Impact Evaluation of MCC/MiDA Water Project

Report on Qualitative Study

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December 18, 2014

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ABBREVIATIONS AND ACRONYMS

UNICEF	United Nations Children's Fund
MCC	Millennium Challenge Corporation
MiDA	Millennium Development Authority
USAID	United States Agency for International Development
MDGs	Millennium Development Goals
UN	United Nations
UNDP	United Nations Development Programme
NDPC	National Development Planning Commission
GOG	Government of Ghana
GII	Ghana Integrity Initiative
STWS	Small Town Water Systems
TWEP	Tamale Water Extension Project
NAZ	Northern Agricultural Zone
ABZ	Afram Basin Zone
SHZ	Southern Horticultural Zone (SHZ)
FGD	Focus Group Discussions
ADB	African Development Bank
WATSAN	Water and Sanitation Committee
DANIDA	Danish International Development Agency
GHS	Ghana Health Service
OHCHR	Office of the High Commissioner for Human Rights
GHC	Ghana Cedi

EXECUTIVE SUMMARY

In 2004, the United States government established the Millennium Challenge Corporation (MCC) to provide external aid to developing countries that showed progress in the areas of governance, human development and adoption of free market economic policies (Tarnoff 2014; Hewko 2010). The overarching goal of the corporation is to promote sustainable reduction of poverty through growth. Ghana is one of the beneficiaries of this initiative. The parliament of the Republic of Ghana authorized an act to establish the Millennium Development Authority (MiDA), mandated to oversee and manage the implementation of the Ghana Program.

The first five-year compact (2007-2012) signed between the MCC and MiDA led to the disbursement of $547 million that was utilized in the execution of projects in agriculture, transportation and rural development (MiDA 2013). Under the rural development component of this compact, water infrastructure was successfully completed, including pipe extensions, small town water systems, and standalone boreholes fitted with hand pumps.

A qualitative study was conducted in August 2014, aimed at informing an incoming survey for impact evaluation by providing valuable information on the communities' progress in implementing water infrastructure and receiving benefits. We used a qualitative study, focus group and key informant interviews, mainly for an exploratory purpose, understanding how the project was implemented and how communities value the water project, documenting direct and indirect impacts, unwrapping issues that were overlooked in the design, and understanding project's sustainability. Further, we also took this as an opportunity to explore if the control communities are still valid for doing survey and comparing the results.

Water is generally the central resource around which rural communities are founded, to the extent that two of the communities studied are named after their natural water source (Communities A and H). Typically, the old water points in the study were disparaged by focus group discussants as causing diseases, dirty, and unhygienic. As such, all of the communities had direct need for improved water infrastructure prior to the MiDA intervention. Generally, respondents construe the level of consultation and participation of community members to be either insufficient or skewed to involve only the community elders. In spite of this, community members viewed decisions on the water projects as highly technical and therefore did not feel discontent for being excluded.

The positive impacts of the MiDA projects on the health of community members were expressed in the focus group discussions and key informant interviews. The respondents spoke about reduction in the incidence of water and sanitation related diseases in connection with the water projects, such as diarrhea, typhoid, guinea worm infestation and bilharzia. Respondents indicated that school attendance and general hygienic practices have also improved, both for themselves personally, and also in the community at large. Although the entire communities seem to derive these gains, the gender analysis point to women in the study of the communities as the greater beneficiaries of the projects, particularly in terms of time savings for economic activities, and in easing their housework burden. The major challenges associated with the project were related to management, sustainability and maintenance.

While these findings are encouraging, because of small sample size, the findings might not be generalizable to all communities that received water infrastructure. A representative survey, which is planned for February 2015, can validate these findings.

INTRODUCTION, BACKGROUND, AND THE STUDY DESIGN

Introduction

The right to safe and clean drinking water was adopted in resolution 64/292 by the United Nations General Assembly as a human right in July 2010. Despite this and the numerous interventions undertaken by the global community, access to clean and adequate water still remains a major obstacle to human development. It is estimated that 780 million people do not have access to improved drinking water (UNICEF 2012). The intensity of the water problem varies from one region to the other; for instance, water supply is a greater problem in sub-Saharan Africa than in other regions of the world (Freitas 2013). The United States Agency for International Development (USAID) notes that 39 percent of the population in sub-Saharan Africa did not have access to sources of improved water in 2012 (USAID[1]). Rural and urban differentials in water supply also exist. In 2010, 96 percent of the global urban population had access to improved water compared to 81 percent of the rural population (UNICEF 2012).

Improvement in the quality and supply of water is crucial for the achievement of the Millennium Development Goals (MDGs). Target 10 under MDG 7 specifically seeks to reduce by half "the proportion of people without sustainable access to safe drinking-water and sanitation." Availability of clean water is also central to the achievement of the other MDGs. For instance, achievements of the goals on child mortality and maternal health are reliant on the availability of clean water. According to the UN, nearly 1.5 million deaths of children under the age of 5 are attributable to water and sanitation related diseases. The burden of some water borne diseases (i.e. Guinea Worm Disease and Schistosomiasis) is also likely to be reduced when people have access to protected sources of water.

In Ghana, the formulation of a national water policy in 2007, as well as the implementation of specific activities contained in national medium term development frameworks has culminated in increased water supply. In fact, target 10 under MDG 7, which seeks to reduce the proportion of the population without access to safe drinking water by half, has been achieved (UNDP and NDPC 2012).

Although this target has been achieved, extension of water facilities and infrastructure to populations without access remains crucial for a number of reasons, including the following:

[1] Water and Development Strategy 2013-2018. Retrieved Tuesday 14 October 2014 from http://www.usaid.gov/sites/default/files/documents/1865/USAID_Water_Strategy_3.pdf

- Available data shows that 16 per cent of the Ghanaian population does not have access to safe water (World Bank 2011). The data also show that water supply is a much bigger challenge to rural dwellers than to urban households.
- The proportion of the population without access to safe water in rural areas is more than three times the proportion in urban areas (NDPC/GOG 2012).
- Water scarcity is more intense in the three northern regions of Ghana than in the south (GII 2011).
- Water scarcity is more intense in the dry season than in the rainy season.

In 2010, MCC funded water projects in water-stressed communities in Ghana through MiDA, a government organization established by the Parliament of Ghana, under Act 702 and later amendment Act 709, to serve as the agent accountable for the implementation of the Compact. Four types of projects were implemented in the program communities:

- boreholes fitted with hand pumps in small communities,
- small town water systems comprised of a lift system for water pump and distribution,
- pipe extensions (from Ghana Water Company Limited network in the southern sector), and
- the Tamale water extension system in the north that extended the piped-water delivery system to surrounding communities.

The theory of change behind the MCC/MiDA water activity is that by improving water systems in districts participating in the Compact, the households' economic productivity and income will increase. This increase could reduce unproductive time spent caring for the sick, and/or collecting water. Since the quality of water will be improved by the project, the prevalence of illness, particularly diarrhea, will be reduced and the overall health status will improve. In addition, the water activity could help shift time formerly reserved for collecting water to income producing activities, especially agriculture.

Selection of intervention communities by MiDA

The Water component of the Rural Development Project's Community Services Activity was designed to provide improved water systems to 137 selected communities in the intervention area in Ghana. Over the course of the project, a total of 392 water points were constructed and rehabilitated, including boreholes, small town water systems, and pipe extensions.

MiDA developed a system to select intervention communities with a point system. A maximum total possible point of 110 was set to facilitate the selection process (NORC 2011). Factors that were taken into consideration while selecting intervention communities were:

1. *Adequacy of water*: The point was based on enough standpipe or borehole for each of 300 persons in the communities. Other factors that were considered for estimating adequate water were water quality and difficulty in getting water from source to surface. An inadequate community received 15 points and adequate received "0" point.

2. *Presence of guinea worm disease*[2]: This was based on cases reported to the health center, assigning endemic communities 50 points, and non-endemic 30 points.

3. *Quality of water*: This was based on observation and subjective assessment. If the water quality was not acceptable, 10 points were given, and if it was acceptable, "0" point.

4. *Distance to water source*: If the water source is above the threshold (set at 500 meters), the communities got 20 points, and if they were below the threshold, they would receive "0" point.

5. *Community participation*: Whether the community had past experience of raising money for improving other infrastructure was taken into consideration. A community with a good track record of participation could get 15 points, and a poor record received 10 points.

The communities within each district were ranked based on their total score and the total cost of the water project with lower cost getting higher score. Communities were selected starting from the highest score, until the allocated district budget was exhausted. Not all eligible communities received the water intervention because of budget constraints.

This process demonstrates that MiDA selected the communities that were similar in water adequacy, prevalence of disease (Guinea worm), water quality, distance to water source, and community participation. Impact evaluation will look at how these factors were improved after the intervention.

Funds for water infrastructure was allocated to all districts based on the weighted average of the concentration of Farmer-Based Organizations-FBOs, and the relative position of the district in regards to the poverty index, with poor districts getting more funds. Eligible communities were selected based on if there was at least one FBO.

While the point system for selecting the communities looks scientific, MiDA officials explained in our December 2013 discussion that this system was not strictly followed, as the communities with schools received priority. This is also mentioned in the baseline report (NORC 2011).

Selection of control groups

Control communities were communities located within MiDA program areas that were considered eligible to receive water improvement services, but had not received such improvements from MiDA. Lack of funds was cited as one of the reasons they were not provided water infrastructure[3] in all water stress communities. Nevertheless, these control communities received other support from MiDA. During the selection of control groups, the baseline Contractor calculated the distance

[2] Ghana government declared that Ghana is free from Guinea Worm in July 2011, which was the result of continued efforts of government and the international communities for years. So the question asking prevalence of Guinea Worm in communities is absolute although some respondents recall higher Guinea Worm infestation before the intervention and now they report there is none.

[3] Discussion is MiDA office in Accra, December 2013

between two units, and the closest unit was selected as a match. Altogether 50 control and 50 intervention communities were selected using this technique. Before calculating the distance between two units, recoding was done to most of the variables, both of which were fixed, such as elevation or temperature, and changing variables like water quality, adequacy, distance, etc. Recoding of the variables was done, creating sets of up to nine different values. For example, if it is water inadequacy (as it has the highest point of 15), the coding was done 0: 0; 1: 0-5, 2: 5-10; 3: 10-15, creating up to 4 levels for water inadequacy (NORC 2011). The factors that were used to match the control and intervention communities were:

- Health problem, specific to Guinea worm problem
- Inadequacy of water
- Water quality
- Distance to water point
- Community participation

Other factors that were considered while matching were:

- Poverty
- Population
- FBO number

Some physiographic variables (e.g., elevation, slope, humidity, rainfall, etc.) that are not impacted by the water infrastructure were also used in matching.

Our qualitative study was based on assessing how several of these factors (water quality, quantity, distance travelled, diseases, etc.) changed after the intervention. For example, in FGD and KII the beneficiaries expressed improvements in distance travelled to fetch water (they are now able to fetch water within communities), availability of more water, and reduction in disease. In several FGDs, the participants expressed improvement in water quality as we documented:

> *It (pipe) is good for drinking and bathing for me* …A female participant in Community 'C'
>
> *When it comes to health, the pipe is clean and healthy as compared to the river that was bringing us sickness...* A female participant in Community 'B'

In some KIIs, the informants reported that the distance travelled to fetch water has decreased in intervention communities, as stated below:

> *Because, previously, it was very difficult to get water. You can even wake up 6am in the morning and you go to fetch water from the river, you may come back home about 11am and you will not get water. That time it was difficult for the school children to go to school early. So as for the water, we have benefitted a lot…* An informant in Community 'T'

> *I have enough time for my activities without thinking of how to get water…*An informant in Community "S"

But the problem persists in some control communities, as expressed by an informant:

> *The water is seasonal and when it is dry season, we have to go to the river. People get upset too because they pay for the year and don't get water during the dry season. When it is the dry season, the water does not flow so we suffer a lot which leads us to going to the river to fetch water…* Female informant in Community 'O'

We explored if there is a new water project added or improved to the existing project after 2011 in the control communities. We did not find the control communities had a new infrastructure added, or that they greatly improved the existing infrastructure. Table A3 (Appendix) shows where these communities are in terms of water adequacy.

Objectives of the Study

How does the qualitative study fit into the context of the evaluation?

The broader objective of the qualitative study was to inform the impact evaluation by providing valuable information on where the communities stand in regards to implementing water infrastructure and getting benefits from the project. The impact evaluation design is based on quantitative method using pre and post project intervention data collected from 1,200 households in 100 communities. We use qualitative study mainly for an exploratory purpose of understanding how the project was selected and implemented, and how communities value the projects, documenting the direct and indirect impact of the project, unwrapping issues that were overlooked in the design, and understanding sustainability of project. Another important objective was to see if the control communities are still valid for comparing the results.

In the context of the large evaluation study, the qualitative study provides better understanding about the project, capturing the demand side perspectives of the MCC/MiDA project. It specifically explores what were the issues during the implementation, how communities were consulted, the level of community participation, the sharing of benefits, sustainability and any other issues that the study team was not aware of.

There are two ways that we foresee using the information that we collected from the qualitative study:

1. The qualitative study was meant to inform our survey by providing information specific to local context. As mentioned earlier, some of the issues might be missed in the design and baselines, and identification of additional issues not only provides a better picture, but also provides opportunity to examine them more closely. For example, in some communities, people speak of the taste of water as a deciding factor for them to determine where to fetch water. We need to explore this issue in great detail to determine its magnitude, and if this is causing an issue for getting enough water from a protected source.

2. Another use of qualitative data is to back the findings from the survey. We plan to use qualitative findings to back up the findings from the survey, and to explain underlying causes and mechanisms of producing certain results.

In short, the qualitative study provides additional perspectives that can help to steer the analyst toward asking the right questions, addressing the sources of bias if any, and to construct the best indicators. Additionally, it can be used to provide context and triangulate findings to support (or to refute) statistical attribution.

The study sought to elicit relevant data to inform the survey on the experiences of the community members regarding the following:

- issues regarding the implementation of the MiDA drinking water projects, with respect to the negative and positive factors that affected the implementation
- impact of the water project on the lives of people; e.g., disease reduction, amount of time saved
- functioning of the water project, reaching the intended/unintended beneficiaries
- addition of new water project(s) funded from different sources
- main issues for sustainability of the water project

Methodology

Qualitative study was carried out in communities of MiDA project areas, distributed among the three zones (See Tables A1 and A2 in the Appendix). The main data collection techniques were focus group discussions (FGDs) with community members and key informant interviews (KIIs), mainly community leaders, educationists, and opinion leaders in the communities.

Sampling

One of the challenges of this study was that the intervention was not uniform, i.e. some communities received boreholes, some received small town water systems comprised of a lift system, and some received piped delivery through the Tamale Water Extension System. The type of intervention might have different impacts on peoples' lives. For example, in areas where electricity is used for water distribution, people are paying more money compared to people in borehole areas,

and still facing irregular water supply because of power outages. Another challenge of the study is that the project was not implemented in the same geographical area. To understand the impact of the water project on people's lives, the design needs to include each of the geographical areas in the study sample to get insights into the types of impact on the different regions. For example, the northern sector is dry compared to the southern sector, and this may cause different impacts among the communities, as communities in dry areas may not have enough water available. Selecting communities for qualitative study was based on these facts. We tried to diversify the communities in the study as much as possible by including communities from northern and southern regions, with different types of interventions (borehole, small town water system, or Tamale Water Extension System).

As mentioned above, the challenge was to cover diverse types of intervention in diverse regions, so doing a few FGDs with only certain types of intervention in one or two regions would not provide a great deal of insight on project and impact (if we divide intervention and control communities equally given the fact we had small sample size of ten[4]). For FGDs, we selected the following intervention by region:

Northern Agricultural Zone (ABZ):

- One borehole
- Two TWEP

South Horticultural Belt (SHB):

- Three boreholes
- One Small Town Water System

Afram Basin Zone (ABZ):

- One borehole
- Two Small Town Water Systems

Basically, the selection of study communities was based on region, the nature of intervention, and population size. First, we created a list of communities that satisfy our need and selected ten for FGDs considering accessibility. In assigning male, female, and mixed, we tried to diversify the intervention type for each group so that more issues around gender aspect could be captured.

[4] This number has been mentioned in the proposal, in the design, study protocol, and also in the scope of work (SOW) provided to the survey firm. We picked 10 FGDs just to get insights into qualitative aspects of project impact and estimated our human and financial resources accordingly.

The following list shows region and types of FGDs:

ABZ:

- One all-female
- One all male
- One mixed

SHB:

- Two all-female
- Two mixed

NAZ:

- One all-female
- One all male
- One Mixed

We selected intervention communities for FGDs for the following reasons:

1. Our original plan for FGDs was ten, so dividing the total sample into intervention and control would further reduce the small sample size. This cannot provide much insight on project and project impact, so we decided to do FGDs only in intervention. Additionally, further reduced sample size would not be able to answer our questions, as we need to obtain insight from diverse project types and regions.

2. Many of the questions that we were interested in exploring revolve around the MiDA water project, relevant to intervention communities, e.g., context of intervention, community participation, sustainability issues, etc. Including as many communities representing different regions and types of intervention in intervention communities could shed light on these research questions.

The selection of communities to study was carefully designed to enable insights and understanding of the nuanced and diverse ways in which the MiDA water infrastructure impacts the lives of the community members. It was also important to pay attention to the ethnic narratives and emic perspectives on the impacts of the projects on the entire lives of community members. The characteristics of selected communities were heterogeneous to elicit insights into the contextual factors and different determinants of the impact of the projects on the wellbeing of community members. As such, the characteristics of communities are diverse.

The diversity in community characteristics is to reveal the nuanced impact of the water infrastructure under different circumstances and in different contexts. In this qualitative study, the selection of communities was not aimed to be representative. The background of members of the focus groups was diverse, reflecting diversity in occupation, age, religious background, and level of influence in the community. There were both single sex and mixed sex focus groups. Single sex and mixed sex groups were assigned to different types of water projects to get insight as to whether or not the type of water project has a different impact for males and females.

In general, focus groups had 8-10 participants, and we tried to include participants from different parts of the communities. Further, we also tried to include at least one non-user to understand why they are not using water from an improved water source. A screener was used to select residents that satisfy our selection criteria, described below:

- Two household heads/spouse farthest from the water point
- Two household heads/spouse around mid-point of the water point
- Two household heads/spouse close to the water point
- Two participants who might be on the water committee and/or water salespersons

Prior to FGD one member of the study team visited the community, consulted the local leaders and water committee people, briefed the study plan, and selected the participants with their suggestions based on who was available and interested in participating in the study and met the criteria.

We engaged 96 community members in focus groups, 40 males and 56 females. Discussions were conducted and recorded in local languages and later transcribed into English. Still, for each of the predefined issues, transcripts were carefully reviewed to identify any patterns. In addition, content analysis was used to identify common words and themes expressed by participants across the different communities.

In key informant interviews, we included both control and intervention communities as we were more interested to know how the project was selected, how the decision was made regarding the water point location, management and sustainability of the water project, and the addition of new water projects in the communities. Asking questions on the addition of new water projects was aimed at assessing the validity of control communities, as we wanted to know if the control communities are still valid for comparison during the survey.

KIIs were done in ten communities[5], five from intervention and five from control. The reasons for selecting different communities for KIIs and FGDs are:

1. The questions that we wanted to explore through KIIs were slightly different than FGDs, although there were some overlaps. We were mostly interested in context of implementation,

[5] From the beginning our plan was to conduct 10 KIIs to get insight in the communities.

improvement in system, the function of the water project, and sustainability issues, targeted mostly to the leaders.

2. We wanted to know more about the communities, water project, and benefits people are getting through qualitative study, so we did KIIs in ten additional communities. Doing KIIs in the same FGDs community could triangulate some of the findings, but we could miss valuable information from other communities, as the higher the coverage, the greater the opportunity to learn from those places.

3. We were also interested in knowing if there was a new water project, especially in control, to assess the validity of control communities. In limiting our KIIs in FGDs communities, it would not be possible to achieve this goal.

In selecting communities we tried to balance them by regions. We included three communities from northern (one intervention and two control), three communities from Afram (two intervention and one control), and four communities from south (two intervention and two control), see Appendix A2. Further, while selecting communities we also reviewed prior water problem and included some from the communities that had high water problem (adequacy issue) and also considered accessibility factor as we were doing study in the rainy season.

A male and a female key informant were separately interviewed in each community. Key informants were targeted in this evaluation project because of their insights into the political systems of the communities and how these affect access and utilization of water and the sustainability of the project. Key informants are also strategically positioned to know the critical areas of impact of the availability or lack of water to community members in general. The inclusion of female key informants was expected to help elicit and decipher the gendered dynamics in the relevant issues of intervention and impact of MiDA projects on the lives of the community members.

The profile of key informants includes Assembly Members, Water and Sanitation Committee[6] Members, Community Organizers, and Retired Educationists. Prior to the interview, the interviewer visited the community and met with the local leaders and water committee, presented the interview plan, and, after the consultation, selected the key informants, one male and one female, and scheduled the interviews. We interviewed 20 informants.

Limitation

The small sample may not provide a comprehensive picture of what is going on in all of the intervention and control communities. For example, it may not provide greater insight on the gendered aspect of water effect, but whatever we have can be taken as manifested effects that can be greatly validated through the survey. The survey data can tell the exact magnitude of impact in those communities.

[6] This is used for committees with small communities with boreholes

COMMUNITY INVOLVEMNT IN INITIATING THE WATER PROJECTS

Introduction

Studies conducted in various places across the globe suggest that infrastructures that are executed with minimal community involvement are more likely to result in failure (Khang and Moe 2008; Dungumaro and Madulu 2003). As a result, inclusion of beneficiaries is critical in many project designs. The African Development Bank (ADB), which has been working to increase water supply through its Rural Water Supply and Sanitation Initiative, advocates for "community participation in the conception, design and implementation of water programs." It is expected that integration of the community in these critical stages of water programming would boost community ownership, management and sustainability (ADB 2005).

In comparison with other developmental projects, water projects are distinct in the sense that certain technical considerations are crucial in the determination of the appropriate site. The qualitative study reveals that for site selection, in some communities the contractor consulted the local community, mostly leaders, tested places suggested by the locals, and if technically feasible, placed the water points in those locations. In some communities there was not any community consultantation so the people were not aware about this.

The main areas explored under community involvement in MCC/MiDA water projects in Ghana center on the siting of water points and the management of water points as follows.

Technical Determination

Based on the analyses of transcripts (discussed below), it is clear that the siting of water points was based on technical and expert decisions on the most appropriate location. For example, in eight (8) FGD communities studied, there was no consultation with community members on where the water points should be sited. Respondents articulate how the construction company people came from the city to the community with gadgets to determine the area where the water point could be sited. From the interviews, it seemed that most respondents understood this process as purely technical and did not worry at all about being consulted in such decisions. They thus admitted that there was no room even for the involvement of community leaders in the determination of the siting of boreholes. We did not feel any indications of resentment, feelings of neglect, dissatisfaction and possible conflict with respect to the siting of the water points. Some of the remarks of respondents are:

> **Community 'J'**
>
> *Moderator: was there any meeting in the community to decide the location of the water points, sister?*
>
> *R6: there was no meeting. The people only brought a machine to test where they can get water. The marked the places where they could get the water (25 year old female, farmer).*

R9: it's the people themselves who determined the locations realized that there was water at most of the places but some were not good so they drilled the places which had good water (25 year old female, trader)
R3: they came with a map so I saw the name Community 'J'. That was when they told me that they were going to undertake a water project in the community. They said they were coming to mark the locations so they marked various place before they brought their machine to do the drilling (44 year old male, farmer).

Community 'A'
M: Did you decide where to drill the borehole?
R: It was MIDA after consultation with the elders of the village
R: When they came, they brought a device with a light and put something there and they said that's the place they will drill. They used the same strategy for all the 4 bore-holes

Community 'H'
M: Did the whole town discuss where they wanted the pipe to be built?
R7: When they came they used a machine to go round the village and test the ground. The machine picked two places and they chose one. We did not choose; the machine did (20 year old male, trader).

Community 'B'
M: Did you all meet to decide where to build the pipe?
R3: I don't know (20 year old female)
R9: At first it was a (well) and they told us it will be used for the pipe (46 year old female, trader/farmer).
M: So there wasn't any discussion?

Community 'F'
M how were the sites selected for the boreholes.
R4: the engineers checked down and use a machine to detect where there was enough water then chose the sites according to their findings. World Vision did one that was built by Indians. MIDA did 2, one at the school and the other is on the way to the next village (54 year old male, farmer).

Community Consultation

Although community preference for locations may not necessarily result in the selection of the most suitable sites, the process of seeking the participation and views of residents has been noted to have positive impacts on project ownership and sustainability (Khang and Moe 2008; Dungumaro and Madulu 2003). If the site selected by a community is unsuitable for a number of reasons, residents could be sensitized on why other preferable sites will yield the desired project outcomes. Relevant community participation played out as follows:

- In two of the FGD communities (Community 'D' and Community 'E'.), meetings were held with community members to purposely discuss the location of water points. It is hard to explain why these communities had meetings and the others did not as the respondents do not provide specific reason.

In two KII communities there was some sort of discussions on water project. An informant in KII Community 'T' mentions the water project was the prioritization over other needs.

> *So later, they interviewed us about our problems. By then, water was the major problem facing this community. So we were there and they came back later to inform us that, our problem would be solved so that is how come we got the MiDA bore-hole water project…* (40 year old male assembly man).

In Community 'Q' an informant mentioned that,

> *…the [site] was selected in consultation with the community.* A male respondent

- However, it seems these meetings were poorly attended, and only a couple of individuals (all males) had any recollection of them. In Community 'E' for instance, only one respondent remembers the initial meeting to discuss the siting of the water points thus:

> *Yes I am aware. I went to that meeting and the organization promised to connect a tank to the previous boreholes which will be mounted to enable us store plenty water for easy fetching without pumping... There was a meeting on how to select but the places that were chosen were not favorable and were assisted by the drillers to select the water point.*
> 50 year old male, Community 'E'

- In all of the three communities, no woman attended the meeting or remembered that there was such a meeting. It is hard to conclude why the women in the community did not attend the meetings, as the FGD and KIIs respondents do not provide concrete reasoning as to why they were not invited. There could be various reasons of not attending the meeting. Tt could be due to the timing or the venue of meeting or there could be other reasons.

- Community members did not worry if the water point was sited at a place different from what they had selected. They reckoned the superiority of the technical decision.

> **Community J**
> *Moderator: did you feel sidelined because you were not involved in the decision making for the determination of the locations*
> *R3: no. The only meeting we had was to discuss about how to contribute to cook for the workers. That is all what I can say. We did not take the decision for the locations. They did it. Their machines helped them to determine the locations (44 year old male, farmer).*

R2: we had challenges with water then, so we didn't have a choice to take any decision. We only took the decision to help cook for the workers (54 year old male, teacher)

Community 'S'

There was a meeting on where to construct the borehole but that could not work, we later depend of the drillers who used machine to detect where water was located on the ground (A male informant)

Consultations with Community Elders

Considering the critical leadership roles played by community leaders (usually referred to as elders), the MiDA technical teams seem to have collaborated effectively with them as expressed thus:

One of the small chiefs came to the area and brought the machines to check, and they pointed three (3) places and a year after they came to drill where they think there is enough water, so I think the chief knows something about it. 48 year old female, Community 'B'

…*It was MIDA after consultation with the elders of the village.* Community 'A'

How were the locations of the first four taps selected?
The leaders of this community met and decided on the specific points that would be convenient for the greater number to access it (Male Key Informant and Assembly Man, Community 'P').

We decided: the unit committee, assembly man and the chiefs of this community located the site of the borehole (40 year old male Assembly Man, Community 'T')

R*: when the constructors came, they met with the leaders of this village*
I: did they meet the whole community or just your leaders?
R*: just our leaders and they asked for the best location to dig the borehole and they went and dug the borehole (Female Key Informant, Community 'Q').*

In brief,

- ✓ Consultations were not community-wide;
- ✓ They involved interactions between technical teams and community representatives.
- ✓ The use of representatives (traditional authorities, unit committee members, etc.) in decision-making as opposed to community-wide consultations should not necessarily be seen as a drawback in view of the following.

MEANINGS AND INTERPRETATIONS GIVEN BY COMMUNITY MEMBERS TO THE PROJECTS

Introduction

Whereas community participation is important in the design, development, and implementation of projects, it is the meanings and interpretation assigned to them by community members that influence their reaction to, and acceptance of the projects. While the meanings and interpretation given are primarily based on how the project meets the relevant practical needs of community members, other factors such as culture, religion, environmental, gender, and community politics may influence such meanings and interpretations. It may be possible for particular sub categories of the community to have their own peculiar meanings to the project.

Ultimately, meaning and interpretations create positive or negative attitudes and behaviors towards the project which would be instrumental for sustainability. This type of information is important in evaluation, as it may provide issues surrounding the water project that the research design may have ignored. In this section of the assessment, attention is paid to the evidence of conformity or the disjuncture between the original intention of the water projects, and the meanings that community members assign to them. The main areas to be explored are as follows:

The Symbolism of Water

Water is universally a necessary commodity, which is essential for life and livelihood. Within the context of this study:

- The availability of a water source (mainly rivers and streams) was the primary factor upon which some studied communities and settlements were founded.

  Community 'H' [community is named after the river]
  M: Before the borehole where do you fetch water? R1: the River [bears the same name as the community H], and some from the well but mostly the river (55 year old male, farmer).

  Community 'E'
  M: what is the meaning of the name of your community, and why was the village given that name?

  R10: We were living elsewhere … but later moved closer to the river [here] due to our fishing activities leaving others who do farming on the hill (54 year old male, farmer). …the village was in existence before I came but what I heard was that during overflow of the Volta Lake those people that were closer to the Volta Lake relocated to this area especially the fishermen and it was name Community 'E' (54 year old male, farmer).

- Because many of such water bodies are associated with deities, the name of the water body is sometimes given to the Community and their taboos are upheld in the communities. *Community 'H' community is named after the Community 'H' River, which used to be the main source of water for the community. The town Kwhehu Praso*[7] *derives its name from the River Pra.*

- In essence, the general conceptualization of water is that the community exists because there is water available. As such, community members suffer much hardship with the unavailability of water.

- Although in-migration relating to access to water was not addressed in the discussions, it emerged in Community 'J' that people relocate and migrate when there is water scarcity.

  …the community is big and people have built their houses at different parts, but because of water problem many people went to build in the bushes. Getting water was one of the major problems we were facing that was why we were fetching from Kolenu, Wegbe and Hohoe. 54 year old male, Community 'J'.

Meanings given to previous water points/system

In spite of popular notions on the cultural symbolism of natural water points and its associated beliefs and adherent practices, the communities studied were very amenable to relinquish their previous sources in favor of new water points. There were no indications of people attaching ritual meanings to previous water points. There was also evidence of undesirable outcomes for using the water from the old and natural sources, with the typical complaints regarding the hardness of the water, and food discoloration.

With the exception of Community 'J', all communities disparaged the old water points (rain, river and stream water, and dams) because of their poor quality.

> *When you fetch the well water, you have to keep it for about three days before you can use it but you can immediately drink the pipe water as soon as you fetch it.* 29 year old female, Community 'C'
>
> *…in my view, the reason why the water was provided is to prevent us from being infected with guinea worm, hernia and other diseases which had been worrying us previously.* 42 year old female, Community 'C'
>
> *During the dry season, the well dries up, but now we don't feel that anymore.* 32 year old female, Community 'H'

[7] Praso literally means "on the Pra".

It is very clean but sometimes the children play in it so when we fetch, we sieve before using it. For instance, the well is uncovered, so there is the tendency for the children to throw objects inside. The river sometimes turns yellow. 37 year old male, Community 'H'

…animals like cattle, pig and goats in the village drink the same river water, moreover we have no toilet facility so we defecate on the ground and during raining season all these wash down into the river. In addition, we the fishermen also defecate into the river especially when we go for fishing. 45 year old male Community 'E'

As I said earlier on, the river was not tidy enough for us. Female informant Community 'R'

The stream is far in the first place and secondly it is scary. Moreover in the dry season we can go this evening and come the following day….That was before the boreholes were constructed. Female informant in Community 'S'

The old and natural sources were further seen as inadequate, and limited the amount of water used in households, especially as demand for water increases with population growth and the growth in economic activity.

It is still not enough for us. For example, in the middle part of this area there are more people living there but the pipe is only one. It is also salty. A female participant in Community 'C'

..and also when it gets to the dry season we have water shortage. A female Community 'H'

Conceptualization of MCC/MiDA Projects

When institutions, organizations, or governments initiate and sponsor projects in developing countries, they pursue the development of the beneficiary community as well as foster harmonious cooperation and goodwill between the donor and the beneficiary. The latter focus is usually achieved through effective communication on the intentions and agenda of the donor institution, in ways that alleviate any suspicions and misgivings by the community, so as to create a good image of the donor. It is therefore important for the beneficiary to know (by name) whom the providers, sponsors, or donors are. In this regard the following were observed:

- There was generally little knowledge among community members of MCC as the funding agency, and that it was working through MiDA to provide the water infrastructure.
- Members of the Water and Sanitation Committee (WATSAN) knew of MiDA as the administering agency.
- Such knowledge differs from one community to the other. For example, in 4 out of the 10 FGD communities (Community 'G', Community 'B', Community 'H' and Community 'J')

no respondent was aware of the specific role of MiDA in the implementation of the water projects.

- Some communities identified other projects, such as intervention in agriculture and road construction. In Community 'G', some participants acknowledged that access to their farmlands was enhanced by a MiDA project; however, the provision of a protected source of water was attributed to another organization. At Community 'B', participants identified a non-governmental organization as the implementing agency responsible for the drilling of boreholes in the community.

The low level of knowledge about the role played by MiDA in the execution of the water projects could be attributed to several factors.

- ✓ The low knowledge could be a reflection of poor technical-community interfaces, and weak rapport between the water committees and community members.
- ✓ Also, it is possible that the concurrent implementation of similar water projects by other development agencies might have overshadowed the role of MiDA in water provision. Prior to MiDA's intervention, a number of communities had benefited from donors, as follows:

i. The Afram Plains Development Organization provided two bore holes in Community 'E'
ii. World Vision, Atua Sikan Bank provided boreholes in Community 'I',
iii. DANIDA provided boreholes in Community 'C' and 'S'
iv. World Vision provided boreholes in Community 'F' and 'L',
v. District Assembly provided boreholes in Community 'M'

The existing water project might not be enough for the entire community, as MiDA used water adequacy assessment in selecting the intervention. Further, MiDA used the stipulation of water adequate/inadequate as a screener, not the presence/absence of water infrastructure in communities while selecting the intervention communities. That may be the reason why some communities have water points funded by other sources.

It is important to note that some of these boreholes had broken down and were dysfunctional at the time of MiDA's intervention. Community people mention lack of maintenance, lack of fund, and in some cases, conflict as the reasons for breakdowns.

Water quality

The qualitative study reveals that the water projects implemented by the Millennium Development Authority (MiDA), appear to be beneficial to the communities studied, so long as they remain functional. However, we need to interpret this cautiously as our small size was small and mostly

based on assessment in intervention communities. The survey, which is representative, can confirm whether MiDA water projects are eventually beneficial.

In intervention communities, the projects have largely resulted in the provision of clean water used for drinking and other domestic purposes, as reported by the respondents in the study. Communities, which previously depended on unimproved sources of drinking water, now consider pipe water and boreholes as their predominant sources of water. A deeper understanding of beneficiaries' perception of water quality is critical to ensuring continued dependability on the water points provided. Inability to do so could potentially lead to a change in choices regarding the preference for specific water points.

Responses on water quality as expressed by participants are analyzed in terms of taste and outcome from usage.

> **Community 'A' female FGD**
> R*: what I will say is GOD that takes care of us. At the time that we started to developing sicknesses [from using the river water] the borehole was built for us…Yes, at first my daughter fell sick and I took her to the hospital and the doctors hinted that her sickness had to do with the water we had been using….*
>
> R*3: it has helped me because the pipe is closer to me and makes me do my chores faster. If I send my Children and they don't want to go I can easily pick my bucket and fetch.*
>
> **Community 'J' Mixed**
> R*4: to add to it, we were using water from unsafe source which exposed most of us to various diseases like guinea worm [called Ator in the local language] … by the provision of the water we no longer suffer from this disease or go to fetch from unsafe stream (25 year old male, student).*
>
> R*1: people have been saying that using the stream water is not good because it gives sicknesses like diarrhea but this new one is secure for consumption (50 year old male, farmer).*

A female KII respondent mentions in **Community 'S'**

> *The borehole water is much better that the stream…*
> *[Before] there were some diseases or sickness that we suffered from.*

a) Taste

The taste of the water is so important that the subject is reflected in discussions in all communities, and was articulated in comparison with water from the previous sources. While respondents generally found the water healthier, many were displeased with the taste. Most communities complained about saltiness of the water.

My wife uses the borehole but she claims food from the borehole does not taste sweet.
32 year old male, Community 'F'

It [water] is also salty… 42 year old female, Community 'C'

It is helpful, we always have water, it is clean, but it tastes salty… 39 year old female, Community 'B'

…it tastes like ORS [Oral Rehydration Salt, commonly used for treating diarrhea].
37 year old, Community 'D'

… because the pipe was salt saturated, majority of the people stopped fetching the pipe and we spotted something like iron… A male informant in Community 'R'

b) Outcomes

The most reported outcome of the generally improved quality of the new water infrastructure related to the positive health outcomes of usage. These are elaborated in the section on the impacts of the water projects. In this segment, the focus is on outcomes in relation to food preparation and other household usage.

In most communities, respondent reported the desirable result of food prepared in association with the new water.

When I use the Pra River to cook plantain it turns black [which is not the normal color] but the pipe gives the natural color of the plantain. 45 year old female, Community 'A'

If you use the Abetima to cook it makes the food looks dirty…but the pipe is clean and healthy to use. 23 year old, Community 'H'

Yes the pipe has helped us when we use the water to bath; it does not itch the skin but the well water itches. For some people, the well water cause stomach disorder upset. Community 'C'

But as has been hinted before, benefits arising from the use of improved water do not necessarily apply to all communities and households. The average effect will be measured by quantitative evaluation. In one instance, the use of water from the MiDA projects has adversely affected food preparation (see section "meanings and interpretations").

Community 'F'

M: when they used the tap water to cook how does the food taste like?
R2: according to them, they said when they use it produces foam (32 year old male, farmer).

Community 'J'

R10: the water is not good for cooking foods like' akple' and 'rice', it makes these foods very soft. It is better to use a different kind of water like the sachet water or water collected during rainfall (36 year old female, farmer).

R1: some men have accused their wives of not knowing how to cook because of the pipe water that we use (50 year old male, farmer).

Quantity of Water

Water scarcity curtails many household activities that are critically needed for safety, hygiene, and sheer consumption. While high quality is the ultimate goal, quantity also matters in ensuring ultimate satisfaction. There were indicators that so long as the new water infrastructure is functional, people got, and actually used, more water than before. This will be measured by the quantitative evaluation. Aspects of this fact are captured under the section on "impacts on education and hygiene".

> *I sell the water; I will say it has increased significantly.* A female respondent, Community 'B'

> *I used to use a small amount of water to bath the children but now I use the water generously.* Female respondent, Community 'C'

> *When our children want to drink water they don't have problem because it is available at any time.* Female respondent Community 'D'

Baseline data shows that households, on average, acquire about 100 liters of water from an unimproved source and about 120 liters from an improved source. Community people speak about increased consumption of water, primarily from the improved source. This can be confirmed from the survey, as our qualitative study sample is too small to generalize the finding, and also get a hard figure around the amount of water used.

The critical challenges to accessing the required quantity of water were related to:

i. Faulty water point or infrastructure
ii. Affordability of new water
iii. Erratic power supply
iv. Increased population and physical expansion of communities

We will explore more on willingness to pay and the affordability issue and its impact in the amount of water used in the survey.

Natural population growth also increases the demand for more clean water, which puts pressure on existing water points and results in inadequate water supply, as expressed in one KII:

> *… water problems during dry seasons and the boreholes are not enough. It is only two and the community population is increasing everyday…* Community 'N', a control community

The data shows that water supply is irregular in at least seven (7) FGD communities. One KII community (Intervention Community 'T') also experienced a similar problem. Respondents indicated that some of the boreholes go dry during the dry season. Irregular water supply will have consequences in the impacts. We will explore the irregular water supply issue more in the survey to understand how severe the problem is, and its impact on source and quantity of water used. Because the quantity of water needed cannot be compromised in all cases, some households may supplement water from unimproved sources depending on the availability of safe water, amongst other things. As some participants in Community 'G', Community 'C' and Community 'I' note:

> *I do use the tap water and when it stops flowing, I'll go for the stream water*
> 20 year old female, Community 'G'
>
> *When the pipe does not flow, we go to where the coconut trees are to fetch water (well water).* 35 year old female, Community 'C'
>
> *The thing is MIDA water uses pumping machines, so when it is light out [power outage] we get water problem but the other water points don't depend on light.* 23 year old female, Community 'I'

A number of communities depend on electricity for pumping water. For example, 11 small town water systems use lift system with water electricity. The Tamale Water Extension System uses electricity to pump water and distribute it among several communities. Interrupted water supply appears to be a challenge, and we include this issue in the survey questions to gain greater insights.

In a study of the performance of rural water supply systems, Whittington *et al.,* 2009 found that 38 percent of Ghanaian households still used water from unimproved sources after safer sources of water had been provided. Findings from this study, and that of Whittington *et al.,* suggest that the execution of water projects may not address all of the water needs of all households. Thus, in order to ensure continued use of improved water, new water infrastructure must preempt and cater for critical technical, financial, and administrative bottlenecks that would inhibit people from accessing and using the infrastructure. The provision ought to be implemented in a holistic manner, with all aspects fully catered to in order to ensure sustainability, maintenance, and continual usage.

Issues of Water Scarcity in Certain Control Communities

- ✓ In Community 'K', the only water point provided by the government is so salty that about 90% of inhabitants have dug their own wells in their houses as a water source.
- ✓ In Community 'M', the borehole, which was constructed by the district assembly between 2004 and 2008, has become dysfunctional. The community has applied for a borehole from the district assembly, but it has not been realized. As such, community members rely on the

four (4) rivers in close proximity to the community. These water points are unsafe, and not sufficient during the dry season.

- ✓ Generally, control communities have insufficient water even from the boreholes, and are therefore unlikely to charge for water fetched from these infrastructures. As such, they are unable to mobilize funds internally for the maintenance of the infrastructure.

DIRECT AND INDIRECT IMPACTS OF MiDA WATER PROJECTS

Health Correlates of MiDA Water Provisioning

In Ghana, diarrheal diseases are among the leading causes of mortality for persons of all ages, especially children under the age of five (GHS 2010). Aside from diarrhea, other diseases caused by the ingestion of contaminated water, namely cholera, typhoid fever, and guinea worm equally contribute to the burden of communicable diseases. These diseases are prevalent in rural and poor urban areas where improved sources of drinking water as well as health infrastructure are inadequate. Thus the provision of protected water points may curtail the incidences of these diseases and further serve as an approach to preventive care advocated by the Ghana Health Service (GHS 2007).

Participants speak of reduction in various water borne diseases after the intervention, so we went back to the baseline data to see the disease prevalence around that time. Unfortunately, the data for prevalence of diarrhea and other water borne diseases during the baseline does not appear to be correct. For example, it produces an estimate of 3.7% for diarrheal diseases. According to the 2008 Ghana Demographic and Health Survey (GDHS), diarrhea prevalence among children under the age of five was 19.8 percent in Ghana, with 27.2 percent prevalence among children of six – 11 months and 32.6 percent among children between 12 – 23 months.[8] The reason for this discrepancy is that the questions regarding diarrhea and other diseases was conditional to a question about whether or not the person was ill during the past two weeks. This approach is prone to cause respondent fatigue since they learn very quickly that if the say yes to the illness question, there will be more questions. This will be more challenging when some people do not want to expose their illness.

If we take GDHS data, it appears that there was a problem of diarrheal disease, and the participants found improvement after new water intervention.

In Community 'G', health care practitioners from the district government health post provided community residents with water filters in an attempt to reduce the prevalence of these diseases before the intervention of the new water project. The analyses show that water-related diseases were a major source of worry for many communities prior to MCC water interventions.

- Guinea worm and diarrhea were reported to be prevalent in eight and seven FGD localities respectively, and three KII localities, prior to the new water points
- Cholera and bilharzia were reported in five and four localities respectively (See table below).
- Discussions at the FGDs indicated that the provision of the water services had positively impacted the health, and led to the decline of these infections.

[8] http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=252829

…*thanks to the pipe, ailments like cholera have disappeared.* 45 year old male, Community 'G'

We no longer experience skin rashes, worms and frequent diarrhea. We are free from cholera so we now realize that the dirty water was causing it. 35 year old female, Community 'G'

…*disease like diarrhea was common but since the pipe came, you hardly see any case.* 46 year old female, Community 'B'

It is also safe for drinking and prevents us from diseases like bilharzia and cholera and diarrhea. Community 'A'

A KII respondent also speaks about the problem:

Community 'S'
it has helped the community a lot, we now have clean water to drink and the problems of guinea worms and stomach pain are gone.

In some control communities, getting safe water is still a challenge, and people are getting sick; informants from the following two communities express this issue:

Our water is not safe at all, it is not clean, people die, we get cases of Bilharzias, Onko, there are flies biting people and giving rashes, a whole lot. The water is just too dirty, even when they post teachers here; they run away because of how dirty our water is… A male informant in Community 'O'

…*when there was an outbreak of typhoid, many people claimed that the cause was from drinking well water. They were saying that drinking the well water was the cause of the typhoid and other disease*…A female informant in Community 'K'

…*We don't have enough though we still go the dam to fetch water and can still be infected by the disease.* A female informant in Community 'O'

Although the community members reported that the water project has a positive impact in reducing diseases in communities, it should be interpreted cautiously as these are the perceived impacts and it could be due to multiple factors (e.g., improved sanitation), and need to be validated by survey and water quality tests.

Reduction in Health Expenditure

Respondents in virtually all communities articulate how investment in the water projects has also resulted in a reduction in health expenditure. The reason given was that the expenditure previously made on treating water-borne diseases is saved because of the new water infrastructure. Table 1

below indicates the previous incidence of the most commonly mentioned diseases in the communities studied.

> …*The reason is since the pipe came I now spend less on hospital bills.* 46 year old female, Community 'H'

> *Yes at first my daughter fell sick and I took her to the hospital and the doctors hinted that her sickness had to do with the water we have been using, but I don't remember the amount we spent.* A FGD participant in Community 'A'

> *Yes it also happened to my son, he got bilharzias and I spent a lot of money to cure it.* A FGD participant in Community 'A'

Table 1. Incidence of water-related diseases previously prevalent in FGD communities

No.	Community*	Diarrhea	Cholera	Bilharzia	Guinea worm
1	Community 'A'	Yes	Yes	Yes	Yes
2	Community 'B'	Yes	Yes	Yes	Yes
3	Community 'C'	Yes	No	No	Yes
4	Community 'E'	No	No	Yes	No
5	Community 'I'	No	No	No	No
6	Community 'D'	Yes	No	No	Yes
7	Community 'F'	Yes	No	No	No
8	Community 'G'	Yes	Yes	No	Yes
9	Community 'J'	Yes	Yes	No	Yes
10	Community 'H'	Yes	Yes	Yes	Yes
	Total number (yes)	8	5	4	7

Source: Transcripts of FGDs conducted in 10 communities in 2014

** Actual name of communities are suppressed for confidentiality*

According to focus group respondents, many of the illnesses related to water points that were prevalent in the communities have almost been eliminated from the communities studied. Some of the quotes from FGDs are presented here:

> **Community 'E'**
>
> *R7: previously we used to suffer from infections of Bilharzia which was confirmed as a result of drinking from the river, because animals like cattle, pig and goats in the village drink the same riverwater, moreover we have no toilet facility so we defecate on the ground and during raining season all these wash down into the river. In addition, we the fishermen also defecate into the river especially when we go for fishing (45 year old male, fisherman).*

Community 'H'

M: Is bilharzias very common here?

R6: Yes before the pipe, it was very serious here but now that the pipe is here, we don't see that again. There also used to be guinea worms in the river (23 year old female, farmer).

R1: Before we got the pipe, I was rushed to the hospital and the doctor said it was cholera I had. I later realized it was the river we have been drinking but since the pipe came I never had such a problem (55 year old male, farmer).

Community 'G'

M: Do you still have any of the diseases mentioned earlier now that taps are flowing?

R6: We still have malaria, and high fever which is from the water. Thanks to the pipe, ailments like cholera have disappeared (45 year old male, farmer).

R3: We no longer experience skin rashes, worms and frequent diarrhea. We are free from cholera so we now realize that the dirty water was causing it (35 year old female, farmer).

Economic Correlates of MiDA Water Provisioning

The water projects may have both direct and indirect economic impacts on the lives of community residents. In occupations where certain tasks require the intensive use of water, the water projects have been a reliable source of clean water, thereby increasing productivity. The main ways in which the projects positively affected economic activities are as follows:

a) Farming activities

In communities where there was an abundance of water, farmers could afford to use water from the MiDA project for agricultural purposes such as mixing pesticides and fertilizer.

We get enough water to mix chemical for our crops and also don't waste time and also makes productivity go high and also save our energy. 20 year old male, Community 'H'

Even more acknowledged was the indirect positive impact of the projects on agricultural activities, whereby farmers (both male and female) got more time to spend on their farms because they were saving a lot of travel time formally spent on searching for water.

> *The borehole water has helped me too, I and wife don't worry about how to get water when we are on the farm working, we have enough time to work on our farms. When we close late, water is just at our door step.* 50 year old male, Community 'E'.

> *Formerly, I had to wake my husband early to follow me to Kolenu to fetch and I have to cook his food before he goes to the farm. But now, the man can stay long on the farm working till evening when he returns home.* 36 year old female, Community 'J'

It has helped me a lot. I work with my wife on the farm; the time she uses to search for water has been invested in farm work and increases my productivity and income. 42 year old male, Community 'E'.

*It has helped because we can now spend more time on the farm. We do not have to travel that far to look for water because it is close by. We are able to save time to work more on the farm.*54 year old male, Community 'J'

… though this new water is not good for domestic use, it is readily available for us to use for spraying on our farms. 54 year old male, Community 'J'

I now have enough time to work on the farm because it is just at my door step. Male informant, Community 'S'

b) Artisanal and Vocational Work

Similarly, time saved from collecting water from the improved water facilities is spent on other productive ventures, which leads to increased output.

We use the water for cooking especially the food that we sell. 20 year old female, Community 'G'

I am a hair dresser so previously I used to use the size 34 bucket in washing more than one person's hair because I used to waste time in getting the water from the well. But now I used that same size 34 bucket of water on one person because the pipe is just close by. 35 year old female, Community 'C'

I used that time to make more kenkey as compared to the past, Community 'H' 42 year old female

If you wake up in the morning and you do not have water, you cannot do anything. So we are now able to concentrate and have enough time for our trading 49 year old female, Community 'D'.

Shea butter producers in Community 'D' also had more water for their business activities.

I do the same; I keep my water in separate containers and use it for different purpose. I use the dam water for cooking and washing, bore hole for making my shea butter oil and the tap for drinking. 20 year old female, Community 'D'.

Below are some direct quotes with respect to the saving of time:

Community 'E'

M: ok can you also tell us the impact of the borehole water on your business.

R4: it has helped me a lot. I work with my wife on the farm; the time she uses to search for water has been invested in farm work and increases my productivity and income (42 year old male, fisherman).

Community 'I'

M: how do you compare the time that you go and fetch the river and now that you fetch from the pipe?

R3: now, we save a lot of time fetching from the pipe (22 year old female, trader).
M: the time saved what do you use it for?
R7: I now get enough time to sell my produce and now sales are higher than before (50 year old male, trader).
R7: we the farmers have increased our production but all we need is the road (50 year old male, trader).

Community 'H'
M: The time the pipe has made you save, what do you use that time for?
R4: It helped me complete my chores faster and get to work early (46 year old female, trader).

Community 'G'
M: Now that the tap is closer, how does it help you in your business i.e. market, farms etc.?
R1: It helps so much because it is a shorter distance. I am able to go for water and finish everything I am supposed to do in time before getting ready for the market (54 year old male, farmer).
R8: For us the farmers, when going to farm we fetch water and reserve in containers. In the past, we could come back from the farm and not even have water to take a bath (38 year old male, farmer).

In some control communities, community members spend up to four hours in a day fetching water when there is not enough water during dry season:

> … *it takes about 4 hours due to the long distance. We can only fetch once in the morning and once in the evening*…A female informant in Community 'O'.

Impacts of MiDA Water Provisioning on Domestic Work (time savings)

In all communities studied, women and children were primarily the ones who fetched water for household use, although there are instances where some males also help in fetching water. In Ghana, as with many other developing countries, the strict gender division of roles, and women's principal responsibility for housework makes them the primary users of water in communities. This finding corroborates with long held opinions regarding the role of women in the collection of water (See Amu 2005; Opare 2005; Baden et al., 1994). There were, however, isolated instances where men directly used large volumes of water for mixing pesticides, and for construction activities. Invariably, both men and women were deeply concerned about water issues.

As can be seen in the quotations below, participants rely on gender roles to explain why it was the duty of women to collect water.

> *It is the duty or responsibility of the woman to make sure there is water at home.* Male participant Community 'C':

It's my wife who fetches the water, it's their work. …because when I go to the farm, she doesn't come with me. Male, Community 'C'.

This water really helps because it saves time. Cooking the porridge or Tuo Zafi [a local delicacy] for the family is now faster. A female participant in Community 'D'

Study result shows the execution of water projects in the beneficiary communities has largely led to:

- ✓ A reduction in the time spent in collecting water. In Community 'G,' where residents previously depended on a dam facility as their main source of water, provision of pipes by MiDA reduced time spent in collecting water by more than one hour.

The baseline data captures how much time the households are devoting for fetching water. The data shows that on average, a person spends about 46 minutes per trip. Following quotes give some insight as to how local people perceive time reduction after the intervention. For average effect, we must analyze data collected from the survey.

Community 'E'

R6*: previously I used to worry about my wife when she would go to fetch from the river especially when she wasted time but it has ceased (37 year old male, fisherman).*

Community 'H'

R6*: To me I spend about 20 minutes going to the river but now I spend less than 4minutes to fetch from the pipe (23 year old female, farmer).*

R4*: I spend about 20minutes going to the river but less than 2minutes if I get water from the pipe (46 year old female, trader).*

R7*: the pipe is closer to me than the river, the machine is close, so it is faster to get water (20 year old male, trader).*

Community 'B'

R6*: Going to the river it will take me about 40 minutes to and fro but the borehole only takes about 5 minutes. So I save about 30 minutes (39 year old female, trader and 48 year old female, farmer).*

R8*: The pipe is closer to me. Sometimes I come from farm very late but anytime I need water I get it, no matter how late it is. The distance from my house to the river and back home is about 45 minutes but the distance to and from my house to the pipe is only 8 minutes (47 year old female, trader).*
R2*: the pipe has helped me very well, the river is far and children also bath inside it. This is very bad (48 year old female, farmer).*

Community 'C'

R7: It has helped because we can now go out to town early to do other things but previously we had to go and fetch water before going to school which wasted time (34 year old female, seamstress).
R1: It has helped because I do not carry big basin and walk long distances to fetch water (29 year old female, seamstress).

Community 'T'

Because, previously, it was very difficult to get water. You can even wake up 6am in the morning and you go to fetch water from the river, you may come back home about 11am and you will not get water. A female informant

- ✓ In other communities, time spent in walking to and returning from water facilities had reduced by more than fifty percent. For instance, time spent by residents of Community 'B' in walking to and returning to places of residence reduced from 40 minutes to 18 minutes. Similarly, it also reduced from 20 minutes to three minutes in Community 'H'[9].

- ✓ As a result, it appears that the burden placed on females to look for and collect water has been greatly reduced.

Variation in time spent fetching water

Despite this marked improvement, it must be noted that time spent in collecting water may vary depending on factors, such as:

- The mechanism of the borehole[10]. With respect to boreholes, those that are difficult to pump take a very long time to fetch, as observed in Community 'J' and Community 'E'. In that case, the strength or age of the one fetching is of the essence.
- The distance from an individual's house to the water source, and the type of facility or the number that run concomitantly.
- Waiting time at the water point.
- Reliance on water facilities by households that were not in the catchment area of the water facility.
- It takes longer to fetch water in the dry season because many alternative sources dry up.

[9] Computations of average time spent in collecting water were based on responses provided by participants during the Focus Group Discussions. More reliable estimates of time spent in collecting water after execution of the MiDA project can be obtained by collecting data from households which were selected for the quantitative aspect of this study.

[10] In Community 'E' and Community 'J' the boreholes provided are referred to as "abrewansah" meaning: the old woman does not fetch since a lot of energy is required to pump water.

Respondents indicated that they spend long periods of time in queues for water, with a wide variation from community to community. We have questions asking waiting time in queue in survey that will provide average time community members spend in queues.

The World Health Organization recommends that water points should be located within 1,000 meters of the home, and that time spent collecting water should not exceed 30 minutes (OHCHR *et al.,* not dated). During the program implementation, MiDA used 500 meters from the community center as a threshold, and communities above the threshold received 20 points in the selection process. However, it is hard to say how many of those water points are within the threshold, as the locations are selected from the technical point not solely based on the community's preferred location. We will be taking GPS coordinates of all water points during the survey that will tell exactly how far those points are from the community centers. Findings from this study have shown that some households get discouraged from using facilities provided due to the distance and time spent in collecting water. To ensure equity in water provision, implementation of future water projects should be informed by disparities in distances to water facilities, with the aim of examining if prevailing location and hydrological conditions may allow for a uniform distribution of water facilities across different segments of the community, particularly for areas located uphill.

Impact on school attendance and hygienic practices

The implementation of the water projects is also positively associated with basic school attendance and improved hygienic practices. These were among the topmost direct benefits accrued by children in the communities in the following ways:

- ✓ Children, who are the main people who run household errands, including fetching water for household use, can now fetch water faster than before.

Community 'J'
R9: my children do the fetching (25 year old female, trader).
R6: I do the fetching sometimes. My children also do it sometimes and my husband also fetches too (25 year old female, farmer).

Community 'F'
Our children and wives may be working till the time they wish to come home and water is always available for them, school children don't suffer any more in search of water before going to school. A male respondent

Community 'I'
R: My children fetch
R10: I pay for it but my wife and children fetch (54 year old male, trader).

Community 'H'
R1: It is mostly my children (55 year old male, farmer).

Community 'B'
R1: My children are young so I fetch myself (42 year old female, trader).
R5: my children do that (38 year old female, trader).
R8: my children (47 year old female, trader).
R2: myself (48 year old female, farmer).
R9: I do with my children (46 year old female, farmer/trader).

Community 'S'
It has helped school children to go the school early because they don't hunt for water again. Male informant

In some control communities, as an informant mentioned in Community 'O,' the distance is very far to fetch water from a dam, and children are not able to help with fetching.

- ✓ They travel shorter distances for water, and generally spend shorter time in fetching water. They evade the previous long queues and are able to get to school earlier and less tired.

Community 'C'
R5: Now they [children] *go to school on time since after completing the houses chores they just go in for the water and depart to school previously my children spend a lot of time at the well which makes them late for school (40 year old female, seamstress).*

Community 'F'
R4: our children and wives may be working till the time they wish to come home and water is always available for them, school children don't suffer any more in search of water before going to school (54 year old male, farmer).
R7: the children also bath before going to school and get there on time (37 year old male, farmer).

Community 'G'
M: How does the tap help you in caring for your children?
R2: When the pipe wasn't there, children had to go and fetch water in the morning and as a result be late for school. This affected the education of the children attending school in the community (55 year old male, farmer).

Community 'J'
R9: previously, before the children will go to school, they had to walk a long distance to go and bath at the stream and then fetch some of the water back home before going to school. But now, as soon as

they wake up they go to fetch, take their bath dress up quickly and go to school. When they come back from school, they go to fetch in the evening to keep for the morning of the following day (25 year old female, trader).

Community 'H'

M: What effect has the pipe on the way you take care of your children?
R1: It has helped the children to go to school early and because it is closer to the house, they are always happy to fetch water, they never say no again (55 year old male, farmer).
R2: It has also helped the children to go to school early because the pipe is closer to everyone unlike the river where you have to wait for the dirt to settle before you can fetch (30 year old male, trader).

Community 'B'

M: How did the pipe help the children in going to school?
R7: It is sometimes cold here so the children use that as an excuse to be late to school but the pipe is warm in the morning so everyone is able to bath early and go to school early (34 year old female, trader).

Community 'I'

M: Does the fetching of the water have effect on the children before the MIDA water tanks came.
R4: they were always going to school late because they spend long hours going to the river or queuing for water. It is clean and easy to fetch, it also flows very well, and we don't get long queue when we go to fetch, so I think MIDA project has brought peace in this village (19 year old male, labourer).

- ✓ The new water seems to be warm in the morning, which makes children enjoy their morning bath. Many school children now bath before going to school.

Community 'I'

R7: The water is warm so they always want to bath (50 year old male, trader)

Community 'B'

R7: It is sometimes cold here so the children use that as an excuse to be late to school but the pipe is warm in the morning so everyone is able to bath early and go to school early (50 year old male, trader).

Community 'H'

R2: The stream water is cold in the morning; they were avoiding bathing in the morning for that reason. The pipe is rather warm so they always want to bath and wash. They are always neat since the pipe came (30 year old male, trader).

- ✓ Both school children and adults maintain better hygiene standards by bathing more regularly, and doing the laundry when required.

Community 'G'

R4: When they drink and bath from the tap water they are cleaner and free from diseases or any other health problems. The hygiene has improved. They bath 2 times a day (25 year old female participant).

Community 'I'

R2: before when you send them to fetch water they come very late and will be cold and won't like to bath but now that we have water close to us, we don't experience such again (42 year old male, farmer).

R7: The water is warm so they always want to bath (50 year old male, trader).

Community 'J'

R2: formerly, we would have to manage with small quantity of water that to bath for yourself and children because we travelled a long distance before getting water but now because the water is close to us though we itch when we use it. I can use the size thirty four buckets to bath both in the morning and in the evening (54 year old male, teacher).

Conflicts

Prior to the provision of MiDA interventions, conflicts arising from the collection of water by households were reported during the study, for example, in Community 'B' and 'G'. In Community 'B', the provision of boreholes reduced quarrels over the use of the Opantu River, which had previously served as the main water source. Despite the provision of additional water infrastructure, quarrels and arguments over water use still persist in Community 'G' as a result of overcrowding and limited water points.

Apart from Community 'H,' where community members do not pay for fetching water from the MiDA project[11], quarrels around payments and queuing are rife in the other communities, as discussed below:

- **Payments:** Petty conflicts, arguments, and disagreements on charges and payments for fetching water are particularly common in the FGD communities that depend on electricity for operating the water infrastructure. This is true in Community 'D', Community 'G' and Community 'F,' which are beneficiaries of the TWEP, and Community 'A' and Community 'I,' which benefited from the STWS, and the areas where payments are most critical. In

[11] So far the borehole in community H has worked well without a breakdown. There has therefore not been a real need for funds for maintenance.

addition to making financial provision for the more sophisticated technology of the infrastructure, high electricity bills have to be settled from the collections for fetching water. The water vendors who collected payments at the water points were sometimes given monthly budgets, and had to be diligent with their collections in order to achieve them. Some water vendors were also paid on commission bases and thus determined to record high collections in order to earn higher income. In all of these cases, vendors did not take kindly to community members who refused to pay for fetching the water, which became a source of conflict at the water points[12].

In one KII community, Community 'T', the informant pointed out that because of poor account keeping system, the project will not last longer:

> *I: If you say accountability, who do you mean by that?*
> *R: …the accountability of the water project is poor*
> *I: So does it mean when they sell the water, people spend the money for their personal use?*
> *R: Yes I am telling you the facts and I can prove.*

- **Queues:** In order to manage payments, control, and monitor the handling of the infrastructure, as well as ensure orderly usage of the infrastructure, most water points are open to the community at particular times of the day, usually mornings and late afternoons. This arrangement results in queues at the water point, and conflicts arise when some community members (particularly males, as discussed under gender analysis) prefer to jump the queues. We have inadequate data to show if households are storing more water because the pipes are not always open, and the hygiene challenges that such practices may pose.

> *No, it is not enough for us, we are usually overcrowded at the water points and sometimes people even fight.* Community 'G'

> *When there are quarrels or fights at the site, we lock it. The rule is "first come, first served"* Community 'G'

Conflict has appeared as a limiting factor for water use, and we will measure the level of conflict through community and household surveys.

Security and safety

The new water infrastructures have provided safety and security for community members, particularly for women and children. The previous system of travelling through the bush to fetch water from far places posed risks and dangers to community members. There were many incidences

[12] More data on this point will be assessed in the quantitative study.

of children being knocked down by vehicles as they travelled to old water sites to fetch water. With the close proximity of water points in beneficiary communities, such tragic incidences have been reduced in the communities. Many women feared being attacked in the night as they travel to fetch water, and this restricted their performance of household chores.

Community 'J'

I have three children and they are all too young to go to a far distance to fetch water. But some people's children have to carry big basins and walk very far to get water. One child was even knocked down by a vehicle. So I think the pipe was dug for us to prevent all those occurrences (25 year old female participant).

Community 'H'

Nowadays the road to OPANTU has become risky, so when I send my children they don't go. Because of the borehole, my children are always close to me. A female respondent

The baseline survey did not collect data on travel safety and security. We will add questions to explore more on how the intervention and control communities differ on travel safety issues.

Unintended Beneficiaries

Some urban dwellers (from Accra) who own farms in Community 'H' were noted to have periodically fetched water from the Community 'H' facility before returning to Accra. In several other communities, people from neighboring areas also do use the new water points when their own water points dry up or are dysfunctional.

Community 'J'

R2: the water issue is a big problem for us here and even for our neighbors from the next village. They come from far distance to fetch water here and will have to wait till it gets to their turn to fetch. Sometimes, it gets very late before they fetch (54 year old male, teacher).

Community 'T'

During the dry season, people from two neighboring communities do come here to fetch water. A female informant

MANAGEMENT AND SUSTAINABILITY

Administration of the Water Infrastructure

Formation and capacity building of a water committee is important for the long-term sustainability of any water project. In Ghana, water and sanitation committees (WATSAN) are established in communities with basic water and sanitation infrastructure. The primary responsibility of these committees is the planning and implementation of water and sanitation systems at the community level (National Water Policy, 2007). In addition, they are also responsible for raising revenues for payment of capital, operating, and maintenance costs (Sun *et al.,* 2010).

With the exception of Community 'H,' where the water committee appeared to be dysfunctional, water committees in the remaining intervention communities were operational (Table 2). The non-operation of the water committee in Community 'H' is due to a number of factors. These include: deaths of committee members, resignations of members because of disagreements by some households over payment of levies, and long-term migration of some members.

In FGD communities water and sanitation management team membership size ranges from five in Community 'B' to 17 in Community 'I'; average number of people across all communities is nine. In six out of the ten communities, there were fewer women in the water committees than men. Representation of women was particularly acute in Community 'B', Community 'E' and in Community 'I' where there were only two female water and sanitation management team members in each case. Thus, the gender-balance advocated for in the setting up of the committee has not been achieved in these communities. When asked why representation of women on the committee was low, some participants respond:

> *At first there were lots of women working in the committee but some stopped because they felt it is a difficult task and others said it is embarrassing.* Male respondent in Community 'I'
> *They don't have the time for it.* Male respondent in Community 'I'

It appears that the strict division of roles requires a great deal of household chores done by women, and leaves little time for rural woman to do community work. In some cases, they are not interested, as one woman explained during the KII in Community 'M':

> *I: if so why that is the committee has few women…….*
>
> R*: maame, the truth about this village is that the women here have made up their minds that they will never have time for anything concerning this village. You see…….*
>
> *I: so it wasn't the men who decided to dominate the committee but it was the women that……..*
>
> R*: as for the women here if not for a few like me, some will never involve themselves in activity that is being organized by this village.*

In the exceptional case of Community 'F', there were more women on the water and sanitation management team - than men. A participant's explanation for this is as follows:

> *Water is a woman's affair. Men are only taking care of maintaining the tap according to the training received. When the machines get loose, we tighten it.* A male participant Community 'F':

Table 2. Women's Representation in Water Committees

No.	Community	Water Committee	Total Membership	Female
1	Community 'A' No.1	Functional	7	4 (57%)
2	Community 'B'	Functional	5	1 (20%)
3	Community 'C'	Functional	8	4 (50%)
4	Community 'E'	Functional	9	2 (22%)
5	Community 'I'	Functional	17	2 (11%)
6	Community 'D'	Functional	7	3 (42%)
7	Community 'F'	Functional	12	7 (58%)
8	Community 'G'	Functional	10	5 (50%)
9	Community 'J'	Functional	7	2 (28%)
10	Community 'H'	Dysfunctional	8	3 (37%)

Source: Transcripts of FGDs conducted in 10 communities in 2014

In KII communities, the total membership of water management committees ranged from six in Community 'L' (control) to 13 in Community 'T' (intervention). Average membership among control communities was 8.7, while that of intervention communities was 10.4. In all communities (both control and intervention), males exceeded females on the water committees, except in Community 'O' where there was an equal representation of both sexes. In many of the communities, male representatives on the water committee were more than double ('L' and 'T') or triple ('M', 'N', 'Q', and 'R') the corresponding number of females (Table 3).

Table 3. Distribution of Females on Community Water Committees in KII communities

Community	Control/Intervention	Total Membership	Female
Community 'K'	Control	---	---
Community 'L'	Control	6	2 (33%)
Community 'M'	Control	12[13]	3 (25%)
Community 'N'	Control	8	2 (255)
Community 'O'	Control	12	6 (50%)

[13] Membership of former committee

Community 'P'	Intervention	A Water Board	---
Community 'Q'	Intervention	9	2 (22%)
Community 'R'	Intervention	11	2 (18%)
Community 'S'	Intervention	7	3(42%)[14]
Community 'T'	Intervention	13	4 (30%)

Maintenance of Water Points

The analyses of transcripts have further revealed that the non-operation of each water facility inadvertently leads to increased pressure on other facilities. In this light, it is important to build capacity of water committees to develop plans for periodic maintenance, anticipate faults, and ensure the timely repair of facilities.

In Community 'E', all boreholes that had been drilled for the community had broken down. In situations like these, the number of protected water points in the community reduces, leading some residents to revert to previous water points that may be unsafe for consumption. Thus, it is important to monitor performance and strengthen water committees so that project objectives are met.

Rules established by committees

The water committees in most communities had established rules to ensure cooperation, maintenance, and sustainability of the water infrastructure, including the following:

- The keeping of particular operational hours during which people can fetch from the facility. This is usually between 5am to 9am and again at 3pm to 9pm.
- Upholding requisite cleaning and sanitary practices around the water point to avoid contamination.
- Monitoring children to ensure they do not mishandle the pumps or taps. In Community 'B', children are not allowed to fetch from the facility for fear that they will mishandle the pump and damage it.

Financial Issues

There were generally two payment schemes adapted by communities to finance costs that accrued from the operations of water projects, to maintain the facility and to repair any damages.

[14] According to the female informant, the committee comprised of four women while the male informant reported three.

1) In five out of ten FGD communities, households made payments every time they collected water. This mode of payment is also referred to as the "payment per bucket" or "pay as you fetch" system (WaterAid 2009; Engel 2005).
2) In the four remaining communities (one community does not charge), households made periodic payments. These payments were normally fixed for all households, regardless of the quantity of water collected.

In communities where payment per-bucket was the mode of payment, the amount paid ranged from GHC 0.05 - GHC 0.10 in Community 'B' and Community 'A,' to GHC0.15-GHC0.20 in Community 'I' (Table 4). Specific amount paid was depended on the size of the container used to collect water. Discussions at the FGDs indicated that the amount paid per-bucket was affordable for the majority of households. Still, there were some households that used water from unimproved sources because they considered the charges too high. The community collects payment but the money is not enough in some of the communities.

> *Even with the GHp 10, some don't fetch, they go to the Pra to fetch; so how much more if we increase it.* Community 'A'

> *Someone will fetch like 10 buckets and she calculates the 10 buckets by the GHp10 so he will decide to fetch in the Pra to save the money no matter how meager it is.*

Communities that adopted the periodic mode of payment were: Community 'F,' Community 'G,' and Community 'H.' Residents in Community 'G' are required to pay GHC1.0 every fortnight compared to Community 'F,' where every woman with a pot pays GHC5.0 per year. In Community 'H,' community members did not pay for using the water.

In five communities, participants noted that the amount charged for water had increased over time. In three of these communities, participants commented that increases in the amount charged were necessitated by the need to generate enough revenue to finance expenditures, particularly the payment of electricity bills.

Baseline data shows that the majority of households, often a very large majority, were not paying for water from unimproved sources, which is understandable as there was not such an arrangement for payment. Those who were paying for getting water from improved sources, control communities were, on average, paying GHC27 per month compared to GHC48 per month by intervention communities, indicating intervention communities paying higher amount. It appears that the trend is continued as intervention communities are paying more.

Both payment per-bucket and periodic payments have their merits and their shortfalls.

- Payment per-bucket promotes equity since households only pay for the water that they collect.

- However, larger households with high demand for water may supplement water from unsafe sources due to the cumulative cost incurred from collecting water from protected sources.
- Periodic payments become advantageous since all users of water pay a fixed price, regardless of the quantity collected. Although equity is not promoted, a communal effort to protect larger households from using water from unprotected sources is significantly reduced.

The community collects payment, but the money is not enough in some of the communities. For example, in Community 'R' the key informant mentioned that,

> …*the fact that the revenue is dwarfed by the maintenance cost considerably and consistently.* Male informant

Financial constraints related to energy use

Another economic issue arising from the execution of the water projects is the inability of communities to pay for the use of electric energy. This challenge was common in all of the communities studied, where the Small Town Water Supply systems were operated.

> *The electric one has broken down about 2 years ago. We are in debt. Since the credit is finished in the prepaid meter, the machine stopped.* Community 'F'.
> *The money we get is not sufficient to cover what the electricity company is charging.* Community 'A'
> *the least bill that we ever had is GHC1,500, we sometimes pay GHC2,900 so we decided to increase it since the bill is becoming high and we have a debt of GHC7,300 to pay.* Community 'I'
> *I used to use the tap water a lot but not anymore due to the price. When it started it was 5pesewas per basin and increased to 20 pesewas, now 50 pesewas per basin.* Community 'D'

This situation has already led to a halt in the operation of the Community 'F' STWS, and could extend to other communities if the problem is not tackled. To ensure sustainability in water supply, water committees in broader consultations with communities should be assisted to develop cost recovery plans. This should enable them to determine how revenue would be generated to cover operation costs in the short term.

Table 4. Payment Schemes used by beneficiary communities

No.	Community	Payment Scheme	Amount Charged
1	Community 'A'	Per-bucket	GHC0.05-GHC0.10
2	Community 'B'	Per-bucket	GHC0.05-GHC0.10
3	Community 'C'	Per-bucket	GHC0.07-GHC0.20
4	Community 'E'	Per-bucket	GHC0.10-GHC0.20
5	Community 'I'	Per-bucket	GHC0.15-GHC0.20
6	Community 'D'	Per-bucket	GHC0.50 for 3 drums
7	Community 'J'	Per-bucket	GHC0.10 for a pan
8	Community 'F'	Periodic	GHC5 every year for every woman with

			a pot
9	Community 'G'	Periodic	GHC1.0 every 2 weeks
10	Community 'H'	Not applicable	No charges at all[15]

Source: Transcripts of FGDs conducted in 10 communities in 2014

This situation is exacerbated especially when there is a technical breakdown of a water facility. In Community 'F', residents have not been able to use one of the water facilities due to their inability to pay the electricity bill that has accrued.

In control communities, studied under KIIs, we found that the system for payment was not well-developed. Out of five control communities, only two had some form of payment collection system (Table 5). One community, Community 'N' charges GHC0.05 per bucket, and another charges GHC2.00 per year. In intervention communities, studied under KIIs, all five communities collect GHC0.10 per bucket of water. Most of them increased the price recently from GHC0.05, as the money was not enough for maintenance.

Table 5. Payment Schemes used by KII communities

No.	Community	Payment Scheme	Amount Charged
1	Community 'K'	None	-
2	Community 'L'	None	-
3	Community 'M'	None	-
4	Community 'N'	Per-bucket	GHC0.05
5	Community 'O'	Yearly	GHC1.00 per year
6	Community 'P'	Per-bucket	GHC0.10
7	Community 'Q'	Per-bucket	GHC0.10
8	Community 'R'	Per-bucket	GHC0.10
9	Community 'S'	Per-bucket	GHC0.10
10	Community 'T'	Per-bucket	GHC0.10

Source: Transcripts of KIIs conducted in 10 communities in 2014

[15] Community borehole is manually pumped and does not use electricity.

GENDER ANALYSIS OF IMPACTS OF MiDA WATER PROJECTS

In this section, we examine and discuss the gender relations, roles, and responsibilities of community members with respect to water access, usage, impact and management[16]. The underlying power dynamics that influence such gendered issues on water are also examined. The findings are discussed under the following themes:

Women, as beneficiaries

Whereas every human being needs water for its very survival, women seem to be the topmost beneficiaries because in all of the communities, they and their children bear the primary responsibility for fetching water. They are also the ones who use most of the household water for cooking, washing, and domestic activities as women are also considered custodians of household hygiene. Men do not usually fetch water, women and their children do. Men do not sell cooked food, women do. As such, the water infrastructures have brought much relief to women in particular in the performance of their household chores and in their economic activities. This fact is exemplified in the high level of appreciation women had for the water points. It is therefore paradoxical that they were not involved in decision-making on water projects. Men were more likely to express dissatisfaction with hitches and challenges.

Community 'B'

M: What is the influence the pipe has on your cooking?

R1: The river is dirty and when you want to cook with it you have to wait for it to settle before you start cooking but the pipe is clean so you can use it immediately after fetch. So it helps me cook early (42 year old female, trader).

R2: when you use the pipe to cook rice it looks neat unlike the river which makes the rice look dirty (48 year old female, farmer).

R3: it makes my food clean and healthy (20 year old female).

Community 'G'

R5: We use it for cooking, drinking, bathing, washing but also to cook the food I sell in the market (24 year old female, trader).

R7: We use the water for cooking especially the food that we sell. There are usually many people at the tap… (20 year old female, trader).

Community 'H'

[16] As mentioned earlier, we had a small sample size to capture the comprehensive gender impact of the water project. Whatever we report here is based on our findings in studied communities. We will explore gender dimension of water impact greatly when we do a survey, as the survey result will be disintegrated by gender.

M: The time the pipe has made you save, what do you use that time for?
R3: I used that time to make more kenkey as compared to the past (42 year old female, farmer).
R4: It helped me complete my chores faster and get to work early (46 year old female, trader).
R8: I used that time to rest and get my body [relax] (32 year old female, trader).

Consultation with Elders

Participants alluded to initial consultations between MiDA and community elders. These elders are usually made up of the chief and his elders who are all males. Although there may by a queen mother in the community, the elders referred to in this context do not include the queen mother or any other female elder who only involve themselves in "women's affairs," and not in "projects". The exclusion of women at the consultative level automatically discounts women's voice, views, and participation at the very beginning of the project. The situation is worsened by the fact that women themselves did not attend meetings in the communities where meetings were held prior to the implementation of the projects.

Project conceptualization and planning

Generally community members had very little information on the conceptualization of the water project and how decisions were made on related issues, women had the least information. Nevertheless, it looks like that women's voice was also heard in some communities while planning the project as following quotes mention. However, in both cases the male respondents mentioned this, not the female.

> *The water company had to come and extend or provide more taps for the community. The women had also raised concerns that it [water] wasn't enough.…* A male respondent in Community 'G'

> *the women prefer the electric one because with the traditional borehole, your hands would be sore from pumping.* A male respondent in Community 'F'

Assigned responsibilities

The responsibilities assigned by the project implementers to males and females in the communities enforce and perpetuate traditional gender stereotypes. During the construction of the water infrastructure, women were engaged to volunteer their services by cooking for the engineers and construction workers, doing nurturing and caring roles. Men, on the other hand, were coached on how to maintain and repair technical problems. It further perpetuates the hegemonic power relations and dependency between men and women by making women (the ones who fetch the water) dependent on men for maintenance and repairs whenever the infrastructure breaks down. With generations of greater involvement in water collection amongst other things, it is likely that women would have a deeper understanding of water issues than men. Thus, sustainability in water supply cannot be achieved unless women are trained to manage important decisions regarding water supply at the community level. Roles performed by women on water committees should not be limited to

the cleaning of water facilities. They should also be "given equal access to training in water systems operations and maintenance and environmental sanitation methods" (UN 2006).

- ✓ Maintaining hygienic conditions at the water points. Although data on the specific duties performed by male and female members of water committees are not adequate for analysis, it seems obvious that duties are gendered. For instance, in Communities 'O', 'S' and 'L,' where cleanliness of the environment of water facilities was reported, it was only women who performed these duties.

  Interviewer: Roles of females?
  They create a wall around the project, clean it; they also are in charge of the water sales (Key Male Informant, Community 'O').
  Yes I am. We ensure the neatness of the surroundings of the water facilities (Female Member of Water Committee, Community 'S')
  We have both men and women in the committee. The women take care of the boreholes to ensure that children do not spoil the amenities (Women's leader, Community 'L').

Water Committee Membership

The analyses also show that the responsibilities undertaken by the water and sanitation teams are gendered thus:

- Female committee members in this study were occasionally responsible for preparing food for mechanics who maintained and repaired the infrastructure.

- In Community 'F' women were primarily responsible for keeping the surroundings of water facilities clean; this is consistent with what is reportedly common in West Africa (UN 2004).

- Maintenance of the facility was generally assigned to male committee members. No female was involved in repairs or maintenance of the facility. An impact study conducted in two districts of the eastern region of Ghana also found that men had greater control in decision-making and operation of water systems compared to women (Opare 2005). This situation characterizes a continued perpetuation of gender bias that prevents women from exploring other possibilities for their own interest and self-development.

- Women were generally in charge of managing the financial aspects of the water projects in our study communities by taking charge of water sales, collecting money on the spot or from the houses, payment of bills, and rendering the account to the custodians. The women however were accountable to male elders or committee members, some of who were alleged to have mismanaged the proceeds from water sales.

Conflicts around the water points

Payment and queue related conflict at the water points were quite common, as illustrated below;

Community 'J'

R8: some times when there is a queue before one comes, they want to fetch before others and that results in to quarrels

R8: it is the young ones who usually start that quarrel (35 year old female participant).

Community 'I'

R6: as I am speaking we have some taps that are locked because we don't have people to sell the water. The reason we don't get people to sell water is because the people who come to fetch are sometimes rude to the seller, so no one wants to volunteer,

R6: some people don't like to pay for the water they fetch and when you insist, they become rude (37 year old male participant, businessman).

Community 'E'

R: I fetch one pan a day because of the pressure on the boreholes some people even quarrel over it.

M: which means people quarrel over it? What brings the quarrel?

R10:yes we quarrel due to impatience, the people find it difficult to wait for their turn before they fetch and this brings quarrel because everyone want to fetch first.

Gender and Conflicts around the water points

Sometimes men generated some conflicts. The few men who went to fetch water were hesitant to join the queues. They found it awkward to join women in the queue and their attempts at jumping the queues usually generated disagreements and disputes. Males were also reluctant to pay for fetching water. They sometimes bullied the female water vendors and fetched without paying, which also created disputes. The typical male chauvinistic tendencies of African men seem to be at play in this matter.

Community 'J'

R9: we quarrel every time at the water… people who sell the water have been spending the money on themselves. A young man beat me up because I told him not to take his shoes to the water point. People are not allowed to take their shoes there (25 year old female participant).

R9: sometimes when I go to pay money to the seller someone who had not paid yet may say he or she came before me and so they have to fetch first. Sometimes too, the young rascals [males] *in the community will not even pay before fetching. When they meet a queue there, they push the children away and then fill their buckets with the water. Those are some misunderstand that have been taking place at the water point (25 year old female participant).*

We heard this type of phenomenon in a few places, which is hard to generalize to all places. We can get more insights on it from survey data as we have included a question on this issue in survey.

CONCLUSIONS AND RECOMMENDATIONS

This report presents findings from a qualitative study conducted in selected communities that benefited from various water projects implemented by the Millennium Development Authority (MiDA). Further, we also included some control communities in the study that were created during the baseline for comparison purpose. The ideas, comments, or suggestions contained in the report were primarily based on the analysis of transcripts available from focus groups and informant interviews. When working with qualitative data, the researcher not only identifies dominant themes that are explicitly expressed by participants, but also identifies other covert ideas that are more or less hidden. Some of these themes may be the direct or indirect implications of other statements made by participants. As such, the report may contain certain statements that are the views of the author based on some of these hidden ideas, as well as the author's knowledge of the Ghanaian society in general; this is, however, on a very minimal scale. In addition, summary statements derived after analysis of transcripts were related to relevant material (mostly from the study country, but also from other international sources) in order to provide context as well as comparability.

The impact assessment of the water provisions on the lives of community members reveals that the projects appear to be making positive impacts on the lives community members as we had a small sample size to generalize. The incidence of water and sanitation related diseases such as dysentery, cholera, typhoid, guinea worm infestation, and bilharzia have reduced in connection with the water projects. School attendance and general hygienic practices have also improved remarkably. Although entire communities derive these gains, the gender analysis point to women as the utmost beneficiaries of the projects, particularly in terms of time savings for economic activities and in easing their housework burden.

In the light of the critical challenges with the management and sustainability of the projects, the following recommendations are proposed as follows[17]:

- ✓ Community participation in project development, implementation, and management is important. In spite of the low level of education among rural dwellers, it is important to note that they are not entirely naïve about technical issues, and desire to be involved in critical matters that affect them and their community. Future suspicions will be alleviated when community members are involved in decisions on the source of the project, funding arrangements and terms, and management. Practically, women are the main users of water in the communities and thus their involvement in relevant decision making commence at the conceptualization stage through management to sustainability.

  One female informant in Community 'T' mentioned that,

  We have people monitoring the system so that in case it develops any fault they can contact the chairman so the problem can be resolved.

[17] These issues seem not to be well addressed in the implementation of the projects.

In Community 'B' female respondents mentioned contribution makes project sustainable,

R2: It is good to get it free but since we maintain it, it is good to pay also
R5: I think it is good to pay because they maintain the pipes

- ✓ The need for project implementers to continuously monitor the project to guide beneficiaries on how to manage challenges and ensure sustainability.
- ✓ The need to ensure and maintain a high quality and functionality of the water and project before handing it over to the community.
- ✓ It is important to mainstream gender sensitivity at all phases of the project.

Certain key words contained in this report, i.e. *improvements*, *reductions*, and *positive impacts* amongst others were based on the opinions of respondents who participated in the study and cannot be generalized to the populations of concern. Impact evaluation based on the use of quantitative methodology involves the use of statistical methods and evaluation tools that can provide reliable estimates and can be generalized to the populations of interest.

Use of qualitative study findings

The information collected through qualitative data collection methods provide a great deal of insight on whether there were any consultations with the communities while implementing the project, how communities participated during the implementation, how the water project is being managed and how the benefits are shared. This type of information is important in understanding the context of project implementation and the nature of the benefits community people are getting from the project. Before the qualitative study, we had little information on the function of water project and the type of benefits the community members were getting.

The study team was able to discover several issues that were overlooked in evaluation design and in baseline survey. We aim to update our survey with these issues in order to explore them further.

Issues

1. *Conflict*: Both FGDs and KIIs documented various forms of conflicts among the management committee and also in the fetching of the water. Management level conflict threatens the sustainability of the project. On the other hand, conflict related to fetching water may deprive some group of getting enough water, as some respondents expressed how some groups of people always bypass the long queue and get water. This also shows power imbalance in the community.

<u>Our plan</u>:

1. Update community questionnaire with questions related to conflict surrounding water committee

2. Update household questionnaire with questions exploring conflict and marginalization when fetching water

2. *Irregularity*: Irregular flow of water has consequences in the amount of water fetched and used. During our qualitative study, some communities reported experiencing irregular water flow caused by power failure if there is a water-lifting system using electricity, and at times broken boreholes that are not fixed.

Our plan:

We want to include a question in the household survey asking if they experience irregular water supply and if that reduced their water use.

3. *Security*: Some participant mentioned that the new water project has increased the security in the communities. For example, people are less likely to be killed by a moving vehicle when they cross the road to fetch water from a distant water source. While we don't have baseline data, it is imperative to explore this issue further and see if there is a different level of security between control and intervention communities.

Our plan:

We will include a question in the household survey asking if they have experienced any incidence.

4. *Water taste*: Participants brought an issue of water taste that they use as a basis for selecting where to fetch water for each purpose. In some communities people prefer to get water from unprotected sources over protected ones because of taste. This question was not included in the survey instrument before.

Our plan:

We will include a taste related question in the household survey asking if it is a factor for selecting where to fetch.

5. *Inconvenience*: Some participants brought the issue of inconvenience of the water project, as the person responsible for taking care of the water project opens the site late and closes early. In some communities, the committee decided to close the water point during the day to make sure nobody from outside fetched their water. Participants mentioned that this type of arrangement forced them to find alternate sources of water. This type of issue has consequences in type of water source used and amount of water used.

Our plan:

We aim to include this issue in the household survey asking if they experience inconvenience because of this issue, and we will explore if there is a different level of inconvenience in control and treatment communities.

6. *Pressure on water point*: In some communities, there is heavy pressure not only from the local residents but also from outsiders. Some water points are open early (two am) and there is long queue that puts heavy pressure, as expressed by the community. This also forces school-aged children to miss classes when they spend hours in line to fetch water. One of the factors taken in deciding community intervention was the adequacy of the water as it was estimated a borehole/standpipe for each 300 persons. We will explore the level of pressure on the water point and adequacy, and see the differences in control and intervention.

Our plan:

1. Update the community questionnaire with questions related to the number of water points currently available in the communities and use from outsiders

2. Update household questionnaire with questions on if they experience long queue to fetch water and missed some important activity

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APPENDIX

Table A1: Communities Selected for FGDs

No.	Community[18]	District	Zone	Project Type	Type of FGD	Mean Age of FGD participants	Population	Remark
1	Community 'A'	Kwahu South	ABZ	STWS	All female	36.8	934	Has 2 primary schools and 1 junior high school. On a district boundary, accessible through a feeder road, busy town with much social activity.
2	Community 'B'	Akwapim South	SHB	Borehole	All female	38.4	2700	Community has a primary school and is near a trunk road
3	Community 'C'	Ketu South	SHB	Pipeline extension	All female	32.5	1788	Community accessible through a feeder road
4	Community 'D'	Tamale Metro	NAZ	TWEP	All female	35.8	527	Community situated near an agribusiness site.
5	Community 'E'	Kwehu North	ABZ	Borehole	All male	39.9	873	Community close to the Volta Lake
6	Community 'F'	West Mamprusi	NAZ	Borehole/Small Town Water	All male	36.8	3745	Farming community
7	Community 'G'	Tolon-Kumbungu	NAZ	TWEP	Mixed	37	836	Close to an irrigation site
8	Community 'H'	Akwapim South	SHB	Borehole	Mixed	34.5	474	Community accessible through MiDA constructed road.
9	Community 'I'	Mampong Municipal	ABZ	STWS	Mixed	36.1	7322	Community has a bank, basic school and periodic market
10	Community 'J'	Hohoe	SHB	Borehole	Mixed	37.3	336	Community close to a trunk road but no feeder road connection.

[18] Community names are suppressed for confidentiality

Table A2: KII Communities

No.	Community	Region	Control/Intervention
1	Community 'K'	SHB	Control
2	Community 'L'	NAZ	Control
3	Community 'M'	ABZ	Control
4	Community 'N'	SHB	Control
5	Community 'O'	NAZ	Control
6	Community 'P'	NAZ	Intervention
7	Community 'Q'	SHB	Intervention
8	Community 'R'	ABZ	Intervention
9	Community 'S'	SHB	Intervention
10	Community 'T'	SHB	Intervention

Table A3: Water stress situation in communities prior and after MiDA intervention

Community	Control/ Intervention	Water access situation prior to intervention	2010 Intervention	Post-2010 intervention	Comment
Community 'K'	Control	Inhabitants mostly depend wells which were available in many households	No intervention by MiDA	No intervention by MiDA or any water sector agency.	The majority of households still use water from wells. Sachet water is used for drinking in some households.
Community 'L'	Control	Households accessed water from the boreholes of nearby communities.	Boreholes were provided by World Vision	No intervention	Women have difficulty using one of the boreholes since it is difficult to pump. Boreholes are also shared with neighboring communities leading to increased pressure on facilities during the dry season.
Community 'M'	Control	Rivers constituted the main source of water for households.	Boreholes were provided by District Assembly between 2004 and 2008	No intervention by a water sector agency.	Community has reverted to the use of unimproved water points, mainly rivers since boreholes are no longer functioning.
Community 'N'	Control	Inhabitants depended on a stream for domestic use	Bore-holes were provided by the district assembly	No intervention.	Boreholes are functioning and are the source of water even in the dry season. Increased population has however led to long queues and provision of inadequate water. Water management committee carries out obligations effectively together with a general involvement by the community.
Community 'O'	Control	The main source of water in this community was a dam	Boreholes were provided by	Some improvement but not enough for all	Although the boreholes are functioning, there is water shortage in the dry season. As a result,

			World vision		women, who usually collect water, have to walk longer distances in search of water. Households also collect water from "the big stream" due to the water shortage.
Community 'P'	Intervention	Households relied on three (3) dams for the provision of water prior to intervention.	MiDA intervention		MiDA intervention has brought about increased access to potable water. Water points are evenly distributed amongst communities making water available to different segments of the community.
Community 'Q'	Intervention	Community relied on unimproved sources of water (stream and well water) for domestic use.	World vision drilled four boreholes in 1992 followed by another two by MiDA in 2011.		All two bore-holes provided by MiDA are functioning. The facilities also comprise a major source of drinking water for community inhabitants. However some households have to walk longer distance in order to have access to the water points. This is "because all the bore-holes are located at one point of the community."
Community 'R'	Intervention	Community relied on the lake for water.	MiDA intervention		All the water points provided by MiDA were functioning. However, patronage of the facilities was very discouraging. Informants report that salinity, "scent of chemicals" amongst other things prevent people from accessing water. As a result, Majority of households still use water from the lake (an unimproved source). The poor performance of the water system has also had a negative impact on revenue mobilization.

Community 'S'	Intervention	Community relied on the stream for water.	MiDA intervention		There has been a general improvement in access to water. However, there is inadequate water in the dry season leading to long queues. The sharing of the facilities with some neighbouring communities further compounds this problem.
Community 'T'	Intervention	Community relied on three (3) rivers for the provision of water prior to intervention.	MiDA intervention World Vision intervention		All the water points provided by MiDA were functioning Access to water has greatly improved since intervention. The only factor which could lead to temporary water shortage is unreliable energy. Households no longer have to rely on the previous unimproved water points. Also, students are able to report to school early.

Comment tracker:

Reviewer/Organization	Page Number	Comment	Evaluator Response
MiDA	p.8	Please provide the specific source just as you did for the next two bullets, instead of leaving it at "available statistics". Is it from GLSS6 Main Report, page 96 – unimproved water sources?	Agreed and we added a reference.
MiDA	p.12	The piped delivery/extension was not just through the Tamale Water Extension Project (TWEP) in the Northern Region. There were pipe delivery/extensions in the Central, Greater Accra and Volta regions of Ghana; extending pipe-borne water from the GWCL pipe network system to communities. Can ignore if the CS Project Manager classified pipe extensions in the south under STWS.	Agreed, but we followed the MiDA classification and used the term STWS (Small Town Water System) for south.
MiDA	p.44	Water boards were also formed and trained in communities that benefitted from STWS. Perhaps could also be noted, unless "water committee" is being used in a generic form to cover both types of water management bodies.	Yes we use "water committee" to cover both types of water management bodies.