republic guarantees Free and Compulsory Basic Education to every child of school going age irrespective of their gender, religion, ethnicity or geographical location. Article 25(i) (a) of the 1992 constitution states that; "basic education shall be free, compulsory and available to all". In 1995, the Free Compulsory Universal Basic Education (FCUBE) for all children was launched. This was a critical step toward achieving the global goals of education for all. Besides, children's active participation in education is a measure of the MDGs.

Studies have shown that there is a positive correlation between education and development because the more a population is educated the greater it contributes to the prosperity of a nation (UNESCO, 2003). Education does not only have a very strong impact on the ability of a population to raise its economy and living standards, but it also has an extensive impact on the physical, social and mental wellbeing of a population.

The question of access to potable water and child education also touches on sustainable development. The Millennium Development Goal 2 of target 2A and Goal 7 of target 7C offer a good illustration of how important water and education is for

sustainable development (UNDP, 2010). Therefore, any country which is not keen on ensuring access to potable water and basic education for all cannot realize the goal of eradicating poverty and achieving a sustainable development.

Compared to developed countries, developing countries are still facing difficulties in accessing potable water and this is likely to disrupt the education of children due to the burden of fetching water for their households. Therefore, access to potable water and basic education for children are mutually dependent.

1.2 Problem Statement

Educational empowerments of the girl-child have in recent decades been placed on top of many country's developmental agenda including Ghana. Access to potable water can enhance the progress of girls in school since they are likely to spend lesser time and shorter distances to collect water for their households and their schools in some cases. Girls in rural Ghana particularly Boti area could have their education hindered because many of them do not have access to potable water in their communities. According to UNDP (2006), in the world, almost 2 million children die each year because they do not have access to potable water. Furthermore, millions of women and children especially girl child are forced to spend long hours each day fetching and hauling water. Many Sub-Saharan African countries like Ghana are worst hit by water scarcity. Reserves of groundwater, major rivers, lakes, and large volumes of rainfall are waiting to be harnessed (UNDP, 2006). This reminds us of what is stated in the same report; 'globally there is more than enough water to go around...' (UNDP, 2006). However, the mismatch between population and water, time variability in rainfall, and, in countries like Ghana and limited infrastructure for storage are some factors which have limit the accessibility of water to all citizens.

Table 1.1: Sources of drinking water in Ghana

Improved water source	Unimproved water source
Household connection	Unprotected well
Public standpipe	Unprotected spring
Borehole	River or ponds
Protected hand dug	Vendor provided water

Source: JMP, 2008.

Also, in Sub-Saharan Africa, about 400 million people live without access to safe or potable water. Majority of them are women and children living in rural households (Sutton, 2008). An estimated 10,000 people die every day from water related diseases, and thousands more suffer from a range of debilitating illnesses (UNESCO, 2009).

Although Boti Falls happens to be one of the tourist attractions for Ghana, people within the catchment area lack improved water supply services and this hinders their productive endeavours such as education, empowerment activities and leisure. The task of water provision for households makes the participation of children in education and other cultural engagements often compromised (Panda, 2007; DFID, 1998).

Apart from scarcity of water, there is a problem of discrimination against the girl-child's access to education. This persists in many areas owing to traditional practices, early marriage and pregnancies which hinder many girls' efforts to stay in school. In some communities, lack of water serves as a major factor in deterring girls from continuing their education, particularly after puberty. Though all children are exposed to the dangers posed by scarce water, girls come under peculiar pressures during menstruation (Chitrakar, 2005). Girls have a sense of being unclean when there is little

clean water to wash themselves and this can lead them to stay away from school. Despite many links between water and school attendance, there have been few studies on the subject in Ghana. Thus, this study seeks to assess the effects of the poor access to potable water on girl child education. The study intends to assess the effects on the educational behaviour of girls in communities in relation to access to clean water. Communities with poor access to clean water in the Boti area in the Yilo Krobo District of the Eastern Region were the areas under study.

1.3 Research Objectives

General objective

The study generally aims at investigating the relationship between access to potable water and girl's participation in school. The research sought to answer the following specific objectives:

- To examine the characteristics of rural water supply systems and their effects on school participation of girls. (This includes, distance to water supply points, water user fee, and pattern of flow, operating times, and management structure).
- To examine the means of water supply to the household and girls participation in school (attendance, punctuality, fatigue/alertness, completion of assignments).
- Determine domestic water use patterns in the household and girls participation in school (attendance, punctuality, fatigue, completion of assignments).
- To find out methods of water storage in the household and girls participation in school (Attendance, Punctuality, Fatigue, Completion of assignments).
- Make appropriate recommendations based on findings as to how governments and other stake-holders could improve access to potable water and girl-child participation in school.

1.4 Research Questions

The following research questions have been set to provide parameters for the study and to guide the study's objectives:

What are characteristics of potable water systems (Types of system, Distance to water supply points, Water user fee, Pattern of flow, Operating times, and management structure) and what effect do they have on girls participation in school?

- i. What are the effects of means of water supply to household on female participation in school (Attendance, Punctuality, Fatigue/ Alertness, Completion of assignments)?
- ii. Can the domestic water use patterns in the household affect girl-child participation in School (Attendance, Punctuality, Fatigue, and Completion of assignments)?
- iii. In what ways can the methods of water storage in the household affect girls' participation in school (Attendance, Punctuality, Fatigue, and Completion of assignments)?

1.5 Significance of the Study

In most rural communities in Ghana, women and children are commonly seen as the primary resource collectors of a family. This study therefore argues that, improved and reliable access to potable or safe water sources will help increase the school progress of girls in general. More importantly, a number of studies have identified financial difficulties and gender biases as the main determinants of families' decisions on schooling; few researches have linked access to rural water and girl child education. This study therefore in filling the gap in academic work; It is expected that it will make an important contribution to poverty reduction in the District. This will also help in

achieving the desired development in most of the rural communities and the whole country at large.

1.6 Organisation of the Study

The study was organized into five chapters.

Chapter one discusses the background to the study. It also discusses the statement of the problem, research questions and objectives, and the organisation of the study. Chapter two is the literature review. The chapter reviewed the relevant and available literature on the topic under investigation. It looked into issues of water supply in Ghana and the educational attainment of children and also drew examples from other countries on rural water supply. The chapter concluded with the conceptual framework that better explained the study's objectives. Chapter three was divided into two sections. Section one of the chapter discussed the research methodology employed for the study. The research design, population, sample size, sampling techniques, and sources of data were also discussed. The section two of the chapter presents the profile of the study area with focus on the water supply systems in the rural communities of the Yilo Krobo District. That is, linking the profile of the District to the phenomenon under investigation. Chapter four also presents the empirical findings, results and analysis of the situation in the study area based on the research questions and objectives of the study. Chapter five summarised the major findings, draws conclusions based on the results, and makes recommendations for policymakers as well as aid further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers a review of relevant literature pertinent to this study. The chapter looks at the General overview of water supply systems; Water Resources of Ghana; Sources of Water Supply: Urban Water Sources; Rural Water Sources; Access to water; Seasonal Variations and Access to Water in Rural Communities; Access to Water and Children Educational Status; Obstacle to Children Education Household Income and Financial Circumstances; Socio-Cultural, Attitudes towards girls education Explaining birth order effects on the education of the girl child and Model of intra-house allocation. It also presents the conceptual framework of the study for further examination of variables.

2.2 General overview of water supply system

UNESCO (2006) asserts that, water is the source of life and it is critical for the sustenance of human life. Every person needs 20 to 50 litres of potable water a day for their basic needs such as drinking, cooking and cleaning, but more than one in six people does not have access to such an amount of potable water. Africa is endowed with abundant water resources but generally lacks adequate supply. Africa has the lowest total water supply coverage of any region, with only 62 percent of the population having access to improved water supply. According to the United Nations MDG report (2011), progress has been good on increasing access to clean drinking water and the global target of access to potable water is likely to be surpassed by 2015. However, rural areas are lagging behind, and more than one in ten people may still not have full access to safe drinking water by the 2015 deadline. In other parts of the world, such as east and south-east Asia, they have already achieved the target with varying progress.

Sub-Saharan Africa remains far behind with only 60% coverage in 2008 despite having almost doubled the number of people using an improved water source between 1990 and 2008.

2.3 Water Resources of Ghana

Ghana is endowed with numerous water resources yet, water demand far outstrips supply just as is the case in most parts of sub-Saharan Africa. Karikari (2000) noted that the main sources of water for households are pipe borne water supply (treated water sources) or untreated water from boreholes (groundwater sources), shallow boreholes, wells, and ponds, springs, lakes, rivers, and streams.

2.4. Sources of Water Supply

2.4.1 Urban Water Sources

Urban communities in Ghana take the larger share of their water supply from rivers at dams and diversion structures which need to be treated to meet health standards. Surface-water resources can probably serve all urban needs for the near future through corresponding programmes of development and conservation (Karikari, 2000). Private individuals, who can afford, rely much on groundwater supplies through either hand-dug wells (with or without pumps or boreholes fitted with pumps).

2.4.2 Rural Water Sources

In most developing countries, especially in the rural areas, the people are self-responsible for collecting water. Most rural communities in Ghana have traditionally relied on surface and groundwater sources for their water supply needs and some have a combination of protected and unprotected water sources. According to Gyau-Boakye (2001), the surface water sources used by these communities include dug-wells, ponds, dugouts, impoundments from dams, ephemeral streams and rainwater harvesting from

roofs whilst the groundwater supplies are obtained from hand-dug wells with or without hand pumps, boreholes fitted with hand pumps, and springs. According to Gyau-Boakye and Dapaah-Siakwan, (1999), the rural communities in Ghana can be categorized into two basic groups: that is those that have benefited from the official rural water supply schemes and those that have not. Even for those rural communities which have benefited, there is sometimes the problem of reliability of the existing systems. This problem sometimes compels the beneficiary communities to return to their traditional sources of water supply much in the same way as those which have not benefited at all. These traditional systems are often insufficient both in quantity and quality. Karikari (2000) indicated that the quality of groundwater in Ghana is usually good and accounts for a large share of the potable-water supply in rural communities, except in some few areas where the water contains iron, manganese and fluoride deposits.

2.5 Access to Water

The definition of “access” to water has been a challenged proposition and will be in the years to come because of the increasing international priority on community development. In 1981, WHO attempted to provide an earliest official definition to ‘access to water’ (WHO, 1981). It proposes metrics to measure progress towards improving health for all citizens by 2000. The organization suggested as a useful indicator the presence of a “safe and adequate” water source within a given walking time, though no specific walking time thresholds were recommended. This emphasis on collection time was supported by a case study from Mozambique (Cairncross and Cliff 1987), which found out that, following the construction of a new water system in one village and a subsequent reduction in collection times from 5 hours to 10 minutes, water consumption in the village

increased by a factor of 2.7 and incidence of trachoma dropped to half compared to that of a neighbouring community.

Gadgil (1998) describes nine different sets of standards for measuring access to water adopted by various developing nations during the 1990s. Some measured walking time between households and water sources (with access ranging from 5 to 30 minutes, each way), while others measured the linear distance (ranging from 50 m to 2 km, each way) between the two. International development agencies attempted to standardize the indicator, though their own definitions were often problematic. One early effort measured population with access to safe drinking water as the, “proportion of population with access to an improved water source in a dwelling or located within a convenient distance from the user's dwelling” (UN Commission on Sustainable Development 2001: 89). While “convenient distance” was then defined for urban areas as no more than 200 m, in rural areas it was simply described as a distance such that people didn't need to spend, “a disproportionate part of the day fetching water” (Cairncross 1990). The roots of the 1 km definition of access to water was adopted by WHO and UNDP in the 1980s, and is now used to measure progress on the MDG for access to water. It also appears to be in a series of independent studies synthesized by Cairncross (1990). Another critique specific to access to safe water target of the MDGs was from the perspective of a national-level case study in Kazakhstan. With regards to the definition of access itself, O'Hara et al, (2008) write: “the emphasis on distance to source is an issue and there is a need to re-evaluate its use. Clearly no one should have to travel far for their water, but while a supply 1,000m away may not be a major issue for people in some parts of the world, for people living in areas where the climate is extreme, for example very cold and inhospitable, or where the terrain is difficult, going a 1,000m

could be life threatening. As such the maximum distance to source needs to reflect the physical conditions of a given region or country” (O’Hara et al, 2008; p.20). Simpson (2006) made a fundamental point on access to water that “local geography matters hugely. Identical distances from water points can mean very different things in practical terms if there are, say, extreme climatic conditions or dangerous social conditions.

Simpson (2006) further posits that, distance does not measure factors as queuing time which depends on population density (p102). Measuring a mere distance or time does not adequately describe whether or not there exist the conditions necessary for that individual to collect a sufficient quantity of water at a minimal cost of human energy.

2.6 Seasonal Variations and Access to Water in Rural Communities

Over one billion people lack access to clean safe water worldwide (Bresline, 2007; NAS, 2009). In sub-Saharan Africa alone, up to 300 million rural people have no access to safe water supplies. Without safe water near dwelling places, the health and livelihood of families can be severely affected (United Nations, 2000). Groundwater includes all water found beneath the earth’s surface in a saturated zone of the aquifer (Todd, 1980). Groundwater can be abstracted by means of hand dug wells and boreholes at various depths. A large percentage of the world population depends on groundwater as their main source of drinking water (Shah, 2004). This is because it is accessible anywhere; it is less capital intensive to develop and maintain; it is less susceptible to pollution and seasonal fluctuations and of natural good quality (Bresline, 2007; Habila, 2005).

2.7 Access to Water and Children Educational Status

The Millennium Development Goals measure ‘access to improved drinking water’ using an indicator that defines access as the presence of an improved water source within 1 kilometre of a person’s dwelling. This purely linear measurement has been significantly criticized for its shortcomings as explained earlier.

One of the key commitments explained in the MDGs is to, “halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation” (United Nations 2008a). The lack of access to adequate supplies of safe drinking water plays a prominent role in the perpetuation of poverty throughout the developing world.

The health, economic, and social detriments associated with this lack of access are well-documented (Howard and Bartram 2003; WHO/UNICEF 2004; Bartram et al. 2005; UNDP 2006), and include disproportionate incidences of debilitating water-borne disease, loss of economic productivity, and reduced opportunities for education, especially among children and particularly young girls.

According to Hutton and Bartram (2008), access to water is viewed as a basic human right, and its universal provision is a part of efforts to reduce global poverty and develop sustainable administration of global water resources (Jolly 2004). Meeting the MDGs for access to water is closely linked with potential success in achieving several other MDGs targets, including improved education, gender equality children school enrolment, particularly for girls.

Fetching water is an exceptionally time-consuming task. The amount of time and energy women and children spend on this chore limits their chances of obtaining basic education, becoming more economically useful and even relaxing and socializing at home (Charmes 2006; Blackden and Wodon 2006).

Furthermore, the physical effort required in carrying heavy containers of water over distance repeatedly has a substantial negative impact on a child's physiological and nutritional health (Ivens 2008). The recent definition of access accepted by the World Health Organization (WHO), the United Nations Development Programme (UNDP) and other intergovernmental agencies requires an "improved" water source (such as a household connection, public standpipe, borehole, protected dug well, protected spring or rainwater collection system) providing at least 20 litres of water per person, daily, within a kilometre of one's dwelling (Ivens 2008). The indicators explicitly assume that people who must carry water up to a km have nonetheless attained an important human development threshold which deserves critical assessment.

According to Hutton & Haller (2004), one of the major benefits of potable water is the time saving associated with better access. Time savings occur due to, for example, the relocation of a well or borehole to a site closer to user communities, the installation of piped water supply to households, closer access to latrines and shorter waiting times at public latrines. These time savings translate into either increased production, improved education levels or more leisure time. WHO figures asserts that improved water supply reduces diarrhoea morbidity by 6 percent to 25 percent (WHO, 2009). Thus, the improvement on water supply has a direct and concrete impact on health. As Hutton, G., et al, (2007) explains, the occurrence of diarrhoea diseases caused by unsafe drinking

water would be reduced if improvements were made in water and sanitation. According to the World Water Development Report (2009), the upgrading of water supply and sanitation services can improve education, allowing more children to attend school instead of spending hours each day collecting water.

Tay (2005c) outlines a summary of facts and evidence of the impacts of rural water supply on education in Ghana as follows:

- ❖ According to the Ghana Demographic and Health Survey (2008), the proportion of the Ghanaian population that have access to potable water has increased from 56% in 1990 to 83.8% in 2008 (MDGs Report, 2011)
- ❖ Children and Health - most childhood diseases that prevent children from attending school are linked to the use of unsafe water, inadequate sanitation and poor hygiene.
- ❖ School Attendance - children's attendance and retention rates at school are higher in communities where water and sanitation facilities with proper operation and maintenance are available; closeness of the facilities to homes is also a factor. In most of our rural communities in Ghana, fetching water early in the morning before school is a common chore. Culturally, this is usually done by girls and in some cases they have to walk more than 2km to get water.
- ❖ Teachers – They are more willing to teach in rural schools where adequate water supply system(s) and sanitation facilities are available. The absence of basic water and sanitation facilities in rural areas is a serious disincentive for teachers to accept rural postings. Adequate access to safe water means that there is adequate water for domestic use as well as in schools.
- ❖ Performance at school - children's performance in school is greatly improved when there is close access to potable water. Also, incidences of water related

diseases are reduced and as a result it reduces the frequency of worm infestation among school going children. This consequently prevents anaemia and stunted mental growth which are some of the major causes of poor performance amongst children in school.

2.8 Obstacle to Children Education

The education of girls plays a vital role in the development of a nation. There are various barriers to girl-child education which prevents them from being given an equal opportunity as their male counterparts. MDGs Report, (2011) suggests that a range of interrelated demand and supply factors interact which serves as obstacles to girl-child education. Some of the factors which serve as obstacles to girl-child education includes the following: household income and financial circumstances; socio-cultural, attitudes and behaviour and traditional beliefs.

2.9 Household Income and Financial Circumstances

According to Croft (2002), household income is influenced by when children start school, how often they attend, whether both the girl child and boy child are sent to school, and also when they drop out (Croft, 2002: 87-88). Porteus et al, (2000: 10), describing the exclusion of the girl child from education, paints poverty as the most common primary contributory factor for their exclusion. Hunter and May (2003: 5) call poverty, ‘a plausible explanation of school disruption’ for the girl child. Dachi and Garrett (2003:36) in a series of questions to parents/guardians on the financial circumstances surrounding children’s school enrolment, indicated that the main barrier to sending children to school was financial and the inability of parents/guardians to pay.

Brown and Park's (2002) indicated that in rural areas the poor and credit constrained parent were three times more likely to have their children drop out of primary school than the rich. The girl-child from poorer backgrounds has a lot of pressure on her to withdraw as she gets older, particularly as the opportunity cost of their time increases. This is because according to Chugh(2004: 86) the girl child may be called on to supplement the household's income, either through wage-earning employment or taking on additional tasks to free up other household members for work.

2.10 Socio-Cultural Attitudes towards the Education of Girls

A research carried out by UNESCO/UNICEF (2005) on socio-cultural attitudes and behaviour towards girl child education in some rural communities in Ghana have shown a negative relationship between social attitudes, cultural practices and female participation in education. This is because parents usually prefer to educate their boys over girls. As indicated by participant in the UNESCO/UNICEF online discussion for the review of Beijing, "It is generally believed that the family name is preserved in the lineage of the male child, hence the male child should be better equipped than the female in order to get a good job and provide for the family. It is believed that women are mainly for the purpose of reproduction and domestic activity, hence (there is) no need to educate them, as this is a waste of resources".

According to UNESCO/UNICEF (2005), in some Ghanaian communities, most fathers believe that the girl-child will eventually marry and be another persons' family member, hence it is of no use sending their girl-child to school. In addition to this, some believe that sending the girl-child to school exposes her and civilizing her may not make her submissive to men. Others also think a woman's job is in the home and she does not need

to go to school to learn it. Thus if parents do not think it necessary or important to educate their female children, they will be more inclined to keeping their daughters at home where she can help with the house chores. To them this will be a way of saving money.

In Pryor and Ampiah's (2003) research on schooling in a Ghanaian village, talks about education being regarded as a 'relative luxury', since it is perceived as a luxury, only male children who are seen as important members of the family are sent. In some communities, as indicated by the researcher, the problem of enrolment starts in the early stages (as in early childcare). Parents enrol boys and encourage them to study hard, while girls are encouraged to learn domestic chores since they will come in handy when they become mothers or wives. Pryor and Ampiah's (2003) findings also revealed that, the attitude of school staff towards girl child education cannot go unmentioned. In most cases school staff viewed domestic sciences such as home economics and home crafts as crucial skills for girls, over subjects such as English and math's (Davison and Kanyuka 1992). In some cases boys are reported to have higher capabilities for learning than girls hence are more inclined to favour boys than girls. This factor continues to weaken the confidence of most girls. This lack of confidence causes them to under achieve and thus drop out eventually.

2.11 Explaining Birthorder Effects on the Education of the Girl Child

Researchers have suggested a number of potential reasons for the existence of birth order effects. According to Ejernæs and Portner (2002), there are three categories of birth order effects. These are constraints, household environment and biological effects. All these three theories explain the position of the girl-child in the family make-up and how this could impact on her education as a result of the additional responsibilities she may have to bear.

Explaining this from two different dimensions, Birdsall (1991) emphasize that, in a situation where the girl happens to be the first born in the family, she bears the extra responsibility of assisting the mother in other household duties and taking care of the siblings; particularly fetching of water. Explaining further, Birdsall (1991) adds that much more duties would be placed on the girl-child where she happens to be the only female child in a large family as is the case in most developing countries. In any of the above scenarios, the girl's education would be negatively impacted.

2.12 Model of Intra-household Allocation

Despite the attention that intra-household allocation has received in the literature, there has been little attempt at integrating models of fertility with models of intra-household allocation (Behrman 1997, p. 128). This is especially problematic when analysing the relation between intra household allocation and birth order since birth order is the realisation of the parents' fertility decisions.

Research conducted by UNICEF (2010) in relation to model of intra-household allocation shows that the burden of fetching drinking water from outdoor sources falls disproportionately on girls and women. Surveys from 45 developing countries show that in almost two-thirds of households without a drinking water source on the premises, it is women and girls who collect water. Twelve percent of households where children collect water, girls are twice more likely to be responsible for fetching water than boys

UNICEF (2010) study further revealed that in the developing countries collecting water takes longer than 30 minutes for more than a quarter of the population. This considerably reduces the time women and girls have available for other activities such as childcare, income generation and school attendance as more girls often have to walk long distances to fetch water and firewood in the morning. After such an arduous chore, they

may arrive late and tired at school. Being 'needed at home' is a major reason why children, especially girls from poor families, drop out of school. Providing water closer to homes makes more time available to Females, thereby boosting their school attendance and performance.

Similar study in Tanzania showed a 12 percent increase in school attendance when water was available within 15 minutes compared to more than half an hour away. When girls enter puberty they are often forced to skip classes or drop out of school. This is because there are no separate toilets for them; simply put, they have no or minimum privacy. Lack of separate and decent sanitation and washing facilities discourages girls who are menstruating from attending full time, often adding up to a significant proportion of school days missed.

According to UNICEF (2010), the availability of water, hygiene and sanitation services were seen as important to female participation in schools. School attendance, educational performance by girls and teacher recruitment and retention rates are adversely affected where there are inadequate water and sanitation facilities.

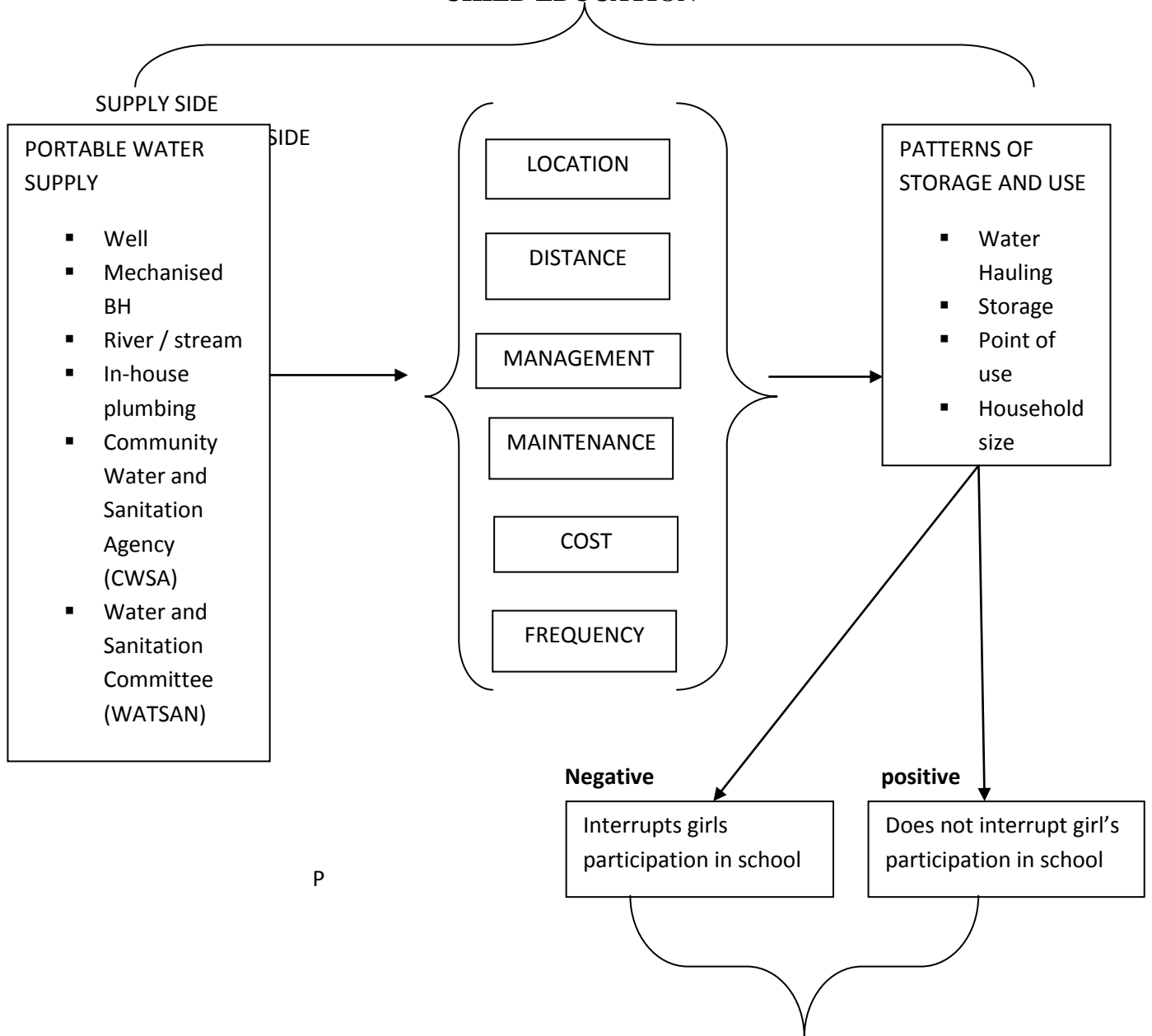
In summary, it can be said that throughout Africa women and girls are the main providers of household water supply and have the primary responsibility of maintaining a clean environment at home before attending to other things such as schooling.

2.13 Conclusion

By way of concluding, the researcher looked at the contribution and propositions other authors have made in respect to access of water in rural communities and its effect on girl child education. Boti area in the Yilo Krobo district was used as a case study. Literatures reviewed in this study indicate that women and girls in many homes spend much time fetching water as part of their domestic duties. In the works of Hutton & Haller (2004), both mentioned that one major benefits of potable water is the time saving associated with better access. Time savings occur, when there is a well or borehole closer to user communities or the installation of piped water supply to households as indicated in the conceptual framework of this study. Also to support this study is the World Water Development Report (2009). In their findings, they reported that the upgrading of water supply can improve education since it allows more children to attend school instead of spending hours each day fetching water. Tay came closer in his summary of the facts and evidence of the impacts of rural water supply on education in Ghana (Tay, 2005c), just as the researcher posits. Another related work was done by Koolwal and van de Walle (2013 forthcoming) cited in Nauges and Strand (2013, forthcoming). These researchers came closer to this study by investigating the relationship between the taken to walk to water source and its effect on school attendance. The difference between their studies and that of the researcher's is where they considered only school attendance as dependant variable instead of adding punctuality, completion of assignment and others factors

2.14: Conceptual framework

CONCEPTUAL FRAMEWORK OF CONTRIBUTORY FACTORS TO GIRL CHILD EDUCATION



EFFECT OF FETCHING WATER ON GIRL CHILD EDUCATION

Source: Author's Own Construction, 2013

The conceptual framework provides the guideline to this study. The framework seeks to show the relationship between the characteristics of rural potable water supply, water system management, household water hauling and its effects on the participation of the girl-child in school. This study examines the link between access to rural water and its effects on the girl-child education. Several institutions that conduct research into water and girl-child education have defined access to potable water and girl-child education (Charmes 2006; Blackden and Wodon 2006; Ivens 2008; Hutton & Haller 2004 e.t.c) in different ways. For the purpose of this study, access to rural potable water includes all activities starting from the provision and management of water supply system(s) to the point of use by households. As stated by (Sutton, 2008) these activities can be categorized into supply and management, the household's users and how that directly affects the female members of our household.

Factors influencing access to rural water and girl-child school participation were categorized under a broad headings in the literature discussed such as (i) General overview of water supply systems. (ii) Water resource of Ghana (iii) Sources of water supply (iv) Urban and rural water sources (v) Access to water (vi) Seasonal variations and access to water in rural communities (vii) Access to water and children educational status. (viii) Obstacles to children's education (ix) Household income and financial circumstances, (Socio-cultural attitude towards girls' education, (x) Birth order on girl child education and (xi) Model of intra-house allocation. All factors discussed play a significant role in influencing access to rural water and girl-child education. For the purpose of this study, factors relating to water supply systems include location, distance, and types of supply point, cost, maintenance and frequency of water flow in a day.

These factors can either promote or impede girl-child education through their school attendance, punctuality, fatigue and completion of assignment. The Millennium Development Goal 7 of target 7c measure ‘access to improved drinking water’ using an indicator that defines access as the presence of an improved water source within 1 kilometre of a person’s dwelling. The linear measurement has significantly been criticized for its shortcomings as explained earlier. (United Nations 2008a; Howard and Bartram 2003; WHO/UNICEF 2004; Bartram et al. 2005; UNDP 2006). This study adopted the use of time to estimate distance covered to water supply point by girls and boys. This was chosen instead of kilometres because the respondents could not tell distance in terms of kilometres and moreover, the researcher lacked the appropriate tools such as Geographical Positioning System (GPS) to undertake such measurements. The girl-child refers to as any girl of school going age who in JHS during the period of the survey. Some boys however, were equally selected and interviewed in order to confirm earlier assertions that female or girls are more burdened with the responsibility of fetching water in many households. Girl-child school participation in this study is also limited to school attendance, punctuality, and fatigue during lessons and completion of assignment by the pupil as well as access to toilet facilities at schools.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter explains the research techniques which were used in collecting and analyzing data as well as a profile of the study area. The chapter is divided into two broad sections. The first section discusses the research design, the choice of sample size and population, methods of data collection, sampling procedure, and ethical consideration. It concludes with how these results are presented to readers. The second section provides a profile of the study area focusing on the socio-economic services provided within the district and particularly, access to potable water and its effects on girl-child education.

3.1 Research Design

The study adopted both the qualitative and quantitative research techniques in the survey [known as the mixed method]. The Qualitative method included the use of purposive sampling and semi structured interview guides, whilst the quantitative technique included the use of systematic random sampling and purposive sampling techniques, using structured questionnaires.

For the purpose of this study, the researcher adopted a survey approach as a guide to the study. Under this design, the researcher attempts to examine how access to rural water affects girl-child participation in school. The study investigates the relationship between time spent in fetching water by girls, water storage facilities, water use etc. and their participation in school with specific reference to school attendance, punctuality, fatigue and completion of assignment.

3.2 Study Population and Sample Size

The target population of the study is grouped into three different categories namely; students, teachers of the three selected schools (from three communities) and the key informants (the main actors in the supply and use of potable water in the District). These three (3) communities were selected by the researcher because according to the planning department of the District, these communities have major challenges with water supply.

3.2.1 Sample Size and Selection Procedure

a) Pupils in the Schools

The sampled students are only girls at the JHS 1, 2 and 3 levels as against the earlier groups from the upper primary. Girls in primary 4, 5 and 6 could not be selected due to their inability to speak fluent English which was going to affect the interview. They were also not suitable due to their ages. Unlike Nauges and Strand (forthcoming) who used girls between ages 5 and 15 in their research, the researcher considered only pupils from the JHS since they were mature enough to fully engage in water hauling in their various households. This was later confirmed by the researcher during a preliminary field visit when it was confirmed that most JHS girls are indeed primarily responsible for fetching water in their households. A total of 90 girls thus, 30 from each school were selected for interview. A systematic random sampling technique was employed. In each of the three schools the average population of girls per school was 60 hence the selection of 30 girls from each school.

b) Teachers in the Selected Schools

A total of 3 teachers from each school in the study communities were also selected and interviewed using a purposive sampling technique. The teachers were selected based on

how well grounded they were on the issues affecting the girl-child's participation in school. These teachers were considered appropriate because, according to the 'Girl-child Coordinator' at the District Assembly education unit in Somanya, the teachers receive periodic training on issues pertaining to girl-child education in general.

c) Key Informant Interviews

There are many actors in the supply of potable water including the Community Water and Sanitation Agency (CWSA), Water and Sanitation committee (WATSAN) and the girl-child coordinators in basic education at the Yilo Krobo District. Using the purposive sampling technique, two officials in charge of water supply at CWSA and WATSAN in the Assembly were selected and interviewed. These officials during our interaction elaborated into details the characteristics of water supply systems as well as the management of the water systems. One officer from the basic education unit of the District Assembly also enabled the researcher gain an in-depth understanding of how household chores, particularly fetching water affects the school participation of the girl-child. In achieving the study's objective, the researcher addresses groups of individuals using personal interviews. The interviews were conducted on a one-on-one basis with the officials of both units. The interviews were conducted by the researcher himself. Two reasons accounted for this: firstly to allow in-depth interviews and secondly, a credible account of the issue under investigation would be available since the experts have the duty of ensuring and supervising development in the Districts.

On the whole, a total of 90 respondents being pupils' were sampled and interviewed. Face to face interviews with selected teachers and key informants comprising of officials from CWSA, WATSAN and the District education unit coordinator in charge of girl-child at Somanya was employed.

3.3 Sampling Procedure

The researcher selected 30 pupils from each school using a systematic random sampling technique. Girls had relatively low representation in all the sampled schools hence the decision of the researcher to select only 30 girls from each school. To ensure equal representations, ten (10) girls were selected from each class. There were five (5) rows of seats in each class; hence the researcher selected two (2) students from each row of seats. The researcher selected only odd girls from each row of seat i.e the first and the third girls in each row. In addition, the researcher used a purposive sampling method to select the key informants from the District Assembly and the teachers from the Boti R/C JHS, Huhunya Presby JHS and Oterkpolu JHS

3.4 Sources of Data Collection

The study used both the primary and secondary data. The primary data were collected using personal interviews with structured questionnaires, and interview guide techniques. The primary sources of data consisted of teachers and the pupils from the various selected schools in the three communities namely, Boti, Huhunya and Oterkpolu. Communities were purposively selected using the criteria of access and poor access to potable drinking water. Key informants in the supply of potable water within the district were also interviewed. In general, the data for the study was collected mainly using a survey approach.

Secondary source of information for the study were obtained mainly from books, bulletins, journals, working papers, published and unpublished works and reports on rural water. Many other relevant and related literatures were obtained from the internet, books, journals and other relevant sources. The secondary sources of information were mostly used in the literature review.

Before collecting the data, a letter of introduction was obtained from the Institute of Statistical, Social and Economic Research (ISSER) and participants were informed of the nature of the research. Another introductory letter was obtained from the District Assembly for formal introduction of field officials in all the three sampled schools.

3.5 Methods of Data Collection

The data was collected using personal interviews (structured questionnaire), and interview guide techniques.

3.5.1 Data Collection Instruments

The researcher used structured questionnaires, and interview guides to collect the data. The structured questionnaire included closed-ended questions with some few open-ended ones. The questions were constructed based on the objectives of the study. Section A of the questionnaire elicited information on characteristics of school children. Section B asked questions relating to characteristics of potable water supply system and their effect on girls participation in school. Section C elicited information on the means of water supply to the various households and girls participation in school. Section D drew out information on domestic water use patterns in the households and girls participation in school.

Finally, Section E acquired information on the method of water storage in the household and girls participation in school. Open-ended questions were also included in the various sections to collect additional information. The questions were set such that respondents could share their stories, experiences, challenges etc. and how they confront them.

Questionnaires and interview guides were drafted and pre-tested in some villages of the Yilo Krobo district in order to assess the ability of the questions to capture the required information and also the ability of the interviewer to work within the required time.

3.6 Data Presentation and Analysis

The primary data collected through the use of personal interviews (structured questionnaires) and interviews were coded, transcribed, screened and analyzed using the Statistical Package for Social Sciences (SPSS 16), to generate descriptive statistics. The results were described with reference to each objective and presented in the form of frequency distributions using graphs, bar charts, pie charts, and tables.

3.7 Ethical Consideration

The researcher took steps to make sure that the rights as well as safety of respondents were not compromised in anyway. Firstly, the researcher made sure that permission was sought from all relevant authorities before the questionnaires were distributed. Also, the aims and objectives of the study were clearly explained to participants before they were issued questionnaires and interviewed. All respondents were assured of the fact that the study was only for the purposes of academic learning and not for any other use. Participants were then encouraged to voluntarily participate in the research. The researcher also made sure that personal information of respondents was kept confidential.

3.8 Profile of the Study Area

This section provides a background information of the Yilo Krobo District; the study district. It offers a brief description of the socio- economic profile of the District, focusing on access to water and various water sources.

3.8.1 Employment and Health

Majority of people in the District practice agriculture as their economic activity. Besides farming, some residents are engaged in other small scale manufacturing activities such as

pottery, trading and beads making. Close to 58% of the economically active population are engaged in agriculture whilst services, trading and small scale industrial activities employs 18.1%, 12.9% and 7.2% respectively.

In the area of health, the Yilo Krobo District has three (3) private clinics, nine (9) reproductive and child health/family planning Clinics, three (3) private mid-wives maternity homes and seventy two (72) trained traditional birth attendants. (YKD MTDP, 2006-2009). Girl-child education and the responsibility of water hauling is also linked to the family's economic activities. This study however focuses on only water fetching and school participation.

3.8.2 Water Sources and Access

According to the CWSA (1996), ground water remains one of the most important sources of water supply in the rural communities and small towns in Ghana. Currently, over 95% of water provided to small communities and towns for domestic use is extracted from ground water sources. Of the district's 239 settlements, about, 67% settlements do not have access to potable pipe borne water facilities but rely on streams/rivers, ponds, open wells, for their domestic use. In all, a total of 75 boreholes were provided out of which 17 are malfunctioning. Of the 122 hand-dug wells in the district, 64 are broken down. (YKD MTDP, 2006-2009).

3.8.3 Pipe Borne: Bore-Hole Water

In the entire district, pipe borne water is found in only the capital, Somanya. From the GWC, though there are 716 pipe borne water points which service 218,800 people, only 27,100 of the populations have access to these facilities (GSS PHC, 2000).

3.8.4 Wells

There are 44 hand-dug wells with pumps in the district. By the GWC standard of 150 people per well, 6,600 people are expected to have access to these wells. However, about 16,288 are found to have actual access to the wells according to (GSS PHC 2000). Population with access to open wells may be included in this figure. These figures accurately depict the real water situation in the district.

3.8.5 Surface Water

As many as 69,372 people in the District depend on surface water such as streams, rivers, ponds and 78 on open wells. This is obviously not very good for the District since it is accompanied with some health implications. Water-borne diseases such as bilharzia, cholera, river blindness, and guinea worm infestations are contracted through the use of surface water for domestic purposes. There is therefore the need to provide potable water for the people, most especially in the rural settlements. Based on the projected district population and the public water supply standard of 300 people to one borehole and 150 to one hand dug well, 202 boreholes or 518 wells will be required by 2009. There is therefore, a backlog of 202 boreholes or 460 wells to be supplied especially in the rural areas.

3.8.6 Educational facilities in the district

The Yilo Krobo District has one hundred and nine (109) kindergarten/nursery schools, one hundred and ten (110) primary schools, forty-two (42) Junior High Schools (JHS), two (2) Senior High Schools (SHS), one (1) technical school and one (1) Teacher Training Institution. Out of this, only approximately 48% are in good condition (YKD MTDP, 2006-2009).

There are a total of 1,171 teachers in the District with a teacher to pupil (student) ratio of 1:36, 1:27 and 1:17 for Kindergarten, Primary and Junior High School (JHS) respectively. There has also been an increase in enrolment of pupils into schools due to the various social interventions such as the capitation grant, School Feeding Programme and the LEAP programme. There has been a steady improvement in the performance of basic level education. However, some JHS are languishing behind. The performance in primary schools for instance rose from 25% in 2004 to 45% in 2005 whilst that of the JHS also improved from 44.8% to 47.96%. Although this situation is encouraging, there is still more to be done if the district is to invest in its human resource to achieve general development (Yilo Krobo MTDP, 2009).

3.9 Justification for the Study Area

The Yilo Krobo District was selected for this study because it is predominantly rural and best fits into the research objectives. Most communities in this area lacked potable water, sanitation facilities, and other basic services until the Koforidua-Bokuno water system commissioned recently. The choice of this area therefore enables the researcher to address the specific objectives of the study by finding answers to the research questions posed.

SUMMARY OF METHODOLOGY					
OBJECTIVES	SOURCES OF DATA	METHOD OF DATA COLLECTION	SAMPLING PROCEDURE	DEFINITION OF VARIABLES	ANALYSIS
Objective 1	Beijing platform for action on girl-child education, MDGs, MoE, MOJSP, Education Sector Performance report	Interviews with key informants, and the use of Interview guides	Purposive Sampling	Access to water, Seasonal variations, Water supply system, Distance to source, Girls participation in school, characteristics of water supply points, water in school premise	SPSS & Excel
Objective 2	Sampled schools	Interviews with structured questionnaire	Simple random sampling,	Attendance, punctuality, fatigue and completion of assignment	SPSS & Excel
Objective 3	Sampled schools	Interviews with structured questionnaire	Simple random sampling,	Attendance, punctuality, fatigue and completion of assignment	SPSS & Excel
Objective 4	Sampled schools	Interviews with structured questionnaire	Simple random sampling,	Attendance, punctuality, fatigue and completion of assignment	SPSS & Excel

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This Chapter presents findings of the research on access to water and girls' participation in school in the Boti area. The students who were interviewed were from Ortekpolu Presbyterian Junior High School, Huhunya Presbyterian Junior High School and Boti Roman Catholic Junior High School. Data was collected using a multi-stage random method and purposive sampling techniques with interview guides, and structured questionnaire. The research sought to answer the following specific objectives; i) examine potable water supply systems characteristics (types of systems, distance to water supply points, water user fee, patterns of flow, operating times, and management structures); and their effects on girls' participation in school ii) examine the means of water supply to the household and girls' participation in school (attendance, punctuality, fatigue/alertness, and completion of assignments); iii) determine domestic water use patterns in the household and girls' participation in school (attendance, punctuality, fatigue, and completion of assignments); iv) to find out methods of water storage in the household and its effects on girls participation in school (Attendance, Punctuality, Fatigue, and Completion of assignments).

Out of one hundred (100) questionnaires administered, ninety (90) questionnaires were returned giving a response rate of 90%. According to Armstrong and Ashworth (2000), the response rate of 60% and above is necessary to ensure that the information given by those responding gives an accurate picture of the population from which they are drawn. By all indications, the response rate of 90% in this study is excellent and is enough for the applicability of the research findings. See (Boote, D. N., & Beile, P. (2005).

This chapter presents the analysis of the data and the results of the study. The research analysed data on the effects of fetching water on girls' education in three communities in the Yilo Krobo District.

The research used variables such as distance to water location, types of water systems, time spent on fetching water, management of water systems, water storage facilities and usage in households, as they relate to school attendance, punctuality, completion of assignment just to mention a few. This was done carefully and critically to show the effects water fetching has on girls' school participation.

The results are presented in the form of tables using frequencies, percentages and figures.

The results have been grouped under five thematic areas. These are as follows:

- Personal data of respondents
- Potable water supply systems characteristics and their effects on girls' participation in school
- The means of water supply to the household and girls' participation in school
- Domestic water use patterns in the household and girls participation in school
- Methods of water storage in the household and girls participation in school.

4.2 Bio-social characteristics of school children

As part of the data collection process for the study, the research attempted to identify the demographic characteristics of the respondents. A summary of the biosocial characteristics of the respondents are given here including their age, birth order and educational level.

Table 4.1: Age of Respondents

Age distribution	Frequency	Percent
12 years old	1	1.1
13 years old	2	2.2
14 years old	14	15.6
15 years old	22	24.4
16 years old	24	26.7
17 years old	14	15.6
18 years old	8	8.9
20 years old	5	5.6
Total	90	100.0

Source: Field work, 2013.

Table 4.1 shows that most of the respondents who fetch water fall within the age range of 14 to 20. The modal age for fetching water is 16, while the median is 15 years. The ages for children fetching water, even though not immediately evident, may have direct link with birth order in most families within Ghanaian communities since first children in many homes are more likely to be physically fit to carry containers of water.

Table 4.2: Birth Order of Respondents

Birth order	Students	Percent
First Child	44	48.0
Middle Child	30	33.3
Last Child	16	17.7
Total	90	100.0

Source: Field work 2013

Ejrnæs and Portner (2002) point out that in some families first born children are made to assist in the house chores especially the females.

This decision made by parents, affects not only a child's current well-being, but also a child's future prospects. A prime example is the amount of schooling that a child receives. Going to school does not only decreases the amount of time spent working; it is

also likely to increase the future earning capacity of the child.

Higa (2011) also posits that some families use the birth order as a criterion for conditional cash transfer allocation. This requires first an understanding of whether parents distinguish between earlier-borns, middle-borns and lastborns within the families. If parents do so, birth order might determine whether a kid attends school or participates in productive and/or domestic work. Moreover, parental decisions about which kid should be sent to work instead of/or in addition to school might affect current and future kids' well-being. As indicated in many literatures reviewed for the purpose of this research and based on findings of the researcher, it has been proven to be true that, birth order effect has an impact on water fetching. Majority of the first children as shown in the Table 4.3 below are engaged in water fetching than the middle born or the last children in order of birth. This is even more practically the case where the first child happens to be a girl. The research also discovered that, owing to the essential nature of water in the household, fetching water does not really have to be associated with relations to parents or not.

Table 4.3: Birth Order and Responsibility for Fetching Water among Pupils in Boti Area

		Which member of the household spends most time in fetching water?			
		Girls	Boys	other relation (women and girls)	other non-relation
Respondents birth order	First born	41	2	1	0
	Middle born	25	4	1	0
	Last born	14	0	1	1
Total		80	6	3	1

Source: Field work, 2013.

Table 4.4: Household size and Period of Water Storage

HOUSEHOLD SIZE	When water is stored, how long does it last?		
	A day	Three days	A week
1.00	0	2	0
2.00	3	2	0
3.00	1	6	1
4.00	1	16	1
5.00	6	12	0
6.00	2	11	2
7.00	3	4	0
8.00	6	4	0
10.00	0	1	0
11.00	1	0	0
12.00	5	0	0
Total	28	58	4

The Table shows the link between household size and length of time water is stored in the household. From the results, it was discovered that 58 respondents from the 12 households indicated that water lasts an average of 3 days after it has been fetched whilst only 4 respondents indicated that their water lasts a week after it has been fetched. These findings have also confirmed Bradley's (2004) assertion that the more people in the household, the more water usage increases. The water is primarily used for cooking and drinking, laundry, bathing, and washing of utensils.

Table 4.5: Proportion of Children who live with Parents

	Frequency	Percent
Relatives	9	10.0
Mother	5	5.6
Father	3	3.3
Brother	3	3.3
Grandmother	15	16.7
Both parents	55	61.1
Total	90	100.0

Source: Field work, 2013.

The findings revealed that as many as 61% of respondents live with both parents, with the rest living with either immediate or extended family members. In relation to the topic under investigation, and with majority of respondents living with both parents and relatives, one can say that the duty of fetching water remains on the respondents, irrespective of who these children live with.

Table: 4.6 Occupations of Both Parents of the Respondents

Occupation	Fathers	(%)	Occupation	Mother	(%)
Farming	54	60.0	Farming	26	28.
Teacher	4	4.4	Homemaker	1	1.1
Missionary	4	4.4	Teacher	5	5.6
Deceased	9	10.0	Deceased	2	2.2
Driver	4	4.4	Nurse	1	1.1
Animal Raring	1	1.1	Petty trading	55	61.
Petty trading	2	2.2	-	-	-
Technicians & associate	8	8.9	-	-	-
Craft & related	2	2.2	-	-	-
Plant & machine	2	2.2	-	-	-
Total	90	100.0	Total	90	100.

Source: Field work, 2013.

The results show that majority, 60%, of respondents' fathers were farmers, as their mothers 61% were petty traders as well as practising some subsistence farming activities. The results show a typical rural characteristic where subsistence farming dominates all other professions. Other professions such as technicians & associate professionals, Craft & related workers etc. were minimally recorded from the research area as indicated in Table 4.6 above.

Table 4.7: Level of Education of Respondents' Parents

Educational level of fathers	Frequency	Percent	Educational level of Mothers	Frequency	Percent
None	19	21.1	None	11	12.2
Tertiary	1	1.1	Tertiary	4	4.4
Primary	17	18.9	Primary	11	12.2
Middle/ JHS	45	50.0	Middle/ JHS	51	56.7
SHS	5	5.6	SHS	7	7.8
O level	1	1.1	A level	1	1.1
Training college	2	2.2	O level	3	3.3
-	-	-	Training college	2	2.2
Total	90	100.0	Total	90	100.0

Source: Field work, 2013

The results in Table 4.7 show the educational attainment of both parents of the respondents. From Table 4.7, it was revealed that majority, 50% of the respondent's fathers and 57% of their mothers, had attained only Middle/JHS level. This level of education could also affect the management of their wards schooling times since they were likely to place little importance to educating their girl children.

4.3: Potable Water Supply Systems Characteristics and their Effects on Girls'

Participation in School

According to UNDP (2010), lack of access to safe drinking water and sanitation affects women in particular. Women and children do most of the water collecting if drinking water is not available on the premises. According to UNDP, it also helps to explain the very large gender gaps in school attendance in many countries. It is not rare for women to spend up to four hours a day walking, queuing and carrying water, time that could be put to productive activities or housework and childcare. Nauges and Strand (2013, forthcoming) in a study of water hauling and school attendance among girls, reported that reducing time spent fetching water by 50% leads to a 2.4% increase in school attendance especially in rural areas (see also WaterAid, 2007). Water availability has other influences on girls besides the time spent hauling water. One of the main reasons why parents do not send their daughters to school in many countries is that there are no separate sanitation facilities for girls. Based on the assertions made above by the researchers and owing to one of the objectives of the study, respondents were asked to answer questions in line with "potable water supply systems characteristics and their effects on girls' participation in school".

4.3.1 Household Main Source of Water and its Effects on School Participation

The Ghana Living Standards Survey findings suggest that the average Ghanaian household continues to rely on outside water installation. To determine water sources for the household, respondents were asked to indicate their main water source. From the data analysis, it was revealed that there are community boreholes, rivers/streams, in house plumbing and public stand pipes that have been serving the communities under investigation as indicated by the respondents.

Table 4.8: Household Main Source of Water and School Participation among Pupils in Boti Area

		Name of Community		
		Oterkpolu	Huhunya	Boti
Main source of water for school	Community stand pipe	29	28	0
	River / stream	1	2	30
Total		30	30	30

Source: Field work, 2013.

From Table 4.8, respondents from both Oterkpolu Presby JHS and Huhunya Presby JHS reported that they rely solely on community stand pipe for their domestic water use. According to CWSA officer, *“the type of water systems they provide depends on topography and hydrological content of the soil. He said ever since Ortekpolu and Huhunya were provided with the stand pipe system, access to water has been eased compared to Boti where people continue to rely only on a river. Even though they have a borehole, they could not access it due to a higher chlorine content.* In essence, pupils from Boti R/C are likely to spend more time carrying water from the river for their household supply as compare to their counterparts from Ortekpolu and Huhunya Presby JHS. This situation is likely to have a negative impact on their school participation as elaborated in Table 4.9 to 4.11 below.

Table 4.9 Effects of Fetching Water on Punctuality of Pupils in Boti Area

		What account for punctuality in less than four days in the week			
		Fetching water	Cooking	fetching water and cooking	Farm+fetch water
Main source of water for school	Community stand pipe	34	15	3	3
	River / stream	8	17	3	3
Total		42	32	6	6

Source: Field work, 2013

Table 4.10 Effects of Fetching Water on School Attendance among Pupils in Boti Area

		What account for attendance in less than four days	
		Fetching water	Farm+fetch water
Main source of water for school	Community stand pipe	8	0
	River / stream	11	1
Total		19	1

Source: Field work, 2013

Table 4.11 Effects of Fetching Water on completing homework among Pupils in Boti Area

		Describe how you manage your last home work		
		Completed all of homework	Completed part of homework	
Main source of water for school	Community stand pipe	55	2	
	River / stream	17	16	
Total		72	18	90

Source: Field work, 2013

In an attempt to show the impact water fetching has on respondents' school participation, the research investigated the various sources of water respondents accessed and how they each differently affect their punctuality, attendance and completion of assignments (homework) as indicated in the above table from Table 4.9 to 4.11.

The study revealed that because of access to community stand pipes, which are more convenient, the students from Ortekpolu and Huhunya schools were more punctual to school than their counterparts from the Boti R/C School who solely rely on rivers/streams. Of the 90 respondents, only 42 said fetching water before school accounts for their lateness.

On the issue of attendance to school in Table 4.10, the story is not different. As evident in the findings, 8 students who access water from the community stand pipe reported not attending school regularly. Those other 18 students who reported not attending school regularly were all from Boti R/C JHS. Respondents' main source of water could account for their inability to attend school regularly since it takes longer time and distance to go to the river or stream for water.

The source of water seems to be paramount on the impact water fetching could have on children in school. This is so because whereas 55 students from Ortekpolu and Huhunya Presby schools were able to complete their homework, only 2 students said they could not due to factors other than fetching water. In Boti R/C JHS, 17 students reported that they always complete and submit their homework. About half of the students from this school could not complete their homework, blaming it on water hauling. From the above Tables, one can conclude that the provision of a good number of standpipes in these communities, affects positively the participation of students in schools.

Table 4.12 Effects of Fetching Water on Test Outcome of Pupils in Boti Area

		Describe your performance in last mathematics test			
		Below 5/10	Above 5/10 to 6/10	Above 7/10	
Main source of water for school	Community stand pipe	13	35	9	
	River / stream	5	28	0	
Total		18	63	9	90

		Describe your performance in last English test			
		Below 5/10	Above 5/10 to 6/10	Above 7/10	Total
Main source of water for school	Community stand pipe	3	24	30	
	River / stream	9	21	3	
Total		12	45	33	90

		Describe your performance in the last exams in your favourite subject		
		Above 5/10 to 6/10	Above 7/10	
Main source of water for school	Community stand pipe	18	39	
	River / stream	17	16	
Total		35	55	90

Source: Field work, 2013

As found by other researchers, the research has established a direct link on fetching of water and children's education especially that of the girl child. As indicated in the above Table 4.12, there is a direct linkage on children's school performance in relation to the manner in which they access water for their various households.

Boti R/C, where students access water from a stream or river appear to have a poorer performance in their last test as compared to the Huhunya and Ortekpolu Presby schools, where respondents have easy and convenient access to community stand pipes. From Table 4.12, it is shown that 35 students who scored from 5/10 to 6/10 and 9 students who scored 7/10 in their last mathematic test were accessing water from the community stand pipe. Majority of students who performed poorly were those having only a river or stream as their main source of water for household and school use. With regards to students' scores on last English test, 24 and 30 students scored from 5/10 to 6/10 and 7/10 respectively. These students may be doing well than their counterpart because they are accessing water from the community standpipes whereas their counterparts sourced water from the river/stream where water becomes almost inaccessible during the dry season. Responses on the scores of students for their favourite subject, student from Huhunya Persby JHS and Oterkpolu recorded higher scores with 39 of them scoring above 7/10 whereas only 16 students were able to score above 7/10 from Boti R/C JHS.

4.3.2 Schools' main source of water

As a follow up question, the researcher wanted to know which of the water sources in the community is mainly serving the schools. To this, almost all respondents from Oterkpolu and Huhunya JHS indicated community stand pipe as the main source whereas pupils from Boti R/C reported that they spend more time collecting water from the river for the school especially during the dry seasons. See Table 4.13 and 4.14 for further analysis on schools water source and girl child education.

Table 4.13: Schools Main Source of Water and its Effect on School Participation

		Household's main source of water		
Name of Schools		In house plumbin	Community stand pipe	River / Stream
Oterkpolu Presby JHS		1	29	0
Huhunya Presby JHS		0	25	5
BotiBoti R/C JHS		0	0	30
Total		1	54	35
				9

Source: Field work, 2013.

Table 4.13 shows the main sources of water in schools per community. In Ortekpolu Presby JHS, almost all 30 respondents said they rely on community stand pipes for water in the school. At Huhunya, about 25 of the respondents reported community stand pipes as their main source. The situation became different in Boti R/C JHS community when all respondents stated that they rely solely on the river called “ponpon” for water supply in the school thereby spending much more time in accessing water for their school as compared to the previous schools shown in Table 4.14 below

Table 4.14: Time Spent on Round-trip to Water Source and School Participation

Source of Water	Ortekpolu Presby (Minimum time)	Huhunya Presby (Minimum time)	Boti R/C (Minimum time spend on round
In-house Plumbing			
Community Stand Pipe	15mns-20mns	15mns-20mns	
River / Stream			30mns-45mns

Source: Field work, 2013

As much as the distance to and time spent on fetching water from the various types of water system matters to the household, the same can be said of the schools. The study revealed that Ortekpolu Presby and Huhunya Presby schools which have stand pipes use minimal time on fetching of water as compared to Boti R/C School which access water from the river and spend over half an hour on round-trip to water source. This may be a contributory factor in the better performance of both Ortekpolu and Huhunya Presby schools in their last test compared to Boti R/C. (see Table 4.23)

4.3.3 Water flow pattern and its Effect on School Participation in Boti Area.

In relation to water flow pattern, 29% of the respondents reported they have uninterrupted flow, with few people saying they have intermittent flow. Majority (68%) could not respond saying that they were not sure about the flow pattern. Interview with the CWSA officer revealed that, because they rely on ground water for the water system, occasionally, water systems are closed down to allow more water to refill. The assumption is that, school children may spend more time in accessing water. (Field work, 2013).

4.4 The Means of Water Supply to the Household and Girls Participation in School

This objective of the study seeks to determine the means of water supply to the household and girl's participation in school, i.e. her attendance and performance in class among others. (See Table 4.16)

Table 4.15: Hours of Water Flow and School Participation in Boti Area

	Students	Percent
6am - 6pm	30	33.3
6am - 7pm	9	10.0
6am - 4pm	17	19.0
6am - 5pm	4	4.4
7am - 5am	30	33.3
Total	90	100.0

Source: Field work, 2013.

Table 4.15 reveals the range of hours the water in the community flow in a day. From the data, majority of respondents said their water flows from 6am-6pm and 7am-6pm, representing 66% of the respondents. Time of water flow from the researcher's findings presumes that punctuality and completion of assignment could be affected negatively regarding the time girls fetch water. Face- to- face interview with teachers also revealed that girls who usually come to school late, mostly blame their lateness on water fetching.

Table 4.16: Water Fetched in a day by Girls and Punctuality at School

Punctuality at School	Less than 3 bowls	3 to 5 Bowls	6 to 10 Bowls
Punctual at school	0	36	6
Not Punctual at School			
• Fetch water only	1	27	4
• Fetch water and cook			
• Cooking	1	3	2
• Farm and fetching water	0	5	1
	0	3	1

Source: Field work, 2013

Of the responses generated in this survey, majority of respondents who fetch water 3 to 5 times a day appears to be reporting to school more late than their colleagues who fetch water once or twice in a day. The research, based on the results, concludes that, the number of times the girl child fetches water for the house could determine whether she is punctual to school or not. 27 respondents answered that they fetch water between 3-5 bowls in a day. The 42 students who were punctual to school also fetched from 3 to 5 bowls of water and more in some cases for their households. The researcher therefore assumes that distances from houses to water sources could account for their ability to be punctual at school for five days in a week.

Table 4.17: Average Number of Minutes Spent in Fetching Water in a Day

		Oterkpolu Presby JHS	Huhunya Presby JHS	Boti R/C JHS
Average number of minutes spent in fetching water in a	20ms - 50ms	4	11	0
	51ms - 81ms	9	7	0
	82ms - 112ms	2	9	1
	113ms - 143ms	8	3	9
	144ms - 174ms	6	0	14
	175ms - 205ms	1	0	5
	206ms - 236ms	0	0	1
Total		30	30	30

Source: Field work, 2013

Table 4.17 shows the average number of minutes respondents spent in fetching water in a day. At Boti R/C JHS, respondents recorded the highest number of minutes spent in fetching water in a day with half of them spending between 144 and 174 minutes in a day. Respondents from Huhunya were next, spending between 82 and 112 minutes each day in fetching water whiles 9 respondents from Oterkpolu also indicated that they spend between

51 and 81 minutes to fetch water for their households in a day. The results indeed confirms the research's assertion that Boti community is worse hit with lack of potable water supply as the finding indicates that students spends more time fetching water in Boti at the expense of their time in school or doing homework because they access water from the river.

Table 4.18 Household Member who spends Most Time in Fetching Water

	Frequency	Percent
Girls	80	88.9
Boys	6	6.7
Other relation	3	3.3
Non-relation	1	1.1
Total	90	100.0

Source: Field work, 2013.

Probing into which member of the household spends most time fetching water for the house, it was discovered that girls spend most of their time fetching water for their household as majority (89%) of the respondents indicated that females/girls do more house chores than the boys including fetching water as shown in Table 4.18 above. This is in line with the findings of other literature reviewed.

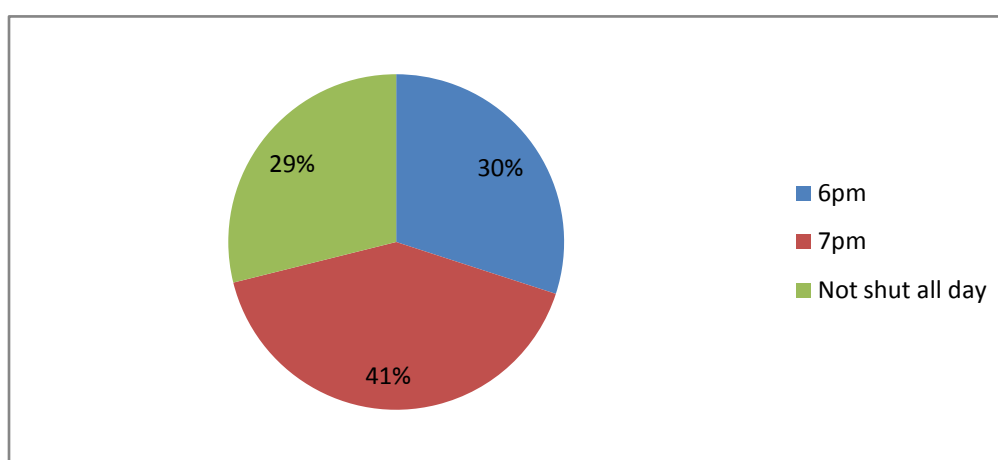
Table 4.19 Time of Fetching Water by Respondents and its Effects on Punctuality at School

	What account for punctuality in less than four days in the week					
	Fetching water	Cooking	fetching water and cooking	Farm and fetching water		
What time of the day do you fetch water	6am	20	1	5	0	
	7am	15	1	0	1	
	4pm	32	3	1	3	
	5pm	2	0	0	0	
	6pm	5	1	0	0	
Total	74	6	6	4	90	

Source: Field work, 2013.

From table 4.19 it is reported that majority of respondents thus 74 out of the 90 students fetch water for their household depending on what time households finds it necessary. However respondents who reported fetching water at 4am could also not be overlooked since that time in many urban households is used for either having siesta or completing homework. Respondents who said they fetch water at 6am and 7am are likely to report at school late since school starts at 8am in all the three schools sampled.

Figure 4.1 Time of Shutting Down of Water Facility and School Participation



Source: Field work, 2013.

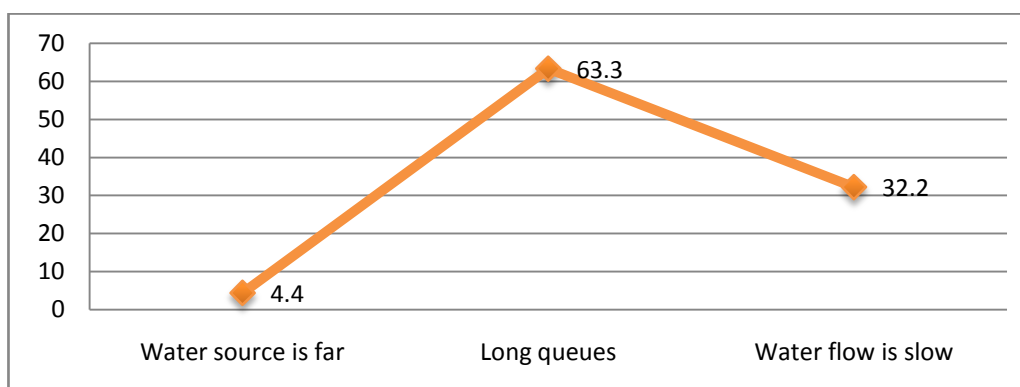
Figure 4.1 indicates the time the water facilities in the communities under study are shut down daily. About 41.1% of responses reported 7pm, while those who reported “6pm” represented 30% of the respondents. However, 29% of respondents reported that water sources or facilities in the community are not shut down at some point in the day. Thus, for 29% of the respondents, water facilities are opened 24 hours. Unlike Oterkpolu and Huhunya, Boti’s river does not get shut down yet accessing water is always relatively difficult in Boti as compared to both Ortekpolu and Huhunya. Closing time brings about longer queues since respondents must at some point supply their various houses with water. This tends to affect their assignment time.

4.4.1 Effect of Fetching Water before Going to School on Pupils in Boti Area

Under the third objective of the study, the research wanted to know the effect of fetching water before going to school from the respondents' point of view. When respondents were asked whether they fetch water before going to school, majority (82%) of the respondents indicated 'yes' while 18% of the respondents said 'no'.

As already reported in Table 4.19 above, the research wanted to know some of the reasons why respondents spend much time in fetching water for their house before leaving for school. Responses to this question are depicted in Figure 4.2 below.

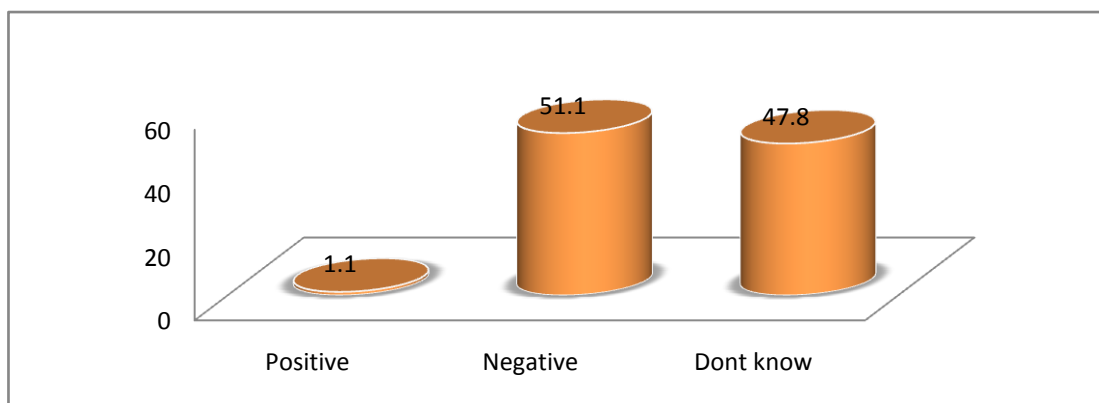
Figure 4.2 Reasons for Spending much Time in Fetching Water for Home



Source: Field work, 2013.

The results of the analyses above shows that 63% of the respondents indicated long queues being the reasons for spending much time for fetching water for their homes, 32% indicated slowness of water flow as the reason for spending much time while others attributed the reasons for spending much time in fetching water to long distances to the sources of water.

Figure 4.3: Effect of fetching water for the home before School and Respondents Education



Source: Field work, 2013.

Figure 4.3 shows effects of fetching water before going to school. Majority 51% have indicated that fetching water for home before going to school affects them negatively as against 48% who remained undecided while only 1% thinks that fetching water for the home before school does not affect their education in anyway. To go by the majority, it can be deduced from the analysis that fetching water before school brings about fatigue to the students as this will affect concentration during lessons. See Table 4.20 below for the negative impact of fetching water on education.

Table: 4.20 Negative Impact of Fetching of Water before Going to School

	Frequency	Percent
No response	44	48.9
My school attendance	11	12.2
Punctuality	27	30.0
Completion of assignment	8	8.9
Total	90	100.0

Source: Field work, 2013.

From Figure 4.5 it was found out how fetching of water before school affects the respondents' education. In Table 4.20, it was found that, those who were negatively affected by fetching water before school further explained how the situation has affected their punctuality at school, attendance as well as completion of assignment as shown in the above Table 4.16.

4.4.2 Home Work

As a follow up question, the research sought to find out how respondents manage their homework. To this, 72 out of 90 representing 80% of the respondents indicated that they complete all their homework while just about 20% of the respondents indicated that they always managed to complete part of the homework given each time due to house chores at home. These responses however might not be credible enough since students may not confidently admit to not completing their homework. Based on the above therefore, the research turned its interest in finding out the performance of respondents in their Mathematic and English test. These subjects were selected because all students do these courses right from the primary level. The response from the Mathematic test is presented below.

Table 4.21 Performance in the Last Maths Exam and Fetching Water

		Name of Schools			
		Oterkpou Presby JHS	Huhuna Persby JHS	Boti R/C	
Describe your performance in last maths exams	Below 5/10	2	11	5	
	From 5/10 to 6/10	21	17	25	
	Above 7/10	7	2	0	
Total		30	30	30	90

Source: field work, 2013.

When the research enquired about performance in last mathematics exams, respondents from Boti R/C JHS appears to have performed poorer as none of them was able to score above 7/10. In Oterkpolu Presby JHS, 7 respondents were able to score above 7/10 partly due the little time they spend in collecting water. This has been elaborated in the above Table 4.12.

To support this finding, UNDP (2006) posited that performances of children in schools are greatly influenced by access to basic services, including water and sanitation in the environment in which they found themselves.

Table 4.22 Performance in the Last English Subjects and Water Fetching among Pupils

		Name of School			
		Oterkpou Presby JHS	Huhuna Persby JHS	Boti R/C	
Describe your performance in last English exams	Below 5/10	2	3	7	
	From 5/10 to 6/10	5	19	21	
	Above 7/10	23	8	2	
Total		30	30	30	90

Source: Field work, 2013.

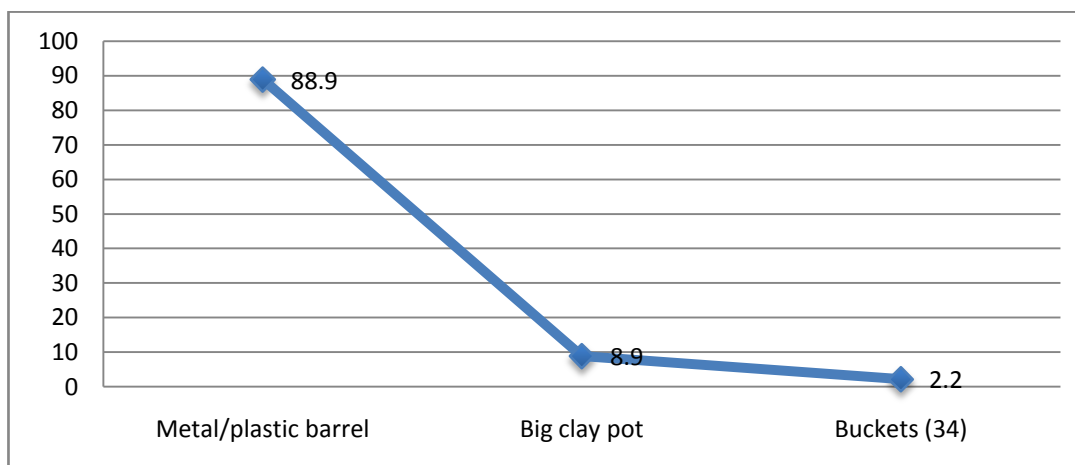
The research again asked respondents of their performance in the last English test they wrote. As shown in Table 4.22 above, students from Oterkpolu Presbyterian JHS performed better with 23 out 30 of them scoring above 7/10. Huhunya Presbyterian also fairly performed well leaving students of Boti R/C JHS with a woeful 2 out of 30 respondents scoring 7/10 in the last English exams. These results, based on earlier findings in Table 4.12 above, could be as a result of spending more time in fetching water at the expense of their school participation.

4.5 Domestic Water Use Patterns in the Household and Girls' Participation in School

The third objective of the study was to determine the domestic water usage patterns in the household and girls' attendance, punctuality, fatigue and completion of assignments. Responses received on the use of water at home were, for cooking, washing and other necessary activities done with water. Every household, no matter their economic status, engage in daily activities such as cooking, bathing/washing just to mention a few. This means that, some school children who are tasked with fetching water for their households would often go to school late or even skip classes in order to fetch water for their homes. On the question of how much water was used for various activities in the households, respondents could not give exact measurements but generally agreed that cooking consumed more water in the household.

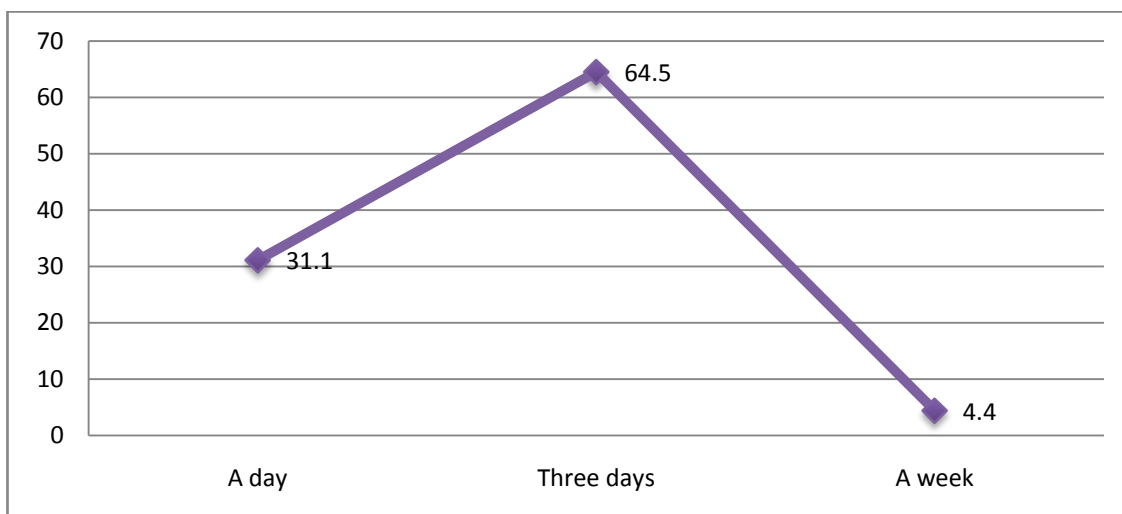
4.6 Methods of Water Storage in the Household and School Participation

This section of the questionnaire sought to find out the methods of water storage in the household and its effects on girls' participation in school. To gather this, respondents were asked whether they stored water at home. From the responses, it was revealed that the entire households where respondents came from store water at their various houses with a 100% response from the respondents. Water storage is very important since the larger the storage facility, the more trips respondents would have to make to the water source. The research was therefore interested in knowing the facilities that respondents used for storing water.

Figure 4.4 Type of water storage facility

Source: Field work, 2013

With respect to the type of water storage facility, metal/plastic barrel appear to be the most common type of water storage facility indicating the highest percentage 89% of the total responses. The remaining facilities such as big clay pot and buckets size 34 were minimally recorded hence the reason for some households engaging in daily water hauling. From the finding, it can be deduced that metal/plastic barrel which can contain about seven size 34 buckets were the most widely used water storage facility among the respondents homes. Most metallic storage facilities have lower storage capacity implying that the frequency with which respondents will have to fetch water is very high. The school participation of the girls are affected when more volumes of water is to be drawn from the water source.

Figure 4.5 Length of Water Stored among Households in Boti Area

Source: Field work, 2013

Now that the type of water storage facility has been identified, the researcher wanted to find out how long water stored in the house lasts. In Figure 4.5, it was revealed that majority, 65%, of the respondents' stored water usually last for three days, 31% of respondents said their stored water only last for a day whilst 4% of respondents out of the total population sample said their stored water normally last for a week. From the finding, it can be said that every three days there is the need for respondents to go for water before or after going to school.

Table 4.23: Length of Water Storage and its Effect on School Participation

		Length of Water Storage		
		A day	Three days	A week
Respondent's School Participation	School Attendance(5 days)	3	4	0
	Punctuality(5 days)	4	4	0
	Completion of Assignment(5 days)	3	5	0

Source: Field work, 2013

Water fetching was found by the research to have a direct consequence on children's participation in school most especially girls. The frequency at which water is fetched however is dependent on the storage facilities available and how long that takes a household to consume. As seen in Table 4.23 above, the research revealed that where respondents have longer period of water storage as shown in five days of the week, their attendance, punctuality, and completion of assignments turns to be much better than the vice versa.

4.7 Responses from Teachers

To gather the needed data for the study to support or disagree with the responses espoused by the respondents (students), an interview guide was designed to solicit additional information to complement some responses obtained from the school children. In all, three teachers, one officer with the Water and Sanitation Department of District Assembly, and one Girl-child Coordinator at District Education Unit were selected using purposive sampling techniques. The teachers helped in answering questions pertaining to the set objectives of the study. Areas covered were:

- Water supply systems characteristics, distance to water supply points, water user fee, patterns of flow, operating times, and management structure and girls school participation.
- Means of water supply to the household and its effects on attendance, punctuality, fatigue/alertness, completion of assignments and general participation in school of the girl-child.
- Water storage facility in the school and whether storage facility at home can also affect school participation.
- Domestic water use patterns in the household and its effect on girls' participation in school.

4.8 Water Supply Systems Characteristics (distance to water supply points, water user fee, and pattern of flow, operating times, and management structure)

When teachers were asked how ‘water supply system, distance to water supply points, water user fee, pattern of flow, operating times, and management structure’ affects the respondents schooling, the teachers mentioned that fetching of water for the household before coming to school affects the respondents psychologically. This is because some of the communities in which the respondents live have problematic water supply system. Even a case where there are community stand pipes, the long queues at the water source and slow flow of the water delays them from coming to school on time. In some cases, others fail to complete their homework. Furthermore, during class hours some of the respondents doze off. The teachers added that attendance is relatively higher during the rainy season as compared to the dry season. The deduction here is that, when attendance becomes very low, respondents’ performance in class works and examinations could be affected negatively. These findings agreed with Table 4.21 which explains the performance of respondents in the last mathematics examination.

Table 4.24: Description of Punctuality at School among Schools in Boti Area

		Name of School			
		Oterkpu Presby JHS	Huhunya Persby JHS	Boti R/CJHS	
Description of punctuality at school.	Punctuality at school for five days a week	3	2	1	
	Punctuality at school for four days a week	2	2	3	
	Punctuality at school for three days a week	0	1	1	
	Punctuality at school for two days a week	0	0	0	
Total		5	5	5	15

Source: Field work, 2013

The research wanted to find out from respondents, punctuality among students from different schools. The Table 4.24 above shows how punctuality differs in relation to communities. Students from Oterkpolu recorded the highest with 3 people saying they are punctual throughout the week. Huhunya followed with 2 students reporting that they are punctual throughout the week; whilst students from Boti recorded the minimum with only 1 respondent revealing punctuality throughout the week. This result can be linked to Table 4.17 above to support the claim that respondents from Boti JHS are not always punctual to school.

Table 4.25: Description of School Attendance and Water Fetching

		Name of Schools			
		Oterkpolu Presby JHS	Huhunya Persby JHS	Boti R/C	
Description of your school attendance	Attend school for five days a week	3	3	2	
	Attend school for four days a week	2	1	2	
	Attend school for three	0	1	1	
Total		5	5	5	15

Source: Field work, 2013

The research further asked respondents (teachers) to describe school attendance by pupils. Table 4.25 presents the attendance record of children in different schools. With regards to school attendance throughout the week, both Oterkpolu and Huhunya Presby recorded 3 out of 5 teachers indicating that students attend school for five days in a week. The high record according to the respondent was mainly as a result of the water system provided to the communities two years ago. Attendance in Boti R/C JHS continues

to lag behind with only 2 out of 5 teachers indicating that pupils manage to attend school throughout the week. According to the Girl-Child Coordinator at the District Education Unit, “*many girls will fetch water for their households in the morning before going to school and in the evening when they return from school. By the time they finish fetching the water, they sometimes get to school late. We also learnt that, they decide not to skip school for fear of being punished if they do so*”. (Field work, 2013). This confirmed the results from the table above since children from Boti do not attend school regularly as compared to their colleagues in Oterkpolu and Huhunya.

Table 4.26: Rainy Season and School Participation

	Frequency	Percent
Attendance is high during rainy season	3	20.0
Punctuality rate is high in rainy season	7	46.7
Enough time to complete assignment	5	33.3
Total	15	100.0

Source: Field work, 2013.

The research asked respondents whether children’s school participation has any relationship with seasonal variation. The results obtained, in Table 4.26, shows that, during rainy seasons in all the three communities, 47% and 20% of students said they are always punctual in attending school respectively. The reason was due to the harvesting of rain water for their domestic use. The teachers finally added that children generally do not engage in water fetching during rainy season; this provides them with enough time to complete their assignments. Respondents quickly added that this favours only people dwellings in houses with iron sheet roofing.

Table 4.27: What Account for Punctuality in less than Four Days in the Week by pupils?

	Students	Percent
No response	7	46.7
Fetching water	5	35.6
Cooking	1	6.7
Fetching water and cooking	1	6.7
Farm+fetch water	1	4.4
Total	15	100.0

Source: Fieldwork 2011

Respondents were asked to adduce reasons for the students being late to school in some days of the week. Showing from Table 4.27, 36% of respondents said it was due to fetching water. This is followed by cooking and fetching water reporting 13% and only a few of the respondent said they go to farm and fetch water sometimes before going to school. Most of the girls (47 %) did not respond since they reported earlier that, they are punctual to school throughout the week.

Table 4.28: School Closing time and Fetching Water

	Frequency	Percent
2:30pm	10	66.7
3:00pm	5	33.3
Total	15	100.0

Source: Fieldwork 2011

The research went further to find out whether the time school closes has any effect on the children's school participation. Table 4.28 therefore present the results of school closing times. In all the schools studied, 67% of teachers reported that students close from school at 2:30pm and the remaining 33% said their school closes at 3:00pm. The result however indicate that the schools did not or could not implement the policy of starting classes at 9:00am instead of 8:00am and closing at 2:30pm instead of the official 3:00pm.

According to the Girl-Child Coordinator, “*Due the problem of fetching water by our girls, we have asked that school should start at 9:00am and close at 3:00pm instead of 8:00am and 2:00pm. This we believe may solve the problem of lateness and even attendance. But you see, the schools are not implementing it as far as I know*” (Field work, 2013).

Table 4.29: What Respondents do Often after School

	Students	Percent
Cook for the household	20	22.2
Fetch water for the household	27	30.0
Cook and Fetch water	38	42.2
Go to farm	5	5.6
Total	90	100.0

Source: Field work, 2013

The above data in Table 4.29 shows the final response obtained from the children when they were asked to indicate what they often do after school closes. From this Table, 42% of respondents reported cooking and fetching of water for their various households after school. Quite a large number of respondents (30%) reported fetching water after school with the remaining respondents saying they cook and go to nearby farms. Going to farm was not common as results from the Table 4.24 recorded minimal farm activity among respondents. This reason might be as a result of the high representation of females in the study sample.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

In this chapter, the research provides the summary of the key findings and draws conclusions to the study and also makes recommendations based on the findings of the study. The research also makes a suggestion for further research. The objectives of the study were to probe:

- Characteristics of water supply systems distance to water supply points, water user fee, pattern of flow, operating times, and management structure and girls school participation.
- Means of water supply to the household and its effects on attendance, punctuality, fatigue/alertness, completion of assignments and general participation in school of the girl child.
- Water storage facility in the school and whether storage facility at home can also affect school participation.
- Domestic water use patterns in the household and its effect on girls participation in school.

Thus, the purpose of the study was to investigate access to rural water and its effects on girl child education in the Boti area in the YiloKrobo District. The study investigated the water supply systems characteristics; means of water supply to the household and its effects on participation of the girl-child in school in relation to attendance, punctuality, and completion of assignments. Other areas the study also investigated was the water storage facility in respondents' households and whether storage facility at home has any impact on the girl child education.

To guide the research, the study reviewed relevant literature pertinent to the study incorporating relevant existing body of knowledge in the field to guide the study.

5.2. Summary of Findings

The summary of the findings have been presented according to the thematic areas captured in the questionnaire in line with the objectives of the study.

5.2.1 Potable Water Supply Systems Characteristics and their Effects on Girls'

Participation in School

The study identified community public stand pipes and streams as the main source of water to the communities in which the study was undertaken. It also identified that although the communities have stand pipes and streams, getting access to the stand pipes becomes very difficult as long queues have to be formed before one gets access. Also, having access to the stream water was very difficult as one have to spend longer times at the stream especially during dry seasons. Types and location of water systems largely depend on the topography and hydrological soil content among others.

5.2.2 Means of Water Supply to Households and Girls' Participation in School

The study established that majority (82%) of the respondents fetch 3-5 gallons of water per day as revealed in table 4.16 above. The fact that girls are the tools with which water is supplied to households hinders the effective participation of girls in school.

5.2.3 Domestic Water Use Patterns in the Household and Girls Participation in School

From the findings, domestic water use patterns in the households indicated quick usage as stored water lasts for only a few days, as 65% of households, as indicated in figure 4.7, use stored water in three days. On the very steep end, 31% of households use up stored water within a day hence girls will need to use more time fetching water for the household. This time spent ultimately limits the time girls have to participate in school.

5.2.4 Methods of Water Storage in the Household and Girls Participation in School

Evidence from the study shows that majority of respondents 89% indicated that they stored their needed water in metal/plastic barrels, big clay pots and buckets as revealed in Figure 4.6 above. The findings revealed that households lack bigger storage facilities therefore cannot store enough water to last for long as majority of respondents said they store water for only three days.

5.3 Conclusion

The primary objective in this study was to ascertain how access to rural water affects girl child school attendance, punctuality, doing of home works and performance in examination. Most of the girls, as part of their domestic work, actively engage in fetching of water before and after school with the likely consequence being that their education will be hindered. The study found that, students perceived water hauling to be very disruptive of their school participation. As revealed in Figure 4.3, a substantial majority of respondents (63%) confirmed that, they have to wait in long queues in order to fetch water for their households before leaving for school. Based on the findings of this study, fetching water as household chore by girls, likely have negative consequences on their performance in school since it affects their punctuality, attendance and fatigue, and regular completion of assignments.

It is believed that domestic tasks affect schooling. In fact, households' demand for chores, including chores which must be accomplished at particular times of day, sometimes large and relatively inelastic, often impact negatively on the education of children. Water may have to be collected from long distances, before the day's primary meals prepared for the family.

5.4 Recommendations

Based on the findings of the study, the following recommendations were made for improvement on access to rural water and the girl child's education in Boti Area in the Yilo Krobo District.

It is recommended that the distance to stand pipes in the communities should be reviewed with a view to shortening distance to reduce traffic and time spent at standpipes to enable people have quicker access to water. In addition, existing standpipes should be improved to be more efficient in the supply of water.

It is recommended that Junior High Schools in the District should be provided with potable water to make them more attractive to girls.

It is recommended that households should be assisted to purchase reasonably sized water storage containers to reduce the number of times that girls have to fetch water for the household.

The Ministry of Education, in collaboration with the Ministry of Water Resource, Works and Housing, should develop a policy framework to oversee the achievement of the girl child school progress as well as provision of potable water sources

REFERENCES

- Amstrong, D., & Ashworth, M. (2000). When Response Rate Do Matter. *British Medical Journal*. Retrieved on 12/09/13 from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1313728/>
- Babbie, E. (2004). *The practice of social research*. Belmont, CA: Thomson/Wadsworth. Retrieved on 14/07/13 from http://books.google.com.gh/books/about/The_practice_of_social_research.html?id=-BFPAAAAMAAJ&redir_esc=y
- Bardley, M. N. (2000). *Barriers to Girls' Education in Ghana*. Retrieved on 25/05/2013 from http://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1102&context=uhp_theses
- Bartram, J., Lewis, K. Lenton, R., & Wright, A. (2005). Focusing on Improving Water and Sanitation for Health. *The Lancet*, 365, 810-12.
- Behrman, J. R. (1997). Nutrition, health, birth order and seasonality: Intrahousehold allocation among children in rural India. *Journal of Development Economics*, 28(1), 43-62.
- Birdsall, N. (1991). 'Birth order effects and time allocation.' In T. Paul Schultz (Eds), *Research in population economics*. (vol. 7), pp. 191-213. Greenwich, Conn and London: JAI Press.
- Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational researcher*, 34(6), 3-15. Retrieved on 15/12/2013 from www.sagepub.com/mertensstudy/articles/Ch_3-1.pdf
- Bradley, R. M. (2004). Forecasting Domestic Water Use in Rapidly Urbanizing Area in Asia. *J. Environ. Eng. ASCE*, 130 (4), 465-471.

- Bresline, E. (2007). Sustainable water supply in developing countries. The Geological Society of America. Pap. No. 194-1.
- Brown, P. H., & Park, A. (2002). Education and Poverty in Rural China. *Department of Economics, University of Michigan, Ann Arbor, MI 48109-1220, USA*
- Cairncross, S., & Cliff, J. L. (1987). Water Use and Health in Mueda, Mozambique. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 81, 51-54.
- Cairncross, S. (1990). Water Supply and the Urban Poor. In J. Hardoy, S. Cairncross & D. Satterthwaite (Eds), *The Poor Die Young: Housing and Health in Third World Cities* (pp.109-26). London: Earthscan Publications, Ltd.
- Charmes, J. (2006). A Review of Empirical Evidence on Time Use in Africa from UN Sponsored Surveys. In C.M. Blackden & Q. Wodon (Eds, *Gender, Time Use, and Poverty in Sub-Saharan Africa*. (World Bank Working Paper No. 73), 39-72. Washington D.C : The World Bank.
- Chitrakar, J. (2005). Gender equity oriented education and pedagogy (in Nepali). In B. Phnuyal & T. Bhattarai (Eds), *Pedagogy for Social Transformation (in Nepali)*, pp.31-46. Kathmandu: Education Network Nepal & Action Aid Nepal.
- Chugh, D. (2004). Societal and Managerial Implications of Implicit Social Cognition: Why Milliseconds Matter. *Social Justice Research*, 17, 2.
- Croft, A. (2002). *Pedagogy in School Context: An intercultural study of the quality of learning, teaching and teacher education in lower primary classes in Southern Malawi*. Unpublished DPhil thesis. Brighton: University of Sussex.
- CWSA (1996) *Ghana Health & Environmental Assessment Project: Ghana*
- Dachi, H. A. & Garrett, R. M. (2003). *Child labour and its impact on children's access to and its participation in primary education: A case study from Tanzania*. London, DFID

- Davison, J., & Kanyuka, M. (1992). Girls' participation in Basic Education in Southern Malawi. *Comparative Education Review*, 36, 446-466 *Economics of Education Review*, Vol. 21.pp. 523-541. EFA Global Monitoring Report.
- DFID. (1998). *Guidance Manual on Water and Sanitation Programmes*. DFID, London.
- Ejrnæs, M. & Portner, C.P. (2002). *Birth Order and the Intrahousehold Allocation of Time and Education*. Retrieved 26/05/2013, from <http://web.econ.ku.dk/CAM/Files/workingpapers/2002/2002-09.pdf>
- Gadgil, A. (1998). *Drinking Water in Developing Countries*. *Annual Review of Energy and the Environment* 23: 253-86.
- GDHS. (2008). *Ghana Demographic and Health Survey. Fact Sheet*. Ministry of Health, Ghana
- Ghana Statistical Service (GSS PHC 2000). *Ghana Living Standards Survey*. Accra: Ghana Statistical Service.
- GII. (2009). *Ghana Mimics Global Failure to Fight Corruption*. GII Quaterly News Paper, December 2009 Issue.
- Gyau-Boakye, P., & Dapaa-Siakwan, S. (1999). *Gender solution to Ghana's rural water supply industries*. Water Resource Research Institute (CSIR) The Engineer on 16/12/2013 from [www. Africantechologyforum.com](http://www.Africantechologyforum.com)
- Gyau-Boakye P. (2001). *Sources of Rural Water Supply in Ghana*. Water International.
- Habila, O. (2005). *Groundwater and the Millennium Development Goals*, *Proceedings Groundwater and poverty reduction in Africa*. Int. Assoc. Hydrogeol. London
- Higa, M. (2011). *The Birth-Order Effect on Child Work and School Attendance in Peru*. (Thesis) Study Programme: Msc. in Economics Department of Economics Tilburg School of Economics and Management.

- Howard, G., & Bartram, J. (2003). Domestic water quantity, service level and health. Retrieved on 26/05/2013 from http://www.unicef.org/esaro/7310_Gender_and_WASH.html
- Hunter, N., & May, J. (2003). *Poverty, Shocks and the School Disruption Episodes among Adolescents in South Africa*. Centre for Social and Development Studies Working Paper, Issued No 153 on the 15/12/2013 from <http://sds.ukzn.ac.za/?3,6,773,4,0>
- Hutton, G., et al. (2007). Economic Aspects of Sanitation in Developing Countries. *US National Library of Medicine National Institutes of Health Journal of Educational Development*, 20:5-27
- Hutton, G., & Haller, L. (2004). *Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level. Water, Sanitation and Health Protection of the Human Environment*. World Health Organization: Geneva.
- Hutton, G., & Bartram, J. (2008). Global Costs of Attaining the Millennium Development Goal for Water Supply and Sanitation. *Bulletin of the World Health Organization* 86 (1), 13-19.
- Ivens, S. (2008). *Does Increased Water Access Empower Women Development?* 51: 63- 67.
- Jolly, R. (2004). Clean Water for All. In R. Black and H. White (Eds), *Targeting Development: Critical Perspectives on the Millennium Development Goals*, 273-91. New York:
- Karikari, K. (2000) Water supply and management in rural Ghana: Overview and case studies. In "Water Management in Africa and the Middle East. Challenges and Opportunities" (Edited by E. Rached, E. Rathgeber, and D. B. Brooks, Eds.). IDRC, Ottawa. On 16/12/2013\
http://books.google.com.gh/books?hl=en&lr=&id=m8gui7drw1YC&oi=fnd&pg=PA231&dq=Karikari+%282000%29+sources+of+drinking+water+in+Ghana&ots=s7r0H32Gjx&sig=_vtNDmQOgkCiy3afIxFWxzRhIU&redir_esc=y#v=onepage&q&f=false

- O'Hara, S., Hannan, T., & Genina, M. (2008). *Assessing access to safe water and monitoring progress on MDG7 target 10 (access to safe water and basic sanitation): Lessons from Kazakhstan*. *Water Policy* 10: 1- 24.
- Oduro, A. D. (2000). *Basic Education in Ghana in the Post-Reform Period*. Accra: Centre for Policy Analysis.
- Panda, S. M. (2007). *Mainstreaming gender in water management: A critical view*, *Gender, technology and development* 11; 321. Paris: UESCO
- Porteus, K., et al (2000). 'Out of school' children in South Africa: an analysis of causes in a group of marginalised, urban 7 to 15 year olds. *Support for Learning*, 15(1): 8-12
- Pryor, J., & Ampiah, J. G. (2003). *Understandings of Education in an African Village: The impact of Information and Communications Technologies*. London: DFID. Routledge.
- Shah, T. (2004). *Groundwater and human development: Challenges and opportunities in livelihood and environment, Proceedings*. Stockholm World Water Week.
- Simpson, R. (2006). *Universal Access in the Water and Sanitation Sector. In Liberalisation and Universal Access to Basic Services*, 97-134. Organisation for Economic Co-Operation and Development and World Bank (joint publication): London.
- Study. A research paper published by the International Development Research Centre. Supply industry? Water Resources Research Institute, Accra, Ghana.
- Sutton, S. (2008). *The risks of a technology-based MDG indicator for rural water supply*. Paper presented at the 33rd WEDC International. Retrieved from www.source.irc.nl
› ... › [Source news sec...](#) › [Technology Update](#) .15 /12/2013
- Tay, V. (2005c) *The Education Millennium Development Goal: What water, sanitation and hygiene can do for Ghana?* Well Country Note 2.1, TREND, Kumasi, Ghana. pp.1-4

- Todd, D. K. (1980). *Groundwater hydrology*, John Wiley. United Nations, 2000. Millennium Development Goals on water.
- UN (2008a). International Decade for Action: Water for Life 2005-2015. United Nations water report.
- UN MDGs. (2011). Report: The Global Partnership for Development, Time to Deliver MDG 8 retrieved from <http://www.un.org/millenniumgoals/reports.shtml> on 15/12/2013
- UN World Water Day. (2013). *International Year of Water Corporation* retrieved 22/07/2013 from www.unwater.org/watercorporation
- UN. (2004). Gender Water and Sanitation Brief: *Report of the World Summit on Sustainable Development*, Johannesburg. Retrieved from www.un.org/waterforlifedecade/pdf/un_water_policy_brief_2_gender.pdf on 16/12/2013
- UNCSD. (2001). *The ninth session of the UN Commission on Sustainable Development* (CSD-9) met at UN Headquarters in New York on 5 May 2000 and from 16 to 27 April 2001.
- UNDP. (2010). The Right to Water: Fact Sheet No. 35. *Office of the United Nations High Commissioner for Human Rights*, Palais des Nations, 8-14 avenue de la Paix, CH-1211, Geneva 10, Switzerland.
- UNESCO (2003). EFA Global Monitoring Report 2003/4: *Gender and Education for All: The Leap to Equality*. Paris: UNESCO.
- UNESCO (2006) Water a Shared Responsibility; The United Nations World Water Development Report 2
- UNESCO. (2005). *Guidelines for Inclusion: Ensuring Access to Education for All*. Paris retrieved on the 15/12/2013 from www.unesco.org/bpi/pdf/iatt_equity_inclusion_tools_042008_en.pdf

- UNESCO. (2009). GLOBAL EDUCATION DIGEST 2009. *Comparing Education Statistics Across the World*. Institute of Statistical Research
- UNICEF (2009). Report on Millennium Development Goals: Special Sections on Child Document; The Convention on Right of the Child: A world fit for children. UNICEF MDG report.
- UNICEF. (2010). *Gender and water, sanitation and hygiene (WASH)*. Retrieved 27/05/2013 from www.unicef.org/esaro/7310_Gender_and_WASH.htm
- United Nation. (1995). *Report of the Fourth World Conference on Women: Beijing*. New York 1996.
- United Nations Development Programme, Human Development Report (2006). *Beyond Scarcity- Power, poverty and the Global Water Crisis*. Basingstoke. United Kingdom. Palgrave Macmillan.
- United Nations Development Programme. (2006). *Human Development Report 2006 - Beyond scarcity: Power, poverty and the global water crisis*. New York: United Nations Development Programme.
- WaterAid. (2007). “Global cause’ and effect: How the aid system is undermining the Millennium Development Goals”. Retrieved 19/06/2013 from <http://www.ohchr.org/Documents/Publications/FactSheet35en.pdf>
- WHO (2006). Geneva Conference on Water and Sanitation from May 15-19
- WHO (2009). *Water, sanitation and hygiene standards for schools in low-cost settings*. ISBN: 78 92 4 154779 6
- WHO and UNICEF, (2008). “*Progress on Drinking Water and Sanitation: special focus on sanitation* retrieved http://www.who.int/water_sanitation_health/monitoring on 12/04/13

- WHO and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation. (2004). *Meeting the MDG Drinking Water and Sanitation Target: A Mid-Term Assessment of Progress*. Geneva:
- WHO. (1981). Health Programme Evaluation; Its Principles for its Application in the Managerial Process for National Health Development. *Health for All Series*. Vol No. 6
- WHO/UNICEF. (2000). *Global Water Supply and Sanitation Assessment Report*. 2000 World Health Organization and United Nations Children's Fund.
- WSMP (2009). Status of Ghana's Drinking Water and Sanitation Sector. Retrieve 11/11/13 from www.wsmp.org/downloads/country-summary-sheet09.pdf
- WWDR. (2009). The United Nations World Water Development Report. WWDR. UNESCO retrieved on 07/ 03/2012 Publications www.rwsn.ch

APPENDIX**QUESTIONNAIRES**

**INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH
(ISSER)**

UNIVERSITY OF GHANA, LEGON

Master of Arts in Development Studies

**Access to Rural Water and its Effects on Girl-child Education in Boti
Area in the Yilo Krobo District Student interview schedule**

MARCH 27, 2013

INTRODUCTION

Good-day,

My name is **Mohammed Ben Abdallah**. I am a student of Masters of Arts in Development Studies at ISSER, University of Ghana. As part of requirement for the programme, I am undertaking a research on **Access to Rural Water and its Effects on Girl-child Education in Boti Area in the YiloKrobo District**. The interview will take approximately fifteen minutes. The answers given during the interview will be kept absolutely confidential and anonymous. Participation is voluntary, but I would really appreciate it if you could spare some of your time for this interview.

Thank you.

- | | | |
|-------------------|-------------------------|----------------|
| 1. Region | 2. District | 3. Community |
| 4. School Circuit | 5. Name of School | 6. Interviewer |
| 7. Date | 8. Questionnaire number | |

A: BIO-SOCIAL CHARACTERISTICS OF SCHOOL CHILDREN

9. Sex of respondent A. Male { } B. Female { }

10. Age range of respondent (completed years)

11. Stage or Class of respondent

Education Level	Stage/Class	Tick
Primary		
	P.4	
	P.5	
	P.6	
Junior High School (JHS)	Stage/Class	Tick
	JHS.1	
	JHS.2	
	JHS.3	

12. Total household members (size). Please state.....

13. Do you live with your biological parents? (01) Yes (02) No

14. If no, who do you live with? (01) Aunty (02) Uncle (03) Brother/ Sister
(04)

Grandparents (05) Other relatives

15. What is the main occupation of your Father?

(01) Farming { } (02) Animal rearing { } (03) Hunter { } (04) Petty trading { }

(05) Technicians & associate professionals { } (06) Skill agric. & fishery workers { }

(07) Craft & related workers { } (08) Plant & machine operators { } (09) Armed
forces & other security personnel { } (10) Homemaker { } (11) In school { } (12)

Legislators/ senior official & managers { } (13) Teacher { } (14) Don't know (15) other
specify.....

16. What is the main occupation of your Mother?

(01) Farming { } (02) Animal rearing { } (03) Hunter { } (04) Petty trading {
}

(05) Technicians & associate professionals { } (06) Skill agric. & fishery workers
{ }

(07) Craft & related workers { } (08) Plant & machine operators { }

(09) Armed forces & other security personnel { } (10) Homemaker { }

(11) In school { } (12) Legislators senior official & managers { } (13) Teacher { }

(14) Don't know (15) other specify.....

17. Mother's level of education

- (01) None { } (02) Primary { } (03) Middle/ JHS { } (04) Voc/Comm. { }
 (05) SHS { } (06) A level { } (07) O level { } (08) Training college { }
 (09) Technical { } (10) Tertiary { } (11) Koranic { } (12) Don't know { }
 (13) Other specify.....

18. Father's level of education

- (01) None { } (02) Primary { } (03) Middle/ JHS { } (04) Voc/Comm. { }
 (05) SHS { } (06) A level { } (07) O level { } (08) Training college { }
 (09) Technical { } (10) Tertiary { } (11) Koranic { } (12) Don't know { }
 (13) Other specify.....

B. POTABLE WATER SUPPLY SYSTEMS CHARACTERISTICS AND THEIR EFFECTS ON GIRLS PARTICIPATION IN SCHOOL

19. What type of water sources do you have in this community?

20. What is/are your main source(s) of water for the household?

- (01) In house plumbing (02) Community public source (03) Community borehole
 (04) Outside community borehole (05) River or stream (06) Tanker services

21. Does your school have access to potable water on the premises? (01) Yes (02) No

22. If no, how do girls clean themselves during their monthly flow?

23. Where is your main water source located? (1) Far from home (2) close to house (3) In house pipe borne. (4) Other.....specify

C. MEANS OF WATER SUPPLY TO THE HOUSEHOLD AND GIRLS PARTICIPATION IN SCHOOL

24 Describe availability of water from different sources:

	Uninterrupted flow	intermittent flow	rare flow
In house plumbing			
Community public source			
Community borehole			
Outside community borehole			
River or stream			
Tanker service			

25. On the average, how many minutes do you spend fetching water in a day?

26. Describe the pattern of water fetching in your household.

- i. 1st adult woman -----
- ii. 2nd adult woman -----
- iii. 1st adult man -----
- iv. 2nd adult man -----
- v. 1st boy ----
- vi. 2nd boy -----
- vii. 3rd boy -----
- viii. 1st girl -----
- ix. 2nd girl -----
- x. 3rd girl -----
- xi. Self -----

27. How many times do you fetch water in a week?

28. At what time (s) of the day do you fetch water?

29. In your view, who spends the most time fetching water in the household?

.....

30. Explain why [name] spends the most time fetching water at home (01) long queue (02) long distance (03) flow of water (04) other.....

31. Do you fetch water for other households? (01)Yes (02) No

32. If yes to Q.26 are you paid for fetching water for other households?

(01) Paid ----- (02)Not Paid -----

33. Describe your punctuality at school

(01) Punctual at school for five days a wk (02) Punctual at school for four days a wk

(03) Punctual at school for three days a wk (04) Punctual at school for two days a wk

(05) Punctual at school once a wk

34. If you are punctual for less than four days in the week what accounts for this?

.....
.....
.....

35. Describe your school attendance

(01) Attend school for five days a wk (02) Attend school for four days a wk

(03) Attend school for three days a wk (04) Attend school for two days a wk

(05) Attend school once a wk

36. What do you often do after school?

.....
.....

37. Do you participate actively in class? (01) Yes (02) No

38. If no, why?

.....
.....

39. Do you do your homework and assignments regularly? (01) Yes (02) No

40. If no, why?

.....
.....

41. Have you been consistent with your performance at school? (01) Yes (02) No

42. If no, what do you think accounts for this?

.....
.....

43. How does fetching water affect your education? (01) Positively (02) Negatively (03) DK

44. If your answer to question (42) above is (01), how does it negatively affect you?

.....
.....

D. DOMESTIC WATER USE PATTERNS IN THE HOUSEHOLD AND GIRLS PARTICIPATION IN SCHOOL

45. What do you use water for most at home?

(01) Cooking (02) Cleaning (03) Washing (04) Bathing (05) Drinking (06)
Other (specify)

46. Do you use water for commercial cooking? (01) Yes (02) No

47. Can you tell the quantity of water generally used by your household in a day?

48. Does your household purchase water? (01) Yes (02) No

49. If yes, how much does your household spend on water in a day (cedis)?

D. METHODS OF WATER STORAGE IN THE HOUSEHOLD AND GIRLS PARTICIPATION IN SCHOOL

50. Does your household store water at home? (1) Yes (2) No

.....

51. If you store water, in what type of storage facility? (1) Metal/plastic barrel (2) Big clay pot (3) Jeri cans (Kuffour gallons) (4) Buckets (5) other specify.....

52. Are storage facilities covered (1) Yes (2) No

When you store water, how long does it last? (1) A day (2) Three days (3) A week (4) other

53. In what ways can access to potable water affect girls participation in school? List effects

.....
.....
.....

54 What other factors affect girls' participation in school? List them

.....
.....
.....

55. What are some of the problems faced in collecting water?

- A. Shortage of water { } B. Long distance (Km) { } C. Long queues { } D. Unsafe water { }
- E. Fighting with others { } F. Fatigue { } G. Sexual harassment { }
- H. Other(s), specify.....

56. Do you have any other information to add in this regard?...

.....
.....

THANK YOU

FGD GUIDE (Key informant, Teachers and Girl Child Coordinator)

1. What are the basic problems in the community?
2. What are the main sources of water used for drinking, cleaning, cooking, washing etc in
in
this community?
3. Generally, how long does it take to move to and fro the source of water?
4. What distance is covered in kilometers (Km)?
5. Which categories of household members usually go to this source(s) to fetch water?
6. On the average how many times do people fetch water in a day?
7. Can water hauling affect girls' participation in school attendance, punctuality, fatigue and the completion of assignment?
8. Is there sufficient water for all community members at any time?
9. Do the dry and rainy seasons affect access to water in this community?
10. Overall, does access to water, time spent and distance covered affect girls' participation in school?
11. What other factors affect girls' participation in school?
12. What are some of the problems faced in collecting water?
13. Your suggestions for improving water access and child education?

INTERVIEW GUIDE (Key Informants CWSA, WATSAN,)

1. What are the basic problems in the community?
2. What are the main sources of water used for drinking, cleaning, cooking, washing etc in this community?
3. Generally, how long does it take to move to and fro the source of water?
4. What distance is covered in kilometers (Km)?
5. Which categories of household members usually go to this source(s) to fetch water?
6. On the average how many times do people fetch water in a day?
7. Can water hauling affect girls' participation in school attendance, punctuality, fatigue and the completion of assignment?
8. Is there sufficient water for all community members at any time?
9. Do the dry and rainy seasons affect access to water in this community?
10. Overall, does access to water, time spent and distance covered affect girls' participation in school?
11. What other factors affect girls' participation in school?
12. What are some of the problems faced in collecting water?
13. Your suggestions for improving water access and children education?
14. How are water source maintained in the communities?
15. What are various user fees to household?