HOW DOES IMPROVED ACCESS TO CLEAN WATER IMPACT RURAL COMMUNITIES?

AN EVALUATION OF THE IMPACTS OF CLEAN WATER

IN THE AJUMAKO-ENYAN-ESSIAM DISTRICT OF GHANA

A

THESIS

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Abstract

Research has shown that rural water programs benefit communities by promoting women’s empowerment, and improving children’s education and the health of residents. However, the tendency for such programs to be short-lived (as water pumps break down and villages are unable to repair them) erodes any benefits and sets villages back on the path toward using unsafe and inconvenient water sources. The incidence of failed rural water projects has prompted calls for a more holistic approach to addressing rural water supply issues. Two development organizations, the Nyarkoa Foundation (NF) and the Rural Education and Development Program (REDEP), implemented a water program in villages located in the Ajumako-Enyan-Essiam District of Central Region, Ghana, where earlier water programs had been unsuccessful. Using a new approach, the program focused on gender-sensitive planning, financing for maintenance and participatory governance. Through interviews, focus group discussions and participant observation, this study evaluates the impacts of the NF/REDEP water program in two villages, Ofosu and Awordo. Findings showed that improved access to clean water enhanced economic opportunities for women and children’s education in both villages. There was also evidence that equitable and participatory decision-making engendered cooperation and efficient management of the water program, while exclusionist policy making led to apathy and noncompliance. However, the combined usage of the water pumps with unprotected water sources threatened to negate its health benefits, while the absence of effective women’s involvement in the management of the program raised questions about its capacity to truly empower women. These findings reveal the need for increased sensitization on the risks of using unsafe water and a review of the program management approach.

Key words: sustainable rural water supply; improved water access and women’s empowerment; impacts of improved clean water access; water use and health; community governance; participatory decision-making.
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Dedication

To my dear friends Lew and Judi Shapiro, for making it possible to follow my dreams.

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To my sister Elizabeth and brothers Joseph and Stephen; I’m blessed to have you in my life.
CHAPTER 1:  
INTRODUCTION  

1.1 Purpose  
The purpose of this study is to determine what impacts, if any, the renewal of safe drinking water sources has had on the villages of Ofosu and Awordo, located in the Central Region of Ghana. Based on the literature (discussed below), the hypothesis of this study is that there will be four primary impacts: 1) a reduction in water-borne diseases; 2) improvements in education, 3) improvements in women’s empowerment and 4) improvements in governance and community participation in development projects. The aim is to look for evidence of each of these categories of impacts and examine whether there is a clear linkage between the provision of improved access to clean water and the impact.  

1.2 Background on the Problem  
Access to safe water remains one of the critical problems confronting rural communities in Ghana. Information gathered from the Community Water and Sanitation Authority (CWSA) of Ghana indicates that at the end of 2008, only 48 percent of Ghana’s rural population was adequately supplied with clean water (Kokutse 2009). Streams and open shallow wells are the main sources of water supply for rural communities in Ghana. However, these sources are unprotected and can lead to serious health problems in the population, in the form of water-borne diseases in rural areas (Dapaa-Siakwan & Gyau-Boakye 2000, 406). Also, as communities are often located far from streams or other water sources, women and children—mostly girls—have to take long trips to fetch water for household use.  

According to the United Nations Economic and Social Council (ECOSOC 2009), the lack of safe drinking water and poor sanitation practices are the leading causes of poor health in many developing countries. It also reports that 470,000 deaths could be prevented annually by providing access to safe water for half the population currently without such access. Studies undertaken in developing countries have shown that the provision of safe drinking water and sanitation contributes to significant reduction in the incidence of child mortality and diseases such as ascariasis, diarrhea, schistosomiasis and trachoma among the population. Along with guinea worm and cholera, these conditions are highly prevalent in West Africa and other places that lack access to safe water and sanitation.
Dracunculiasis, hookworm infection, schistosomiasis and trachoma tend to be more locally restricted, yet common in the developing world. Dracunculiasis, however, occurs only in parts of Africa and Asia. It is particularly prevalent in poor, isolated rural areas that have a high dependency on stagnant water and ponds. It is reported to be the leading cause of ill health in places that use water from unsafe sources like streams, usually leaving those afflicted too weak to work or attend school. This illustrates the correlation between lack of access to safe water, poverty and school absenteeism (Esrey et al. 1991, 609; Hunter 1997, 105; Tay 2005, 2; Harvey 2008; VOA July 2009; ECOSOC 2009).

The United Nations Human Development Report (2006) estimates that the lack of safe water and sanitation costs sub-Saharan Africa about 5 percent of its Gross Domestic Product (GDP) each year; that translates into a loss of $28.4 billion each year (UNDP 2006, 6).

**Measures to Address Rural Water Problems and Issues Arising**

As far back as 1975, efficient groundwater utilization was identified as the solution to rural water problems in Ghana. This is because the population resides in scattered villages that are too small to support central, pipe-borne water systems. Instead, the alternative of drilling or digging wells to supply ground water to villages was adopted. Wells are established within close proximity to communities that need water and, since groundwater is free of pathogens, it does not require treatment before use. The government of Ghana thus saw groundwater utilization as the way to provide rural communities with safe water without incurring the heavy costs that are associated with more centralized water supply systems. Another significant benefit is that in many areas, wells can continue to produce water even during dry seasons when surface water sources are dry (Bannerman 1975,197; Dapaa-Siakwan & Gyau-Boakye 2000, 407).

The Community Water and Sanitation Authority of Ghana (CWSA) was established in 1994 to oversee the government’s rural water supply program. It works within the framework of Ghana’s decentralization program, and is the culmination of earlier attempts at addressing rural water problems by successive governments. These projects usually involve drilling boreholes and fitting them with manual hand or foot operated pumps. The wells are designed to be deep enough to ensure a water supply in the dry season, but the pumps often break down within a short time, leaving people to fall back on traditional water sources (streams and open shallow wells). Thus, communities that had their water needs met at one time often find themselves again without access to safe water. As hand pumps have a finite lifespan, the real challenge in rural water
supply remains the establishment of effective management systems within each community, so that timely repairs or replacements of hand pumps are possible.

A study across 11 Sub-Saharan African countries demonstrated that the challenges of rural water programs are not peculiar to Ghana. Findings indicated that at any time, depending on the country, about 35 to 85 percent of rural water pumps in Africa are not functional. These findings are similar to the situation in the two study communities, both of which had working water pumps at one point (before the introduction of the water program under evaluation). These pumps however broke down a few years after their installation due to lack of maintenance. The prevalence of failed water pumps has given rise to a renewed quest for sustainable development interventions. Hence, the issue of rural water supply is no longer solely focused on finding ways to bring potable water to rural communities, but also on ensuring the continuity of supply (Carter 2009; Montgomery et al. 2009, 1018).

1.3 The Need for the Research and its Potential Benefits

This study is developed in recognition of the potential for projects that provide improved access to safe water to (1) promote equity in resource use and management, (2) sustain benefits for long-term impact and (3) encourage synergy in management of water resources (Gender and Water Alliance 2006a, 9).

A further impetus for this research is the need to develop indicators for organizations and agencies seeking to measure the effectiveness of water projects. It is also aimed at fostering continuity of rural water supplies by involving communities in the evaluation of the projects, and offering the implementers the opportunity to evaluate their work.

1.4 Description of Program Being Evaluated - (NF/ REDEP Water Program)

In November 2008, the Nyarkoa Foundation (NF), a US non-profit organization, in partnership with the Rural Education and Development Program (REDEP) a local non-governmental organization (NGO), started a water program in the Ajumako-Enyan-Essiam District of the Central Region, Ghana. The program entails repairing and/or replacing manual pumps in selected villages where the original pumps are no longer working. As it is much less expensive to repair/replace existing manual pumps than to drill new boreholes, this approach is an effective way of making safe drinking water available to as many people as possible, given the limited resources available to these organizations. The research communities (Ofosu and Awordo) are among the communities that have so far benefitted from this program. Hand pumps
in both villages had been broken intermittently for several years. For these years, the villages had relied largely on polluted streams and a shallow well for household water supplies, as they did before the wells were provided by the government.

Specifically, the main components of the NF/REDEP Water Program (discussed below) distinguish it from previous efforts from the government that were focused on simply providing needed water and made little effort toward providing the means of ensuring sustainability. Thus the necessary components of community consultation and involvement; establishment of water management committees; gender-sensitive programming; financing for sustainability and health and sanitation education were lacking.

1.4.1 Community Consultation and Involvement

The absence of committed community involvement in development interventions has often been cited as part of the reason for failed projects. The NF/REDEP Program therefore seeks to engender community ownership by directly engaging in consultation with the people before work on a broken pump begins. The first stage of the project entails community consultation meetings, and repair and/or replacement of the broken pump is contingent on a clearly expressed commitment to the project on the part of the beneficiary community. Commitment is determined by a collective agreement to establish a gender-sensitive management team and to make regular payments toward the maintenance of the newly repaired hand pump.

The community-wide meetings provide a platform to…

• officially inform residents about the proposed intervention;
• solicit their views concerning proposed measures to ensure sustainability of the projects;
• educate residents about the essence of community ownership and commitment;
• give an overview of the importance of using safe water and maintaining good sanitation practices.

1.4.2 Establishment of Water Management Committees

A central part of fostering community involvement in the planning and management of the project, in order to ensure sustainability, is the establishment of five or seven-member Water and Sanitation (WATSAN) Committees in all beneficiary communities. Once selected by the community, the NF/REDEP program managers train the committee members for their various duties. The committee is, in turn, expected to continually engage the entire community in dialogue about the operation and maintenance of the water pumps. Decisions about water
charges, schedule for operating the pump and its maintenance are to be made jointly by the entire community. WATSAN duties include holding regular community meetings, educating people on the essence of sanitary practices and keeping the pump site clean.

1.4.3 Gender Sensitive Programming

In order to address the customary exclusion of women from decision-making processes, the NF/REDEP program implementers included a clause that made it mandatory for the WATSAN committees to have significant representation by women. The program also went further to encourage women to be active participants in the planning and implementation of the project.

This gender-sensitive feature of the project partly accounts for the reason why it is being evaluated. Studies on women’s empowerment recognize that projects that acknowledge the existence of gender inequalities and incorporate measures aimed at addressing them during project design and implementation have a greater chance of improving women’s lives (Gender and Water Alliance 2006a, 18).

The involvement of women is also considered essential to the sustainability of the project. Given the fact that they are traditionally responsible for household water supply, making women equal partners with men in planning and management is expected to afford them the opportunity to directly influence a project in which they have a major stake.

1.4.4 Financing for Sustainability

The NF/REDEP also provides three years of support for maintenance, repair or replacement of the pump if communities demonstrate adequate financial commitment. This requires financial contribution from residents toward the maintenance of the facility. Proceeds from each community’s contributions are deposited into a bank account and saved all through the three-year project period, to be used for future needs.

1.4.5 Health and Sanitation Education

The NF/REDEP Program includes a community education component due to the observed needs for instruction on the importance of using safe water and practicing good hygiene.

1.5 Description of Study Area (Ajumako-Enyan-Essiam District)

1.5.1 Location, Physical Features and Water Resources

The villages of Ofosu and Awordo are located in the Ajumako-Enyan-Essiam District, which is one of the twelve districts in the Central Region of Ghana. The entire District is rural and
covers an estimated land area of about 520 square kilometers (200 square miles), representing five percent of the Central Region land area. Figure 1.1 is the map of Ghana indicating the location of the District.

![Figure 1.1. Map of Ghana showing location of study area, Ajumako-Enyan-Essiam District](image)

The Ajumako-Enyan-Essiam District is centered about 40 km inland from the coast of the Gulf of Guinea. The area generally has low relief with elevations from about 35 to 100 meters. The forest cover is semi deciduous. However, much of the original forest had been cleared for the small farms that support the rural population and some larger palm oil and cocoa operations.

Annual rainfall in the District is about 1500 – 2000 mm a year. Like the rest of the country, the area experiences two rainy (wet) seasons; most of the rain comes in May and June, and somewhat less falls in September and October. The driest times are December to February. Between late-November and early March, the harmattan winds that blow south from the Sahara desert produce hot, dry, dusty days, and cool nights. During this period, shallow wells and small surface water sources typically dry up, and only large streams retain water. Within the District, the only surface water during the dry season is a perennial river (locally called "Ochi") that flows through the district.
The bedrock in the District is metamorphosed sedimentary rocks intruded by granite. These are normally not good sources of water because, except for fracture zones, they have low porosity. However, the combination of climate and rainfall produces a deeply weathered zone, which is the probable source for many of the wells in the District. Shallow, hand dug wells up to 10 meters deep are common and borehole wells fitted with hand pumps extend somewhat deeper (Dapaah-Siakwan & Gyau-Boakye 2000, 405-416; Ajumako-Enyan-Essiam District Assembly, 2006).

**Housing**

Houses in Ofosu and Awordo are constructed with either mud or cement and roofed with corrugated iron sheets. Bamboo and rattan are typically used as props and fencing. Figure 1.2 shows examples of houses in the two villages.

![Figure 1.2. Typical homes in Ofosu (mud, left) and Awordo (cement, right).](image)

House sizes differ and are largely dependent on living arrangements. For example, nuclear family households (as in Figure 1.3) usually consist of three structures; the first is the main living quarter and contains anywhere from one to three rooms, depending on family size and available resources. The second structure is the kitchen, normally located about three meters from the living quarters. This arrangement might be a check against accidental fire outbreak due to the open fire mode of cooking (with firewood). The third structure is the bathroom. It is usually a roofless structure, and like the kitchen, could be built of either mud or concrete. Individual households do not have latrines. Rather, residents use designated community latrines that are strategically placed in order to prevent pollution of water sources.
Extended family households (shown in Figure 1.4) usually consist of grandparents and/or other relatives and are sometimes made up of as many as three nuclear families. Such households live in what are locally called “compound houses”, which could either be a cluster of structures or one block of building with demarcations for each family. Nuclear families could either share one kitchen or build separate ones for themselves. The same applies to bathrooms.

1.5.2 Population

Typical village populations in the district range between about one hundred (100) and nine hundred (900) people; Ofosu and Awordo have estimated populations of 120 and 400 respectively.

1.5.3 Social Organization

Governance

Like all rural communities in Ghana, Ofosu and Awordo are headed by Traditional Chiefs, who are assisted by Queen Mothers (not necessarily the chief’s mother) and Council of Elders. It should be noted that traditional rulers in Ghana are in many respects nominal heads. The national government has ultimate jurisdiction in all parts of the country, and chiefs are expected to govern
their communities within the framework of the National Constitution.

Religion

Religion is an important part of social identity, and, like many communities in Ghana, these two villages feature a mix of Christian, Muslim and African Traditional believers.

1.5.4 Economic Activities

The District’s economy is based on agriculture, mainly through subsistence farming. The most commonly grown crops are cassava, corn, plantain, yam, oranges and vegetables (eggplant, tomatoes and pepper). Small-scale food processing units are also available for refining palm nut into palm oil, cassava into gari (a floury substance) and making corn dough.

Food vending is another important source of livelihood for people in the district. Good farm yields typically enable people to sell their surplus produce. Depending on financial circumstances and community set up, food vending could involve either setting up market stalls and/or hawking produce as well as cassava and maize meals.

The economic lives of the residents of Ofosu and Awordo follow the general District pattern. With few exceptions, most residents are either completely reliant on subsistence agriculture, or augment their income with other activities such as stone quarrying, petty trading and selling cooked food. Only two respondents, the chief of Awordo and a teacher stationed in the same village, had external funding sources. The chief is a retired civil servant, which provides him a pension, and the teacher is salaried. Another described himself as a ‘businessman’; he operated a business (and employed other people) to supply several fishing communities with large stocks of firewood for fish processing. Figure 1.5 illustrates the general income-generating patterns in the two communities. The occupational distribution within individual villages will be discussed in Chapters Four and Five.
1.6 Explanation of Key Variables

The lack of access to safe drinking water can have adverse health and socioeconomic effects on rural communities. In a study of rural water supply services in four African countries (Ghana, Kenya, Uganda and Zambia), Harvey (2008) established a correlation between access to safe water, health, education, and poverty alleviation.

The key variables for this study (as reflected in the hypothesis) are improved health, education, women’s empowerment and community governance and participation, all of which contribute to the broader objective of improving the quality of life of the people. These variables are further broken down into measurable indicators. The impact of the projects is then judged on the basis of the extent to which they have:

1. Empowered Women
   • reduced the workload of older women and girls and offered them the opportunity to invest more time in productive ventures and community decision-making.

2. Improved Health
   • contributed to the reduction of water-borne diseases and improved the general health of the communities.
   • prevented morbidity and mortality, particularly among children.
   • induced good sanitation and hygienic practices among community members.

3. Improved Education
   • enhanced the education of children by reducing incidence of illness and school absenteeism.
• removing the need for girls to miss critical school hours in order to fetch water for their homes.

4. Enhanced Governance and Community Participation

• promoted community commitment and involvement in development.
• encouraged local decision makers to recognize and incorporate divergent views when making policy decisions.

As summarized in Figure 1.6, impacts on women’s empowerment were determined by the socioeconomic status measured by time use, level of participation in decision-making, and personal well-being (self-esteem, opportunities for advancement and mobility, among others). Assessment of the health impacts of the project was based on observed sanitation and hygiene standards as well as respondent’s perceptions and understanding of modes of disease transmission. Educational impact assessment involved examining patterns in students’ school attendance and punctuality during the project period. Finally, implications for community involvement and participation in local development affairs were determined by the level of overall commitment to the management of the project including the maintenance and operation of the pumps, patronage and financial commitment.
Figure 1.6. Relationship between key research variables and their indicators
1.6.1 Indicators of Women’s Empowerment

Women’s empowerment can be defined as the process by which women acquire the capacity to correct conditions of inequality and improve their lives. While specific definitions differ, most of the literature on women’s empowerment recognizes the need for deliberate efforts to address the underlying causes of gender inequality (Agarwal 1997, Datta & Kornberg 2002, Ambler et al. 2007). Perhaps the most representative of the various definitions of women’s empowerment in this context is the one that describes it as the “…expansion in people’s ability to make strategic life choices in a context where this ability was previously denied to them.” (Malhotra et al. 2002, 6).

Acknowledging the pervasive and multidimensional nature of gender inequality, gender advocates recommend that conscious efforts be made to address its various forms. This means each condition of inequality needs to be analyzed within it’s own context so as to design a method of intervention suited to that situation and capable of empowering the women within that setting. Key literature on women’s empowerment recognizes that projects that acknowledge the existence of gender inequalities and incorporate measures aimed at addressing them during project design and implementation have a greater chance of improving women’s lives. It is also recognized that projects that consciously address gender inequalities can improve the management of water resources and enhance the lives of men, women and children (Gender and Water Alliance 2006a, 4, 18).

Women are traditionally responsible for household water supply and have to spend a significant amount of time and energy collecting water. It is believed that women in sub-Saharan Africa spend about four hours daily on water errands (Momsen 2004, 71). For women, this could have been time spent undertaking a relatively more rewarding activity, while for girls, it could mean sacrificing critical school hours (Ivens 2008). Studies conducted on impacts of water projects on women in developing countries such as India, Indonesia, Kenya, Nepal, Zambia and Pakistan demonstrate that women’s socioeconomic status can be improved when they gain improved access to safe water. It is also believed that there is a greater chance of improving women’s condition if they are involved in the planning, implementation and management of the project (GWA, 2006a).

A case study on the impact of improved water access on women in one community in Ghana identified positive outcomes such as recognition of gender equality by the community, increase in women’s productive hours and increases in girls’ school enrollment (Gender and Water Alliance
2006a, 164). However, the study did not provide information on what standards were used to determine the positive results that were identified.

For this study, specific indicators were defined for establishing the various ways in which the lives of women in Ofosu and Awordo have been improved by access to a nearby source of safe water. These indicators were modeled on key criteria that have been used to assess impacts of access to safe water in other studies (WaterAid 2001; Gender and Water Alliance 2006b; Ivens 2008; Harvey 2008) including:

- women’s participation in planning, implementation and management of the projects,
- reduction in women’s work load;
- improved ability to devote more time to income-generating activities;
- increased self-confidence among women as they participate in decision-making,
- opening avenues for self-expression through interaction with other women in leadership positions, thus becoming role models;
- improvement in girl’s education,
- increased income-generation activities and improvement in general well-being.

Women’s Participation in the Planning, Implementation and Management of the Projects

The level of women’s participation in decision-making within a society is often a key determinant of their influence within that society. For example, a case study of impacts of water projects on women in Pakistan revealed an increase in women’s self-confidence and corresponding recognition of their leadership capacities by men. It has also been observed that in cases where women gain leadership capabilities as co-managers of the projects with men, the benefit extends to other women who are then encouraged to recognize their own potentials as opinion leaders (Gender and Water Alliance 2006b, Ivens 2008).

Interviews, focus group discussions and participant observation were used in this study to gather information about the extent of women’s participation in the planning, implementation and management of the project, how women’s membership of the management team has impacted their private lives and that of other women, and what the general perception of the community is about women’s roles and capabilities. Questions aimed at investigating whether the deliberate involvement in the management team had led to changes in the communities’ estimation of women as incapable of leadership and women’s perceptions about their own abilities. Interviews with men and women were used to determine the level of women’s participation in community
affairs as compared to the past; that is, whether there has been an increase in their involvement in decision-making in the community as well as women in leadership capacities.

*Women’s Time Use*

Ivens (2008) estimates that rural women in Ghana work 12 hours a day, while rural men work nine hours. As mentioned earlier, rural women in the developing world typically spend 25 percent of their days fetching water.

Information gathered through interviews and focus group discussions with men and women as well as direct observation aimed to assess…

- Any change in women’s work loads
- Length of time spent performing house duties
- Amount of time spent on income-generating activities and self-improvement.

Each of these situations was compared to the period before and after the project to determine whether there have been changes due to the provision of an improved water supply.

1.6.2 Health Indicators

The main indicators of health as used in the survey were sanitation standards in the communities and people’s perceptions on how diseases are transmitted. Although the original intention was to examine the relative prevalence of water-borne diseases such as guinea worm, cholera, typhoid, dysentery and diarrhea in the period before and after the NF/REDEP project, it evolved to focus instead on respondents’ perceptions about the modes of diseases. This is because it was discovered during the study that residents of Ofosu and Awodo do not generally patronize the health centers that serve the communities. Hence, there are no medical records to serve as a source of statistical data.

Furthermore, respondents generally appeared unsure about the symptoms of the diseases in question, and it became apparent that it would not be possible to obtain the necessary information from them. Thus, rather than asking directly about the incidence of diseases, it was more practical and useful to ask about their understanding of the modes of disease transition.

The level of respondents’ understanding about how diseases are transmitted would be instructive in determining whether they have adequate knowledge about disease prevention. Considering that such level of awareness could be reflected in the day to day activities and habits of residents, this might offer greater insight into whether the desired health gains of improved access to clean water will be attainable. Thus, interview responses were used as a guide to
evaluate the extent to which participants’ perceptions about mode of disease transmission has influenced their choice of water supply source and basic sanitation practices.

1.6.3 Education Indicators

Lack of convenient access to safe water can affect education in three primary ways: absenteeism, poor academic performance and lateness. First, it can lead to absenteeism on the part of students who get sick from drinking unsafe water. Secondly, conditions such as worm infestation associated with unsafe water use reduce children’s ability to concentrate during lessons, resulting in poor academic performance (VOA 2009, Ivens 2008).

Girls are particularly affected in another way, because one consequence of women’s responsibility for the larger part of domestic duties is that adolescent girls are usually trained to assist their mothers in household tasks. Since collecting the household water supply is a large part of this responsibility, girls are expected to perform this duty. In the developing world, a typical morning chore for rural girls is to collect water from an often-distant source, leading to lateness and sometimes absenteeism in school (Ngorima et al 2008; Harvey 2008; Ivens 2008).

Studies conducted in India and Morocco revealed that school attendance and enrollment rates for girls increased when their communities gained access to improved, reliable, and nearby water supplies. Attendance in six Moroccan provinces was reported to have increased by “20 percent over four years, attributed in part to the lesser time spent” fetching water, while the amount of time spent on this task was reduced by 50 to 90 percent (Gender and Water Alliance 2006b, 15).

1.6.4 Indicators of Governance and Community Participation

Research has shown that greater community involvement in the operation and maintenance of water supply systems enhances sustainability (Carter 2009, 2). In fact, studies on sustainable rural water supply have found that people are more likely to use and be committed to maintaining improved water sources if they participate in its planning, implementation and management (Carter 2009; Engel et al. 2005). In particular, the study by Engel et al in the Volta Basin of Ghana revealed that people who were excluded in the planning and implementation of water projects showed little or no interest in either using the improved water source or managing it. This signifies the importance of strong community involvement in development interventions.
In determining the level of governance and community involvement in the project therefore,

- Attention was paid to the quality of committee governance with regard to patterns in participation and decision-making.
- WATSAN committee members from the two study villages were interviewed to see how they are implementing what was learned during the training.
- Community members were interviewed to gather their views on governance and participation in order to ascertain the extent of residents’ involvement in decisions about the operation and maintenance of the water facilities.

Enquiries and observations were made to determine the level of community involvement and commitment to the maintenance of the water facilities. This was measured by:

- how much of the population participated in decisions about where the well was drilled (before the NF/REDEP intervention), how much money should be paid by each resident/household and how it will be collected, and who uses the new water pump.
- the degree of financial commitment by residents. WATSAN records on payment patterns and interviews with WATSAN members and residents were used to measure this.
- how often community meetings were held to discuss issues pertaining to the management of the water pumps, how many people attend those meetings and participate actively in deliberations. This was measured by analysis of WATSAN records, holding one-on-one interviews and focus group discussions.
- observing the physical condition of the water facilities, establishing through interviews and observations who was responsible for cleaning the site, and how often this was done.
CHAPTER 2:

METHODS

2.1 Sample Population

Two beneficiary communities (Ofosu and Awordo) were studied to assess what impacts the projects have had on their lives. These were selected because they had not had convenient access to safe water for several years before the NF/REDEP program. A further consideration for selecting these two was that they have broad similarities in social structures, yet identifiable distinctions in levels of education and community organization.

Obtaining a large statistically representative sample of the two communities was beyond the scope of this study. Efforts were made, however, to obtain a purposive sample that included men and women of different age groups. It was not possible to meet the initial projection for a maximum of 30 (15 male and female) respondents in each village.

In Ofosu, the male population had dwindled to eight due to out-migration. Thus while the projected number of 15 female respondents (for the general community surveys) was realized, only eight male were present to participate in the study.

The occupational demands of residents in the larger community of Awordo made it particularly difficult to locate a significant number of people to interview during the study. As a result of the challenges involved in recruiting the projected number of participants, I chose equal numbers of people from the households close to the pump and from those located further away.

In the end therefore, respondents were selected based on their availability, willingness to participate in the study, and in the case of Awordo, their residence relative to the pump and the stream.

All community members and health workers who were approached for the study participated. Three health professionals declined based on time constraints, but equally relevant replacements were identified and interviewed. All respondents agreed to be recorded, and all requests for photographs were granted.

2.2 Methods of Gathering Data

The study employed qualitative, quantitative and participatory methods to gather information. Qualitative methods used included interviews and participant observation, while quantitative data from local health and educational institutions were sought to determine the
impacts of the water projects on beneficiary communities. The participatory action approach was used as part of the focus group sessions and interaction with participants. Interviews and focus group sessions were audio-recorded upon the consent of respondents and later transcribed.

2.2.1 Participatory Action Approach

The study adopted the participatory action research approach in order to provide opportunity for beneficiaries to evaluate the project along with the researcher, by identifying the ways in which it has impacted their lives individually and collectively. This method also offered the opportunity to receive first-hand information from the beneficiaries themselves. Since the community is considered part of the project team, this presented a means for self-evaluation to recognize where expectations have been met and areas where more work needs to be done (Berg 2007, 247).

The participatory action approach has been used in the evaluation of poverty reduction programs in Kenya, India and Uganda (The World Bank 2001). It is widely used elsewhere in the development sector for purposes of program evaluation.

Focus group discussions were used to involve participants in developing indicators for measuring the project’s effectiveness. The focus group method was adopted because of its ability to facilitate easy communication among homogenous groups (Berg 2007).

2.2.3 Interviews and Focus Group Discussions

A total of 79 interviews (involving 71 respondents) and four focus group discussions (involving 60 participants) were conducted within a 4-week period in 2009 and 2010. Interviews aimed at obtaining information about health, socioeconomic status, personal well-being and educational impacts of the water projects were used.

In 2009, separate focus group sessions were held with 13 men and 15 women in Ofosu, six teachers in the Atwereboanda Basic School, and four health workers at the Nkwantanum Health Center. It was a preliminary survey that did not include Awordo because it was not part of the study at the time.

The 2010 survey included 14 teachers (nine from Awordo and five from Atwereboanda), 10 health professionals and 44 community members from Ofosu and Awordo. Structured interviews were conducted with 26 women and 18 men in the two villages; 15 women were interviewed in Ofosu, along with the only eight remaining men within the village, while 11 women and 10 men were interviewed in Awordo.
Although the 2010 fieldwork was not originally intended to include focus group sessions, certain developments in Ofosu prompted its adoption\(^1\). Participants included 10 men (the two others were the chief who was on a customary visit, and a member of a neighboring village) and nine women.

In addition to the general community interviews, five members of the WATSAN committee in Awordo and three in Ofosu were interviewed. Four of the WATSAN respondents in Awordo also participated in the community interviews, while one in Ofosu participated in the general interviews in that village.

Details of the composition of study participants are shown in figures 2.1 and 2.2:

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\(^1\) This will be fully discussed in Chapter Four.
Center and Ajumako District Hospital. It was hoped that such data would validate the qualitative data obtained in the interviews. However, very few data were available in either of these areas.

2.3 Integrating Natural and Social Sciences

The study aimed to incorporate an interdisciplinary approach to address the wider issue of sustainability of community development projects. The integration of natural and social sciences was accomplished in two main ways. The first entailed adopting a blend of quantitative and qualitative methodology in data gathering and analysis as discussed above.

The second component involved establishing what constitutes a viable water source in this context. This entailed:

i. Gaining knowledge about the nature of the soil, vegetation patterns and different types of rock formations and how these might affect ground water quality.

ii. Understanding the nature of waterborne diseases and parasites and the mechanisms of transmission.

iii. Establishing the communities’ notions about clean water and accessibility.

2.4 Data Analysis

Individual interviews and focus group discussions were recorded with the consent of respondents and then transcribed for the study. Most of the interviews were conducted in the local Fante language and translated during transcription.

Study participants in the villages (henceforth referred to as “community respondents”) ranged from their early 20s to mid 70s (Figure 2.1). The occupational distribution of respondents in Ofosu and Awordo will be discussed in Chapters Four and Five respectively.

Figure 2.3. Age distribution of study participants in Ofosu and Awordo communities as gathered from the survey
Information gathered from participants shed light on the impact of the project on the respective demographic groups. In much the same way, professionals such as teachers and health workers provided information that helped to determine the health and academic impacts of the project. Members of the WATSAN committees provided perspectives based on their experiences as managers of the project.

A Note on Presentation of Findings

An important aspect of this study is to communicate findings on what impacts improved access to clean water has had on study participants in a manner that upholds the dignity of all respondents. For this reason, and to guard against any potential, unforeseen threat to their wellbeing through the presentation of these findings, respondents shall generally remain anonymous. Only the traditional chiefs and WATSAN officials of the respective communities are identified by their titles. All other respondents are assigned pseudonyms. It is envisaged that the use of pseudonyms would afford readers a better opportunity to connect with study participants while protecting their real identities.

2.5 Structure of the Thesis

The first three chapters of this thesis cover the introduction, methods and literature review. Chapters Four and Five discuss findings in Ofosu and Awordo, Chapter Six compares findings in Ofosu and Awordo, while Chapter Seven contains conclusions and recommendations.
CHAPTER 3:  
STATE OF KNOWLEDGE (LITERATURE REVIEW)  

3.1 Introduction  
This chapter reviews literature that discusses how development interventions like the provision of improved access to clean water to rural communities can lead to improvements in health, educational options for girls, women’s empowerment and community governance and participation. It also examines the methodology used in assessing the impacts with a view to determining their applicability as a tool in measuring the impact of clean water projects in rural Ghana. 

Carter et al. (1999, 1) recommends that efficient “strategies for community water supply and sanitation programs in developing countries should be based on a clear understanding of the existing problems, the beneficial impacts achievable, and the factors that determine sustainability”. He further points out that development projects can only be truly beneficial if their impacts are sustainable in the long run, and that long-term sustainability is often impeded by a variety of factors, such as prevailing attitudes in beneficiary communities, institutional constraints and limited finances. In analyzing the impact and sustainable of clean water and sanitation projects in the developing world therefore, he observes that no single approach has the capacity to solve the recurring problem of failed projects. Rather, the study advocates synthesizing different approaches such as community participation, financing for maintenance and emphasizing the importance of sustaining benefits of improved water supply. 

While various proposals have been made about how to sustain rural water projects, the approach of Carter et al. differs in the sense that it advocates an integrated approach. And like all recommendations, implementation is the surest way to determining its feasibility.  

3.2 Health Impact  
The World Health Organization (1999) defines Health Impact Assessment “as a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.” 

Children under the age of five appear to be the most vulnerable group to diarrheal infection. An estimated 1.8 million children die each year as a result of it, which translates into 4,900 deaths
a week. Repeated diarrheal infections before the age of five predisposes children to vitamin deficiency and malnutrition, which also puts them at even higher risk of contracting the disease and having it linger for longer times. Frequent diarrhea further makes a child more prone to weight loss, stunted growth and vitamin deficiency (United Nations Development Program [UNDP] 2006, 47).

The World Health Organization (WHO) and the United Nations Children’s Education Fund Joint Monitoring Program (UNICEF/JMP) estimate that 884 million people worldwide have no access to clean drinking water; 328 million of these live in sub-Saharan Africa (WHO & UNICEF/JMP 2008, 30).

The 1980s were declared the International Drinking-Water and Sanitation Decade by the United Nations General Assembly. Research conducted in the early 1990s, after a decade-long drive toward improved water supply and sanitation, reported significant reduction in water-related diseases as a result of intervention projects that provided clean water and sanitation facilities to communities that lacked them. For example, analyses of 144 studies through the calculation of “disease-specific median reduction levels” revealed a 26 percent median reduction in diarrheal morbidity, 27 percent in trachoma, 29 percent in ascariasis, 77 percent in schistosomiasis and 78 percent in dracunculiasis. In Ghana, the introduction of boreholes in Upper Region from the 1975-1978 led to 80 to 100 percent reduction in the incidence of guinea worm, which is transmitted exclusively through surface water (Esrey et al. 1991, 609; Hunter 1997, 88).

3.2.1 Health Determinants

Key literature on health impact analysis shows correlations between behavioral change and exclusive use of clean water, sanitation and proximity of the new water resource. Case studies in Lesotho, Peru and Mali not only corroborate these findings, but also reveal that health impacts are enhanced when access to clean water is complemented by improvements in personal and domestic hygiene and the exclusive use of the improved water facility. Good domestic and personal hygiene are influenced by the quantity of water used, which is determined, in turn, by the distance to the improved source. In fact, it was discovered that communities were more likely to use the new water system if it was closer than the old water source. In Mali, interviews with parents and guardians of children under seven years of age in villages that used various water sources showed that children who exclusively used water from an improved source had a lower diarrheal prevalence level than those who relied on a spring or stream. Some studies in Lesotho reported no positive results, because the improved water source was not the only available option.
It is therefore recommended that intervention water projects incorporate education on the need for practicing good sanitation and encourage attitude change so as maximize their health benefits (Esrey et al. 1988, 1991; Carter et al. 1999; Checkley et al. 2004; Plate et al. 2004).

The knowledge that different variables combine to determine whether rural water programs generate the desired health benefits is not only essential at the planning stage, but also necessary for effective impact analysis.

3.3 Impact on Education

Studies have established clear linkages between the health of children and their academic performance. Worm infestation is known to affect the child’s concentration in class, and the absence of water supply and sanitation often impede children’s education. Every year, about 443 million school days are lost as a result of water and sanitation related diseases. In many cases, the effects of lack of access to clean water trap generations of children in a cycle of poverty, as the lack of clean water causes ill health, which results in lost education and finally, poverty in adulthood (Tay 2005; UNDP 2006, 6).

While the health consequences of lack of access to clean water are well documented, most of the educational impacts identified are related to the length of time children spend hauling water from long distances, leading them to often miss out on school. The key literature more often identify enhanced educational opportunities for girls as a major impact of improved access to clean water, because it increases their school attendance as a result of reduction in time spent hauling water (Harvey 2008). For example, an evaluation of rural water projects in India, Pakistan, Nigeria and Morocco revealed that school attendance and enrollment rates for girls increased when their communities gained access to improved water. School attendance in six Moroccan provinces was reported to have increased by “20 percent over four years, attributed in part to the lesser time spent” fetching water, while the amount of time spent on this task reduced by 50 to 90 percent (Gender and Water Alliance 2006b, 15).

3.4 Community Governance and Participation

As a counterargument to the view that common property resources are typically bound to fail, Ostrom (2009) provides a framework for assessing the sustainability of socio-ecological systems. She identifies certain conditions under which jointly owned resources could be managed efficiently to ensure sustainability. It is however conceded that resources within diverse communities with challenges in communication and no established regulations are less likely to
be managed sustainably. The success or otherwise of managing common property resources is therefore determined by the type of resource in question, users, the governance system and the interaction of all these factors. For instance, the presence of rules does not always guarantee effective governance in the long term. Rules need to be compatible with local conditions for them to be effective in both the long and short term and must be suited to the resource system in question. Regulations should further be endorsed by legitimate authority and monitored to ensure utility (Ostrom 2009; 419).

Studies about the dynamics of managing common pool resources further reveal that community ownership, participation and governance are necessary for the sustainability of rural water supply systems. Case studies from Asia and Africa show that jointly owned resources are better managed under conditions of social cohesion and effective, equitable regulatory measures. Participation is described as a “process, through which stakeholders influence and share control over project initiatives and the decisions and resources, which affect them” (Doe & Khan 2004, 367). The quality of participation is considered vital to the outcome of community management strategies. While a unified sense of direction and purpose is essential, there need to be avenues for addressing different concerns in a manner that ensures collective viewpoints become the fabric of the management system that is ultimately adopted. This not only negates the potential for external interference to undermine local regulatory measures, but also ensures core support for the adopted mechanism. It could further inspire a sense of ownership that comes from knowing one is truly a part of a system set up for the good of the community (Bromley 1992; Karikari 1996; Poolman & Van De Giesen 2006; Ostrom 2009). It can be deduced therefore, that an internally generated, equitable, participatory community governance system could enhance sustainable resource management.

A key determinant of successful community participation is the implementing agency’s mode of operation. In Mali, findings through analysis of village records, participant observation and interviews revealed that people’s discomfort with the method of community consultation, location of hand pump and the type of technology being used resulted in low patronage of new water supply facilities. The perception was that the planning process did not adequately capture the preferences of the diverse social actors within the community. Greater flexibility is therefore recommended in community development work in order to promote widespread participation (Gleitsmann et al. 2007).
The Community Water and Sanitation Authority (CWSA) in Ghana was established in the 1990s and mandated to oversee rural water supply. It was set up to operate under the new local government system, and to be distinct from urban water supply system that is managed by the Ghana Water Company. Unlike the urban system that entails distribution of treated surface water through pipes at costs borne jointly by government and users, rural water supply involves extraction of ground water through the drilling of wells and the installation of hand or foot pumps. The strategy of the Community Water and Sanitation Authority for ensuring ownership was to require communities to pay 5 percent of the cost of drilling and installation (Nyarko et al., 2009). It is not exactly clear how a strategy for engendering ownership that did not originate from the users was expected to work in villages that had been newly introduced to the use of hand or foot pumps. Perhaps it is no coincidence that more than twenty years after the introduction of this scheme, most of these pumps are broken, and villagers have gone back to the traditional sources of water (streams, rivers and shallow open wells) while waiting for the government to repair or change the old pumps.

Active community participation in the planning, implementation and management of the water facilities is central to the NF/REDEP water program. Community members are encouraged to work together in making decisions at all stages of the project, and regular community meetings are recommended to facilitate this. It is believed that such constant gathering among residents creates the opportunity for thinking about other community development needs (Doe & Khan, 2004, 367).

According to Doe & Khan (2004, 366), effective community management is influenced by population and household size as well as the age and occupation of the head of the household. Describing a case study based in Ghana, they conclude that smaller villages (of about 1000 to 3000) are more likely to effectively manage a project than larger ones. Similarly, single-family households were more homogenous and cohesive, thus facilitating community-level participation. Also, communities with more elderly residents were more likely to support development projects, and those with large farming populations were better disposed to participation in intervention projects.
3.5 Impact on Women’s Empowerment

Key literature on women’s empowerment underscores the importance of gender sensitive planning and implementation in development interventions. Being aware of specific local contexts and designing intervention projects that address the specific needs of women in these areas are considered more effective in enhancing the status of women than projects that are gender-neutral (Gender and Water Alliance 2006a, 4, 18). For example, Ambler et al. (2007, 1) recognize the linkages between tailored interventions and improvements in women’s socioeconomic status:

…interventions to improve the lives of women should seek to build both women’s assets and their social status in order to transform gender roles….building women’s economic assets improves their social status …strengthening status can promote asset development.

Empowerment is also considered “a process of change in power relations that is multidimensional and interlinked” (Kaur et al. 2007, 7) and “a multilevel process involving the individual, organizational and policy levels.” (Datta & Kornberg 2002, 4). Koggel (2006) recommends sensitivity to local context, an assessment of the “multidimensional and multileveled aspects” and adoption of a “cross- and multi-disciplinary approach” in measuring women’s empowerment.

March et al (1999, 93) discuss Longwe’s five hierarchical levels of equality in development interventions necessary to realize women’s empowerment: “Control, Participation, Conscientization, Access and Welfare”. Participation in the decision-making process, policy-making and planning as well as involvement in development projects, are key empowerment indicators. In particular, their involvement in needs assessment, project design, implementation and evaluation is considered essential to achieving equity. While acknowledging that the model does not fit all development interventions, emphasis is placed on the importance of gaining control and being aware of gender considerations when planning, implementing and evaluating projects.

3.5.1 Opportunities and Constraints for Meaningful Participation of Women in Community Water Programs

The realization that women’s needs could be better served by involving them in the planning and management of community water programs was embraced by a number of development agencies as part of the Women in Development paradigm. For example, in the early 1990s, development organizations in Tanzania, Morocco and the Philippines made the establishment of
gender-sensitive water management committees a central part of their approach. Women were involved in some technical aspects of the program, such as construction work for water facilities (Wakeman et al. 1996, 15-26).

However, while the involvement of women represented a shift in the traditional scheme of things, cultural obstacles impeded their meaningful participation. Women’s domestic responsibilities limited the amount of time they had available to engage in committee meetings and perform other duties that went with their new roles. Also, internalized notions that they did not belong in the public realm and were incapable of leading kept many women from being active. In fact, the time limitations on women appear so substantial that development practitioners have been cautioned against unwittingly increasing the workload on women. Male dominance also came to the forefront; men made committee decisions that should have been made by consensus, and in some cases expressly ignored the wishes of the women in the community (WaterAid Nepal 2009, 9-13; Wakeman et al. 1996, 18-19, 24; Regmi & Fawcett, 2001).

3.5.2 Relationship Between Women’s Domestic Responsibilities, Health and Socioeconomic Status

As in many parts of the developing world, women in Ghana are still bound by customary obligations to take sole responsibility for domestic duties. This obligation is based on the perception that women’s main functions in life are reproduction, childcare and homemaking. These expectations exist against the background of beliefs that the domestic realm is not important (Nukunya 2003, 47; Buor 2004, 86).

*Opportunity Cost of Fetching Water*

It is believed that women in sub-Saharan Africa spend about four hours daily on water errands. Studies in Mozambique, rural Senegal and eastern Uganda showed women spend 15-17 hours a week collecting water. This increases in the dry season, when women have to walk 10 km to fetch water. In eastern Uganda, it was reported that households spent an average of 660 hours a year fetching water (UNDP 2006, 47).

Research shows that the time that women spend fetching water is often at the expense of income-generation or leisure activities. For example, some women in the Gujarat region of India who run their own microenterprises reduced the time they spent in their businesses by two hours per day in order to fulfill household water needs during the dry periods. The report further estimates that if the women reduced the amount of time they devoted to fetching water, they
would earn an additional $100 per year, depending on the nature of the business (UNDP 2006, 47).

Indeed, there are examples where women have used the extra time gained through improved water access for income-generation activities. There are cases in Uganda and Bangladesh where women earned income working as technicians and vendors of new water facilities. There are other examples in Ghana, Senegal, India and Bangladesh where improving the water supply enabled women to engage in income-generation ventures like pottery making, cola nut and palm oil processing and farming. The findings also reveal a correlation between women’s economic advancement and their enhanced self-image. Not only did they gain the self-confidence to aspire to public leadership, but also the wider community recognized their knowledge and skills. They further experienced increased mobility, greater negotiating power within their families and the wider community, as well as greater autonomy and independence. There have also been reported instances where women’s new status challenged customary perceptions of women’s incompetence in technical fields (Gender and Water Alliance 2006b, 19).

On the other hand, a case study from Benin revealed that in spite of measures taken to involve women in water management, they still lacked negotiating power in their households. Although they participated in decision-making processes concerning the water projects, they were not allowed to decide how to use the time freed up by improved access to water (Ivens 2008).

These examples indicate that, while it is not a given that all women will make use of free time gained by having access to improved water services, it is possible for some women to acquire better livelihood options due to such interventions. Clearly, there are certain factors that predispose women to one condition or the other.

Apart from the time women lose as a result of prolonged hours of fetching water, there are indications that this phenomenon might be playing a central role in perpetuating the low socioeconomic status of women. For example, a study conducted among 210 women to determine the impacts of chronic water shortages in the Kumasi metropolis of Ghana revealed a correlation between women’s responsibilities as primary suppliers of household water and their health, income, and educational status. The amount of time women spent fetching water during times of scarcity had negative effects on their income levels. Additionally, the energy women spent in fetching water had adverse effects on their health. The study further compared the impacts of the chronic water shortages on women who lived within the core of the metropolis and its fringes. Women in the core settlements were generally better educated, more financially secure and more
likely to have spouses who assisted in domestic duties than those living in fringe communities. As a result, women living in the core area were better equipped to deal with the chronic water shortages than their counterparts in the peripheries. Customary obligations, poverty and low level of education had made the latter more vulnerable to water shortages, leading to a cycle of poverty and ill health. It is particularly interesting to note that the author identified cultural influence as the main reason why husbands in the fringe areas failed to assist their wives with domestic duties. He then stated that this failure was as a result of the low social status of women within the urban fringe communities, and that it was a situation that mirrored rural Ghanaian lifestyles (Buor 2004, 86-89).

Among other recommendations, the study advocates involving women in planning and managing community water programs and promoting female education as means to reduce male dominance within the household. The purpose is to reduce the enormous workload on women. Ironically, however, the author also recommends that women be educated on better ways of ensuring water purification (Buor 2004, 96). The irony lies in the fact that such an approach would reinforce the prevailing perception that water supply and related issues are the preserve of women. Rather, efforts at addressing the water needs of communities should ideally be aimed at the entire household to emphasize the need for sharing domestic responsibilities.

It can be said from the foregoing that, while the active involvement of women in intervention programs is laudable, this approach still operates within a socio-cultural context that is largely opposed to women’s autonomy. For this reason, it is important that such gender mainstreaming efforts be closely monitored and frequently evaluated to determine whether they are producing desired outcomes.

3.6 Methodology

3.6.1 Appreciative Inquiry: A Tool for Positive Communication

Finegold et al. (2002) present Appreciative Inquiry (AI) as an effective means of engendering dialogue among multiple stakeholders to bring about desired change. AI is described as being rooted in the social constructionist viewpoint that there are multiple ways of knowing and multiple realities, and that none has preeminence other the other. It is therefore necessary to encourage the expression of multiple viewpoints. Considered a shift from the problem-centered mode of inquiry, the appeal of AI lies in its capacity to create an enabling environment for vision building and collaboration with the aim of bridging the gap between
desired outcomes and reality. Language and perception are considered vital to this end, so that emphasis is placed on encouraging positive expression and avoiding polarizing dialogue. Stakeholders therefore engage in constructive discourse to explain their aspirations and design the roadmap for achieving them.

In their study, Finegold et al. (2002) depict the successful application of AI in effecting whole systems change within a university, building a coalition for improved housing and community development in Dubuque, Iowa, empowering villagers in Phakhel, Nepal to help themselves and in setting up an inter-faith cooperation under the auspices of the United Nations. These tenets of AI significantly guided my interactions with participants in this study. Throughout the interviews and focus group discussions, I mentally acknowledged the fact that their communality, rich values and commitment to improving their lives are potential tools for building the desired future for their communities.

3.6.1 Methods of Impact Analysis

Scientific research is evaluated on the basis of relevance to study area, extent of intellectual contribution, as well as rigorous selection, treatment and investigation of the subject. It is also expected to be credible, reliable, valid and generalizable. The extent to which a study meets these criteria depends in large part on the methodological approach used (Silverman 2007; 272-311, 338). An objective, analytical approach is therefore vital.

Lakwo (2006) describes impact analysis as an enquiry into change, with a focus on the changed variable(s), its cause(s) as well as recognizable linkages between a particular intervention (catalyst) and the change. He employs a blend of quantitative, qualitative and participatory methods in assessing the impact of microfinance on women’s empowerment in Uganda. Ngorima et al. (2008) also use a similar combination of methods to study gender perspectives in rural health, poverty, water and sanitation in South Africa. In his study, Lakwo provides an analysis of the types of methods typically used in impact analysis studies. He demonstrates that, notwithstanding the varying potentials and limitations of individual methods, a judicious blend of qualitative, quantitative and participatory methods in impact assessments has the capacity of enhancing the quality of the study.

As discussed, studies into impact of improved water supply on the health, education, women’s empowerment and community governance and participation employed these methods. Structured interviews, focus group sessions and examination of statistical data are especially applicable to research in rural communities (Twumasi 2001).
CHAPTER 4:
EVALUATING IMPACTS IN OFOSU

BACKGROUND

4.1 Introduction

This chapter is based on information gathered through focus group discussions and interviews held in August 2009 and May/June 2010. In 2009, three separate focus group sessions were held: one with men, women and children in Ofosu, another with health workers of the Nkwantanum Health Center and a third with teachers at the Atwereboanda Basic School. In 2010, however, children were left out of the study because information from the previous focus group meeting with them had been largely inconclusive. The 2010 study therefore involved focus group meetings with the adults as well as individual interviews with men and women in the community. Interviews were also conducted with a number of health professionals in the Nkwantanum Health Center and Ajumako District Hospital, the two main health facilities that cater to residents of Ofosu.

The same set of questions was used in both the 2009 and 2010 fieldwork, with only minor additions aimed at capturing the age, educational level, household size and occupation of the interview respondents.

The Interview Guide, which lists the questions used in both the focus groups and the individual interviews, is included in Appendix A.

4.2 Background on the Community

4.2.1 Location and Features

Ofosu is a village located in the Sonkwa Sub-district of the Ajumako-Enyan-Essiam District. Due to its relatively small size (population of 120), one is not likely to come across the name in regular local government records.

It is located about 1.5 km along a gravel road from the paved main road that connects the district capital, Ajumako, to Mankessim, a major trading town in the neighboring Mfantseman district.
Due to its relative proximity to the main road, Ofosu has electricity. However, it does not have a school, and students walk about 1 km to attend school at the neighboring village of Atwereboanda.

The nearest year-around surface water source (Ochi River) is located 1.6 km away along a hilly, generally unimproved one-lane dirt track. A round trip on foot to collect water from the river, takes about 45 minutes to one hour. Details on the community’s water supply issues will be addressed in section 4.4.2. Figure 4.1 is the map of the village.

4.2.2 Population and Social Organization

Information gathered from respondents in the summers of 2009 and 2010 indicated that Ofosu had an estimated population of 120 (counting adults and children). Residents informed me that there were more women than men currently living within the village; in fact, only about eight men were living in the village when I visited. Most of the men have relocated for economic reasons. In spite of this, those absent were still considered residents and were counted among

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2 It should be noted that, while Ofosu is located 1.6 km from the river, the second study village, Awordo, is only about 300 meters away from their stream (which is a tributary of the same river).
members of the community (and were therefore included in the population estimate of 120) This is common in Ghanaian villages; community members who have essentially relocated may still be considered residents until they have been continuously absent for roughly four years.

One interesting phenomenon about Ofosu that was gathered during the 2010 study was the fact that all residents are related either by blood or marriage. According to village sources, individuals who inherited the land from a mutual ancestor established the community. The population grew with the addition of spouses and children, making it a clan settlement.

A traditional chief who is a clan member heads Ofosu. He lives and works outside the community, but pays regular visits. One respondent said that he returns “every two months.” Mallam Issah, one of the village elders (who happens to be married to the chief’s sister) acts as “assistant chief” in his absence, and has been given the title “Regent”.

Residents are adherents of Christian, Muslim and Traditional African religions.

4.2.3 Economic Activities

The residents of Ofosu are mostly subsistence farmers who supplement their income with odd jobs and business ventures. Of the 23 people who participated in the 2010 survey in Ofosu, 10 are full time farmers, two combine farming with work at a stone quarry, one combines farming with tailoring, one works full-time at a stone quarry, two sell cooked food, and one other woman is a homemaker. One respondent also practices as an herbalist in addition to farming, two are full time petty traders (in assorted food items including vegetables and fish), while one combines petty trading in with farming. Figure 4.2 shows the occupational distribution of respondents in Ofosu, separated into men and women. It shows that, although both men and women work on farms and in the stone quarry, food vending and petty trading are predominantly female jobs in Ofosu.
Farms are typically located from half kilometer to a kilometer away from the village. According to some respondents, some women are now turning to farming closer to the village as a result of water availability (from the pump). This includes women who never had farms before, as well as those who now cultivate backyard gardens in addition to their already existing farms outside the village. Two of the female respondents were among those who now had farms inside the village. A third female respondent grew peanuts in her backyard.

### 4.3 History of Ofosu’s Water Supply

Knowledge about the history of Ofosu’s water supply is necessary to understanding the context within which the NF/REDEP water project in Ofosu is being implemented. In 1995, The Community Water and Sanitation Authority (CWSA) of Ghana dug an open well for the community (shown in Figure 4.3) after repeated requests from residents. Before then, the village relied on seasonal ponds and the Ochi River for its water supply. However, it was soon realized that the well dried up during the dry season.

Several respondents, including 45-year-old Ewusie, noted that there are typically chronic water shortages during the dry season when the open well and nearby ponds dry up, and the immense difference that the pump made in the lives of community members:
...we had a difficult time getting water during the dry season, especially... right now the rains have set in, so there's water around. But around Christmas time when the weather becomes dry and we would have had to go to Ochi everyday this water is close by instead. So, we see that it has helped us.

In addition to the irregular water supply from the open well, another problem with it is that the well is not covered, making it a health risk. It is prone to contamination, as there is no restriction on what residents can use in collecting the water. The Regent, Mallam Issah, expressed displeasure at this practice:

I have been thinking that we should have a designated container for drawing water from the well. I am not happy about the fact that children can even drop any dirty container into it to draw water.

![Figure 4.3. Photograph of the open well in Ofosu, showing some of the containers that residents often use to collect water.](image)

Several respondents also complained about the fact that children often dumped debris into it. These reports were made both during the 2009 focus group discussions and the 2010 individual interviews. In 2009 for example, participants at the men’s focus group session said they believed the well was unsafe to use because the debris had polluted it, and reiterated the fact that the pump was a healthier option:

You see the little children – when there are no adults around – they drop whatever they’re holding inside it. Because of this, it’s impossible for us to drink it... The children can dump all kinds of things into it... so it’s impossible for us to drink it. You yourself, if you take a good look at it after fetching it, you won’t drink it... anyone who looks into it after fetching it won’t drink it. But with this one [meaning the pump] when you look into it after fetching, you can see there’s nothing in it.

The community therefore requested a more reliable water supply system. The CWSA eventually installed a borehole fitted with a manual (foot) pump in 1996. Forty-eight-year old Kwodwo revealed that one late village elder had been instrumental in lobbying the government to
provide the village with the pump, because he recognized the need to address the chronic water scarcity in the village:

He realized we were suffering, because walking from here to Ochi took a lot of energy out of us. You couldn't even fetch one bucket before daybreak -- we had to fetch about three or four to meet our needs, and then go to our farms afterwards. He realized it was too much toil for us. It was for this reason that he discussed with the village committee to bring this pump.

The installation of the new water pump was not the end of Ofosu’s water problems, however, for the pump broke down several times through the years. Whenever this happened, residents were compelled to go back to the former water supply sources, with all the inconvenience and health risks that it presented. In the absence of the pump and open well, residents had to depend on the Ochi River that is a 45 to 60 minute walk. Not only does the stream present health risks because of its pathogen contents (Bannerman 1975), but also the task of walking to and from the stream was an ordeal. In order to get to the closest source of the river, residents had to travel a distance of about one mile that takes them through two villages.

During the interview, 48-year old Kwodwo recounted the inconvenience and hardships that residents experienced during that time, saying it aggravated the already difficult economic conditions in the community. He was particularly thankful that the village now had the pump:

We become stressed out when this water [pump] isn't here... If this water hadn't been here, we would all have moved away.... You just imagine, madam, from here to Oboum [the village where the stream is located] -- you'll walk past two villages before you get there, before you fetch one bucket or one basin, what can you do with it? You can’t use it for anything! [Meaning it’s barely enough to handle a family’s real water needs]

As shown in Figure 4.4, the path to the stream is rough and wooded.
Whenever the pump stopped working and the open well dried up, residents would start a
typical day at 5AM (while still dark), walking down the path with their children to get water and
prepare for school. For example, Ama, a 32-year-old mother of four said she would wake her
children up “about 5 AM” to get water, and that the children ‘took their baths there [at the
riverbank], and then fetched water home.”

The most compelling aspect of this is the fact that residents have to go through all this in
order to get water that is polluted and puts them at risk of contracting serious water-borne
diseases like guinea worm, cholera, typhoid fever and diarrhea. Even without scientific proof of
this pollution, respondents testified about the unhygienic practices that they had witnessed, which
they admitted made the stream potentially unsafe to use. While some reportedly saw people wash
their laundry and dirty dishes in the stream, others described how human waste would inevitably
end up in the stream. For example, 35-year-old Agnes explained that she believed the stream was
unsafe to use because she would see what she recognized as human feces:

When you go to Ochi, especially when it dries, you see small organisms in it ...some even
defecate into it...I have witnessed it myself. You see, some of it washes from upstream,
so you see it coming from upstream. When some gets into the water without being
detected, we also fetch and drink it.

The health risks of using the stream were reinforced during the 2009 men’s focus group
discussion, when one participant recalled that as a child, he and some of his play mates
sometimes exhibited symptoms of shistosomiasis after bathing in the river:

The Ochi – I grew up here, I lived here when I was attending school, before I moved
away. We contracted a disease whenever we bathed in the Ochi – we’d be passing blood
in our urine.

The distance to the stream and the unsanitary conditions described by respondents were
independently confirmed through field observations. GPS data obtained during fieldwork also
confirmed the location of the stream relative to the village. On reaching the stream, the study
crew witnessed several people bathing in the stream (as in the example shown in Figure 4.5). The
boy in Figure 4.6 was also observed washing dishes in the stream, while debris were seen floating
on the water surface.
During the rainy season, the residents also collected water from a puddle that formed near the outskirts of the village. This puddle, shown in Figure 4.7, also happened to be the road to the next village. Residents would allow the water to settle after a car passed through, believing it was okay to use as long as it did not appear muddy.

A break in this cycle came in November 2008, when the faulty foot pump was replaced with a new hand pump (shown in Figure 4.8), under the auspices of the NF/REDEP water program.
4.4 Sample Population

Ofosu was selected as a study village because residents relied largely on an open well, pond and the Ochi River until 2008, when the faulty foot pump was changed into a hand pump through the NF/REDEP water program. The survey discussed here involved 19 out of the 20 households in Ofosu. Distance to the pump, though a key consideration for household use in the second study village (Awordo), was not an issue in Ofosu because all the 20 houses were located no more than 100 meters from the pump.

A total of 26 interviews (8 men and 15 women) were conducted in Ofosu. I had hoped to interview 15 men also, but only eight men were available for the interview because the rest had relocated to find work. However, the exact number of men who had moved out of the community could not be determined.

In addition to the general community surveys, three members of the Water and Sanitation (WATSAN) Committee were also interviewed. The Committee was established to supervise the maintenance of the water facility. The total membership of the committee is five, but only three remained, the other two having left the village. Household sizes ranged from a minimum two to a maximum of 10, as shown in Figure 4.9.
As illustrated in Figure 4.10, the survey recorded a total of 76 children (individuals under 18), evenly split between boys and girls, and 36 adults (aged 18 and above) of which only eight were men. It should be noted that 64 percent of village residents are below 18.

The study respondents ranged in age from their early twenties to their late seventies, with the exception of a sixteen-year-old WATSAN committee member (the hygiene educator). The age distribution of survey participants is shown in Figure 4.11.
DISCUSSION OF IMPACT AREAS

This section examines what impact, if any, improved access to clean water has had on residents of Ofosu in terms of health, education, women’s empowerment and community participation and governance.

Findings indicated that, although some of respondents complained that the pump had a “salty” taste and does not lather when washing clothes, residents were generally appreciative of the fact that they currently have access to clean water all year round as a result of the pump. Respondents mentioned improvements in children’s school attendance, reduction in time spent and distance covered to fetch water and prevention of water-borne diseases as the most significant benefits of the water project.

In spite of these benefits, however, the prospects for sustaining the water project appeared dim as a result of low community participation in the management of the water project and absence of strong financial commitment toward the maintenance of the pump. From the findings therefore, it became clear that Ofosu needs a way to sustain the benefits being derived from the pump to avoid a recurrence of past water problems.

The rest of this chapter is a detailed discussion about respondents’ views on how diseases are spread, good sanitation and what constitutes safe and unsafe water use. It also addresses the impact that the water project has had on children’s education and also examines whether the availability of a close water source has had an impact on women’s empowerment. It further gauges the project’s prospects for sustainability, measured by the level of community governance of and participation in the management of the water project.
4.5 Impacts On Women’s Empowerment

This section discusses what impacts, if any, improved access to clean water has had on the women of Ofosu. The indicators for measuring impact on women’s empowerment established at the outset of this study include:

• the level of women’s participation in the management of the water project;
• decision-making ability in the home and wider community;
• the community’s perception about women’s capabilities,
• women’s own perceptions about their capabilities;
• reduction in time spent fetching water, and
• time used for self-improvement and generating income.

Responsibility for Household Water Supply

Feedback from all respondents indicated that women had primary responsibility for ensuring there is adequate water in the home. They could either fulfill this responsibility by collecting water themselves or by delegating the work to other members of the household, typically children. Generally, as long as there were children of either sex old enough to collect water within a household, the responsibility for water supply would effectively fall on them, while the wife, mother, aunt or older sister provided supervision.

For instance, Papa Annan made reference to this custom when he first made it clear that his wife had primary responsibility for providing water for the home, and that she was assisted in this duty by their children (both male and female):

Typically, it's the women – women and the children we've given birth to – have the responsibility for fetching water for the home.

He then went on to explain that because their older children had taken over the task of fetching water for the household, it was almost as if his wife was “unaware of where the pump is located.” He clarified this later by saying “she knows [the pump’s location] alright; it's only because she has children in the house who can fetch water, she doesn't bother to fetch it herself.”

Another finding was that sometimes mothers and wives still took part in water collection even when they had older children. This happened sometimes when they needed water quickly and felt they could not rely on the children to bring the water fast enough. Other times, more water might be needed than could be supplied by one or two children, in which case a mother remained actively involved in daily water collection. Ewusie’s household was one such place.
where the wife/mother collected water along with their daughter and son. As he put it, “My wife is a young girl so she fetches some herself, as do the older children.”

It also emerged from the interviews that women usually accompanied their children or wards to the stream during those times when there was no other source of water supply available. This was likely due to the distance involved and the fact that they had to set off in the dark. Abena, for example, would wake her children up “at about 5 AM ... to go fetch” water from Ochi. In order to reduce the number of trips, the children “took their baths there [at the river], and then fetched water home.”

Survey findings therefore showed that women and children (both male and female) had the highest responsibility for household water supply. This indicated a shift from the customary practice where girls were the primary water fetchers.

In fact, only two households (out of the 23 involved in the survey) relied solely on the daughters for water supply. Both of these households had sons who lived outside the village; their daughters thus happened to be the only children available to fetch water. Interview responses showed that the task of fetching water for all but one of the households involved in the survey fell equally on male and female children, with only one exception - the household of Maame Tawiah. Even though she lived with her daughter, one grand son and one granddaughter, the females had primary responsibility for supplying water for the house, because the grandson would only fetch water once in a while.

One example of households that equally shared water collection duties between male and female children was that of Yaa. She said both her sons and daughters had the task of supplying their home with water, and that she had even “apportioned [the number of daily trips] out for them – some fetch four, others three.” Another example is Maame2 Asana, who lived with her husband and grandchildren. She said it was the duty of her granddaughters and grandsons to fetch water for the home:

“In my house all the children go out to get water – whether male or female. As long as there's the need for water, they'll all go together. When we had to get water from Ochi, I'd wake them all up.

These trends are tabulated below (in Table 4.1). Out of 23 respondents, eight people (36 percent) said both boys and girls had the duty of supplying water to their households. One person said boys have sole responsibility (she is a 50-year old single mother living with her son); 13 percent (3) said the entire household fetches water; 9 percent (2) said girls were mainly in charge.
of household water supply; 4 percent (1) said girls were primarily responsible, with the only boy in the house occasionally joining in only occasionally; 4 percent (1) said grandmother (who lived with four grandchildren all below nine years of age) was the sole supplier; 18 percent (4) said mother and children were responsible and 13 percent (3) said mother only supplies household water.

Table 4.1. Who Fetches Water for the 19 Households in the Ofosu Study?

<table>
<thead>
<tr>
<th>Number of Households</th>
<th>Who fetches most of the water?</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Boys and girls share the duty</td>
</tr>
<tr>
<td>4</td>
<td>Mother and children share the duty</td>
</tr>
<tr>
<td>3</td>
<td>Entire household shares the duty</td>
</tr>
<tr>
<td>3</td>
<td>Mother has sole responsibility</td>
</tr>
<tr>
<td>2</td>
<td>Girls have sole responsibility</td>
</tr>
<tr>
<td>1</td>
<td>Boys have sole responsibility</td>
</tr>
<tr>
<td>1</td>
<td>Grandmother has sole responsibility</td>
</tr>
<tr>
<td>1</td>
<td>Girls have primary responsibility, while boys helped sometimes.</td>
</tr>
</tbody>
</table>

In order to ensure that women’s views and perceptions were taken into consideration, the NF/REDEP program required that the Water and Sanitation committee that was formed to manage the pump have a gender sensitive membership. Therefore, at the outset of the project, three out of the five WATSAN committee members were women. However, as a result of the out migration, two of the original members, one man and one woman, were no longer available. The three remaining members were two women and one man.

Feedback from interviews indicated that the establishment of the WATSAN committee signified the first time in the history of Ofosu that women had been given such a management role. Upon close scrutiny however, it became apparent that in spite of their new role, women were still regarded along traditional gender roles and perceptions. In this sense, not only men, but also the women themselves often considered their roles as WATSAN members as an extension of their customary roles.

There was widespread belief among respondents in Ofosu that women were the biggest beneficiaries of the water project, because it made it easier to fulfill their traditional housekeeping roles. The most significant findings relating to the impact of the water project on women was that the proximity of the safe water source had enabled them to have more time to commit to their businesses (engaging in trade, farming and/or other manual work), and to improve their health through rest. Women’s workloads were also reduced in the sense that many of the respondents
received help from older children in household water supply. Even for women who still had to fetch water for their homes, the time and distance saved were critical to their ability to perform other important tasks that would have been ignored or postponed in the past. In some cases, women who could hitherto not cultivate farms as a result of time constraints and poor health had been able to establish farms and gardens within the village. These women maintained their crops all year round by using the pump to water them.

Another interesting detail that emerged from researching the pump’s impact on women’s income-generating activities was that men had also benefitted economically from it. Both male and female respondents related how they had been using the pump to mix up herbicides to spray on their farms in preparation for planting. In the past, they would have had to get water from the stream in order to do so. Given the 3.2 km trip to the stream and at least 800 meters to their farms, it would be tiring.

Another finding was that availability of the pump had enhanced women’s capacity to support each other in both practical and emotional ways.

4.5.1 Women’s Participation in the Management of the Water Project

The performance of women WATSAN committee members and the overall level of women’s involvement in decision-making concerning the pump can determine the degree of women’s participation in the management of the water project. Separate interviews with all three members revealed that the most active member of the group is the Elsie, 16-year-old hygiene educator. Although only the chair is mandated to call meetings, the Elsie had also taken on the job of the pump caretaker. She turned out to be the younger sister of the original pump caretaker, who had left to continue her education after completing junior high school. The older sister had also been the youngest member of the committee at the time. Elsie was nominated to the committee because of the exemplary work she had been doing in the past in gathering her peers to clean the pump whenever she saw the need to do so:

I used to rally some of my peers to clean the pump area, whenever I realized it was dirty and between the weekly cleaning schedules set up by the community. This is what made people nominate me.

After her appointment as hygiene educator, she continued to perform duties beyond what was expected of her, such as cleaning up the pump area every two weeks and advising residents to maintain proper sanitation at the pump site. She admitted though, that she was having trouble getting people to cooperate with the rules governing the maintenance of the facility. She felt she
was not taken seriously because of her age. One such issue involved the implementation of the rule that required patrons of the pump to remove their sandals before stepping on the platform in order to keep mud off the pump area. She said repeated calls for residents to comply with this rule had fallen on deaf ears. Not even a complaint to the Regent helped. Finally, she took her mother’s advice and decided to communicate her frustrations to the REDEP:

I usually scrub the pump every two weeks. However, rules don't really work in this village. For a long time, I kept telling them to leave their sandals and slippers outside the pump area, because it makes the place muddy. They just ignore me – even the children. Sometimes they'll walk all over it with their sandals even as I scrub it. They regard me as a child, so they pay no attention to anything I say.

When I realized that, I complained to the Regent. He called them and told them to follow the directive. But they still ignored it. That made me really angry, but my mother cautioned me against reacting to the situation. She pointed out that it would earn me a bad name in the community, and advised that I inform people from REDEP and Nyarkoa Foundation when they come around. Hopefully, the people would listen to them.

The active role being played by the hygiene educator was confirmed by Aba, who said “she [the hygiene educator] is the one who scrubs” the pump, and that other residents only become involved in the cleaning “when it gets weedy.”

A number of respondents also made reference to an elderly woman who had been instrumental in rallying women to perform various community-related tasks. She was later identified as 74-year-old Maame Asana, wife of the Regent. She had assumed the position of “women’s organizer”, prompting the women to accomplish tasks such as cleaning the pump whenever she realized they had become too laid back. She was also identified as one of three women serving in the seven-member town committee, a position that enabled her to share her views on various aspects of community governance:

I'm one of two women who serve on the village committee. I sometimes help in calling people out for meetings. And I certainly share my opinions on how to manage the pump - whether we need to clean up or just clear weeds.

It should be pointed out however, that her main role has been to supervise women in accomplishing the traditionally designated tasks of scrubbing and sweeping. Her role therefore falls under the stereotypical community “elderly woman” who, by virtue of her age, is deemed qualified to sit with the “natural” all male village elders during meetings. The roles played by such women as Maame Asana on village councils therefore reinforce traditional gender views and ensure the continuity of customs by ensuring women are guided toward performing their socially assigned roles. They are mostly expected to implement decisions made by the chief and other
male elders, who are all considered superior. In light of this, Maame Asana’s role may not be considered an example of active female participation in the management of the project. In particular, the traditional framework within which she operates does not grant her decision-making power, which would be an important indicator that women’s perspectives and preferences were being taken into account in deciding issues concerning the water facility. Her membership of the village committee is therefore only nominal.

It became apparent that both male and female WATSAN members regarded the latter’s role on the committee as an extension of their traditional roles. This came out clearly in the course of the 2009 focus group session with WATSAN officials. When asked his opinions of working alongside women on the committee, the then secretary (who is currently the chair, having taken over from the member who left the village), responded that women’s presence on the committee had been beneficial in the sense that they could effectively carry out directives from the male leadership. In particular, he commended their skills in supervising children and overseeing the performance of duties by other minors, which also happen to be responsibilities that fall traditionally to women:

[Having women on the committee has] helped in the sense that it’s not everything that a man can go ahead and do – but with woman, when you just tell her, she’ll lead them – telling the children to do this and this and that – while we men would be seeing to the men and issues pertaining to the village.

What is more, the only two female committee members who participated in the discussion (the treasurer and the pump caretaker, then 18 and 22 years old respectively), agreed with this view. In a dialogue that is reproduced below, they stated clearly that since cleaning and sweeping were “not men’s work” they had been supervising the cleaning of the pump and even doing it themselves (the words in double parentheses indicate overlapping speech):

Question: [addressed to the pump caretaker and treasurer] How do you also see it, working with men?
Pump Caretaker: I feel that being part of the committee makes – something like sweeping isn’t men’s ((work))...
Treasurer: ((work))
Pump Caretaker: ...so we women supervise the sweeping of the village...
Treasurer: ((and the pump))
Pump Caretaker: ((and the pump))... we women ((scrub it)).
Treasurer: ((scrub it)).

It is worth mentioning that Maame Asana buttressed the statement made by these two women (that they had been cleaning the pump themselves), during the 2010 personal interview.
In reference to arrangements made to keep the pump in good condition, she said although it had originally been decided that all the women would share the work, in the end “the ‘children’ who were given the WATSAN training were the main people keeping it tidy.”

This brings up another manifestation of the hierarchical nature of the society within which the two women on the WATSAN committee find themselves – ageism. In fact, during the 2010 separate interviews with WATSAN officials, the chair mentioned that he found it easy to work with the current female WATSAN members “because they are young, [and] follow whatever directive we [male leaders] give.” This raises questions about the effectiveness of the women who are currently serving in this capacity. There were also clear indications of male domination during the 2009 focus group session, during which the only male participant (then secretary and current chair) was more vocal. The two women had to be drawn out to contribute to the discussion.

The interviews further indicated that decision-making patterns within the WATSAN committee were not as participatory as program implementers had hoped. It appeared that the younger members of the committee (both female) found it necessary to defer to the chair during meetings. For example, although the WATSAN chair said that “We all share our opinions at meetings”, he also conceded that “the secretary [the other man on the committee] and I would often speak more.” This was confirmed by the hygiene educator, who, when asked who spoke more at meetings, responded; “The men. They are older than us so they usually speak out.” But she said that the female members could share their views sometimes. When asked if any of the women had something to say besides what the older males said, were they also able to speak out, she replied: “The chair speaks most of the time, but we could share our views also when we had to.”

This kind of situation might lead to the dismissal of women’s representation on the water management committee as more symbolic than effective. Nonetheless, other information gathered during the survey indicated that women had made some inroads in leadership within the past two years, as a direct consequence of the project requirement to ensure gender-sensitive representation on the WATSAN committee. For one thing, it was revealed that their membership on the WATSAN committee was the first time women, and young ones at that, had been given the opportunity to participate in any semblance of decision-making capacity. This was pointed out by the pump caretaker and the treasurer during the 2009 focus meeting, and reiterated by the current hygiene educator during the 2010 individual WATSAN interviews.
In 2009, the two female officials said, “in the past, it was mainly the elderly women, not us children” who were likely to be regarded as community leaders. In 2010, the 16-year-old hygiene educator said even though children (anyone below 18) were normally not included in community meetings, she participated actively by virtue of her position as a WATSAN member:

Children can attend, as long as they only go to listen and not disrupt proceedings.... Except for me, since I am a member of the WATSAN committee. If they bring an idea that I think would not work, I'm able to share my thoughts on that.

The level of women’s participation in the management of the water project in Ofosu can best be evaluated on the basis of the gains made in women’s exposure to leadership since the establishment of the WATSAN committee. Although their roles as WATSAN officials appear to have been used to reinforce customary gender roles, there is an element in the level of involvement being shown by the youngest female member that defies the traditional label of women. Elsie assumed the task of pump caretaker. This is a bold move for a 16-year-old girl living in a hierarchical society to not only take the initiative in cleaning the pump after adults renege on their duties, but also take issue with their disregard for rules to lodge a complain with the second highest authority in the village (the Regent). The opportunity to serve in such a leadership capacity would serve her well as she matures, and represents a practical example of the fact that female leadership in not a misnomer.

WATSAN membership also enabled women to jump the traditional hurdle of waiting until midlife to be a recognized community leader. While the wife of the Regent and other elderly women receive “ceremonial consultations” by virtue of their age, these two young women, aged 16 and 23, get to sit at meetings with the chief and other elders. They have the opportunity to share perspectives that, as WATSAN officials, do carry some weight.

4.5.2 Decision Making Ability in the Home and Wider Community

Interview responses indicated that Ofosu currently has a seven-member town planning committee that includes four men and three women. According to one respondent, it was an offshoot of the NF/REDEP suggestion to involve women in the management of the water program, and to create a platform for discussing community needs. All respondents said that women currently played a more active role in the village than they did in the past. For instance, the hygiene educator mentioned that the WATSAN committee in Ofosu was the first real management committee the village ever had. She said, although some people had been appointed to supervise the pump during its installation, the set up was not as interactive as the WATSAN.
Rather, it involved the selection and training of two educated men, who had the task of maintaining the pump. The two selected persons were her father and another young man who had received some training in mechanics and were considered qualified for the task. Both have since moved out of the village. She pointed out that the current WATSAN committee members have no technical qualifications, but are performing the same tasks that those two men had been assigned.

Maame Tawiah reiterated the assertion that women in Ofosu were currently performing nontraditional tasks, noting that in the past, government agencies only conferred with male members of the community:

> Until now, women were not considered representatives of this village. Whenever the District Assembly needed a village representative, only men would be called up to go. Now women also get called up to trainings and meetings... We seldom held meetings to discuss community needs before this project. Now we call meetings -- we the women come together to think of ways to maintain the pump.

Abena also expressed similar views. She observed that unlike before when training programs and other official matters concerning the village had been channeled through the male leadership, the current arrangement gave exposure to all who were part of the water management committee, whether male or female:

> I had never encountered anything like this before, until you brought this water. Now when the elders come to announce they're going to Badukrom [for WATSAN training] those who are part of it go.

An attempt was made to evaluate the level of women’s involvement in household decision-making. However, after a couple of awkward instances during private interviews, it became apparent that respondents were uncomfortable discussing such issues. Therefore, the question was dropped. The only time that question was really addressed was during the 2009 men’s focus group, during which one respondent explained that in his home,

> Everyone is able to express their views. It’s not possible to have the same viewpoint. She might not take my idea.... We look at what would work, whoever that idea came from – and adopt it.

It is worth mentioning, however, that out of the 15 women interviewed, only four lived with their spouse. Of the remaining 11, three said their husbands lived in a different town or village, four were widows, while four were either separated or divorced. The majority of female respondents were therefore in a position to plan their schedules and make their own decisions without having to consult a male partner.
Even among those who lived with their spouses, it was obvious that the women were quite mobile. While the exact level of autonomy could not be determined, it was clear that women set their own schedules and worked in tune with their traditional responsibilities. Hence, women could attend functions and devote time to their farms and trading activities, as long as they performed their domestic responsibilities. So for example, Esi, who has five children (two very young) and lives with her husband, could travel if she needed to, because the older children help: “If I have water at home, I can leave my oldest child to take care of the house and the younger ones. She can even supervise their baths.”

Do Women Need to Ask Permission from Spouses to Go Out?

Another question that was meant to determine the level of women’s autonomy had to do with whether they needed their spouses’ permission to leave the house. Here, it was discovered that decorum dictates one informs the partner or whomever they live with on his/her whereabouts for safety. It was therefore established that spouses would inform each other about their whereabouts in case of any eventuality. As one male participant put it,

As a woman, you ought to inform your husband when you’re going somewhere. Otherwise, where do I begin to look for you in case something happens? I also ought to inform her, so that if I keep long she knows the reason.

4.5.3 The Community’s Perceptions about Women’s Capabilities

As mentioned above, the involvement of women in the management of the water project signified the first instance when women had been given an opportunity to serve the community in such a leadership capacity. The female members also appeared equal to the task, particularly the young hygiene educator who had consistently shown a sense of commitment unusual for someone her age. It should be pointed out that the fact that she was nominated by other members of the community by virtue of the initiatives she had been taking over the years signified a vote of confidence on the part of the community. In spite of the challenges she had faced in ensuring compliance of regulations, she came across as self-confident and determined, virtually unaware of any social limitations on her as a result of her gender.

The survey also included questions aimed at gauging respondents’ perceptions about women’s capabilities. In particular, respondents were asked about their views on the education of girls and having women on the WATSAN committee.

On views concerning women’s involvement in the management of the project, respondents thought it was a move in the right direction. Kobina, for example, made reference to the
important role women currently play as lawmakers within Ghana’s democratic dispensation. He said it was necessary to combine the views of both men and women in any kind of governance:

[It is necessary to have both men and women on the WATSAN committee] because even when we go to parliament, women are among those present. Everyone expresses their views. It’s not just men's opinions that – excuse me to say – can be used to govern this country. So we combine men's ideas and that of the women to govern the nation.

Papa Annan also expressed similar views, prophesying that Ghana would have a female president before his generation ends. He believed women had superior ethics, a trait he considered vital for governance, and the country would have been better off if a woman were in charge:

Yes, there's much use in [involving women on the management of the pump], because even with the current government – even by the time my generation ends a woman will be president. Because when we consider the way the country is being governed, we would have our peace of mind if a woman was in charge – because of women's honesty – when they decree that it's one, it's one!

On the question of whether it was necessary to educate girls, feedback indicated widespread recognition that girls were as capable of accomplishing their visions as boys were. In fact, Papa Kojo, a 77-year-old respondent, pointed out that “Women are now vying to be presidents. It's not just men who have the brains to learn. Some girls are even more brilliant than boys.”

Papa Annan shared the same view. Using the interviewer as an illustration, he stated:

Yes, there's certainly much benefit [in educating a girl]. It's an indecent person who'd say there's no use in it. If nothing at all, I'll use you as an example; in your education, if your parents had denied you they would have denied themselves. So at least look at your own status! It's useful to educate girls.

There was widespread recognition that an educated girl could offer much reward for her family and community as a whole. As Kwodwo put it, “If a woman has a job and a purpose in mind, or is able to do some trading and bring money home, wouldn't one be in heaven?”

In reference to his seven-year-old daughter, Ewusie expressed the hope that she would complete her education without incident. He touched on what appeared to be a longstanding fear among parents, a fear that, according to most respondents, explained why some people were reluctant to send their daughters to school. This was the fear of teenage pregnancy—that the girl would be impregnated and drop out of school, an occurrence that parents believed represented a waste of resources. So even as Ewusie expressed high hopes that his daughter would attain higher
education and get a good job afterwards, he also prayed that she would not end up being a drop out:

We only pray that she will complete junior high --that we'll have the means to educate her further, and that she won't get impregnated halfway--so that in the end she'll get a good job and be able to care for herself—and us—in future.... When she completes basic school, we'll either ask her to continue [to senior high] or enroll in a vocational training program.

Once she's able to complete school and learn a trade without dropping out, she'll realize her parents have supported her. Then she also can support the parents. When she gets knowledge, she can even bring jobs to this village. She would say 'this is the village I grew up in, let me take this job there so people can have access to them.'

The uselessness of [educating a girl] comes when, in spite of the parent's intentions to give her a good education, she gets pregnant midway and drops out. And once she gives birth, she can't go back, and she can't gain any meaningful employment either. It becomes a total waste of investment.

While some female respondents also spoke about the scourge of teen pregnancy and subsequent school drop out, it emerged also that it had not been the main reason why parents had been reluctant to educated their daughters. The traditional perception that girls would end up marrying and being supported by their husbands made it unnecessary to train a girl for any vocation. This was the phenomenon that accounted for the gap between educated men and women in Ofosu, as discussed under the section on education. That is why nine out of 15 female respondents in Ofosu were totally uneducated, while each of the eight men interviewed had at least a primary school education. As Amina pointed out, girls who would have liked to attend school were discouraged by their families because it was deemed useless.

In a dialogue representative of the shifting paradigm concerning women’s capabilities, Amina, a woman of 40, revealed that she considered everyone important enough to receive education. She then went on to use her own life as an example that not all women are destined to start families early in life. She said her desire to attend school never became a reality because her family did not believe in educating girls:

Yes, it's important. Everyone is important now. At first, our mothers had it in their minds that a girl would get pregnant and drop out of school. They believed you'd give birth early if you go to school, so they didn't take us to school. But look at me --at the age of 40, my firstborn is only 14. Going with the kind of reasoning that pertained, my oldest should be about 22 years. I have peers with children that age.

In spite of the widespread belief that the education of girls and boys were equally important, and that a well-educated girl could bring as benefit to the family and community as a well-
educated boy would, traditionally entrenched roles such as gendered division of labor still persisted in the village. The domestic sphere, comprising housekeeping and childcare were considered the realm of women. By extension, any task related to cleaning was also deemed “women’s work”. That is why Kobina could talk about the importance of women’s involvement in decision-making and in the same breath point out that, “The cleaning of this village is the responsibility of women. That has always been the case. It’s women that we've appointed to sweep and generally clean this village.” By implication, women had no room to negotiate what duties to perform; their responsibilities were spelt out right from the moment they were born.

4.5.4 Women’s Own Perceptions about their Capabilities

As mentioned earlier, all respondents recognized this era as a new dispensation with equal opportunities for both their sons and daughters. This is very significant, considering the fact that none of the women who expressed such thoughts had been raised to believe they could aspire to the same level of attainment as the male members of their families. Neither had the men been socialized to regard higher education for women as useful in any way. Yet, each respondent appeared to have come to the realization that women were just as capable as men of fulfilling their aspirations.

No interviewee represented this shift in thinking as poignantly as 31-year-old Sarah, who had never been to school. For her, an individual’s vision and purpose in life were the ultimate determinants in how their lives turn out. In a statement that took for granted equal opportunities for boys and girls, she observed:

“Someone might be determined to build a good future for themselves and possess a vision to make a real difference when they grow up, be in good standing so as to be able to support his/her mother. Others have no such aspirations ...Some women are more than men [meaning they are capable of accomplishments traditionally considered the domain of men]... They can possess a real determination to succeed in order to be able to take care of the mother. Others have no such thoughts.

In effect, she was saying that both men and women had inherent potentials that could be fulfilled if given the opportunity.

4.5.5 Reduction in Time Spent Fetching Water

It was also determined that the pump’s availability had led to a reduction in both the time spent and distance covered to fetch water. A round trip to the pump was estimated at 100 meters, whereas a round trip to the stream covered a distance of about 3.2 km.
Time spent fetching water had decreased by 75 percent, from an average of one hour to 15 minutes. This impact alone can have a huge effect on the lives of those fetching water. Eighty seven percent of all respondents said a trip to the stream took one hour, while 17 percent said it took between 45 minutes and one hour.

*How Much Weight Are They Carrying?*

Another strain of fetching water is the weight involved. A liter of water weighs 1 kilogram at most temperatures. The containers used in fetching water included seven, 10 and 17 liter buckets as well as small and large water basins, depending on the age of the user and how much water a household needed for a day. Seventy percent of all respondents (representing 16 out of 23) used either 10 or 17 liter buckets depending on how much water was needed at the time and the age of the person. This equates to 10 to 17 kilograms (22 to 37.5 pounds) for each vessel carried. Children below the age of nine usually used smaller, seven-liter containers, weighing 7kg (15.4 pounds); two respondents said they used either 10 or 17 liter buckets in addition to a big basin; 1 respondent said she used a 10 liter bucket in fetching water, one used a 17 liter bucket only, while one used a big basin only.

*Number of Trips Per Day Per Person*

The interviews indicated that water needs differed from one household to the next, and depends on the size of the family. For example, a household with a higher number of young children (below seven years) than adults would mean more trips by fewer people. Referring to this phenomenon, Esi (a mother of five, three of them below eight years), remarked that “the water pump was made for mothers.” She and her two older children were the primary suppliers of water for their home, with her husband helping sometimes. She said each person made one to three trips a day to get water, that it takes them an average of 15 to 20 minutes per trip, depending on the number of people using the pump at the time.

A similar example was the case of a 65-year old woman who lived with four grandchildren, all below eight years of age. She said she was the only supplier of water to their house, made between five to six trips daily, spent 10 to 15 minutes per trip and used 10 and 17 liter buckets to collect water. That means that she is carrying a minimum of 50 kilograms (110 pounds) of water a day.

In all, respondents in Ofosu said they made between three to eight trips in a day, meaning they had been able to save between two and one-half and six hours everyday.
4.5.6 Reduction in Women’s Workloads

Responses also showed that the reduction in time spent fetching water had led to a corresponding reduction in women’s workload and had also enhanced cooperation from members of the household in house duties.

Amina, a 40-year-old woman, described the physical ordeal of walking down the path and descending the hill to the stream, and then climbing back up with a load of water to walk back home:

It's far, about one mile, all the way to Oboum [the village that is closest to the stream]. By the time you descend the hill, scoop up the water and walk back here, you could have just have easily done 15 rounds at the well.

As already mentioned, interview responses showed that women and children were mainly responsible for household water supply. In fact, both male and female respondents acknowledged that having the pump was much more beneficial to women than to men, because women had oversight responsibility for supplying water to the home. Papa Annan's words summarize men’s outlook on who benefits most from having improved access to clean water (in the form of the pump):

The benefits for women will be typically bigger than that of men. The reason is, that is what women use in the kitchen, in bathing and washing clothes. They use the pump in performing all these tasks. For us men, all we need is for our children to put water in to our bathroom after we have returned from the farm. Afterwards we go out for some fresh air awaiting the call that the meal is ready -- and then we use some to wash before eating. After eating, we just go and relax in bed.

So, for women it's a great concern -- because as a woman, no matter what, you always need to have water on you. Therefore, the benefits for women are far more than the benefits for men. It's useful for men also, but it's much more of a necessity for women.

In a statement representative of how Ofosu women regarded the pump, Amina related:

I think it's more beneficial to us [women] than men, because the man just stays home for you to bring it to him. But for us, whether you are exhausted and going to the farm or not, you'll go fetch the water for him to bathe with. But today, you just walk up there and get your water. Although when you have children who are old enough, they can help you fetch it so you can get some relief.

Esi, who has five children, three of them under eleven also said:

The pump was made for mothers.... because a woman with a small household would only need to make one or two trips a day, but for us mothers with so many children...you just look at these kids and guess how much water we’ll need in a day!
**Men Helping Women**

During the 2009 focus group session, one couple stood out as the only family to demonstrate how the proximity of the pump had encouraged greater cooperation in household work. The woman was the first to point out during the women’s focus group that her workload had reduced because her husband had been assisting her. She said: “Because the pump is just here, I can ask my husband ‘please get me a bucket of water’. And he does it, because it’s just here.” She mentioned also that he would often “prepare their children for school while [she] would be cooking kenkey to sell.”

Later, her husband also confirmed this during the men’s focus group, during which he sought to debunk the notion that women were the only ones who had a difficult time during the days when the pump was not working:

Women are not the only ones whose workload has reduced. We men were the ones who mostly carried big containers to fetch water, because the women would easily tire out after a couple of trips. So it was rather we men who used to get really tired. But because this water came, we men are more relieved.

That he regularly helped in performing tasks traditionally labeled “women’s work” became clear, because he was the only male focus group participant who had his child with him. Later, the other participants pointed out that he was taking care of his child while the wife prepared kenkey (maize meal) to sell.

This example however turned out to be one of a kind. Unfortunately, the couple were no longer residing in the village in the summer of 2010, and so did not participate in study in that year. In any case, the husband’s example turned out to be the only instance where men actively participated in house duties. This was reflected in responses about whether men and women derived the same kinds of benefits from the pump. Feedback showed overwhelmingly that benefits for women outweighed that of men. This is because even during the rare occasions that a man took a bucket to collect water from the stream, he would only get what he needed for a shower and nothing more. The rest of the water needed for housework and cooking was considered the sole responsibility of the woman, and whomever she called on to assist her. Sika cited the example of her teenage son, saying he currently fetched more water (from the pump) than he did when they got water from the stream:

In the past when we relied on Ochi, a man would sometimes fetch one bucket, and that would be it. That alone was not enough to do all the chores in the house. With this pump here, he can get more than one bucket. He goes along with us when we go to fetch.
4.5.7 Time Used for Self-Improvement and Generating Income

The interviews showed that the proximity to the pump had advantages for men, women and even members of neighboring communities. It enabled more women to complete house chores faster, engage in trade, and put in better hours in their farms. Seven out of 15 of female respondents said access to a nearby water source had enhanced their financial prospects. An example was Maame Mansa, who said there were days when she was too tired to go to the farm after going to the river to fetch water.

Elsie, the hygiene educator also observed that before the pump was repaired, women spent most of their time collecting water and were often too exhausted to go to their farms:

I can say that women hardly had time to do anything else after walking to Ochi to get water. Many were simply too tired after getting all the water they needed for their homes to go to their farms afterwards. This made life difficult for the women here.

She further said there had been an increase in women traders. Using her mother (who sells donuts in the morning and goes to farm afterwards), she said women did not have time for anything besides housework:

The absence of a nearby water source impeded their ability to do anything else besides house duties. Take my mother for example; she makes donuts, which requires that she start working at dawn. If she didn't have a child and had to go to Ochi by herself, it'd be daybreak, meaning she wouldn't be able to prepare anything to sell. In the end, she would simply give up the trade.

Maame Asana described how things were in the past and the ways in which it affected her:

We had a difficult time before the pump came. By the time we made two trips to Ochi we’d be too tired to do anything. I am now too weak to go to Ochi. But I see that the young women are able to finish up their chores more hurriedly and go to farm before the sun gets scorching. That is the help I see.

She further explained that the long trips usually left her too tired to work on her farm, a situation that cost her economically:

I usually can't do much work once the sun comes up.... When I had to go to Ochi, I could barely clear a small piece of land before getting exhausted from the heat. Since this pump came, I can work hurriedly and go to my farm. My farm is doing very well.

4.5.8 Enhanced Income Generating Opportunities for Both Men and Women

Findings also showed that the proximity of the pump had enhanced the income generating activities of both male and female residents, as well as some people living close to the village.
For example, Papa Kojo spoke about observing people—from both within and outside the village—fetching water to sprinkle on their farms:

It’s helped people in their work-- people who have the strength to carry water to their backyard gardens to water their crops. I see people do that, some don't even live here; they come from Bobobraden [the first village on the road to the river from Ofosu].

Several male and female respondents reiterated that their farming activities had been greatly enhanced by the proximity of the pump. They said those with farms close to the village used some to water their farms, whiles others used it to mix up herbicides. Describing the most common application of the pump during the dry season, Agnes (a farmer) said “if you can't clear the bushes around your corn, you fetch some to mix up the herbicide to spray on around the corn so that all the weeds will die out.”

During the 2009 focus group, one participant had this to say:

Ever since the water came here, women’s workload has decreased – it has decreased very much! Because some of them grow pepper and other things. Before the pump was repaired, we would sometimes walk to a nearby village to fetch water from an open well to sprinkle on them. With this water close by, everyone easily gets up to fetch some to water their peppers. It’s all part of the help.

The WATSAN chair also mentioned the financial gains made by women as a result of the pump:

The pump helps women in their farming activities. Those who grow peppers and eggplants use it to water their gardens during the dry season. That certainly increases their income. They get money when they sell the produce.

Essel provided a more comprehensive outlook of the various ways that the pump had benefitted residents. He believed the pump had “brought progress to [the] village”, mainly because it had provided residents with a year-round water supply that enhanced farming opportunities for both men and women. In particular, he pointed out that women who were hitherto unable to cultivate farms now had farms because they could water them from the pump:

When all the water in this area dries up, because the pump always produces water, that's what we fetch during that time to spray our farms to get rid of weeds. As a result, the women who couldn't farm before now have farms—because of the water that is always available.

Asked why those women could not farm in the past, Essel explained:

The reason was that there was no water close by. By the time they returned from Oboum they would be too tired to do anything else, they wouldn't even consider going to the
farm. However, this one [meaning the pump] is close by, so they can just fetch and be on their way.

**Income-Generating Activities Enhanced By the Pump**

Some of the women whose income-generating activities have been enhanced by the pump were Maame Mansa, Amina, Esi, Yaa and Abena.

Sixty-six year-old Maame Mansa (seen in Figure 4.12) is one of the community members who has been able cultivate a farm within the village as a result of having access to water all through the year, thanks to the pump. She has a 1.2 hectares farmland located about 80 meters from the pump, where she has grown “corn, cassava, pepper, garden eggs [egg plant], among others.” She said all she does is “carry water from the pump to water the crops when the season gets dry”. She said before the pump was repaired, she was often too tired to walk to her farm after making several trips a day to collect enough water for herself and her three grandchildren. Now she does not even have to walk far to her farm, because it is right there in the village.

![Figure 4.12. Maame Mansa stands in her 1.2-hectare farm where she’s cultivated corn, cassava, pepper, garden eggs, oranges, among others.](image)

![Figure 4.13. A cross section of Maame Mansa’s farm showing corn, and orange and plantain trees](image)
Forty-year-old Amina (shown in Figure 4.14) sells cooked rice and has a farm also. She explained her schedule:

In the morning, I cook rice water [porridge]. After selling it off, I go to the farm. On non-farming days (Tuesdays and Fridays), I cook rice in the afternoon as well.

Concerning the impact of the pump on her she recalled:

I used to fetch Ochi in the evenings – about two trips every evening. I’ll be aching all over by the time I’m done. Now I just walk over and fetch water for the food. Sometimes I wouldn't have a drop in the morning. I just walk over and get what I need. I can do that at 5 am. But if I had to go to Ochi, it'd be 6 am by the time I return.

According to her, she makes a daily profit of about GH¢5 ($3.5) if she is able to sell both morning and afternoon.

Esi (a 32-year-old mother of 5) said that the proximity of the pump had made it possible for her to grow peanuts in her backyard. She said she was motivated by her children’s fondness for peanuts, the opportunity to save money on peanut snacks for the children and the potential to gain extra income from selling some as well:

Because of this water, I have been able to cultivate groundnuts at the back of my house. It saves me a lot. My kids love groundnuts! When I thought of all the money I could save by growing it myself, I decided to go for it.

Thirty-eight year old Yaa (seen in Figure 4.15) took advantage of the pump’s proximity to start a business selling banku (another kind of maize meal). With water close by, she is able to start preparing the meal by 5:30 AM. That permits the food to be ready by 7:00 AM so children can buy some for school. According to her, she makes a profit of about GH¢ 3.50 to GH¢ 4 (about $3) every day. After selling off her maize meal, she usually spends the rest of the day selling drinking water at the local school in Atwereboanda.
Abena (pictured in Figure 4.16) is a 32-two-year-old widow with four children. She works three jobs (farming, petty trading and stone quarrying) in order to cater for her children. For her, having water close by has many advantages, because it frees up precious time. She says all the money she makes in a day goes toward educating her four children:

I can earn up 50 cedis in a month sometimes, but I have nothing left by [the end of the month]. I'd be lying if I said I'd have one cedi saved at the end of the month.... I give the oldest 70 pesewas, the second 50 pesewas and the two youngest 40 pesewas.

Although she has not been able to save any money, she is happy for the opportunity to meet her family’s daily needs.

4.5.9 Fostering Cooperation and Enhancing Interpersonal Relationships Among Women

Another observed impact on women was that the proximity of the pump made it easier for the women to support each other. For example, Yaa and two of her children took it upon themselves to fetch water for a neighbor who had recently given birth. When asked why she was playing this role, she replied the neighbor’s “mother herself was aged.” About four days earlier, when I arrived to do a feature on Yaa’s peanut farm, her husband informed me that she had accompanied the neighbor to the hospital for her delivery, and had stayed on to look after her. It is worth mentioning that this might not have been possible if the community did not have the pump so close to them, for the proximity of the pump made it easier for Yaa to leave her own five children and attend to a neighbor. Knowing that there was water less then 50 meters away from her home, and that the older children were capable of taking care of household needs made it possible for one woman to lend a helping hand to another.

It was therefore determined from the survey that the introduction of the NF/REDEP water project in Ofosu had given women the opportunity work as leaders in the community. It had also led to a reduction in the time and distance covered to fetch water for the home. With gendered division of labor still strong in the village, women could now get their housework done much faster as a result of the proximity of the pump, and devote the extra time to working on their farms, trading and/or resting.

4.5.10 Summary

Findings on women’s empowerment identified a gendered division of labor, with women maintaining responsibility for domestic needs such as cooking and household water supply. It
also appeared that women’s role within the water management committee was largely seen as an extension of their traditional responsibilities for cleaning and child supervision. However, there was also evidence that the women who served on the WATSAN committee had been thrust into leadership roles that were hitherto unavailable for women their age. Moreover, there were clear indications that the proximity of the pump had freed up time for them to either rest or engage in income-generating activities.

The pump was also identified as having an economic importance for both men and women in the communities. Findings showed women who were hitherto not farming now did, using water from the farm to grow their crops in the dry season especially. The men also used the pump to mix up herbicides to spray on their farms.

Women’s participation in decision-making within the community was however minimal. For example, although women formed part of the water management committee, men were still the ultimate decision makers. In spite of this, two women appeared to be making efforts to ensure the pump remained in good condition.

Table 4.2 summarizes the impact of the pump on women’s empowerment.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings in Ofosu</th>
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| Women’s Participation in the Management of the Water Project | • Two out of three members of the water management committee are women. However, they defer to the male chair.  
• Membership of WATSAN however gives the young women experience in leadership, something that was not possible before the start of the water project. |
| Decision Making Ability in the Home and Wider Community | • Female respondents demonstrated significant levels of autonomy and mobility as well as close adherence to traditional gender roles.  
• Involvement in management of water project gives women exposure to high-level community discussions, although men continue to have decision-making power. |
| The Community’s Perceptions about Women’s Capabilities | • Widespread acknowledgement that men and women have equal capabilities and can fulfill their potentials if given the opportunity.                                                                                                                                 |
| Women’s Own Perceptions about their Capabilities | • Women recognize that past notions about female limitations were erroneous, and believe their daughters deserve as much opportunity to discover their potentials as their sons do. |
| Reduction in Time Spent Fetching Water | • Time spent fetching water decreases by 75 percent, from an average of one hour to 15 minutes.                                                                                                                  |
Table 4.2 continued...

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<tr>
<th>Indicators</th>
<th>Findings in Ofosu</th>
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</thead>
<tbody>
<tr>
<td><strong>Reduction in Women’s Workloads</strong></td>
<td>• The proximity of the pump makes it possible for other household members, especially children, to assist women in household chores, thus reducing the work loads of women.</td>
</tr>
</tbody>
</table>
| **Time Used for Self-Improvement and Generating Income** | • Seven out of 15 women interviewed said they now have time to trade and do extra jobs since they spend less time fetching water.  
• One of these started a new business, while two resumed businesses they had put on hold.  
• Women who were too tired to farm after collecting household water can now do so.  
• Three women have taken advantage of having a nearby water source to cultivate their farms and gardens all year round. |
| **Enhanced Income Generating Opportunities for Both Men and Women** | • Both men and women rely on the pump to water their crops and spray herbicides on their farms during the six-month dry season. |
| **Fostering Cooperation and Enhancing Interpersonal Relationships Among Women**   | • Esi, a 32-year-old mother of five, is able to leave her children and care for a hospitalized neighbor because she is confident her family can manage without her as water is so close by.  
• After her neighbor is discharged with her newborn baby, she and children are able to help her out with water because the pump is only 50 meters away. |

4.6 Impact on Health

The main indicators of health as used in the survey were sanitation standards in the communities and people’s perceptions on how diseases are transmitted. The survey showed residents had awareness of what constituted good sanitation. It also showed that although most believed the pump was the safest source of drinking water, many still patronized the open well and the stream because they considered the pump water “too salty”.

Interviews with community members and district health professionals affirmed that the Nkwantanum Health Center (located about 8.4 km from the village) is the designated health post for residents of Ofosu. Health records at the center showed only three entries between 2006 and early part of 2010 for patients from Ofosu; one was diagnosed with malaria and two with skin rashes. In fact, five of the 23 respondents in Ofosu said they attended hospital when they felt ill, and three of these would self-medicate and use traditional herbs first. The other 18 respondents
said they routinely self-medicated and used traditional herbs, which usually helped them. Maame Asana, a 74-year-old respondent with an arthritic condition threw light on why some people preferred self-medication and herbs to attending hospitals. She explained that although she liked going to the hospital, she had difficulty swallowing pills, and preferred liquids. For this reasons, she would simply put aside the pills and use traditional herbs.

4.6.1 Sanitation Standards

Respondents in Ofosu demonstrated satisfactory levels of sanitation. Interview responses indicated that participants practiced hand washing with soap and water before eating, upon returning from their farms and after using the lavatory. About 60 percent added that they routinely cleaned their hands after handling objects that they perceived to be tainted.

It should be mentioned, however, that such assertions could not be independently confirmed. Nevertheless, one health worker presented a less-hygienic portrayal of the village by expressing concern over the condition of the children at Ofosu, whom she often encountered “dirty” during her outreach visits.

Observations showed Ofosu had designated places of convenience and refuse disposal are located outside the general living quarters. Some respondents demonstrated awareness of the health implications of siting water sources too close to such facilities, and said this was a major determinant in selecting a location for the village pump. For example, Kwodwo recalled how the community carefully selected a site that was free from possible contamination. He said the first well that was drilled was abandoned because it was close to a cemetery:

The first well was drilled in the plantain fields in the northern part of this village, but this was abandoned when the technicians learned the site was close to our cemetery. They explained that the cemetery would contaminate the water, so we went round and tried several other places, until we found the present location.

Papa Annan also stated that the community, with the guidance of the people who came to drill the borehole and install the very first pump, went to great lengths to ensure that the chosen site for the pump would be free from contamination. Care was therefore taken to ensure the pump was not located anywhere near a toilet or rubbish dump:

Before they installed it, they came to meet with the community to identify a suitable location. They told us before picking a place that it should not be close to a toilet, because it would go deep and that wouldn't be good.... They also stressed that it should not be close to a rubbish dump, because the water doesn't like dirt.
According to Papa Anna, this health awareness led the community to relocate its rubbish dump, amid fears that it might drain into a seasonal pond that the community sometimes relied on when the pump was not working:

With the rubbish dump, at first we relocated it to the road leading to Bobobraden [a neighboring village], but that was too close to the seasonal pond. That pond served our water needs during the rainy season. When it rained, debris would wash into the pond, but because of what is called hygiene – hygiene teaches about cleanliness.... So in order to prevent - even if we don't drink it - to ensure that nobody who drinks it gets sick, we moved that thing from there.

It is noteworthy that male participants at the 2009 focus group discussion had indicated that the village needed a designated place of convenience in order to fully realize the health benefits of gaining access to clean water. In a statement that revealed a remarkable level of health and sanitation awareness, one participant pointed out the clean water being provided by the pump would not sufficiently protect residents against disease, unless it was accompanied by good sanitation. He said this in reference to the practice of open defecation that apparently existed within the community at the time, and went ahead to relate a scenario where a family’s drinking water became contaminated by a housefly that had flown from exposed feces into the water.

When asked to state what he wanted from the NF/REDEP project, he said:

We want a latrine! That’s what is most important to us, because with the kids and all – at night you’ll see them easing themselves by the road side...You see – the latrine issue that I’m talking about – we may go on and fetch the water, believing it contains no disease. We bring it home, perhaps leave it uncovered, while just behind the backyard a child may have defecated. A fly moves from the feces and falls into the water. You may think of just taking the fly out, but then it might have already carried disease into the water, so that when you drink it, it troubles you!

4.6.2 People’s Perceptions about Mode of Transmission of Water and Sanitation Related Diseases: Notions Of Safe Versus Unsafe Water

Respondents in Ofosu demonstrated considerable awareness about what constituted safe and unsafe water. This observation was garnered from responses to three questions that sought to find out respondents’ perceptions about a) which of the available water sources they considered safe and why; b) which water source they considered unsafe, and why, and c) what they liked best about the availability of the pump.

For the most part, participants acknowledged that drinking from the stream was the least safe as it is exposed to contaminants, and that the pump is a much healthier alternative. For example,
Ewusie believed that “people often wash out dirty stuff into the Ochi, and that makes it unsafe for
drinking--you can develop stomach problems as a result.”

Some respondents drew particular attention to the fact that unlike the open well and the
stream, the pump was not exposed to physical contaminants. During the 2009 focus group
discussions for instance, some participants cited this feature as the reason why they considered
the pump to be the safest source of water. As one respondent said:

The water source is way beneath the surface; it is not exposed so it contains no diseases.
But with this [referring to the open well], I can just descend into it and come up again.

As mentioned above, the participants also mentioned the tendency for children to throw debris
into the open well also made it an unsafe to use.

Papa Annan expressed similar sentiments, adding that the fact the pump is covered prevents
it from being a breeding place for mosquitoes:

What I like about this pump, that’s what I've been saying – hygiene – that's one thing that
makes me happy about this pump, because no unclean substance can get into this pump.
It’s water that comes straight from the ground, so it's clean. Another thing that makes me
happy is that it's covered and so nothing can fall into it, as I mentioned. Around here
mosquitoes bring all kinds of illness. Mosquitoes won't be able to enter it to lay eggs and
spread terrible diseases. Thus, it is a water source that I'm very happy about.

Esi echoed the notion that the open well provides a breeding ground for mosquitoes, and
expressed immense gratitude to the people who implemented the water project:

I always praise the people who brought this pump. They've done a great job! We need to
reward you! It's helped us so much! We have enough for the kids to bathe with. Now, if
only you could put a pipe on the open well for us [meaning cover up the well and fit it
with a faucet that can simply be turned on for water], it would be complete! Mosquitoes
lay eggs in it; that's where all the fever comes from! They lay their eggs into it, and we
fetch to drink.

Although rainwater is generally considered safer than open well and the stream, Ama
pointed out a possible source of rainwater contamination – water draining off roofs that are
littered with animal feces. Her conclusion therefore was that the pump is the safest source of
water:

Lizards and cats defecate on roofs, the rain washes it into our containers, we drink it and
can get sick from it. But the pump comes from deep within the land.

For other respondents, the health benefits of the pump go beyond its ability to prevent water-
borne diseases. Part of its appeal lies in the fact that it saves them from other kinds of physical
pain and even stressful conditions that could potentially affect their health. For instance, Amina summed up the relief that improved access to clean water has brought to the women in Ofosu by pointing out the physical burden of collecting water could be almost as debilitating as contracting a water-borne disease:

It's saved us from contracting those water related diseases and fever. Even walking – I think too much walking can cause ill health. Our necks ache, as do our bodies, from carrying the big water basins.

Other respondents, such as Essel, recognized the pump’s dual advantages of protecting them from water-borne diseases and being available all year round, unlike the open well and the pond:

I'll say it's really good; it's a water source that protects people against diseases or other difficulties. It's a water source that never dries up, that's always there to help us in many ways. That is what makes me like it.

Despite this widespread acknowledgement, close to a half of respondents in Ofosu (47 percent, representing 11) admitted to using the pump alongside other sources such as the open well and the stream. Out of a total of 23 respondents, 53 percent (12) said they used the pump exclusively, 26 percent (6) used both the pump and the open well, 17 percent (4) combined the pump with the open well and stream, while another 4 percent (1) used the pump along with rainwater. These trends are illustrated in Figure 4.17. The main reasons given for using other sources were the perceived “salty taste” of the water, and the fact that it failed to work up lather during laundry.

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**Figure 4.17. Various water preferences of Ofosu respondents as gathered from the survey**
In fact, a number of those who combined the open well with the pump believed both sources were equally safe to use. For instance, Maame Asana, who used water from the open well, the pump and the stream explained that she believes both the open well and the pump are safe to drink. She understood that “Ochi [the stream] is contaminated” and that “one can fall sick from drinking it.” She believed, however, that both the pump and the open well pump were equally “safe from disease-causing contaminants.”

She (along with 26 percent of respondents who combined the pump with open well and stream) gave more insight into reasons why some residents continue to do so. First, she clarified that her household only used water from the stream for laundry because the water from the pump did not lather. For drinking purposes however, the family relied on both the well and the pump, except during the dry season when the well dried up, when they only used the pump. The pump is not her first preference, because it has a “salty” taste. She said also that the only time that her family made trips to the stream to do laundry was during the dry season, because water from the open well served their needs during the rainy season:

Ochi is contaminated; we elders prefer the pump to it. We only use it for laundry.... The only problems we have about the pump are its salty taste and the fact that it doesn't lather. We can't wash clothes with it. We will all be greatly relieved to see the taste improve and the water capable of working up lather.

She added that having a nearby water source had encouraged her grandchildren to maintain proper hygiene by taking regular baths:

The kids are also much cleaner now; they couldn't be bothered to bathe before, due to the long trips they had to make to the stream. Now they all take regular baths.

In addition to reservations about the taste of the water, Papa Kojo alluded to a different level of physical discomfort from drinking water from the pump. Although he was happy that the village has the pump, he preferred to drink from the open well and the stream. His household uses the pump for cooking and laundry, but he liked to combine the open well and the stream because he did not like the taste of the water. He hinted, however, that he did not always get his preferred choice of drinking water, which is the stream:

What I feel most comfortable drinking are the open well and Ochi. I don’t feel good about drinking from the pump when all the water dries up, leaving it as the only available option.

Another reason why some respondents preferred other water sources was the perceived inability of the pump to lather during laundry. For example, Papa Kojo mentioned that another
reason why he was not keen on the pump was because “it doesn't even lather when you use it for laundry.” His wife, 60-year-old Maame Efua (who admitted to using the pump alongside the open well and the stream) agreed with him on this. Her attitude could best be described as a grudging acceptance of the clear advantages that the pump had over other water sources. Thus she believed the pump is safer to use, because she has been told it is, but she admits to drinking from the open well. She then admits the well cannot be relied on all year round, because “it dries up”, and that the pump offers significant assistance to the community.

In spite of this, she maintains the pump “is salty” and that “some people get stomach upsets when they drink it.” She also complained that water from the pump “doesn't lather either” and that she would “work as much as possible but still see no lather.”

Interestingly, not all respondents had issues with the water when it came to doing laundry. In fact, two female respondents spoke about the ease with which they were now able to take care of their laundry. One such person was Agnes, who stated that the best thing she liked about the pump was the fact that she had water readily available for all her chores, including laundry. She said all she needed to work up a good lather was the Omo brand of powder detergent (manufactured by Unilever PLC):

The main help that it offers is – for example returning home late from somewhere and being able to have access to the water. The water really helps us in a lot of ways. If you get the soap called Omo, you can work up lather when doing laundry.

Abena expressed similar views, saying having water close by had helped her six-member family immensely. They no longer pile up heaps of dirty clothes for days on end, but wash them promptly with So Klin (a brand of powder detergent imported from Asia):

Once I get soap, I've got a major problem solved.... If this pump weren't here, I'd have to carry my laundry to the next village to wash them.... It’s made me clean.... When our clothes get dirty we don't have to heap them up like we used to.... If you pour So Klin on it, it will lather.

It became clear, however, that complaints about the inability of the pump to produce lather were fundamentally economic concerns. Although not so effectively articulated by all, respondents’ main concern was to be able to work up the kind of lather that makes Ghanaians comfortable that their clothes are really being cleaned, without using up large amounts of washing soap. Ghanaians mainly do laundry by hand, and the typical laundry set up, as pictured in Figure 4.18, entails filling up three to four buckets and/or washing basins with water.
Each bucket of water represents one step in the washing process. The first wash is the most critical, because it involves soaking the dirty clothes in one of the buckets, preferably a basin as pictured above. The overall quality of the laundry hinges on this stage of the process, because that is when accumulated dirt from the humid and often dusty environment is shed, and where heavy stains will hopefully be removed. After the initial wash with soap, the clothes are then passed through two or three rinses in buckets half filled with clean water (depending on availability) to get rid of the soap and any lingering dirt.

The first stage of the laundry thus requires a considerable amount of soap. The soap bar seen on the pile of clothes in the picture is the most widely used and much cheaper than powdered detergent. Ordinarily, this size should handle a week’s worth of laundry for a family of about five. That is, if the water that’s being used is the standard, soft kind. If it happens to be hard water (like the pump in Ofosu) however, much more effort would be needed to work up lather, and a lot more soap would be required. A bar of soap like the size shown in the picture would cost about two Ghana cedis (GH¢ 2.00), which is about $1.38. A sufficient amount of powdered detergent would cost about GH¢4.00, almost $2.80. For people who earn less than a dollar a day and need to put children through school, this quickly adds up. Combined with the perception that clothes are not clean unless they are washed with heavy lather, the decision to switch water sources when doing laundry becomes an economic one.

However, there were other considerations at play, key among them being the time that an individual has available to perform different functions. One could sometimes decide to make trade-offs between buying the more expensive powdered detergent and saving time for other activities like trading, farming and working at the stone quarry, such as Abena did. Being a widow with four children, she works three jobs a week and is therefore constantly on the move. She would rather she did not need to spend extra cedis to buy powdered detergent, and hopes “to be able to wash clothes with it with any other soap, even if [she doesn’t] get So Klin.” In the meantime, however, she is grateful for the convenience the pump offers her: “It’s much closer
and has therefore made things more convenient for me. Instead of having to go to Ochi myself after work, my children have water ready."

Some other respondents were also quite decided in their views about the advantages of using the pump. One such person was 38-year-old Yaa, whose household uses only the pump. She said she had seen considerable improvements in her health since she stopped using the stream, and was convinced it was the ultimate water source:

Ochi is really not appealing. People wash laundry in it and do all kinds of things in it, and we just fetched and used it in our house. We thought about it and decided that in comparing Ochi and the pump, the pump seems more appealing.... All kinds of things end up in Ochi. In those days when we drank Ochi, stomach upsets would occur every so often. All that is gone now that we only drink from the pump.

Ewusie also pointed out that even though rainwater and the stream may taste better than the pump, the latter was by far the safest water source, due to its capacity to prevent disease. He said he no longer uses the stream:

Nobody has become sick from drinking this water since it was brought. It may not taste as good as rainwater, but when drinking it prevents some diseases.... Ochi is also not good, but because it's flowing water, we don't see it to be much of a threat. But people wash their clothes and dishes into it, after which we also fetch. But since this pump was repaired, we no longer go to Ochi.

He went on to mention stomachache and shistosomiasis as some of the diseases that had been averted as a result of the pump.

What became apparent during the interviews was that underneath all the complaints about the poor taste of the water from the pump, all respondents agreed that the pump had brought immense benefits into their lives. It also became obvious that those who were reluctant to use the pump were basically ignorant about the full extent of risks involved in using water from such potentially contaminable sources as the open well, the pond and the stream. Abena captured this in her assessment of the attitude that her fellow residents had toward the pump:

Yes, it tastes bitter, but this is–we don't understand–because of the Ochi they're used to drinking, they prefer that to this [the pump]. But if we were to seriously consider it, we'd say this is better than Ochi, because this one no organisms can do what, enter it! .... You know, sometimes you see tadpoles and other organisms in the surface water, but this one is covered so no organism can get into it.

This brings up an important aspect of respondents’ notions about what makes water safe or unsafe to use. It became clear during the interviews that some respondents had no notion of bacterial infection. For these, the only source of concern were the visible threats, the living
organisms like tadpoles and water insects that can be seen with the naked eye. Hence, Agnes was convinced that the stream contained disease causing organisms primarily because she had been seeing “tadpoles all over it.... especially when it dries” and also seen traces of feces in it. A microscope might have revealed far more harmful “organisms”, but the point is that for her (and many other respondents), this knowledge is sufficient to make her stop using the stream altogether.

Likewise, Ewusie considered the contamination of the stream a seasonal occurrence brought on by heavy rains:

Ochi tastes good when you drink it, but at times –like now when the rains have washed into it – you can see it's dirty. When we see that, we realize it's been contaminated so we don't drink it.

Such simplistic views about what causes water pollution could pose challenges to efforts aimed at encouraging people to shift from unsafe water sources to safer alternatives. The views expressed by Ataa would certainly fall into such a category, because she used it to justify her continued dependence on the stream for drinking purposes. First, she made it clear that she thought having the pump has brought benefits to the entire community. Then she added that she was too accustomed to the taste of the stream to switch to drinking from the pump. She said her household does not go to Ochi (the stream) as often as they used to because they only go to fetch enough to drink. Thus, one trip goes a long way. And when she was asked whether she knew about possible contaminants, she stated emphatically that the only time she worried about that was when the water level dropped, because then she would see tadpoles in the water. As far as she is concerned therefore, the water is safe as long as the level remained high:

As for the Ochi, during this period it doesn't contain any organisms. It is when it gets low that you often see tadpoles in it. When it gets really low, you'll see tadpoles all over it. But when it's full like this, you don't see any tadpoles when you fetch it – it contains no organisms.

Having said that, the bright side of this would be for the program implementers to see this lack of knowledge about what constitutes water pollution. It would be helpful for them to have a magnifying glass so they could see the many small organisms that occur even in “clean” water.

### 4.6.3 Summary

The main challenge in determining the health impacts of the pump in Ofosu was the inability to obtain statistical data on health. The reason was that almost 90 percent of respondents admitted to using over-the-counter medication and traditional herbs during illness rather than seeking
medical help. They only went to the hospital if their conditions worsened, but even then, it depended on whether the person had enough money to do so.

Respondents demonstrated varying degrees of awareness about what constituted safe and unsafe water. While some showed awareness about the polluted state of the stream and open well and the risks involved in using these, others were convinced that as long as water looked clear it was safe to drink.

Respondents also exhibited satisfactory levels of knowledge regarding personal sanitation. They all indicated that they washed their hands before and after meals and after visiting the lavatory, although one person admitted to not always applying soap.

One rather disturbing discovery however, was that only 12 of the 23 people interviewed obtained their water from the pump exclusively. The other 11 also used rainwater, or got drinking water from the pond, the stream and/or the open well. The main reasons that respondents cited for this practice were the “salty taste” of the pump and its inability to lather when used for laundry.

Nonetheless, amid the lingering complaints about the “salty” taste of the pump, there was widespread acknowledgment that the pump had made life considerably better for the entire community. The statement by the Regent (Mallam Issah), regarding what he liked best about the pump succinctly summed up this sentiment:

> When I think of my life in general, I feel that the people who brought this have really helped us. We have something to rely on when the open well dries up. That's what we use. I, too, drink from it. Before this, there would have been no water once the well dried up. When I need water, I'd have to send a child to Oboum to get water for me.

Thus in spite of what some respondents might have said, the health benefits of having access to clean water were very much appreciated by those who had made the choice to use the pump regardless of its taste. Amina was among the respondents who made this assertion. It affirmed that, ultimately, the health gains received from the pump—protecting users from contracting water-borne diseases—outweighed the inconvenience of its taste:

> It’s good for those of us who use it. It’s very, very good! Considering the diseases you mentioned, people walk in the stream, even animals drink from the stream – dogs even drink from it – and then we would go and fetch it, not knowing who walked in it or who's bathing in it. So I think the pump is very good for us in the village.

Table 4.3 provides a summary of the indicators used in measuring health impacts.
### Table 4.3: Summary of Impacts on Health

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitation standards.</td>
<td>• Designated places of convenience and rubbish disposal within the village.</td>
</tr>
<tr>
<td></td>
<td>• All respondents said they practiced regular hand washing, although one admitted to not always using soap when pressed.</td>
</tr>
<tr>
<td></td>
<td>• The pump area was clean.</td>
</tr>
<tr>
<td>Perceptions about what constitutes safe and</td>
<td>• Twenty-two out of 23 respondents believe the pump is safer than the stream and open well, while one respondent thinks the stream and</td>
</tr>
<tr>
<td>unsafe water.</td>
<td>open well are just as safe as the pump.</td>
</tr>
<tr>
<td></td>
<td>• In spite of widespread recognition that the pump is safer, some residents complained that it’s ‘salty’ taste and inability to lather made it difficult to use.</td>
</tr>
<tr>
<td></td>
<td>• Twelve out of 23 respondents use the pump exclusively. However, due to the perceived “salty taste” and inability to lather, 11 admit to using the pump alongside the open well and the stream.</td>
</tr>
</tbody>
</table>

### 4.7 Impact on Education

In assessing the impact on education, respondents were asked to relate how the pump’s proximity had impacted their children’s school attendance and punctuality. Findings showed that children’s school attendance had been greatly enhanced as a result of this. It was apparent that before the pump, the absence of an easily accessible source of water had been an impediment for children’ education. However, the survey also showed that even though the proximity of the pump had made it easier for children to go to school, poverty, long distance to the school (located 1km away) and the domestic responsibilities of girls still inhibit the education of children in Ofosu.

The indicators for measuring impacts on education were improvements in school enrollment, academic performance, school attendance and student punctuality. Feedback from community respondents indicated that the main educational impact was that the proximity of the pump had improved children’s ability to attend school punctually. Parents and guardians also said with the proximity of the pump, their wards had more time for rest and relax than they did in the days when they had to wake up about 5:00 am to fetch water from the stream.
Statistical data on trends in school enrollment, attendance and student’s performance from the local school could not be obtained, because the school lacked the resources to keep such records. In the absence of such records, it was necessary to rely on the recollections of parents regarding the impact of the water source on education.

The survey indicated that men in Ofosu were more likely than women to be educated, and men were also more likely to have a junior and senior high school education than women. This observation provides a strong basis for encouraging the education of women by removing obstacles to girls’ education, such as traditional notions of women’s roles and capabilities.

4.7.1 Trends in School Enrollment, Attendance and Punctuality

Having determined from parents that all children from Ofosu attended the Atwereboanda Basic School, located 1km from Ofosu, a survey was conducted among five teachers from the school. Although teachers attested to an overall change in student punctuality and performance, the school survey was inconclusive because it failed to show what changes had occurred among the percentage of students who lived in Ofosu. In fact, the total number of students from Ofosu could not even be determined, and trends in student enrollment and performance could not be established because the school had no record of these. The head teacher explained that for almost five years, the government’s Ministry of Education had failed to supply the required stationary that would enable it to keep cumulative records of students’ attendance.

In the absence of academic data from the Atwereboanda school therefore, qualitative data from community surveys were drawn upon for information on what impacts, if any, improved access to clean water had on the education of Ofosu school children.

Field Observations on Children’s School Enrollment and Attendance in Ofosu

While interview responses indicated that all children of school-going age were enrolled in school and attending regularly, there were two instances in separate households where children were seen at home during school time. Both instances involved girls. The first involved a 16-year-old girl who had dropped out of school for about five years due to a foot injury. According to her parents, “her legs would get swollen and painful after walking to and from school”. It appeared therefore that the distance to the school had impeded her access to education.

The second instance involved a nine-year old girl who was in the care of her grandmother. According to the grandmother, the child is “enrolled in school” but had missed the day because “she didn't finish up her [house]work in time”. She went on to explain that, although the girl had
risen early to do dishes, “she put it off until late. By the time she finished, all her colleagues had already left for school in Atwereboanda.”

In order to fully appreciate the potential impact that improved access to clean water can have on education in Ofosu, it was considered important to determine who had major responsibility for household water collection within the households that participated in the survey.

Impact of Improved Access to Clean Water on School Children in Ofosu

Since children were responsible for household water supply, they bore much of the brunt of the water problems that the community had been experiencing. As Sika put it, “having to get water in the morning before school sometimes made the kids late for school, and just stressed them out.” This led one respondent (Maame Asana) to observe that children had benefited the most from the improved access to clean water because their education and wellbeing had been greatly affected by the long trips they had to make to the stream several times a day. According to her, some of her grandchildren would “be crying on the way” to the stream. She said having a nearby water source meant that children only had to walk a shorter distance to get the water they needed. As a result, they now get ready for school much faster than they did in the past:

The pump has helped school children immensely. Imagine waking up a kid at dawn to walk one mile to the stream to fetch water, and then coming back to bathe and do other chores before school! Now they only have to walk up the road to the pump. They can prepare for school much faster than before. So it's been a big help to school kids!

All 23 respondents expressed similar sentiments and said there was an overall improvement in punctuality and school attendance among pupils. Parents were particularly relieved at the fact that their children no longer had to walk 3.2 km to get water every morning before school, especially since they were often caned for lateness as a result of this. As Ewusie put it, children are able to perform their tasks of supplying their households with water because the water source is so close to them. The distance involved had reduced significantly —3.2 km (round trip to the stream) to about 200 meters (round trip to the pump). In his opinion, conditions for pupils has greatly improved, as long as they stuck to their schedule by not playing around:

The distance that they cover to collect water has reduced. Rather than spend over 30 minutes [other respondents said it took close to one hour] walking to Ochi, they only spend —if only they don't go and play—they’re usually back within five to 10 minutes.

Yaa (who has four children enrolled in basic school) also noted that the reduction in the distance covered by children to fetch water has led to a corresponding improvement in school
punctuality among her children. They were now able to complete their chores in good time, go to school on time, and therefore avoid being caned by the teachers:

At first, the children had to go to Ochi. The distance was too long. Now, you just pick up your bucket and collect water from the pump. It makes things faster; they don't walk too far. The children no longer go to school late as they used to in the past, when they had to walk a long distance to get water before school. They're able to finish up their tasks quicker now, so they're not late and do not have to receive caning as a result.

Essel (who has four children enrolled in basic school) spoke about the overall benefits that his family had obtained from the pump. He mentioned that his children even considered fetching water fun. As a result, they needed little prompting to collect the needed water in the morning to get ready for school. He was especially glad that they no longer had to make the trip to the stream to fetch water before school (or even afterwards), because that often made them late to school, an offence that typically resulted in corporal punishment:

The children themselves even enjoy fetching the water. It's a fun thing for them. We hardly ever have to tell them to fetch water. They take pleasure in walking up there and pumping the water. So, the progress that this has brought to my family is that all that the children have to do now is pick up a bucket and head for the pump. They get ready for school much faster than before.

None of them is late to school anymore. But at first, they had to go to Oboum before going to school. By the time they finished, they would be late for school, and would be caned by the teachers because they could not explain to the teachers that they had to go to Oboum to get water before school.

Similarly, Kobina (who had five children in basic school) spoke about how his children were often late in the past, because of the trips they had to make to the stream before going to school. Because the trip typically started at 5:00 AM and lasted about an hour, the earliest they could be ready for school was about 7:30 AM (or sometimes much closer to the 8:00 AM school commencement time). In contrast, their chores are usually completed by 6:00 AM, leaving them enough time to prepare for school:

You see, when the pump wasn't working, they had to walk all the way to Ochi to fetch water and would often be late to school. Now, because we have water close by, they're able to finish up their chores by 6 am.

Kwodwo (who had four children in basic school) also reiterated this improvement in children’s school attendance and described his children’s current morning routine: “In the morning the children ... take their bath as soon as they bring back water from the pump. By 7:00 AM they'd be in school.”
Maame Asana added that the presence of the pump has had some advantages for the wellbeing of school children in that it afforded them the opportunity to get the required rest and relaxation:

Now the school children can sleep till daybreak and have full rest, conveniently walk up to the pump for water, and leave for school punctually.

It is worth mentioning that there was widespread acknowledgement within the village that children’s education had been remarkably enhanced by the presence of the pump, so much so even respondents like 64-year old Papa Annan who had issues with the taste of the water, attested to it:

Yes, it helps them; it gives them water to bathe with before school. It's a big improvement from having to go to Ochi and back before going to school. Drinking it is just what we're unhappy about.

4.7.2 Literacy Level of Community Respondents

Patterns in academic performance and enrollment in the school that serves Ofosu could not be determined quantitatively, due to insufficient data. However, findings from the survey conducted in Ofosu produced the strongest indications of literacy trends and school enrollment rates among the population.

Of the 23 community respondents, nine females had never been to school, two men and three women said their highest educational level was primary school, three women and four men said they had schooled up to junior high, while two of the men had completed senior high school. As the Figure 4.19 indicates, significant gender differences in the educational level of study participants were found in Ofosu. None of the men interviewed were uneducated, and no female respondent had attended senior high school. This trend is illustrated in Figure 4.20.

![Educational Level of Ofosu Study Participants](image)

Figure 4.19. Gender disaggregated data on maximum educational level of study participants as gathered from the survey.

As indicated, all male respondents had at least a primary school education, and no female respondent had been to senior high school.
4.7.3 Summary

These findings therefore demonstrate that improved access to clean water has enhanced the education of children in Ofosu to a considerable extent. Among the educational benefits cited by parents and guardians were reduction in time spent and distance covered to fetching water, as well as improvement on the wellbeing of children as a result of the rest and relaxation they now enjoy.

Although statistical data from the local school could not be obtained, results from the survey provided a unique insight into the experiences and perceptions of parents and guardians as they related the various ways that the pump had impacted their families.

Table 4.4 summarizes the health findings from the study.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings in Ofosu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trends in School Enrollment, Attendance and Punctuality</td>
<td>• Improved punctuality in school attendance&lt;br&gt;• Improved well-being (students have more time to rest before and after school)</td>
</tr>
</tbody>
</table>

4.8 Impact on Governance and Participation

The indicators for measuring community governance of and participation in the project were the levels of community involvement and sense of ownership in the management of the project as well as equity and participatory decision-making.

The extent to which residents patronized the pump was used as a basic indicator of the level of community participation in the project. Closely related to this was financial commitment in the form of regular contributions toward the maintenance of the facility.

The overall level of community participation in the management of the project was not very encouraging. WATSAN and community meetings were reported to be irregular. Monthly levies designed to contribute money into the water fund had been discontinued, and decision-making processes appeared to exclude women.

4.8.1 Community Involvement and Sense of Ownership in the Management of the Project

As already mentioned, 96 percent of respondents in Ofosu patronized the pump. Although about 30 percent used it alongside other sources of water, the fact remains that the majority of the people relied on the pump as their main source of water supply.
Under the Nyarkoa Foundation/REDEP water program, all WATSAN committees were required to hold evaluation meetings every fortnight, and to hold monthly assessment meetings with the broader community. This was designed to ensure a closer working relationship between the committee and the community, as well as enhance community involvement in the management of the project.

I mentioned that the interviews indicated that after the pump was repaired, much of the responsibility for maintaining the pump had been left to the younger members of the WATSAN committee. They had the task of cleaning and weeding the pump area twice a week. However, most of these young ones no longer lived in the village; they had moved away after completing basic school.

Maame Asana, a member of the town planning committee, said there had been an improvement in the level of cooperation within the community since residents had an opportunity to get together and plan ways to manage the pump. However, she also conceded that cooperation was not always forthcoming. She blamed this on the attitude of some of the women who would not do anything unless somebody exerted some pressure on them, adding that she had just spent the morning rallying people to clean the pump:

Yes, there has been an increase in cooperation, not only among women, but within the entire community. It's hard to get the other women to do things though. I went round this morning reminding them about the scheduled pump cleanup; I'll do it again tomorrow. They only work when you put pressure on them; otherwise, they just relax.

Another respondent however hinted that the lack of cooperation might have an economic basis. According to Aba, the level of cooperation has “been alright” and that “it's only when it gets to money issues that things hit a snag.” She attributed this to the low sales that traders make in the village: “But then they don't buy much in this village. As a result, any mention of money often meets with unfavorable response.” This might explain why some residents have been reluctant to pay the monthly water levy.

Further findings in Ofosu showed that neither WATSAN nor community meetings were being held regularly, as recommended. All 23 respondents reported this, including Abena who said frankly, “We hold no meetings here” and Appiah who stated, “You can’t get anyone together if the chief himself isn’t here.”

The hygiene educator and the chair both said the last WATSAN meeting was held in February 2010, four months before this survey was conducted. The treasurer could not recall when the last meeting was held.
Community meetings were just as sporadic; the last meeting anyone could recollect was in April, when the pump broke down. The hygiene educator explained that initial community interest in the regular meetings had waned over time, with most adults citing tiredness as a factor for not responding to meeting calls:

We used to meet every two weeks in the period immediately after the pump was repaired. But over time, the adults began complaining that they were too tired from working on their farms. Meetings gradually fizzled out as a result. So we do not meet at all these days.

The hygiene educator explained that it was virtually impossible to get the community together for a meeting, except when the chief himself was around. She said it was rare for residents to heed meetings called by either WATSAN members or the Regent:

We usually wait for the chief's return before holding a community meeting. This is because people do not attend meetings when the chief is not around. They wait to see the chief before responding to calls. They pay virtually no attention to what Mallam [the Regent] says, because he is not the chief.... The chief returns every two months, so we wait for him to come, and then inform him of our desire to meet with the people. He then gives the call for a community meeting.

The hygiene educator added that once the chief gave instructions to accomplish a task, all residents would comply:

Once everyone gathers for the meeting, we go ahead and inform them about what we think should be done, such as cleaning/weeding backyards. The chief would then set a time frame for completing that particular task. As long as the chief gives the directive, everybody will do it.

This assertion was confirmed, to some extent, by observations during the time spent in the community. The day after the chief arrived in the community, all residents – men and women – were seen clearing bush and sweeping up the pump area. When I arrived at the home of the WATSAN treasurer in order to interview her, she was holding a broom and explained, “I’m on my way to sweep the pump area.... It’s a directive from Nana [Chief]; the men cleared the weeds, and we women are supposed to sweep up the place.”

Survey responses and observations also revealed that residents were not consistently adhering to the monthly water levy that was instituted by the community. Respondents in Ofosu admitted their inability to pay the monthly sum of 50 Ghana pesewas (about $0.30) per adult as initially agreed. WATSAN officials had given up the task of going house to house because it never yielded any results. As a result, they had made no bank deposits for over a year. An inspection of the community’s bank deposit book (with the consent of the WATSAN committee
leadership) showed that a total sum of GH¢ 41 ($27) remained in their bank account, representing two deposits (plus an initial deposit of GH¢10, about $7) since the project started in November 2008. It is worth noting that this information confirmed earlier observations made by the country representative of the Nyarkoa Foundation.

Findings from two focus group discussions that were held with men and women gave a clearer picture of the low level of participation in Ofosu.

4.8.2 Findings from Ofosu Focus Group Discussions

The focus group sessions were prompted by the information that the pump had broken down for three weeks in April 2010. The problem happened in the dry season, when the shallow well and pond had both dried up, leaving the 3.2km trip to the stream as the only option for residents to get water. The focus group discussions therefore offered the opportunity to gauge people’s reactions to the incident, determine what lessons they had learned as a result and how this has affected their outlook on the sustainability of the water project.

As an indicator of their level of participation in the project, this incident revealed an absence of proactivity on the part of the community. For example, when the pump broke down for three weeks, no one reported it. The explanation given was that they had no means of getting in touch with either REDEP or the government technician who would have normally handled the problem. The only reason the pump was repaired after three weeks was that the technician happened to pass through the village on his way to a nearby community.

During separate sessions with women and men, participants recounted the inconvenience they experienced as a result of having to trek 3.2 km to the stream while the pump was broken. They reported that whole families had been affected; children were overworked in the mornings and often late to school as a result of having to fetch water from the stream. Mothers/wives suddenly saw an increase in their workload, having to put in more time to get household water as well as attending to house duties. Women who sold food to schoolchildren in the village and environs were suddenly faced with the burden of either waking up an hour or two earlier to get water to cook the meals, or risk losing the income. Men either had to walk to the stream to bathe or go without bathing if they returned from work after dark. They also lost a convenient means of mixing their water-based fertilizers. Feedback from participants therefore showed that the problems caused by lack of improved access to clean water in the relatively short time had been a burden for the community.
In addition, the lack of financial commitment was evident in the fact that the village had no money to cover the cost of the replacement part, since the recommended monthly payments were not being done. Even more revealing was the fact that only one participant spoke about the need to save money to ensure there is enough funds to cover future breakdowns.

4.8.3 Equity, Participatory Decision-Making

It has been mentioned that the female WATSAN members found it necessary to defer to their male counterparts, due to traditional age and gender roles. Interview responses further indicated that this male control over decision-making was present in the community also. In fact, information gathered from the WATSAN chair suggested that this might be a significant factor in the low level of cooperation that the committee is currently facing. His remarks indicated that a subtle form of gender power conflict was underway. For example, he complained that the women “are too difficult ... and refuse to follow [men’s] directives,” which led him to conclude that “the women in the village want to conquer the men”. By this, he was referring to women’s refusal “to abide by any “agreement” we [the men] come up with.” Such “agreements”, it turned out, entailed telling women “what is expected of them.”

However, when asked about his experience with the female members of the WATSAN committee (who also happen to be younger), his response reinforced the power dynamics at play in the community. According to him, “those ones are good; because they are young, they follow whatever directive we [male WATSAN members] give.”

The chair also lamented the overall lack of commitment in paying levies, and the fact that it was virtually impossible to enforce rules since the village is a “clan settlement”. This means the community is populated by individuals who inherited the land from a mutual ancestor. As the family expanded, they populated the land with their spouses and children. As a result, everyone in the village is either related by blood or by marriage.

He recounted an incident that happened in April 2010 (about two months before the 2010 fieldwork), when the pump broke down, to illustrate the extent of non-cooperation within the village. Since residents had failed to save money through monthly contributions, there were no funds to draw upon for the necessary repairs. At a community meeting, the decision was made that all the men would go out to clear fields one day and use the proceeds to cover the cost of repairing the pump and addressing electricity problems, while the women paid one cedi (GH¢1; about $0.60) each as contribution.
The men went out to work and brought in the proceeds as planned, but nothing came from the women. This was really disappointing, particularly because they had voiced no opposition to the idea when they were ‘informed’. Informed? Yes, explained the WATSAN chair, the decision was made by the men at the meeting. Did they ask the women what they thought of the idea? No, they felt no need to do that; it was a good idea that was brought up by one of the men and endorsed by the rest. Further questioning concerning decision-making mechanisms within the community confirmed that the men were the major decision-makers in the village. The chair said as much:

We may take views from women that we consider relevant. We just happen to have different views.... Everybody has the chance to speak at meetings. The usual procedure is to compare ideas from men and women. If they're similar, we'll apply them. If not, we'll go with the men's idea, because we know that will work.

Meanwhile, only three women had paid the GH¢1 as ‘agreed’ (only after the intervention of the chief), and the men felt aggrieved.

Hence, the level of participation in Ofosu was not as encouraging as it was hoped. Residents had failed to abide by the established 50 pesewas monthly levy. Decision-making was also more exclusionary than participatory, with men making most of the decisions. Table 4.5 provides a summary of the findings on governance and participation.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings in Ofosu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Involvement and Sense of Ownership in the Management of the Project</td>
<td>• Lack of financial commitment; no payment of monthly water levy.</td>
</tr>
<tr>
<td></td>
<td>• Irregular community and WATSAN committee meetings.</td>
</tr>
<tr>
<td>Equity, Participatory Decision Making</td>
<td>• Men have maintained exclusive decision-making, with obvious consequences for compliance of rules and regulations.</td>
</tr>
</tbody>
</table>

4.9 Summary of Impacts on Ofosu

This chapter has discussed the extent to which improved access to clean water in Ofosu has benefited residents in terms of improvement in women’s empowerment, health, children’s education, and community participation and governance. A section of community respondents showed keen awareness about what constitutes clean and unclean water, as well as the health benefits and risks of using each source. Others, however, recognized little or no difference in the
quality of water resources available to the community, believing that the open well and stream were just as healthy to use as the pump. However, some respondents among the group that acknowledged that the pump was a much safer water source combined its use with the open well and stream.

Under education, parents said their children were now able to wake up at regular hours instead of rushing out of bed at 5am to fetch water from the stream. They were more punctual than before.

On improvement in women’s empowerment, it was discovered that serving in the WATSAN committee had given women an unprecedented opportunity to become community leaders. Traditional gender roles were also pervasive, and the women on the committee were largely seen as fulfilling their customary functions.

Findings about the low level of community participation and inefficient governance in Ofosu leads one to question whether the benefits of improved access to clean water could actually motivate a community to ensure the sustainability of the water supply system. Certainly, this does not seem to be the case in Ofosu. What comes out clearly, though, is the need to find ways of improving cooperation and financial commitment in Ofosu so as to safeguard the gains that have been achieved and ensure the water pump lasts the lifetime of the communities. Awordo, the second case study, provides some interesting perspectives on this.
CHAPTER 5:

EVALUATING IMPACTS IN AWORDO

BACKGROUND

5.1 Introduction

This chapter discusses findings on the impacts that improved access to clean water has had on residents of Awordo. It is based on information obtained during a three-week study that entailed individual and focus group interviews with 21 community members and nine teachers from the local school. The Interview Guide, which lists the questions used in both the focus groups and the individual interviews, is included in Appendix A.

5.2 Background on the Community

5.2.1 Location and Features

Awordo is a village in the Ajumako-Enyan-Essiam District of Central Region, Ghana. It is located on the same gravel road that passes through Ofosu, but is 3.2 km further from the main paved road (making it about 5.6 km from that road). Its community market and water pump are near the village entrance. The closest water body is the Ochi River, which is 330 meters from the village center (as compared to 1.6 km for Ofosu). The village is spread over an area of 89,000 square meters. There are 72 households in the village. The longest household distance to the stream is half a kilometer, while the shortest is about 180 meters. On the other hand, the longest distance to the pump is 300 meters and the shortest about 15 meters. Figure 5.1 is the map of the village.
The village has no electricity but does have a school that serves Awordo and four neighboring villages from kindergarten to the sixth grade. Thereafter, students who wish to continue to junior high enroll in the neighboring Atwereboanda school, about 3 km away.

5.2.2 Population and Social Organization

Information gathered from respondents and the village leaders indicated that Awordo had an estimated population of 400 (counting adults and children). Unlike Ofosu, Awordo is headed by an Nkosuo Hene, which translates into “Progressive Chief” or “Chief for Progress”. His name is Nana, and the title implies that he was either appointed or voted to be a chieftain, rather than reaching the office through inheritance. The practice of installing development chieftains is rare and is adopted by communities that have lost confidence in the hereditary chieftain. Communities might also opt for a non-hereditary leader as a result of chieftaincy disputes among factions of the ruling family that delay the seating of a hereditary chief. In such situations, local residents have
the option of seeking intervention from local government authorities that could result in dethroning the presiding hereditary chief if investigations prove that to be the best for the community.

It is not clear what the circumstances were in Awordo, and it was not deemed prudent to delve into issues of past leadership during this study. However, it is worth mentioning that by choosing an Nkosuo Hene, the people of Awordo appeared to be communicating their vision for their community by choosing to take control of their own affairs. According to Nana, he is a retired civil servant and has been resident in the village for 27 years.

Like Ofosu, residents of Awordo are adherents of Christian, Muslim and Traditional African religions.

5.2.3 Economic Activities

Interviewees indicated that nine out of 21 were fulltime subsistence farmers. Other economic activities mentioned included petty trading (in assorted food items including vegetables and fish), vending prepared foods, tailoring and hairdressing. One respondent identified himself as a businessman; another was a teacher in the local school, while the Chief described himself as a retired civil servant and part-time farmer. Figure 5.2 depicts the occupational distribution of respondents in Awordo, separated into men and women. It shows that women have more diversified livelihood options than men and that there are more full-time male farmers than females.
5.3 Sample Population

Awordo was selected as a study village because residents had relied largely on the Ochi River for about two years after their pump broke down, until they received a replacement through the NF/REDEP Water Program. The survey discussed here involved 18 out of the 72 households in Awordo.

A total of 21 interviews (10 men and 11 women) were conducted in Awordo, representing 18 of the 72 households in the village. The initial plan was to interview 15 men and women, but this was not possible because, for various reasons, most residents were not available during the study period. As a result, the sample population covered only about 5% of the estimated population. Because of the limited sample size, it was decided to select households based on their distance from the pump and the stream. Ten of the selected households were located on the east side of the village and eight on the west side. The distances to the pump and the stream varied, but the households on the east side were furthest from the stream (as illustrated on the village map).

In addition to the general community surveys, five members of the WATSAN committee were also interviewed for the study. As shown in Figure 5.3, household sizes ranged from a minimum of one to a maximum of 14.

As illustrated in Figure 5.4, the total number of children (individuals under 18) and adults (aged 18 and above) were uniformly distributed.
The study respondents ranged in age from their early twenties to age 70; their age distribution is shown in Figure 5.5.

5.4 History of Awordo’s Water Supply

Background information on the water supply in Awordo is helpful to understanding the context of the NF/REDEP community water project in the village. There are two main sources of water in the community, the hand-operated borehole pump and the Ochi, the river that flows through the District. There is also an open well at the village school and the school has a tank to store rainwater that runs off its roof. The well was dry with debris at the bottom at the time of a visit in 2006. The village was later discovered to have a second open, shallow well, although respondents made no mention of it during the interviews. It turned out that it had long been abandoned as it produced very little water and was dry most of the time.
According to 70 year-old Nana (the Chief), the pump was installed in 1996. Before then, the Ochi was the only source of water for the community. He recalled that a group of officials from the District Assembly had visited the community one day and inquired about the water situation in the village:

The stream dries during a certain season [meaning dry season], so out of the blue some elders came around asking us questions and all that. So, we told them that there were times that the water situation became difficult for us, and requested that they add us to their projects.

Atta, a 42-year-old male respondent, attributed the need for a well and a pump to the harsh sunlight (typical to the West African region). He said the pump “was brought here because [they] were told [the] stream would dry with time, due to the intensity of the sun.”

Other respondents however believed that the introduction of the pump was based on health considerations. For example, Kwabena (35-year-old male respondent and WATSAN pump caretaker) said although he was not present at the time, he was informed that concerns about the health effects of drinking Ochi water had prompted the government to provide water to the community:

I wasn't here when it was initially installed, but when I arrived I heard they were told the water here wasn't good, so they'd brought us this pump ...They meant that since it's flowing water, leaves or other things can fall into it. Also, we here had the tendency to wash all kinds of things into the water -- and even bathe in it. Afterwards, we'd go ahead and fetch some home for drinking. All those things are not good. (See Figure 5.6.)

Others reiterated the perception that the stream was not wholesome for consumption. For example, Papa Kofi, a 69-year-old male respondent, felt it typically became unclean in the dry season:
One, because Ochi sometimes dries up during the dry season. Also, we used to notice that the water looked unclean when we fetched it during the dry season; we'd see small organisms in it. So, when they [District Assembly] considered it, they decided to drill a borehole for us.

Other respondents stated more clearly that the pump was introduced to prevent residents from contracting diseases. For example, Adowa, a 38-year-old female respondent said:

They [District Assembly officials] told us that the surface water contains disease-causing organisms, and that it wasn't good for us to drink it.

Esuman, a 54-year-old male respondent, stated more categorically that the residents wanted the pump because they learned that ground water was much safer for consumption than surface water:

We got the pipe [pump] because we were made to understand that the stream causes disease and that we needed a better source of water - one that comes from deep within the ground and thus was free from disease.

They told us we could contract diseases like by using unclean/unsafe water. As long as it's flowing water, someone upstream can even dump something harmful into it without us downstream knowing about it. After hearing all this, we realized we needed to find the kind of water that would protect us -- that was why we got this pump.

As a result of these concerns, the Community Water and Sanitation Authority of the Ajumako District drilled a well and installed a foot operated pump (shown in Figure 5.7) in Awordo in 1996.

Information gathered from respondents indicated the pump remained in good condition “for about five years” after the initial installation. According to Esuman, “as soon as it was first installed, [the village] set up a committee and trained members to handle ...minor faults.”

Kwabena (the pump caretaker) recalled the challenges that the community had with the foot-operated pump. He said at a point in time, residents had to prime it each morning before it would
work. Interestingly, unlike in Ofosu where residents complained about having to use water from the stream to prime their foot pump, Awordo had a gallon container of water from the well set aside for this purpose. According to Kwabena,

> It was the foot operated pump, and it would drop many times. Lots of times we had to pour water into it – take out the tube and pour water into it.... We had a gallon that was filled and put aside for that, so anytime the water dropped they'd take out the handle with a spanner and pour water into it until it fills up. The moment it filled up, they'd fix the handle back on and start the pump.... That usually held until they stopped pumping. By the time we woke up [in the morning], it'd be down again.

The problem with the pump appeared to have worsened with time. Esuman mentioned that “after a while it broke down” because one of the tools used in fixing the pump could not be found. Before then, residents had been able to repair minor faults, requiring the pump to be primed before it could be used:

> You see, we used to have the tools to open up the pump whenever it dropped [it was foot-operated then]. That helped quite a bit. However, a time came when we couldn't find one of the tools -- the big spanner among them. We couldn't figure out which committee member had possession of it. That's what made the repairs cease a bit.

The pump had been broken down for about two years before the NF/REDEP program began. During that time the only water sources were Ochi and the well at a village 2.5 km away. Kwabena, who was then a member of the town committee when the pump broke down (and still is), said the community had no funds to repair the pump because the water committee at the time had failed to save money for pump maintenance. When the town committee learned about the NF/REDEP water program, they dissolved the old committee and set up a new one:

> We realized after it broke down that the old water committee had no money saved. So we members of the town committee took up the responsibility and formed the new WATSAN committee.

Atta added:

> It was an inconvenience; we drank the Ochi. We tried to find ways of repairing [the pump], but it all amounted to having money. So it was broken for a while, until the NGO came to fix it for us.

In October 2009, the broken foot pump was replaced with a hand pump (shown in Figure 5.8) under the auspices of the NF/REDEP Water Program. Before then, the newly constituted WATSAN committee had been trained and a bank account established for saving proceeds from a community water levy.
As in Ofosu, a deliberate effort was made to establish a gender-sensitive water committee in Awordo, with the view to ensuring that the diverse views of men and women would be incorporated into managing the project.

Figure 5.8. The new hand pump in Awordo that was installed in 2009 to replace the faulty foot pump

DISCUSSION OF IMPACT AREAS

This section examines what impact, if any, improved access to clean water has had on residents of Awordo in terms of women’s empowerment, health, education, and community participation and governance.

With the exception of one respondent, all community participants acknowledged that having water from the pump was an improvement over the Ochi for reasons of health and supply during the dry season. The most significant educational impact was that the pump made it possible for the village to retain teachers who would not have stayed to teach in the local school had there been no clean water in the village. Respondents also mentioned improvements in women’s income-generating activities and reduction in women’s workloads as key benefits. The study further identified a high degree of community involvement in the village water supply. This was manifested through participants’ level of awareness about the process of maintaining the pump and decision-making concerning financial arrangements.

Notwithstanding the widespread view of the positive impacts of the NF/REDEP water project, some respondents admitted to using the stream along with the pump because of the perceived bad taste of the water, and its inability to generate lather during laundering. However, the overall prognosis for the sustainability of the water project in Awordo was positive; a high degree of community acceptance was evident from the interview responses and members
demonstrated an impressive degree of financial commitment toward the maintenance of the pump.

The rest of this chapter gives a detailed account of respondents’ views on how diseases are spread, good sanitation and what constitutes safe and unsafe water use. It also addresses the impact that the water project has had on children’s education and examines whether the availability of a close source of clean water has had an impact on women’s empowerment. It then examines the project’s potential for sustainability, measured by the quality of community governance and participation in the management of the water project.

5.5 Impacts On Women’s Empowerment

This section examines whether improved access to clean water has had any impact on the empowerment of the women in Awordo. The indicators for measuring impact on women’s empowerment established at the outset of this study (and used in measuring impacts in Ofosu) include:

• the level of women’s participation in the management of the water project;
• decision-making ability in the home and wider community;
• the community’s perception of women’s capabilities,
• women’s own perceptions about their capabilities;
• reduction in time spent fetching water, and
• time used for self-improvement and generating income.

Responsibility for Household Water Supply

Interview responses showed that women had direct responsibility for providing their households with water. For example, 32-year-old Sammy whose wife has responsibility for water collection in his house believed “women obtain more benefits from the pump because it's women who mostly use water for chores. They use it in cooking, and even washing clothes and bathing.” He went on to explain that although men “also use it to bathe, [they] don't use it as much as women do.”

Forty-two-year-old Atta provided a further insight into women’s role in household water supply by declaring that unlike his wife, he has no need for water. He was therefore of the opinion that the pump was of much greater benefit to women than to men:

Women gain greater benefits because they fetch it to cook. They get far more benefits. All I do in the morning is go to my farm, so I don't need water for anything. If she's
collected some for the house, I'll take some with me. I don't really need to take water to my farm all the time. My farm isn't too far away from this village.

The interviews revealed that women also supervised the children’s water collection. As long as there were children aged 10 and above within a household, they were expected to help provide household water supply. As illustrated in Table 5.1, boys and girls shared water collection duties in four out of the 18 study households, while another four said the task was shared between the mother and children of both sexes. There was no household where men helped more than occasionally. It is also noteworthy that there were no girls in the two households where boys were solely responsible for water supply.

Table 5.1. Who Fetches Water for the 18 Households in the Study?

<table>
<thead>
<tr>
<th>Number of Households</th>
<th>Who fetches most of the water?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4  Boys and girls share the duty</td>
</tr>
<tr>
<td></td>
<td>4  Mother and children (boys &amp; girls) share the duty</td>
</tr>
<tr>
<td></td>
<td>3  Girls have sole responsibility</td>
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<tr>
<td></td>
<td>2  Boys have sole responsibility</td>
</tr>
<tr>
<td></td>
<td>1  Mother and girls share the duty</td>
</tr>
<tr>
<td></td>
<td>1  Mothers and kids have responsibility, while father helps occasionally</td>
</tr>
<tr>
<td></td>
<td>1  Mother has sole responsibility</td>
</tr>
<tr>
<td></td>
<td>1  Mother and daughter have sole responsibility, while father helps occasionally</td>
</tr>
<tr>
<td></td>
<td>1  Hired hands are contracted to supply water</td>
</tr>
</tbody>
</table>

In households where the only children were below 10 years of age, the mothers had primary responsibility for supplying their homes with water. The reasons are the obvious inability of very young children to carry water, and second, as explained by Nana, the community imposed “an age limit on children's use of the pump; they can't use the pump until they're 10 years.” According to him, residents “reasoned that they [children below 10 years of age] do not have the capacity to operate it in a responsible manner. They're usually more thoughtful from 10 years on.” Also, children playing with the pump, cause excess wear, which is to be avoided.

While adolescent boys could decide not to fetch water, adolescent girls did not seem to have that option. For example, Kwabena lived with his 18-year-old brother along with his wife and children, aged 15 and three years. However, his 15-year-old daughter had sole responsibility for supplying their home with water. His brother did not help. Similarly, Kessie, a 21-year-old respondent who lived with her parents and 23-year-old brother, shared the responsibility with her
mother, but was not helped by her brother. A third example was 50-year-old Afia’s household, which had two girls aged 12 and 14 and two boys aged nine and 18. Here, the 12-year-old girl was reported to have sole responsibility for fetching water while the 14-year-old female was exempt.

*How Many Trips Does Each Carrier Make Per Day, and How Much Weight Are They Carrying?*

As in Ofosu, the number of daily water trips to collect water ranged from three to eight, depending on household size. For example, Maame Esi lived with only her grandson, who made a maximum of three trips daily, while Atta’s five-member household needed a minimum of three and maximum of eight trips to meet their daily water needs.

Containers used in fetching water were 10 and 17 liter buckets, and basins of various sizes depending on the strength of the carrier. Fourteen out of the 21 respondents said younger carriers used 10-liter buckets while older ones used the 17-liter sizes. Three households used a combination of large basins as well as 10 and 17-liter buckets to collect water.

5.5.1 Level of Women’s Participation in the Management of the Water Project

The determinants for the extent of women’s participation in the management of the water project were the performance of women WATSAN committee members and the overall level of women’s involvement in decision-making concerning the pump. Awordo instituted a seven-member WATSAN committee, three of whom were women. Separate interviews were held with the four male members and the one female member who was available. It was established that WATSAN meetings were held every fortnight.

Concerning interactions during committee meetings, the female member and two of the males said men and women contribute equally at meetings, while the remaining two men said that men were more likely to contribute than women.

In order to gain some perception about power dynamics within the committee, WATSAN respondents were asked to measure the likelihood that a male or female member would be interrupted by a member of the opposite gender while speaking during committee meetings. Two male respondents said no one would interrupt when a member of the opposite gender was speaking, the female respondent and another male respondent said that both men and women rarely interrupted each other, while the other male respondent said both men and women often interrupted the opposite gender. All five WATSAN respondents, however, pointed out that the committee has a policy that ensures that members speak in turns and thus avoid interrupting each
other. In fact, the WATSAN Chair emphasized that the committee has “a policy that whoever is speaking must be allowed to finish without interruption.”

One worrisome finding that came up during the WATSAN interviews involved the role of the Treasurer who was the one female member of the committee who was interviewed. Even though she was meant to have oversight for the monthly water levy, she said she had no part in the collection of funds. According to her, the money is collected by the “secretary and the chairman… they tell [her] how much they've collected; the secretary records it in a book, but they don't give the money to [her].”

While the other two female WATSAN members were not available for the interview, the fact that the treasurer had not been given the opportunity to perform her designated task raises questions about the extent of women’s involvement in the management of the project.

Findings also showed a gendered division of tasks that appeared consensual. All respondents stated, as a matter of fact, that women were in charge of the daily cleaning of the pump area, while men took care of occasional tasks regarding it. For example, Yaw, a 27-year-old male respondent, noted that “women are in charge of [cleaning the pump]; they take turns cleaning up everyday, depending on the weekday they were born...while [men] remove the sand that sometimes blocks out the drain when it rains.”

5.5.2 Decision Making Ability in the Home and Wider Community

Information gathered from the interviews revealed that before the NF/REDEP water project, Awordo had an eight-member water committee that included only two women, so the current membership of four men and three women on the committee is a significant improvement. In addition, the village has had an 11-member town committee that includes four women since before the start of the current project. This is worth noting, because rural villages in Ghana seldom appoint women into decision-making positions.

There was little information gained about the influence that women had beyond their representation on the two committees. Information received from the WATSAN chair during the interview to the effect that “even the chair of the town committee is a woman”, could not be independently confirmed and, in fact, efforts to locate the woman proved unsuccessful.

Interview questions aimed at establishing the extent of women’s participation in decision-making and leadership in the period before and after the water project yielded disparate results. Five respondents (three men and two women of 21 interviewed) said there had been an increase in the level of women’s participation in decision-making since the project started. All five
attributed this to the involvement of women in the management of the water project. However, 14 respondents (six male and eight female) said there had been no increase.

Concerning the comparative number of women in leadership positions before and after the start of the NF/REDEP project, eight people (four each men and women) said they had observed an increase in the number of women leaders since the project begun, although 11 (five men and six women) said there had been no change. Those who said there had been no change pointed to the presence of women on the town committee even before the project began. For example, Abeiku, a 54-year-old male respondent, considered it routine to have female representatives on village committees:

Yes, there are women in the committees that we have here.... Every community has women on the town committee, which is in order because they're part of the community.

On the other hand, the WATSAN chair (Sammy), who was among those who reported an increase in women’s leadership as well as participation in decision-making since the introduction of the project, said he could “see there’s been some changes” and that women had a more active role in the management of the pump than they did in the past. As a result, he said, “Managing the pump is a much smoother experience than it was in the past. For example, it's now cleaned more often.”

Questions aimed at measuring women’s level of involvement in household decision-making were excluded from the survey as was done in Ofosu. As discussed in Chapter four, the questions were dropped because it became apparent that some of the respondents were not comfortable discussing that subject.

It should be mentioned that seven out of the 10 women interviewed lived with their spouses, while the remaining three were single, divorced and widowed. Each of the women appeared to have their lives centered on economic activities, with three of them juggling two, and sometimes three jobs (as shown on the occupational chart). For example, 35-year-old Adjoa sold food at Mankessim, a major trading town that is about 20km from Awordo. She said as a result of the long distance involved, she stayed with family at Mankessim for five days (Tuesday to Saturday) so she could sell her goods, while her husband and children remained in Awordo to be joined by her on Sundays and Mondays. None of the female respondents appeared to be restricted concerning mobility; they came across as in control of their own affairs, dividing their time between work and other obligations as they chose. However, it was clear that women maintained their domestic responsibilities in addition to engaging in income-generating activities. As will be
elaborated under section 5.5.7, the amount of time women spent generating income depended on how much time they had after completing their domestic duties.

5.5.3 The Community’s Perceptions about Women’s Capabilities

Respondents were asked whether they believed women’s education and empowerment could contribute toward the improvement of the community. All respondents acknowledged that there were great benefits in educating girls, and that just like men, an educated and successful woman would be an asset to her family and community as a whole. They said that men and women had equal capabilities, and that given the chance, a woman could gain as much success as a man if given the opportunity. For example, Abeiku expressed the opinion that the benefits to be gained from educating a daughter are the “same as the benefit... from educating a son. As long as both males and females receive the necessary support to acquire advanced education, they can [even] become president.”

Forty-two-year old Atta considered girl’s education useful because he believed “even reading could be useful.” Having dropped out of school at the third grade, he felt “there’s a whole lot of information from the government that [he] wouldn’t be aware of” because he could not read. He said it helped to “[have] someone in the family who can read and pass information ...if there’s any impending danger”, for example. Furthermore, the entire community would benefit “if there's the need to write an application to receive something” that is needed.

Similarly, 35-year-old Adjoa believed “there's benefit to educating all children in order that they can find jobs and bring relief to their parents.” She believed “a village that has learned men and women becomes prestigious. When your children have good education and good jobs, it brings progress to the village.”

The respondents also acknowledged that past cultural biases had accounted for low literacy levels among elderly women, because they grew up at a time when girl’s education was considered useless. For example, Nana (the Chief) recounted how cultural perceptions about the relative importance of educating girls had evolved over time, and how the growing awareness of the need to do so spread from the urban to rural areas of the country. He added that notions about the importance of universal education were currently so internalized even in villages such as Awordo, that it had become mandatory for parents to enroll both sons and daughters in school:

At first - even in big cities and towns - not many women attended school. But as time went on, we realized both men and women – that whatever a man can do, a woman can also do. You see, so it became the practice for all urban residents to educate their
daughters as well as their sons. And then the awareness came to reach our villages. If you don't educate your children, you'll even be insulted. You'll be summoned and chastised ...in this village!

Using his four-year-old granddaughter as an example, Nana went on to explain how school attendance could lead to the inculcation of good sanitation practices in the short-term:

Just look at her [pointing to his granddaughter]- she's four years old; if she were to stay home, she'll just end up being filthy [from laying in the dirt]. But since she attends school, she's bathed every morning, so when she returns you can see she's neat --in everything! But those who don't go to school, you see they're dirty --their skins aren't so nice.

He ended by emphasizing that the practice of educating only sons is no longer acceptable:

So now, you don't give birth to a girl and ask her to stay home; when your son goes out to get education, your daughter goes as well!

When I asked 69-year-old Papa Kofi what he thought were the advantages of educating girls, he had this to say:

You're an example of the benefits. She can help the nation --assist in the advancement of the nation. When a girl is educated, she can also educate other girls-- organize other girls, teach them proper way of cooking and also discipline.

Nana and Esuman were of the opinion that girls who were studious and well behaved brought honor to their families and inspired good conduct in younger children. Nana was particularly impressed with a the attitude of a neighbor’s daughter:

One of our neighbors has a daughter in senior high school. You hardly ever see her loitering around. She's always occupied with something positive.

Fifty-one-year-old Esuman, a nephew of Nana who was visiting towards the end of his interview, added:

When you have such a person in your house, it raises the image of the family. Also, she will be a good example for younger children. Because of her education, she will gain authority and be in a position to influence her younger siblings toward good behavior.

While respondents generally believed that educating both boys and girls was important, some of them pointed out that that girls’ education would only be useful if the girl in question was committed and acted responsibly. Some participants said teen pregnancy and resulting school dropout, and the reluctance of some children to “give back” to their families and communities after they had been educated were some of the drawbacks to educating children, particularly girls.
For all his support for girls’ education, Esuman believed teen pregnancy negated any potential benefits, and something that no dedicated girl would get herself into:

If one's daughter understands the importance of education and commits herself to it, there's no way she wouldn't bring any good-for-nothing pregnancy along the way.

Well, a good-for-nothing pregnancy – that means she hasn’t reached the proper age for childbirth. She just becomes pregnant when she becomes [prematurely] involved with a man. If girl has a real purpose in life, she wouldn't be interested in such behavior. She will wait until she's in a better situation to [to take care of herself] before she becomes involved with men in that sense.

5.5.4 Women’s Own Perceptions about their Capabilities

Women’s responses concerning the relevance of girls’ education gave insights into their own experiences and the lessons that had shaped their perceptions. Like the men, all the women acknowledged that cultural prejudice and in some cases, poverty, had prevented them from gaining education. For example, 35-year-old Kukua had never been to school, and felt that educating her daughter was her most important task as a parent, because:

If I am able to give my daughter a good education, to a high level, that will be my ultimate accomplishment. I will be much better off once she finds a job. The community also stands to gain because she can help us all.

Sixty-year-old Maame Esi, also uneducated, said past notions about the futility of women’s education had given way to modern-day recognition of the inherent potentials of men and women:

In our era, our fathers were convinced it was no use to educate girls, so we weren't taken to school; but today female or whoever, they all go. Right now, everyone has realized that a woman can be a lawyer; a woman can be a police [woman], a woman can be a soldier, you see? Yes, so we know women are important, their education is important.

Interestingly, two respondents regarded education as providing a much-needed avenue to escape the intense physical labor that rural farming typically involves, and hoped their children would have better lives. For example, 50-year-old Afia (a woman farmer as well as petty trader), believed “everybody needs to go to school; if you don't go to school you'll have no option but to farm”, pointing out that “farming is very difficult!”

Similarly, 32-year-old Serwah bemoaned the fact that she had been compelled to drop out in junior high school due to parental neglect. She said her experiences had taught her that education is the greatest treasure she could bequeath her children:
Today, education has become a treasure! A farm is not a treasure – school has become a treasure now, not a farm! Yes, education is a treasure!

It is worth mentioning that respondents’ views about the equal value of male and female education reflect a progressive trend that is being encouraged by the government.

5.5.5 Reduction in Time Spent Fetching Water

The amount of time spent by a household to fetch water from either the stream or pump depended on its location. Therefore, some respondents reported no change in the time it took to fetch water from the pump as compared to the stream, while others reported some reduction. For example, 36-year old Kwesi (father of 4), who lives about 120 meters from the pump and 370 meters from the stream, observed that the “pump is closer and therefore faster to get to than Ochi.” Findings showed that it took about 10 to 20 minutes for households to collect water, but the time required could increase to about an hour when the pump was crowded. For people who lived close to the stream it took them about the same amount of time, 10 to 15 minutes, when they needed to use it. For instance, Abeiku lives approximately 60 meters from the pump and 240 meters from the stream (on the eastern side of the village). According to him, there had been no change in the time his wife spends fetching water and performing other house chores, because they lived relatively close to the stream:

The stream that we used before the pump came is pretty close by as well, so there hasn't been any real change in the time that she spends doing things. She could make five trips to the stream in 20 minutes if she wanted to.

Awordo's proximity to Ochi means that the time saved fetching water by repair of the pump is less significant than was the case at Ofosu. The distance to water was reduced for most to the village, but probably not by enough to be important in itself. In fact, for some people who wanted to use the pump, the time required to get water probably increased, because of the waiting line at the pump. Several people including Nana, the chief and Kwesi, the WATSAN secretary, mentioned this. According to Kwesi, while the village is grateful to have a working pump, having only one was beginning to take its toll on the village:

Right now, our only problem is to get two of them [pumps]. Our village is growing, so the children keep too long when they go to fetch water because of the long lines at the pump.

He said at the time of installation, the village had a population of only 140; it is currently 400.
Yaw, 27-year-old respondent (and father of four) said his children would often “keep a bit long in fetching water...because there's usually a lot of people waiting to fetch water.”

5.5.6 Reduction in Women’s Workloads

There was unanimous agreement among respondents in Awordo that the pump had improved women’s lives. Although some respondents said the stream was not so far from the village to be a burden for women and children who provided water for their families, they also conceded that the pump was a far more convenient option. As Nana mentioned, one major advantage to having the pump was the sense of security from having a readily available safe water source:

The stream isn't all that far, so they could get water at any time –they could fetch water after returning from the farm, and even get some in the morning before going to the farm. But it's easier here [at the pump]... It enables them to work faster. The benefit is that they know whether the stream dries or not, they can always count on getting water upon their return from the farm.

Serwah, who combined farming with petty trading and food vending, referred to her own experience to explain why she believed the pump had made things easier for women:

On Wednesdays for example, I spend a lot of time on my farm. I'm usually very tired when I get home –too tired to walk to Ochi to fetch water if I had to. With this pump here, I can get water to bathe with ease.

**Men Helping Women**

As mentioned, respondents’ perception about the time and distance involved in fetching water depended on the relative location of their homes to the pump. Generally, the pump was seen as a more convenient option than the stream. It also came out during the interviews that this relative proximity and convenience made it more likely that some husbands to assist their wives in collecting water. Two of such husbands were Atta and Sammy.

According to Atta, “...there are times when my daughter is not around and my wife is too busy with something. I go out to fetch water then.” This was confirmed by his wife Kukua who, even though could not “recall” the last time he helped with water collection, said “he would get me about one bucket [of water] when I'm really busy.”

Sammy offered the clearest insight into the impacts that proximity and convenience of a clean water source could have on reducing women’s workloads. He made it clear that while he occasionally helped his wife in collecting water on days when she had a lot on her hands (since they have two children, both below seven years), he may not have been so eager to help if the
pump was not close by and convenient to use (the family lived about 70 meters from the pump and 300 meters from the stream):

I occasionally fetch a bucket to bathe with. Sometimes, I also fetch some for cooking and other chores if my wife is hard-pressed. But it's not a daily occurrence.... I would rather go to the pump...because the distance from here to the pump is shorter. Besides, I would have to roll up my trousers before. [At the pump] all I'll have to do is take off my sandals, so that'll be better than going to Ochi.

Interview responses further revealed that residents recognized that the availability of the pump also provided security from potential mishaps that might happen if people had to fetch water from the stream at night. This was also pointed out, by Nana, who described the pump as being an “immense help” to the village. According to him, even travelers who returned home after dark no longer had to choose between making a risky trip to the stream or going without water. Instead, they now had access to clean water right next to their homes:

It's been of immense help to us all! ... Someone could travel and return at a ‘late hour. There's no way that person can walk to the stream at that hour, particularly when they're alone.... But this one is situated at home, so it can be accessed at any time!

Thirty-seven-year-old Maari reiterated this: “let's say you've returned home late from a journey. Because the pump is in the town, you can get the water you need easily.”

5.5.7 Time Used for Self-Improvement and Generating Income

Respondents indicated that a major advantage to having the pump was its convenience, as compared to the stream. Interview findings further revealed that the women benefitted most from this. For instance, Maari also pointed out that “women derive more benefits than men. All a man needs is to bathe morning and evening, whereas the woman uses it for everything in the house.” Similarly, Adjoa said:

We use it to perform our chores and also for drinking ... in washing dishes, you see. So I think those are the benefits that we get from it. We women use it to cook for the men.

Serwah, however, highlighted how the pump (which is locked at 8 PM) had enabled her to combine domestic responsibilities with her work. She keeps a stall at a market about 50 meters from the pump, and spoke of a sense of relief from knowing that no matter how late she stayed at her business, her family would always have water without having to walk through the dark to get to Ochi:

This pump here has really helped us! I'm able to get water even late in the evening. I usually send my children out to sell in the neighboring communities. On days that they
don't come back early, or have to do something else I fetch a bucket to cook dinner. Knowing that it's going to be locked, I make sure to get some water myself around 7 [pm], I really monitor it -and then I quickly run to get a bucket and fetch it. That's something I couldn't do with Ochi --you just can't go to Ochi at 7 [P.M]!

5.5.8 Enhanced Income Generating Opportunities for Women

Interview findings showed that the proximity of a clean water source had led to an increase in women food vendors in Awordo. Indeed, 19 respondents reported an increase in the number of women working outside the home, and they all attributed it to the pump, although one male participant said he had seen no change (another male participant, the teacher, said he did not have enough knowledge to respond to that question). For example, Yaw mentioned that these women “sell food in the market place”. Sammy noted the increased number of women food vendors, some of whom sold “…banku, fish, and other things.” This was buttressed by Maari’s assertion that “there are those women who use it to cook rice and sell, those who sell banku, those who use it to prepare palm oil – they get a lot of benefit from it.”

Serwah, who, as noted, operated a stall at the market, also observed an increase in the number of women who cooked rice and maize porridge to sell in the village. She said that:

"… in the past they couldn't have done it. I mentioned earlier that we used a substance to whiten the water [alum] in the past. In those days, we simply didn't attempt to cook such dishes until we had that substance –it just wouldn't turn out right, because Ochi is brownish and the dish is supposed to look white.

In much the same way, Afia, who combined farming with palm oil processing and food vending, described how the pump had led to a reduction in the distance covered to fetch water. She said she never liked to use the stream in the days when the pump was not working, choosing rather to walk 170 meters to use an open well in the school (which is no longer in use). Now she only had to go 30 meters to fetch water from the pump:

It's reduced the distance that I need to cover in fetching water to cook my food. I used to fetch the well water in the evenings when I returned from the farm. I wake up at 4 am, cook the food by 6:30 and take it to the market.

Some Income-Generating Activities Enhanced by the Pump

Three of the women whose income-generating activities have been enhanced by the repaired pump were Serwah, (who was quoted above), Awusi and Kessie.

Serwah (seen in Figure 5.9) is a 32-year-old mother of four, who dropped out of junior high school due to financial constraints. She subsequently married and relocated to Awordo with her husband, where they have lived for the past 11 years. In addition to farming, she sells “beans,
rice, plantain [raw and cooked] and smoked fish” She said having the pump so close to her had significantly benefitted her business, because she had water to cook her meals and also supply her customers with drinking water:

![Figure 5.9. Serwah standing in her market stall](image)

It’s been a big help to my business. That's what I'll keep using until I leave here. I can just walk up to get water as many times as I need to in the day. It also provides drinking water for my customers, because of the yok [gari and beans] that I sell. If the pump weren’t here, I would have to go all the way to Ochi to get water, so the pump has certainly helped me in my trading.

She said sales varied sometimes, but that she typically made about “GH¢7 to GH¢8 ($US 5-6) cedis on a good day”, GH¢4 (about $US 2.50) of which counted as profit. Generally, as long as she had time to cook the meals and money to stock merchandise, she made reasonable returns.

Twenty-nine year old Awusi (pictured in Figure 5.10) is a food vendor in addition to trading in cooking utensils. She is married with two children, aged one and four years. Until 2009, her main occupation was selling used clothing to residents of Awordo and surrounding villages. She realized, however, that the income from that business was not sufficient to make ends meet. Once the village got a working pump, she started selling banku (maize meal), because it “offered a way to make extra income.” She said combining food vending with trading had improved her finances, since “money for the utensils [came] in rather slow, but this one [income from selling banku] is pretty steady.”

![Figure 5.10. Awusi wrapping up the banku after cooking it](image)

She added that she would occasionally sell cooked rice as well, noting that the pump came in particularly handy in those instances as well as others:

There are many advantages to it [that is, having the pump]. Even the rice that we cook; it makes a big difference what type of water you use in cooking, because it will tell in the end. It has a much better appeal when you use the pump in cooking it –whatever we use the pump in doing looks just outstanding –it makes it clean, so that makes me see it's very valuable.

She said the pump also enabled her to work more efficiently, as it cut down on the distance she would have to walk to get water:
If this pump weren't here, I would have had to walk all the way down to Ochi to fetch water for my business. I'm able to work faster because the pump is close by, and it just makes everything look so neat.

Kessie (seen in Figure 5.11) is 21 years old, single and has a one-year-old daughter. She completed junior high school and was training to be a hairdresser at the time she was interviewed. Part of her job as an apprentice was to ensure the beauty salon had an adequate supply of water. With the pump less than 50 meters from the salon, she said, “it's easier for me to get water to do my work – it saves me time.”

5.5.9 Making Life Easier for a Blind Woman:

One significant finding in Awordo was that the pump had made a wealth of difference for Abena, a 56-year-old blind woman (shown in Figure 5.12). She lived alone and made a living from operating a convenience store (which is actually a stall stocked with sundries). Unable to get around because of her condition, she had long depended on rainwater and hired hands to supply her water needs. She said living just about 20 meters from the pump had saved her a reasonable amount of money, because the people she hired charged “only 20 pesewas [$0.15] for three trips”, as compared to the “80 pesewas [$0.65]” she used to pay in order to have her “30 liter tank filled” from the stream.

5.5.10 Summary

Study findings about the impact of the water project on women’s empowerment therefore showed substantial increase in women’s opportunities for income generation, as well as reduction in time and effort spent fetching water. Particularly significant was the finding that the pump’s proximity and convenience encouraged husbands to assist their wives in household water supply.

The positive outlook for women’s empowerment was however slightly dimmed by the discovery that one of the three women who served on the water committee was not performing
her duties as treasurer. Rather, the chair and secretary appeared to have taken over her designated role. This raised questions about the exact role of women in the management of the project, particularly since the other two women serving on the committee were not available for the interview. Table 5.2 summarizes the impact of the pump on women’s empowerment.

Table 5.2: Summary of Impacts on Women’s Empowerment

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings in Awordo</th>
</tr>
</thead>
</table>
| Women’s Participation in the Management of the Water Project | • Three out of seven members of the water management committee are women.  
• The fact that only female WATSAN interviewee was not performing her designated duties however raised questions about women’s effectiveness in the management of the project. |
| Decision Making Ability in the Home and Wider Community | • Female respondents demonstrated significant levels of autonomy and mobility as well as close adherence to traditional gender roles.  
• Women consider themselves equal in community decision making. They attend meetings and share their ideas. |
| The Community’s Perceptions about Women’s Capabilities | • A number of respondents, male and female, acknowledge past views about women’s limitations were erroneous, and that all humans have the potential for great achievement if given the chance. |
| Women’s Own Perceptions about their Capabilities      | • Women recognize that past notions about women’s role in life had shortchanged their self-development and communicated the desire to ensure their children have equal opportunities to succeed. |
| Reduction in Time Spent Fetching Water                | • Convenience and safety were identified as the most crucial advantages gained by women as a result of the pump. |
| Reduction in Women’s Work Load                        | • The proximity of the pump makes it possible for other household members, especially children, to assist women in household chores, thus reducing the work loads of women. |
| Time Used for Self-Improvement and Generating Income  | • Four out of 11 women interviewed said they now have time to trade and do extra jobs since they spend less time fetching water.  
• Women who sell food in the village market were relieved to have clean water close by.  
• Three women find it possible to take up businesses that they couldn’t have done otherwise, particularly in selling porridge and rice. One of these started a new business while the other two resumed trades they had shelved due to nonavailability of clean water. |
| Making Life Easier for Blind Woman                    | • A blind woman with limited mobility who relies on hired help for water supply reports a reduction in water cost as a result of the pump’s proximity. |
5.6 Impact on Health

The main indicators of health used in the survey were sanitation standards in the communities and people’s perceptions on how diseases are transmitted. The survey showed residents had awareness of what constituted good hygiene. It also showed that although most believed the pump was the safest source of drinking water, a few still patronized the stream because they considered the pump water “too salty” and “difficult to wash clothes with.”

5.6.1 Sanitation Standards

Observations showed Awordo had designated places of convenience and refuse disposal that are located outside the general living quarters. All respondents said they practiced hand washing, although two admitted to not always using soap when pressed. Another respondent was observed washing her hands with plain water under circumstances that required the use of soap for proper cleansing. The pump area was however clean.

5.6.2 People’s Perceptions about Mode of Transmission of Water and Sanitation Related Diseases and Notions of Safe vs. Unsafe Water

Residents’ perceptions about what constituted safe water was mixed. While many believed the pump was the safest source of water, others were of the view that the stream was just as safe to use as the pump. Adjoa, for example, was convinced the pump was safer than the stream “because it contains no disease causing organisms; it's also clear so it's obvious to see that it's healthier.” She elaborated further on why she considered the stream unsafe:

The reason why I think Ochi contains disease organisms us that when it rains water washes from all over the place into it. Although I haven't seen it myself, I know that by all means, some harmful organisms will end up in the water.

Awusi reechoed the idea that water that looks ‘clear’ must be clean, indicating that in comparing the surface color of the pump and stream, he felt more confident that the former was the safest to use:

The pump is very 'fine' [meaning ‘appealing’], that's what I always drink, because the surface is white. When you fetch you can see the surface is clear and clean, that there's no dirt in it when you drink it.... With Ochi, we've notice that dirt settles under when we store it for a while. Whereas as long as no child dips their [dirty] hands in the water we fetch from the pump, it will remain clean.
Two respondents made reference to the fact the introduction of the pump was a significant social change that had initially met with mixed reception. In particular, Nana mentioned that some people were so used to the stream that it took a while for them to get used to the pump:

You know, our elders didn't have pipe [pump] so they only drank from the stream. But when the pipe came, some people felt they'd be thirsty soon after drinking it. You know, they'd been used to drinking the stream, which, because of all the leaves that fell into it, they thought it was ‘heavier’. But now they prefer the pipe to the stream.

Interview findings however showed that not all residents had transitioned from the pump to the well. As shown in Figure 5.13, 14 out the 21 community participants used the pump exclusively, five combined the pump and stream, one used both the pump and rainwater, while another used only the stream.

The participant who admitted to using only the stream explained that she did not like the taste of the water from the pump. Although the district health educators had told her that the pump was the safest water source, she saw nothing unhealthy about the stream since she had used it all her life:

I was raised on the stream water so I can't say it's not good. However, they made us understand – when they [district health educators] came – that the pump was the best ... but I don't like the taste of it.

5.6.3 Summary

Findings on sanitation standards in Awordo thus revealed the community has designated places of convenience and rubbish disposal deliberately located far enough from sources of water supply and houses of residence as to not pose health hazards. While interview responses
demonstrated most participants practiced basic hygiene like hand washing, there was also evidence of the need for improvement in health habits among some respondents.

A section of respondents considered the pump a healthier water source than Ochi, yet a few felt there was no harm in using Ochi because their ancestors had used it without encountering any adverse reactions. Others complained the pump was “salty” and failed to lather during laundering. One participant however perceived the pump to be a necessary part of modernization. Table 5.3 summarizes the findings on the sanitation standards in Awordo, as well as respondents’ perceptions about what constitutes safe and unsafe water.

Table 5.3: Summary of Impacts on Health

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings in Awordo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitation standards.</td>
<td>• Designated places of convenience and rubbish disposal within the village;</td>
</tr>
<tr>
<td></td>
<td>• All respondents said they practiced regular hand washing, although one admitted to not always using soap when pressed.</td>
</tr>
<tr>
<td></td>
<td>• Pump area was clean.</td>
</tr>
<tr>
<td>Perceptions about what constitutes safe and unsafe water.</td>
<td>• Sixteen out of 21 respondents believed the pump is the safest water source, while five felt the stream was equally good. This attitude appears to stem from the belief that the stream is an important part of the village’s legacy, hence the reluctance to dismiss it altogether.</td>
</tr>
<tr>
<td></td>
<td>• One respondent was of the view that the pump was a logical step on the path to modernity, tracing how old ways of doing things had given way to more improved ones.</td>
</tr>
<tr>
<td></td>
<td>• In spite of widespread recognition that the pump is safer, some residents complained that it’s ‘salty’ taste and inability to lather made it difficult to use.</td>
</tr>
<tr>
<td></td>
<td>• While 14 out of 21 respondents used the pump exclusively, As a result of dissatisfaction with taste and utility as well and habit, five combined the pump with the stream, one used the pump and rainwater, while another used only the stream.</td>
</tr>
</tbody>
</table>

5.7 Impact on Education

As in Ofosu, data on school enrollment and attendance were not available. However, interview responses provided insights into the educational impacts of the pump. The two main educational impacts of the improved access to clean water in Awordo, as narrated by some respondents, were that it helped to retain resident teachers in the community school, and also reduced lateness in school children. For example, 36-year old Kwesi believed the pump was introduced for two main reasons:
It was mainly because we needed clean water, and partly to encourage the young teachers to stay.... It’s already difficult to live in a village –for example; we don't have electricity here – so we realized it would be worse if we didn't have good water either.

The personal testimony of 32-year-old Arthur, a male respondent and resident teacher who had been at post for three years, lent credence to the perception that having clean water in the village encouraged teacher retention. Arthur recounted his experience with a village where he had been posted previously, explaining that he had refused to stay because, after making a particularly difficult and expensive trip on his first day, he discovered that it lacked clean water:

I remember my first station [posting]: I went to report and then afterwards I found out that they didn't have good water. Even going there was a problem. That day I had to take a "dropping" [i.e. charter a taxi] And then when I got there I asked for water and they brought this -- that one it was not even river, they said it was some stagnant water somewhere. So they went to fetch it for me -- they brought me a brownish substance, and that was the end. I went back and informed my supervisor that I wasn’t going back to that village.

5.7.1 Trends in School Enrollment, Attendance and Punctuality

Arthur also said typically, students were more punctual when the village has a working pump. He recalled frequent lateness during the period that the pump was broken:

Their time of coming to school changed --they were coming late. When you asked them --they'll say, "I went to fetch water". So we used to tell them to fetch the water in the evening so that in the morning they can come early, but it wasn't really working.

Maari, a 37-year-old female respondent who lived in a two-family household (compound house), revealed that children often turned morning trips they had to make to the stream into playtime, rather than collecting water and promptly returning. According to her, this tendency contributed to school lateness. She said having access to the pump enabled parents like her to enforce a strict schedule for the children:

They used to be late to school because they would play. But with this one, they just fetch, come back to shower, and go to school. Even now, we let them fetch it the evening so they'll be all set to go to school after sweeping.

Thirty-two-year-old Sammy captured the full impact of the pump on children’s school attendance:

It’s the water that the children fetch to bath every morning before going to school, so they're a lot faster in getting ready.... They get ready for school much faster than before.
In the past when they had to go to Ochi on the morning, they were often late. By the time, they made three trips to Ochi they'd be really late!

5.7.2 Literacy Level of Community Respondents

As mentioned, patterns in academic performance and enrollment in the local school in Aworno could not be determined quantitatively, due to insufficient data. Survey findings however provided some information about the literacy level of study participants.

As shown in Figure 5.14, approximately 18 percent of female respondents in Aworno had schooled up through primary and junior high levels respectively, while 14 percent had never been to school. On the other hand, about 18 percent of male respondents had both primary school and junior high school education respectively, 5 percent had senior high diploma, while 9 percent had tertiary qualifications.

![Educational Level of Aworno Study Participants](image)

**Figure 5.14. Gender disaggregated data on maximum educational level of Aworno study participants as gathered from the survey.**

As indicated, all male respondents had at least primary school education, and no female respondent had been to senior high school.

5.7.3 Summary

These findings therefore demonstrate that improved access to clean water has been of significant educational benefit to the people of Aworno. Most notable is the fact that having clean water has encouraged one teacher to stay on and work in the community school. This is noteworthy, because its lack of electricity and remote location (4.5 km away from the main highway, with a road that is difficult to access) would already make it an unattractive working post. As Arthur’s experience revealed, finding teachers to work in rural schools can be challenging in Ghana, particularly when a village lacks essential amenities like clean water. The fact that the pump also led to reduction in school lateness is further testimony to the far-reaching
impacts of clean water on education. Table 5.4 summarizes the impacts on education found in the study.

### Table 5.4: Summary of Impacts on Education

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Trends in School Enrollment, Attendance and Punctuality | • Two respondents reveal one motivation for sustaining the clean water facility in the village is to attract and retain teachers.  
• Buttressed by interview with young teacher who had left an earlier post because of the absence of clean water in that community.  
• Respondents note marked improvement in student punctuality after repairing broken pump. |

#### 5.8 Impact on Governance and Participation

The indicators for measuring the impact of the pump on community governance and participation were level of community involvement and sense of ownership in the management of the project, equity and participatory decision-making. Financial commitment was one of the important determinants of community participation. Findings revealed a coordinated system of managing the pump that involved regular monthly meetings (usually held on Tuesdays, which are off-farm days), daily cleaning of the pump area, and diligent collection of a monthly water levy of 30 pesewas ($0.20) per adult resident.

##### 5.8.1 Community Involvement and Sense of Ownership in the Management of the Project

Findings showed a remarkable degree of community commitment to the sustainability of the water pump as reflected by proactive measures they took toward preventing a repeat of previous errors. Kwabena, a 35-year-old member of the town committee and pump caretaker of the WATSAN committee, described efforts made at ensuring better management of the new water pump based on lessons from the past (as mentioned in Section 5.3).

Other respondents confirmed that the old water committee had been in place for about 10 years. The new water committee was “trained to manage the pump, to make sure nothing goes wrong with it. They also supervise the collection of levies – making sure people pay up.”

Another indicator of the level of community involvement in the management of the pump was the extent of respondents’ awareness about meetings, discussions and arrangements concerning its maintenance. Of the 21 participants, 18 showed extensive awareness about measures that were being taken to maintain the pump and how those measures were adopted. All
18 described the monthly community meetings during which the pump was among the issues discussed. For example, 69-year-old Papa Kofi (a male respondent) gave the following description about how the pump was being managed, emphasizing the rational behind the payment of monthly water dues:

The arrangement is that we call meetings every month to discuss issues concerning it. We also collect monthly levies from everyone, whether male or female. Everyone pays 30 pesewas, so that we can have money to add to what our helpers [NF/REDEP] will bring the next time we need to repair the pump.

Only three respondents reported having no direct knowledge about meetings that were held to discuss issues concerning the pump. Two of these were 56-year-old Abena and 32-year-old Arthur, who had been excused on account of disability (blindness) and position as resident teacher respectively. The third, 35-year-old Adjoa, was a trader who was usually away on meeting days. Even then, she was fully aware of meeting proceedings because her husband briefed her about them:

I don't live here so I don't attend all the meetings, which are usually held on Tuesdays. But my husband tells me about the meetings that are held very month.

Findings also showed that the women in the community had responsibility for cleaning the pump, and that this done by assigning daily work shifts to groups of women based on the week day each was born. Maame Essie (60 year old female respondent) gave a detailed description of how the system worked:

As for the cleaning, the arrangement is that people born on a particular day of the week get together to clean it. For example, women born on Saturday will get together and clean on that day, and then those born on Sunday will follow, and so on – they sweep and clean up the place nicely.

Sammy, (the WATSAN chair), said he had observed a higher level of community involvement in the maintenance of the pump since the introduction of the NF/REDEP water program in Awordo. According to him, the current water management committee (WATSAN) introduced as part of the water project was an improvement over the previous one:

I've seen improvements in [community] participation ever since REDEP came into this village and we ended up forming a new water management committee ... because at the time that the old committee was in place, we never had any money beyond the initial GH¢50 that was donated. Now we've added more money to that since the new WATSAN was set up.
An inspection of Awordo’s bankbook showed two deposits totaling GH¢50 (about US$33), in addition to the initial deposit of GH¢10 (US$7), since the project began in November 2009.

The extent of community participation in managing the pump was reflected in the commitment of most residents to paying the monthly dues. Two striking examples were Abena and Maame Essie. Abena, who had been excused from paying the monthly dues (because she already spent money hiring water collectors on account of her blindness), still paid occasionally because she considered it her duty:

They don't come to collect it from me. Sometimes I do it out of consideration – when I see them going around collecting the levy.

It should be mentioned that the exemption given to Abena falls in line with the policy of the NF/REDEP water program that encourages project villages to find ways to accommodate residents with special needs.

In the case of Maame Esi, even though she did not use the pump because she was “raised on the stream” and thus preferred to use that, she still paid her monthly dues because “everyone agreed to pay it.” Besides, she did not want to default because the WATSAN committee had a close monitoring system: “When anyone pays they take out a pen and a book and write down the person's name.”

Respondents, even those who were not part of the WATSAN committee, knew exactly where the money went. For example, 27-year old Yaw was aware “that they [WATSAN committee] save the money [in a bank] after collecting it.”

Another indicator of the level of community involvement and sense of ownership was that measures had been taken to prevent mismanagement of the pump. One such measure was to restrict its use to only those who could be trusted to operate it responsibly. Nana (the Chief), explained thus. Another protective measure was to lock the pump after 8 pm to prevent children from mishandling it.

One other remarkable finding about the level of community participation was that the village leadership upheld the mandate of the WATSAN committee and mediated in conflicts that arose as a result of rule enforcement. This was reflected in the experience of Kwabena, the pump caretaker with responsibility to locking the pump as directed. According to him, the only reason he had not quit his position was because he felt encouraged when the village elders intervened on his behalf during a dispute that arose between him and another resident over his enforcement of the regulation:
In fact, there was a time after we returned from that course [WATSAN training] that I almost quit. There's the tendency for some people to take advantage of familiarity and break the rules that we have all set. But I'm encouraged by the elders' handling of the situation; that's why I'm still on the committee.

Kwabena further pointed that the village has laid down procedures for ensuring rules were observed. He spoke about a time when steps were taken to curb the tendency to shield people who broke agreed laws:

At a point in time, we realized the women were reluctant to point out if another failed to observe the arrangement. They are liable to be fined if they failed to perform their duties, but it was beginning to look like some were trying to cover each other. We had to bring it up at the meeting; we realized that kind of attitude wasn't going to help us. So we reinforced the fine to make sure everyone performed her duties.

These findings therefore indicate that Awordo residents have a significant level of community involvement and sense of ownership in the management of the community water project.

5.8.2 Equity, Participatory Decision-Making

Interview responses further revealed a participatory and equitable system of decision-making that may have contributed to the high level of community involvement in the management of the pump. Study participants indicated that they were involved in formulating the rules governing the use of the pump. With regard to the water levy, for example, Yaw recalled: “We held a community meeting and came to the decision that everyone would pay 30 pesewas.”

Kwabena described the meetings as interactive, enabling residents to share perspectives on a range of community issues:

Well, people express their opinions – someone would talk about our community latrine, another one would talk about the fact that our water isn't tasty. Someone even proposed the possibility of installing a second pump to serve those living up [the hill].

It is worth mentioning that providing a platform to discuss wider community concerns was one reason that the NF/REDEP program implementers recommended regular community meetings. The evidence from the study thus signified the fulfillment of a major project objective.

Other respondents threw more light on the deliberations that resulted in the agreed mechanism for raising funds to maintain the pump. As Esuman explained, efforts were made to accommodate different preferences in order to avoid future conflicts and encourage compliance:
Initially, we thought about selling it, but it occurred to us that, due to the proximity of the stream, people might not be too eager to buy it. So, we rather decided to collect monthly levies to save for future maintenance.

Atta (the WATSAN organizer) added that the decision to pay monthly was based on observations that pointed toward the strong likelihood “people wouldn't want to pay by the bucket, since Ochi is so close by.”

Findings also showed the WATSAN committee and community leaders acknowledged the concerns of residents who were not always forthcoming with their monthly dues, and endeavored to handle such cases with consideration. According to Sammy (WATSAN chair), defaulters fell into two categories; “those who felt they did not use the water often enough to pay for it” and others “who simply did not have the means to pay every time.” Emphasizing that “the majority do pay”, he explained: “With some of these people, even if they don't pay this month, in the next month they tend to pay extra to cover what they owe in arrears.” Although they would “rather they paid it when it's due”, the community leaders had chosen the path of dialogue over confrontation: “In order to prevent conflict, we've been in negotiations with them.”

The program implementers emphasized the importance of respecting differing viewpoints and endeavoring to accommodate various concerns during the community consultation meeting (held before the start of each project). These findings on the extent of equity and participatory decision-making in Awordo therefore points towards the adherence of a key program recommendation with a potential to enhance cooperation and overall sustainability of the water project in Awordo.

5.8.3 Summary

As summarized in Table 5.5, findings on the impact of the water project on community participation and governance in Awordo showed the community was proactively engaged in managing its water project. Rules governing the use of the pump were formulated with consensus and strictly upheld, while occasional dissentions were handled with decorum, with a view to reform rather than antagonize.
Table 5.5: Summary of Impacts on Governance and Participation

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Findings in Awordo</th>
</tr>
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</table>
| Community Involvement and Sense of Ownership in the Management of the Project. | • Regular payment of monthly water levy by community members, even by one respondent who does not patronize pump. A visually impaired respondent who has apparently been exempt speaks of attempts to contribute “out of consideration.”  
  • Evidence of growing water fund (bank account) fed by levy.  
  • Regular community and WATSAN committee meetings.  
  • WATSAN pump caretaker encouraged by support given by village leadership during a confrontation with a non-conforming resident.                                                                                                               |
| Equity, Participatory Decision Making.                                    | • Respondents have a sense of involvement in managing the pump, and feel they are part of decision-making process.  
  • This reflects in respondents’ level of knowledge concerning processes leading to the establishment of the current water levy.                                                                                                                                                                           |

5.9 Summary of Impacts in Awordo

This chapter discussed the extent to which improved access to clean water in Awordo benefited residents in terms of improvement in women’s empowerment, health, children’s education, and community participation and governance. Findings on women’s empowerment revealed a gender-sensitive WATSAN committee, with three out of seven WATSAN committee members being women. Respondents reported a reduction in women’s workload due to the proximity of the pump. However, there were indications that more effort was required to make women’s leadership in the management of the project more functional.

On health impacts, the community had designated places of convenience and rubbish disposal, and kept the pump area clean. Participants’ sanitary standards appeared satisfactory based on feedback from the interview, but observations and further probing indicated there was room for improvement. Under education, respondents said having the pump had encouraged teacher retention in the village school, while improving student punctuality.

Finally, findings on community participation and governance depict Awordo as a community that is actively engaged in the management of its water pump through the payment of a monthly water levy, regular meetings and commitment to enforcing rules made by consensus.

These findings portray Awordo as a community that is conscious of the benefits of improved access to clean water and is making efforts toward sustaining the water project, which is the source of those benefits. The next chapter compares impacts of improved access to clean water in Ofosu and Awordo.
CHAPTER 6:
COMPARISON OF IMPACTS IN OFOSU AND AWORDO

6.1 Introduction

This section compares the impacts of the NF/REDEP water program in Ofosu and Awordo. The closest similarities could be seen in the areas of women’s empowerment, hygiene standards and perceptions about what constitutes clean and unclean water. Educational impacts were also somewhat similar in the sense that the improvement in water supply led to a corresponding improvement in student punctuality. A closer look at the educational impacts however reveals other distinct, yet important ways that the water projects have benefitted each village. However, the levels of governance and community involvement in the management of the project differed considerably.

The main points of the comparison of impacts in Ofosu and Awordo are provided in the table below:
Table 6.1. Comparison of Impacts in Awordo and Ofosu

<table>
<thead>
<tr>
<th>IMPACT AREA</th>
<th>INDICATORS</th>
<th>FINDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMEN’S EMPOWERMENT</td>
<td>1) Women’s Participation in the Management of the Water Project</td>
<td><strong>Similarities</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enhanced income-generating opportunities, reduction in workloads and time gains for women identified as the most significant impacts in both villages.</td>
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<td></td>
<td></td>
<td>• There was little indication of women’s influence in the actual management of the water projects in either village, beyond their (nominal) representation on the water management committees.</td>
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<td></td>
<td><strong>Findings</strong></td>
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<tr>
<td>WOMEN’S EMPOWERMENT</td>
<td>INDICATOR</td>
<td>Similarities</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>2) Decision Making Ability in the Home and Wider Community</td>
<td>• Female respondents in both villages had personal autonomy and mobility. They acknowledged their traditional roles as homemakers and planned their business schedules around their domestic responsibilities.</td>
<td>• Women in Awordo considered themselves part of the decision-making process, participated in community meetings and felt their views were valued.</td>
</tr>
<tr>
<td>3) Reduction in Time Spent Fetching Water</td>
<td>• While the presence of the pump in both villages led to reduction in the distance covered to fetch water, women in Ofosu were able to save more time than those in Awordo.</td>
<td>• Convenience and safety were the most important advantages gained by women as a result of the pump. The difference in the distance between trips to the pump and the Ochi River is not as significant as it is for Ofosu.</td>
</tr>
<tr>
<td>4) Reduction in Women’s Workloads</td>
<td>• Women in both communities experienced reduction in their workloads as a result of the improved water supply and could delegate water errands and other household duties to children old enough to help.</td>
<td>• Parents in Awordo spoke of safety concerns only during the rainy season when the level of the Ochi River rises and they had to accompany their children on water errands. Children could now fetch water on their own from the pump. Not having to make the trips to the Ochi meant a reduction in housework.</td>
</tr>
</tbody>
</table>
### WOMEN’S EMPOWERMENT

#### Table 6.1 continued...

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>5) Time Used for Self Improvement and Generating Income</td>
<td>• Improved access to clean water enhanced the economic activities of women in both study communities.</td>
<td>• Four out of 11 female respondents in Awordo said they had more time to devote to their businesses since the pump gave them the convenience of having water close to their work sites. — One started a new business, while two resumed former businesses that were stopped due to the lack of clean water.</td>
</tr>
<tr>
<td>6) Other Personal Impacts</td>
<td>• Study findings revealed that the pump offered other unique advantages to some respondents. Two such unique impacts concerned 56-year-old Abena and 32-year-old Esi.</td>
<td>• In Awordo, 56-year-old Abena (who is blind and lives alone) said she was totally reliant on hired labor for her water supply. As she lives about 50 meters from the pump, she spent less on water than she did in the past; it now cost her 20 pesewas (about 15 cents) to fill her water tank, as compared to 80 pesewas (75 cents) in the past.</td>
</tr>
<tr>
<td></td>
<td>• In Ofosu, 32-year-old Esi (a mother of five) was able to devote time to the care for her expectant neighbor due to the convenience of the water pump, which made it possible for her to delegate house chores to her older children. This example reflects some of the truly enriching ways that improved access to basic services like clean water can strengthen community bonds and promote interpersonal relationships.</td>
<td>• Seven out of 15 female respondents in Ofosu said the reduction in the time and distance spent fetching water had given them more time to devote to their businesses. — One of these started a new business as a result of the pump.</td>
</tr>
</tbody>
</table>
Table 6.1 continued...

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>Similarities</th>
<th>Differences</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7) The Community’s Perceptions about Women’s Capabilities</strong></td>
<td>• Study participants in both villages acknowledged that traditional prejudices had prevented women from attaining their full potential in the past.</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td>• People believe in giving their sons and daughters equal opportunity to achieve their life goals and recognize the importance of education, and said an educated daughter was as great an asset as an educated son.</td>
<td></td>
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<tr>
<td></td>
<td>• Some respondents in both communities identified possible teen pregnancy as a problem because it would automatically lead to school dropout and wasted investment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8) Women’s Own Perceptions about their Capabilities</strong></td>
<td>• Women in both villages said that past prejudices and lack of opportunity had prevented them from living better lives. They were determined to give their children better opportunities than they had by offering them better education. They said that previous notions about the inherent capabilities of men and women were erroneous, and considered their daughters just as capable as their sons of attaining high status in life.</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td><strong>WOMEN’S EMPOWERMENT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6.1 continued...

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>INDICATOR</th>
<th>Similarities</th>
<th>Differences Awondo</th>
<th>Differences Ofosu</th>
</tr>
</thead>
</table>
| Sanitation   | 1) Sanitation standards            | • Both villages had latrines and refuse dumps that were located far from the water points to avoid contamination. This was the result of information received from health personnel and other government officials.  
• Individual sanitary standards were generally less than adequate. Although respondents said they be washing their hands appropriately, there was no way to verify that that was really the case. A few admitted washing without soap, which weakens the effectiveness.  
• Public areas in both villages were free from litter, and the areas around each pump were clean and weeded. | NONE               | NONE               |
| Perceptions  | 2) Perceptions about what constitutes safe and unsafe water | • Majority of study participants – 16 out of 21 in Awondo and 22 out of 23 in Ofosu – were convinced that the pump was the safest source of water for human use.  
• Even though most participants believed the pump was the safest source of water, the actual number of respondents who used the pump exclusively in both villages did not entirely reflect this awareness. | Six of the 21 participants in Awondo continued to use river water in addition to the pump, while one used the river only—meaning that only 14 households used the pump exclusively. Thus, two of the respondents who considered the river not entirely safe used it anyway.  
• Five out of 21 respondents in Awondo thought open wells and the river were as safe to use as the pump because their ancestors had used it. Some people used water from both sources. | Only one out of 23 respondents in Ofosu thought open wells and the stream were as healthy to use as the pump. |
Table 6.1 continued...

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION</td>
<td>• The introduction of the water projects in Ofosu and Awordo had significant impacts on education, both directly and indirectly</td>
<td>• Parents in Awordo said the pump had improved student punctuality because children no longer had the chance to turn water errands into playtime. • Evidence also showed that the presence of the pump accounted for the retention of one of the community schoolteachers. • The improvement in student punctuality was more pronounced in Ofosu where the distance to the stream was greater and the water collection workload on children therefore heavier.</td>
</tr>
<tr>
<td>PARTICIPATION AND GOVERNANCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Community Involvement and Sense of Ownership in the Management of the Project.</td>
<td>NONE</td>
<td>• Residents of Awordo held regular meetings and paid monthly levies save for future pump repairs as recommended under the NF/REDEP program. • Meetings were held in Ofosu only when the chief (who resided elsewhere) arrived for a visit about once every two months. • Residents were not regularly paying the monthly contributions needed to save money for future repairs.</td>
</tr>
<tr>
<td>2) Equity, Participatory Decision Making.</td>
<td>NONE</td>
<td>• The study showed respondents have a sense of involvement in managing the water program and feel they are part of the decision-making process. • Women showed a sense of detachment about water management issues. This was traced to the male monopoly on decision-making. • The absence of participatory decision-making resulted in noncompliance with rules concerning the program.</td>
</tr>
</tbody>
</table>
6.2 Summary: Comparison of Impacts in Ofosu and Awordo

The study therefore revealed that some women in Ofosu and Awordo gained financially from improved access to clean water, experienced reduction in workloads and found free time to engage in other activities. Both communities also experienced comparable gains in education in terms of improved student punctuality and enhanced ability to retain one schoolteacher. Further education is however needed to sensitize residents of both communities about the risks of using unsafe water in order to encourage exclusive use of the pump as a source of drinking and cooking water. The most significant differences were found in the impacts on governance and participation, where evidence pointed to Awordo’s adoption of the participatory decision-making approach as recommended by program implementers, whereas Ofosu retained its customary exclusive method of decision-making by the men of the community. The implications of these findings will be explored in Chapter 7.
CHAPTER 7:
CONCLUSIONS AND RECOMMENDATIONS

"Development programs are complex systems with many potential blowouts.... The good news is that every potential blowout is also an opportunity."

(Karlan & Appel 2011, 189)

7.1 Introduction
This section discusses the relationship between study findings and the guiding hypothesis, and examines the implications of the findings for promoting sustainable rural water programs. As Carter (2009) points out, rural water supply entails more than providing water facilities; it also involves ensuring water facilities are sustainable in the long run. The implementers of the NF/REDEP water program aimed to make their projects sustainable in the Ajumako-Enyan-Essiam District of Central Ghana by introducing new elements into rural water supply programs. By recommending the establishment of gender-sensitive water management committees, a guarantee to finance maintenance of the pump for three years provided the community saves regularly, and the adoption of a participatory decision-making process to enhance cooperation, they hoped to provide a sustainable water supply for program areas. The general results from the study confirm the observation by Carter et al. (1999) that active community involvement, financial planning and motivation have a greater potential for providing continuity in rural water supply than simply providing a water pump.

7.2 Conclusions

7.2.1 Impact on Women’s Empowerment
Not surprisingly, this study identified women as the primary suppliers of household water. It found their heavy workloads, prior to the installation of the pumps, had compromised their health and finances (Nukunya 2003; Buor 2004; UNDP 2006). This was especially evident in Ofosu, where women said the effort once involved in fetching water from the Ochi River had left them too physically exhausted to engage in income-generating activities.
The three primary impacts on women’s empowerment were reduced workloads, decreased time fetching water, and enhanced opportunities for income-generation. This was found in both communities, but to a greater extent in Ofosu, where the time spent fetching water decreased by 75 percent (from one hour to 15 minutes), and seven out of 15 respondents reported enhanced economic activities. Another factor that contributed to women’s reduced workloads and time spent fetching water in both communities was that the convenience and safety of the pump enabled them to delegate water collection to their children.

Besides confirming that reduction in workloads and time spent fetching water gave women more time to rest and enhance their economic activities, findings also showed the availability of the pump enabled some of the women to build support systems and help each other in times of need. Another interesting finding (not mentioned in the literature) was that some husbands found it more culturally acceptable to assist in household water supply if they went to the pump instead of the river, further contributing to women’s reduced workload.

Other indicators of women’s empowerment, such as increased leadership roles, were not found. Cultural constraints and internalized notions of their appropriate roles often prevent women from assuming more active roles in project management (WaterAid Nepal 2009; Wakeman et al. 1996; Regmi and Fawcett, 2001). This conclusion certainly applies to the present study. Further research is needed to determine how their lack of involvement in water management might affect women’s gains in the long-term.

The study found no significant change in women’s mobility, as the women already enjoyed freedom of movement without requiring their husbands’ permission. It was not possible to find data on changes in women’s bargaining power within the household as I found women were not comfortable discussing this.

A close look at the impacts of the water projects on women’s empowerment in Ofosu and Awondo shows that the strongest advantages lay in reduction in workloads and time spent fetching water, which in turn translated into enhanced economic opportunities. While the positive implications of such economic enhancements cannot be ignored, it is important to recognize that such gains could be fleeting if women do not possess the power to contribute to the management of the water project. Given that women’s empowerment aims at “enabling women to take an equal place with men, and to participate equally in the development process in order to achieve control over the factors of production on an equal basis with men” (March et al 1999, 92), it is important to ensure “that women are equal partners with men in decision making over ... use,
financing, and other aspects of water management” (Gender and Water Alliance 2006a, 31). The widespread acknowledgement of the inherent competence of both men and women as articulated by study participants could be considered an indication that the community would be receptive to women’s active leadership.

7.2.2 Impact on Education

While statistical data on trends in school attendance in the two schools that served Ofosu and Awordo was not available, feedback from respondents confirmed the hypothesis that improved access to clean water enhances students’ education. This was evident in parents’ testimonies. This is another indication of the potential for modest improvements in basic infrastructure like clean water to trigger unanticipated gains that end up complementing overall community development efforts.

However, beyond the improvements in punctuality in both villages was the opportunity that it offered Awordo to retain a teacher for its school.

7.2.3 Impact on Health

General feedback from respondents indicated the need for health and sanitary education to sensitize residents about the consequences to their health of using unclean water. Other researchers found that people are more likely to use a safe water source if it is closer than their current water source, but that if they have strong preferences for a particular water source they might not switch to the safer one (Esrey et al 1988, 1991; Carter et al. 1999; Checkley et al 2004; Plate et al 2004). This was evident in both communities: In Ofosu, some respondents complained about the “salty taste” of water from the pump but used it anyway, because it was more convenient than the river. This was true in Awordo also, except that some respondents found it easy to use the river, since it was so close. Maps indicating the sources of water used by households that participated in the study are shown in Appendix B.

In all, feedback on respondents’ perceptions of safe and unsafe water and sanitation standards demonstrated that health gains from projects of this kind are not always a given. Exclusive use of the water pump is necessary to fully realize the health benefits of the project. Use of the pumps was not universal in either village, demonstrating that the health benefits of these water projects are not being fully realized.

Findings demonstrated that a combination of a) knowledge about benefits of the pump and risks of using the Ochi and the open well, b) inability or unwillingness to change attitudes and
beliefs concerning water use, and c) economic considerations were the strongest determinants for using the pump exclusively, combining it with unprotected water sources, or avoiding its use altogether. Participants who used the pump exclusively did so because they were aware of the health benefits including prevention of diseases transmitted by unclean water and poor sanitation.

Knowledge About Benefits of the Pump and Risks of Using Ochi and Open Well

Among those who believed in the health advantages of the pump over the open well and Ochi were also those who chose to use the latter anyway. It seems that, for them, the ‘nice taste’ of these sources nullified whatever risks they posed.

However, within the group that knew about the health risks involved in drinking from the Ochi and the open well was a subset that believed water was safe for consumption as long as it had no visible particles or pollutants. Such respondents, for example, thought the Ochi became polluted only when it was stirred up by rain or was low during the dry season and "harmful organisms" were visible in the water.

Inability or Unwillingness to Change Attitudes and Beliefs Concerning Water Use

For some participants, making the break from an open well and the Ochi to the pump was a hurdle. The most common excuse used was that the water from the pump was “too salty,” a reference to its mineral content. Considering that the writer tasted the pump water in both villages and did not detect an overwhelming bad taste, the conclusion is that such respondents were reluctant to shift from drinking from a traditional source, even one that they knew to be unsafe, it is not clear how to address such a stance.

Economic Considerations

The third factor that determined respondents’ choice of water source was financial in nature. This played out in two parts; first, there was the blind woman in Awordo who said asking hired hands to fetch water from the nearby pump instead of the Ochi saved her money. The second concerned the nature of the pump water, which some respondents described as “difficult to launder with.” Those in this group said washing with the pump water made them use more soap than they would with Ochi, and increased their laundry expenditure. A solution to this problem could be for affected households to use Ochi for laundry only, and the pump for drinking, cooking, bathing and other household chores.

These findings illustrate the need for increased health and hygiene education and sensitization on the benefits and risks of using various water sources. In particular, the perception
of the Ochi River as an ancestral source of water signals the importance of understanding the cultural contexts within which community development programs are undertaken and acquiring the skills to address such value issues.

7.2.4 Impact on Governance and Participation

In general, findings supported the assertion that formulating rules in a participatory manner enhances the likelihood of compliance. Conversely, rules perceived as incompatible with the needs of community members are more likely to be ignored (Ostrom 2009). Evidence from Ofosu, in particular, confirmed that rules alone do not guarantee effective resource governance. Rather, social cohesion, effective and inclusive equitable regulations are essential to governing common pool resources such as a community water facility (Bromley 1992; Karikari 1996; Doe & Khan 2004; Poolman & Van De Giesen 2006). Thus, a community’s ability to effectively manage its water program will affect its ability to ensure a sustainable water supply.

Contrary to the perception that single-family households, being more homogenous and cohesive, facilitate greater community participation in managing development projects (Doe & Khan 2004), evidence from Ofosu shows homogeneity and cohesiveness do not automatically translate into widespread cooperation. According to the hypothesis put forward by Doe & Khan, Ofosu should have had the most efficient water management system, because it is made up of individuals who are related to each other, either by blood or by marriage. Findings also contradicted the perception, also put forward by Doe & Khan, that smaller communities are more likely to efficiently manage a project than larger ones.

Comparing evidence about project management in Ofosu and Awordo (which have populations of about 120 and 400 respectively), shows that it is leadership, methods of governance and community engagement that determine whether project management will be effective. Firstly, Awordo has a resident chief who facilitates greater participation and openly supports the work of the water management committee. On the other hand, the chief of Ofosu lives away from the village, and returns once every two months to issue directives upon consultations with older male members of the community.

Secondly, the decision-making pattern in Ofosu appears to have isolated its women, who have grown apathetic as a result. The consequence is that residents have not made real progress toward saving the amount of money needed to enable them pay for future repairs after the end of the NF/REDEP water program. In addition, offering each community three years of free
maintenance as an incentive, if they saved to make future repairs themselves, did not seem to encourage a change in attitude. On the other hand, Awordo is saving steadily, and residents who have good reason not to pay the levy are paying anyway, because they feel a sense of responsibility. The result of this level of financial commitment is that within a year, the village has managed to save the amount of money that it took the former WATSAN committee 10 years to accumulate.

The result of these differences in leadership and governance is that Awordo is actively engaged in the management of its water pump, while Ofosu appears apathetic and divisive.

**Implications of Findings on Governance and Participation for the Long-term Sustainability of the Water Projects in Ofosu and Awordo**

Findings on governance and participation are especially significant because, to a considerable extent, they predict the long-term outcomes of the water projects. Because both villages have histories of failed water projects, one way to gauge the future of water projects is to compare current practices with the past to determine whether there has been a change, and if so, to what extent. In resilience literature, a community’s reaction to changing circumstances is referred to as “learning loops,” which are described as “critical reflection, spaces for learning, and power” (Tschakert & Dietrich 2010, 1). According to Chapin, Kofinas & Folke (2009, 104), “transformative learning...that reconceptualizes the system through processes of reflection and engagement” is a favorable condition under which a socio-ecological system can develop the capacity to absorb unpredictable change while maintaining its survival. They identify institutional fluidity as essential for building the robustness necessary to not only withstand, but also anticipate shocks.

In the context of a water supply, a village that constantly reassesses its water management methods based on past experiences is more likely to move toward a successful management model than one that retains long-established methods, irrespective of outcomes. Of the two study communities, Awordo has adopted the former approach, abandoning a 10-year water management committee that had lost its effectiveness, and replacing it with the WATSAN committee that is more focused on community engagement and fundraising. The results are evident in the high level of cooperation in the village and the feat of saving, in less than a year, the same amount (GH¢50 - $40) that the old committee had taken ten years to accumulate.
Ofosu, on the other hand, formed a new water committee, but failed to adapt its decision-making approach to the need for broader participation and cooperation. By preserving customary male policy-making power, they lost the opportunity to build the sense of ownership among the wider community that would have enhanced cooperation. In fact, information gathered during the 2010 focus group discussions indicated that the absence of active community engagement and lack of financial resources, which characterized the earlier water project, still persisted.

7.3 Recommendations for Further Research and Future Rural Water Supply Programs

The quote introduced at the beginning of this chapter acknowledges that development programs are “complex systems” that need to be addressed on various fronts, each of which has its own complexity. The quote also brings attention to the fact that within each problem – or “blow out point” is the opportunity to succeed in meeting the goals of the program (Karlan & Appel 2011, 189). The challenge of finding a sustainable community water program provides the opportunity to reshape strategies through lessons gained from past failures. For example, the program implementers could use the significant improvements in women’s income-generating options and children’s education as incentives to encourage the communities to work harder to ensure long-term sustainability of their respective projects. In particular, since women have new income-making opportunities as a result of the pumps, the need to sustain those advances could be a strong motivation for seeking women’s active leadership in the management of the projects.

It is important to recognize that all the impact areas are interconnected. Hence, improvements in women’s economic empowerment and education cannot be sustained if the water projects fail because of poor management and non-cooperation and, as a result, health benefits will not be realized. An effective way to motivate people to adopt winning attitudes would be to present explicit evidence of benefits. For example, testimonies from parents describing striking improvements in student punctuality does carry some weight, but a chart of the changes in school enrollment and attendance would give a more vivid image of educational benefits. Since the local schools do not have the necessary records, this information should be gathered by a researcher or program evaluator periodically, and compared over time to measure any possible changes.

A similar approach could be used to investigate possible health changes in the periods before and after the water projects. Since residents in these sites seldom seek treatment from clinics or hospitals, the program implementers could adopt the method used by an Indian development organization, which gathers health statistics about a community before the start of a project.
(Banerjee & Duflo 2011, 47). In Ghana, the community health teams would be the best people to gather this information.

There is also a need to review the program and re-examine underlying assumptions. First, it might be helpful for the program implementers to reconsider their application of a one-size-fits-all method. Although they are located close together, each village is unique, and what works in one may not necessarily work in the other (Karlan & Appel 2011, 230). The process of discovering the unique characteristics of each village would provide opportunities to learn what might work in a particular village and thereby minimize the chances of failure.

Another area worth revising would be the nature of health and hygiene education. During interviews with health workers, I was told that such education should be more explicit. As one of them expressed:

Sensitization efforts should be stepped up to educate people on the side effects of water-related diseases such as bilharzia. For example, learning that it can harm a woman's reproductive ability and affect a man's urinary functions will drive the message home. The health talks should present graphic images of the effects of drinking polluted water. They also need to understand the financial cost of treating such diseases.

While an externally generated intervention program is laudable, a community-led initiative is more likely to have the community ownership component that could enhance its sustainability. For this reason, development organizations might find it more useful to play the role of facilitators by helping communities identify critical areas of concern and decide how to address them, rather than performing this role themselves.

When project communities are located close to each other (as in the NF/REDEP program) inter-village networking is possible and should be encouraged to create opportunities for learning and sharing experiences among program participants. The WATSAN training workshops would be fitting platforms to start building connections among program villages.

Early identification of traits that contribute to successful water programs would ensure that development organizations deploy their limited resources in the most effective way. Results from this study indicated that a participatory method of governance in a village produced the cooperation needed to ensure an effective and sustainable management of the water project, while an exclusive method did not. Therefore, participatory governance should be encouraged as part of any project, with the level of effort dependent on the character of the village organization.

The study presents clear evidence that improved access to clean water leads to improvements in women’s economic empowerment and children’s education. What is needed is on-going health
education to encourage exclusive use of the pump in both study communities, and a more efficient management system in Ofosu to enhance cooperation and long-term sustainability of its water facility.
LITERATURE CITED


APPENDIX A: INTERVIEW GUIDE

Questionnaire for Water and Sanitation (WATSAN) Committee Members

Name of village:
Source(s) of water supply:
Estimated population:

Purpose:
To find out the main activities, procedures and views of WATSAN committee members.

Committee Members Designation:

<table>
<thead>
<tr>
<th>Designation / Gender</th>
<th>Chair</th>
<th>Secretary</th>
<th>Pump Caretaker</th>
<th>Hygiene Educator</th>
<th>Treasurer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Did you receive training for this position?
   a. If yes, please state briefly what form of training that was?
2. Do you use water from the new water pump?
   b. If not, why?
3. Do other people in the community use water from the new pump?
   a. If not, do you know why they don’t use it?
4. Where do you get your water now?
5. Where did you get water before the new water project started?
6. How long does it take to fetch water now?
7. How long did it take before the pump was introduced?
8. How many trips are needed to supply water to your house in a day?
9. What is the average quantity of water that a person can fetch per trip?
   a. What size container is usually used in collecting the water?
   b. How much water does your household use in a day?
10. How often are committee meetings held?
    a. Who calls these meetings?
    b. Who speaks the most at the meetings, □ women  or  □ men?
    c. On a scale of 1 to 5, how often do men and women speak up at the meetings?
d. On a scale of 1 (never happens) to 4 (always happens) please rate the likelihood of a man interrupting a woman as she speaks during meetings.

| Likelihood that man interrupts a woman when she speaks |
| Likelihood that woman interrupts a man when he speaks |

11. How do you address misunderstandings that occur during the committee’s work?
   a. What kinds of misunderstandings are likely to occur?
   b. On a scale of 1 to 5, who would you say is more likely to apologize if they are in the wrong:
      i. Men
      ii. Women
   c. On a scale of 1 to 5, who would you say is more likely to point out another member’s oversight:
      i. Men
      ii. Women

12. How often are community meetings held in this village to discuss the water project?
   a. Who calls the meetings?
   b. What are some of the issues that are discussed?
   c. Do you keep records of all the meetings?
   d. Please rate the level of participation of the following people:

| Likelihood that woman interrupts a man when he speaks |

13. How much does each user pay for water?
a. Does the committee keep a record of payments?

14. What is your opinion about having women on the committee?

a. Before the water project started, how likely were women to do the following?

<table>
<thead>
<tr>
<th></th>
<th>1 Rarely if ever happened</th>
<th>2 Sometimes Happened</th>
<th>3 Often Happened</th>
<th>4 Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serve as community leaders</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Work outside the home</td>
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</tbody>
</table>

b. How likely are women to do the following now?

<table>
<thead>
<tr>
<th></th>
<th>1 No Change</th>
<th>2 Happens a bit more often now</th>
<th>3 Happens Much more often now</th>
<th>4 Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serve as community leaders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work outside the home</td>
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<td></td>
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</tr>
</tbody>
</table>
Questionnaire for Community Respondents

Name of village:

Source(s) of water supply:

Estimated population:

<table>
<thead>
<tr>
<th>Age of Respondent</th>
<th>☐</th>
<th>☐</th>
<th>☐</th>
<th>☐</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25yrs</td>
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<tr>
<td>30-35yrs</td>
<td></td>
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<td></td>
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<tr>
<td>35-40yrs</td>
<td></td>
<td></td>
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<tr>
<td>45-50yrs</td>
<td></td>
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<tr>
<td>50+</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Maximum level of education attained:

<table>
<thead>
<tr>
<th>☐ Primary School</th>
<th>☐ Junior High School</th>
<th>☐ Senior High</th>
<th>☐ Tertiary</th>
<th>☐ Other (please specify)</th>
</tr>
</thead>
</table>

PURPOSE

To discuss your views, observations and expectations about the new water project. We will also talk about basic health and sanitation issues.

BASIC INFORMATION

1. How many people live in your household? _________

2. Do you have children? ☐ Yes ☐ No
   a. If yes, how many? _____ Number of Daughters:_____ Number of Sons:_____
   b. How old are they? _____Ages 1-5yrs _____6-10yrs _____11-17yrs _____18yrs +
      i. Are your sons enrolled in school? ☐ Yes ☐ No
      ii. If they are not in school, what sorts of things prevent them from enrolling?
      iii. Are your daughters enrolled in school? ☐ Yes ☐ No
      iv. If they are not in school, what sorts of things prevent them from enrolling?

ABOUT THE WATER PROJECT

3. Why was the project introduced?

4. What role did you play in deciding the following?
   a. Where the pump will be sited?
   b. How much will be charged for the water
   c. How the well will be maintained?
5. USE OF WATER PUMP
   a. Does your household use water from the new water pump?
      
      Yes  No  No Answer

   b. If no, where do you get your water from?
      
      Rivers/stream  Open well  Borehole  Other

   c. Why don’t you use it?
      
      Money  Distance  Time  Other  No Answer

   d. If yes, where did you get water before the project?
      
      Rivers/stream  Open well  Other

6. DUTIES
   b. Whose duty is it to fetch water for the household?
      
      Only girls  Only boys  Only mother  Only father  Both boys and girls  Both parents  Entire household  No response

   c. How long does it take to fetch water?
      
      10-15 mins.  15-20  30-40 mins.  40-60mins  1.5-2hrs  3-5hrs  0ver 5hrs

   d. How many trips do you usually make per day?
      
      1-3  4-5  6-8  8+  1.5-2hrs  3-5  0ver 5hrs

   e. What size of container do you usually use to collect water?

7. SANITATION
   a. Which water source do you think is safest to use?
      
      Rivers/stream  Open well  Borehole  Other

   b. Can you tell me why you think so?

   c. Which do you think is the least safe?
      
      Rivers/stream  Open well  Borehole  Other
d. Can you tell me why you think so?

e. When do you wash your hands?

<table>
<thead>
<tr>
<th>Before eating</th>
<th>After eating</th>
<th>After visiting the lavatory</th>
<th>Other</th>
</tr>
</thead>
</table>

8. HEALTH

a. How often do you fall sick?

<table>
<thead>
<tr>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>No response</th>
</tr>
</thead>
</table>

b. Has anyone in your household suffered any of these diseases within the last 2 years?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea worm infestation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholera</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysentery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c. Please indicate which form of treatment you get you when you fall ill:

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Traditional healer</th>
<th>Self-medication</th>
<th>None</th>
<th>Other</th>
</tr>
</thead>
</table>

9. EXPECTATIONS: What, if anything, do you personally expect from the project?

10. OBSERVATIONS: Has the project been a “success” to date?

a. If so, in what ways?

b. If not, why not?

c. What could be changed to make it more of a success?

11. What is the best thing that has happened as a result of the project?

a. Are there also some not-so-good things that have happened as a result of it?

12. Do you think that women, girls, boys and men benefit differently from the project?

13. What differences, if any, have you seen in the following aspects of your life since the project was introduced?

a. Health

b. Education

c. Community participation in development

d. Income-generation

e. Other personal impacts
**CHANGES IN WOMEN'S ROLES:**

**a. FOR MEN:**

<table>
<thead>
<tr>
<th>TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING STATEMENTS?</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>NO CHANGE*</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>IF you agree, do you think the pump has contributed to the change?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In the past two years, women’s workloads have decreased.</td>
<td></td>
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</tr>
<tr>
<td>2. In the past two years, other family members have been helping more with women’s work.</td>
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<tr>
<td>3. In the past two years, women are able to spend more time at family gatherings, cultural activities, etc.</td>
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<tr>
<td>4. In the past two years, there has been an increase in women’s ability to leave home without permission</td>
<td></td>
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</tr>
<tr>
<td>5. Women seem to feel stronger and more confident than they did two years ago.</td>
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</tr>
<tr>
<td>6. The productivity of crops and livestock that women raise has increased.</td>
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<tr>
<td>7. There has been an increase in women’s income from crops, livestock or crafts that I sell.</td>
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<tr>
<td>8. There has been an increase in cooperation among women in the community.</td>
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<tr>
<td>9. There have been positive changes in my family life (fewer disagreements, more cooperation, etc).</td>
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<tr>
<td>10. In the past two years, more girls are attending school regularly.</td>
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<tr>
<td>11. There has been an increase in women’s involvement in decision making at home.</td>
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<tr>
<td>12. I feel equal to my partner when it comes to workloads and decision making in the home.</td>
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</tbody>
</table>
### Changes in Women’s Roles: for Men (continued)

<table>
<thead>
<tr>
<th>TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING STATEMENTS?</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>NO CHANGE</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>IF you agree, do you think the pump has contributed to the change?</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Women spend more time participating in women’s groups than they used to.</td>
<td></td>
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<tr>
<td>14. There has been an increase in women’s involvement in decision-making in the community.</td>
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<td>15. More women are now serving as community leaders than they used to.</td>
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<tr>
<td>16. More women are working outside the home than they used to.</td>
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<tr>
<td>17. I feel that women’s education and empowerment are the best ways to increase our community’s prosperity.</td>
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<td>18. The water pump has changed women’s lives for the better here.</td>
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</tr>
<tr>
<td>If so, list any ways that are not discussed above</td>
<td></td>
<td></td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If not, why not?</td>
<td></td>
<td></td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### b. FOR WOMEN:

<table>
<thead>
<tr>
<th>TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING STATEMENTS?</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral or NO CHANGE</th>
<th>Agree</th>
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<td>3. In the past two years, I’ve been able to spend more time at family gatherings, cultural activities, etc.</td>
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</table>

* Should be marked when you need to indicate that there has been no change in the item listed.
### Changes in Women’s Roles: for Women (continued)

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<tr>
<th>TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING STATEMENTS?</th>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If so, list any ways that are not discussed above. | Not applicable |
If not, why not? | Not applicable |
2010 Ofosu Focus Group Script

Topic: Reactions to April 2010 Pump Breakdown and Lessons Learned

In attendance:

• Gender:
• Number of participants:
• Duration:

A) GENERAL REACTIONS

1. Can anyone describe to me what happened to the pump a month ago?
   a. How long did it take to fix it?

2. Where did you get water from after it broke down?

3. What effects did the break down have on
   a. Children
   b. Women
   c. Men
   d. Families
   e. Health
   f. Education
   g. Income generation/business
   h. Community organizing/planning?

4. How did you feel when the pump broke down?

5. What did you do when it happened?

6. How did it feel like to suddenly have to rely solely on the Ochi River?
   a. Did you feel comfortable drinking from the Ochi River?
      i. If yes, can you tell me why?
      ii. If no, can you tell me why?
B) ROLES AND RESPONSIBILITIES

7. What could have been done to avoid the breakdown?

8. Would you do anything differently if it happens again?

9. What role did the following play in fixing the pump:
   a. WATSAN committee;
   b. Men
   c. Women
   d. Social clubs/organizations

10. What lessons, if any, have you learned from this experience?

11. What would you do to make sure it does not happen again?

12. What does this tell you about the importance of saving for future maintenance of the pump?
   a. Do you think it is worth investing in the pump? Why or why not?
   b. How much did it cost to fix the pump?

13. Can you tell me how the community organized to repair the pump?
   a. Do you believe the community response was timely and useful?
   b. Why, or why not?

C) ATTITUDES

14. What new measures have been adopted as a result of this recent experience?
   a. What is the agree plan of work?
   b. Do you think it is feasible?
      i. Why or why not?

15. Any further suggestions?

16. Comments/observations?
Questionnaire for School Teachers

Name of school: 
Type of school: 
Location: 
Respondent: 

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
</table>

**PURPOSE**

To get teachers’ views about school enrollment, attendance and performance patterns of students in the Ofosu and Atwereboanda communities.

1. How long have you been teaching in this school?

<table>
<thead>
<tr>
<th>7-12 moths</th>
<th>2 - 4 yrs</th>
<th>5 yrs +</th>
</tr>
</thead>
</table>

2. Which villages do your students come from?

<table>
<thead>
<tr>
<th>Village</th>
<th>Distance from School</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. In general, have you seen a change in student behavior since the water project started?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Maybe / Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. ACADEMIC PERFORMANCE OF STUDENTS

a. On a scale of 1 to 5, where 1 is poor and 5 is excellent, how would you rate the academic performance of your female students in the following areas before the water project:

<table>
<thead>
<tr>
<th>Female students BEFORE water project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Punctuality</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>II Lateness</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>III Participation in class</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>IV Attentiveness in class</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>V Quality of assignments/homework done</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VI Test grades</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I Punctuality</td>
<td></td>
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</tr>
</tbody>
</table>
b. On a scale of 1 to 5, how would you rate the current academic performance of your female students in the following areas?

<table>
<thead>
<tr>
<th>Female students AFTER water project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Punctuality</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>III Participation in class</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>IV Attentiveness in class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V Quality of assignments/homework done</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI Test grades</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Punctuality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c. On a scale of 1 to 5, how would you grade the academic performance of your male students in the following areas BEFORE the water project?

<table>
<thead>
<tr>
<th>Male students BEFORE water project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Punctuality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II Lateness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III Participation in class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV Attentiveness in class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V Quality of assignments/homework done</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI Test grades</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Punctuality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

d. On a scale of 1 to 5, how would you rate the current academic performance of your male students in the following areas AFTER the water project?

<table>
<thead>
<tr>
<th>Male students AFTER water project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Punctuality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II Lateness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III Participation in class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV Attentiveness in class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V Quality of assignments/homework done</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI Test grades</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. STUDENTS’ ATTENDANCE

a. Which categories of students are more likely to be punctual now?

<table>
<thead>
<tr>
<th>Student category</th>
<th>Rate of punctuality BEFORE PROJECT (1=rare; 5=often)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td></td>
</tr>
<tr>
<td>Those living far away</td>
<td></td>
</tr>
<tr>
<td>Other (Please specify)</td>
<td></td>
</tr>
</tbody>
</table>
b. Which categories of students were more likely to be late BEFORE the project?

<table>
<thead>
<tr>
<th>Student category</th>
<th>How often late BEFORE PROJECT (1=rare; 5=often)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Boys</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td></td>
</tr>
<tr>
<td>Those living far away</td>
<td></td>
</tr>
<tr>
<td>Other (Please specify)</td>
<td></td>
</tr>
</tbody>
</table>

c. Which categories are more likely to be late NOW?

<table>
<thead>
<tr>
<th>Student category</th>
<th>How often late AFTER PROJECT (1=rare; 5=often)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Boys</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td></td>
</tr>
<tr>
<td>Those living far away</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

6. Please rate (from a scale of 1-5) the most common explanation students gave for being late in the PAST (before the project) and state which category would be more likely to give such explanations for each of them:

<table>
<thead>
<tr>
<th>Reason Given</th>
<th>How often heard (1=rare; 5=often)</th>
<th>Students most likely to give this reason:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Fetching water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assisting in house chores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking long distance to school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sickness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Are there other observations you would like to talk about?
Questionnaire for District Health Workers

Name of health institution:
Type of health institution:
Location:
Respondent’s Gender:

<table>
<thead>
<tr>
<th>Designation:</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Purpose
To establish the disease prevalence and child morbidity/mortality rates among residents of Ofosu and Aworodo.

1. How long have you been working with this health center?
2. Where do your patients come from?
3. What typical medical conditions have you treated since you started working here?
4. What is the incidence of each of the following diseases over the past five years in people from Ofosu and Aworodo:

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea worm infestation</td>
<td>Ofosu</td>
<td>Aworodo</td>
<td>Ofosu</td>
<td>Aworodo</td>
<td>Ofosu</td>
</tr>
<tr>
<td>Cholera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysentery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hookworm infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ascariasis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trachoma</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. What are the rates of child morbidity and mortality over the past five years in children from Ofosu and Aworodo?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ofosu</td>
<td>Aworodo</td>
<td>Ofosu</td>
<td>Aworodo</td>
<td>Ofosu</td>
</tr>
<tr>
<td>Child Morbidity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Mortality</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

6. Have you observed any other medical conditions associated with water and/or sanitation?
APPENDIX B:
MAPS OF OFOSU AND AWORDO SHOWING SOURCES OF WATER USED BY STUDY HOUSEHOLDS

Map of Ofosu Showing Sources of Water Used by Participant Households
Map of Awordo Showing Sources of Water Used by Participant Households
APPENDIX C: INSTITUTIONAL REVIEW BOARD

RESEARCH APPROVAL LETTER

August 3, 2009

To: Susan Todd, PhD
   Principal Investigator

From: Bridget Watson
   Research Integrity Administrator
   Office of Research Integrity

Re: IRB Protocol Application

Thank you for submitting the IRB protocol application identified below. This protocol has been administratively reviewed and determined to meet the requirements specified in the federal regulations regarding human subjects’ protections for exempt research under 45 CFR 46.101(b)(2) for research involving the use of educational test, survey procedures, interview procedures or observation of public behavior, unless: (i) information is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects, and (ii) any disclosure of the human subjects’ responses outside of the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing employability, or reputation.

Protocol #: 09-35
Title: Impacts of water projects in two villages in rural Ghana
Level: Exempt
Received: July 28, 2009
Exemption Date: August 3, 2009

If there are major changes to the scope of research or personnel involved on the project, please contact the Office of Research Integrity. Email us at irb@uaf.edu or call 474-7800. Contact the Office of Research Integrity if you have any questions regarding IRB policies or procedures.