R25 International Practicum
Summary Report

The WAQA Project
Water Access and Quality Assessment
Offinso North District, Ashanti Region, Ghana
March 17-26, 2011

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Official WAQA Project Website: www.wix.com/ironsks/ondwaqa

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Offinso North District Assembly’s Community Water and Sanitation Agency (CWSA)
**Practicum Summary**

**What I did**

The goals I stated before leaving for the Offinso North District are stated below:

- To learn and understand the concept of development and be able to apply it to the Offinso North District, Ghana
- Work in interdisciplinary teams on development projects stemming from the District’s Medium-term Development Plan that are culturally and socially appropriate, acceptable, and sustainable
- Evaluate water sources for rural communities in the Offinso North District
- Learn to take water samples and test for coliform presence/absence
- Observe and communicate with members of the community to understand daily behaviors, specifically relating to water use and sanitation

Many of these goals were addressed in the CRP 749 course in the winter 2011 quarter. The course gave an overview of international development with a focus on West Africa and Ghana. The professors assigned readings for each class that covered various aspects of development, from health to planning theory to addressing the Millennium Development Goals (MDGs). They also invited guest speakers from different disciplines, both professors at OSU and professionals from outside the university. For the first part of the quarter, each graduate student was required to select a case study of a development product or program that had successfully been implemented in West Africa. Some of the topics included the biogas digester, market programs for tomato crop, and human resource programs to empower women. My case study looked at point of use (POU) water treatment technologies, focusing on the LifeStraw™ products made by Vestergaard-Frandsen.

For our final project, we were required to form vertical, interdisciplinary groups that addressed one of the challenges that the district leaders outlined in the October Offinso North Planning Workshop and the District’s Medium Term Development Plan. Keischa Irons (Masters in City and Regional Planning candidate), Michael Fortune (BS in City and Regional Planning candidate), and I formed the WAQA (Water Access and Quality Assessment) Project. We worked together to formulate a research project that Keischa and I would implement on the ground in Offinso North, and also looked at further recommendations in dealing with water access and quality.
Keischa and I knew that surveying would be an important part of the WAQA Project, so we submitted an application through the Institutional Review Board (IRB) at The Ohio State University. Our application was accepted shortly before we left for Ghana. This was a process that I had not expected to do, but was a great learning experience. Dr. Charisma Acey is listed as the primary investigator with Keischa, Jessica Blank, Patrice Scipio and I listed as co-investigators.

Once in Offinso North, Keischa and I travelled around the district with members from the Community Water and Sanitation Agency (CWSA) to find water sources (boreholes, standpipes, or streams), collect samples, complete surveys, and tag parcels with the GPS. The following table is a general schedule of events.

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<th>Fri, March 18</th>
<th>Sat, March 19</th>
<th>Sun, March 20</th>
<th>Mon, March 21</th>
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<td>9:00</td>
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<td></td>
<td>Meeting with District Assembly and Chiefs</td>
<td>Field notes, tested samples from previous day</td>
<td>Tested water samples, field notes</td>
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<td>9:30</td>
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<td>Sampling and surveys in Akomadan</td>
<td>Surveys in Afroma</td>
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<td>12:30</td>
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<td>Meeting with Offinso Paramount Chief</td>
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<td>Field Notes/ Regroup</td>
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<td>Surveys in Afroma</td>
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<td>2:00</td>
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<td></td>
<td>Out to Afroma and Akomadan</td>
<td>Sampling from borehole and streams in Akomadan</td>
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<td>Surveys in Afroma</td>
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<td>2:30</td>
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<td>Field Notes/ Regroup</td>
<td>Surveys in Afroma</td>
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<td>3:00</td>
<td>Meeting with Vestergaard-Frandsen at their West Africa Office in Accra</td>
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<td>Field notes, meeting to work out logistics for following day</td>
<td>Collected samples from Asempanaye and toured community; tested water samples</td>
<td>Surveys in Afroma</td>
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<td>Surveys in Afroma</td>
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All together we visited 8 neighborhoods, collected 16 water samples, completed 50 surveys, and tagged over 70 parcels with the GPS.
Focus on one particular topic related to trip

The Offinso North District’s Medium Term Development Plan listed potable water and adequate sanitation facilities as areas of concern for the District Assembly (DPCU, 2010). They are currently in the process of digging more boreholes and building more latrines to improve access for the communities. The Offinso North’s MTDP also stated that diarrhea is one of the leading causes of disease within the district, following malaria, acute respiratory infections, and intestinal worms (DPCU, 2010).

The World Health Organization (WHO) defines diarrhea as the passage of three or more loose stools over a 24 hour period (WHO 2009). It is estimated that globally, there are over 2 billion diarrheal cases each year and an estimated 1.5 million deaths in children, making it the second leading cause of death for children under the age of five years (WHO 2009). Most of the children who die from diarrheal diseases do not die from the disease itself, but from severe dehydration, loss of fluid (WHO 2009). Children who are under nourished, malnourished, or are immunocompromised have been found to have an increased vulnerability to diarrheal diseases (WHO, 2009).

Viruses, bacteria, and protozoa are all important pathogenic microorganisms that cause enteric diseases in humans, usually transmitted through a fecal-oral route. These enteric pathogens are usually most stable in water (Gerba, 2009). Enteric pathogens that involve a water environment are categorized into one of four categories: waterborne diseases, which are transmitted via ingestion of contaminated water or food; water-washed diseases are those that are related to lack of hygiene and sanitation; water-based diseases are those in which the pathogens spend most of their life in the water or depend on aquatic animals to complete their life cycle; and water-related diseases are those that are transmitted by vectors that live near or breed in water (Gerba, 2009).

While in the Offinso North District, Keischa and I were informed of outbreaks of typhoid in certain areas in and around Akomadan. We also surveyed a number of households who responded positively to having a household member, usually a child, who had had or currently had diarrheal
episodes that week. We could not confirm that it was typhoid, but we were in those neighborhoods of concern. There are approximately 400 cases of typhoid in the United States each year, compared to an estimated 21 million cases worldwide, with approximately 200,000 deaths (CDC, 2009). If left untreated, typhoid can last up to four weeks and has a 12 to 30 percent death rate (CDC, 2009).

Typhoid fever is caused by the bacterium *Salmonella typhi* (*S. typhi*) and is spread by ingesting contaminated water or food (CDC, 2009; Gerba, 2009; NCBI, 2009). The bacteria enters the digestive tract, goes through the intestines into the blood stream where it can travel to various organs, including the liver, lymph nodes, and spleen, among others (CDC, 2009; NCBI, 2009). There are the few individuals who are infected with the disease, are treated, but remain carriers of the disease (CDC, 2009; NCBI, 2009). This is an area of concern because though these individuals do not display clinical symptoms, they continue to shed the bacteria in their wastes at an estimated $10^4$ to $10^8$ per gram of feces (CDC, 2009; Gerba, 2009). *S. typhi* has the ability to survive in the environment for up to three months (Gerba, 2009).

Clinical signs of typhoid include high fever, abdominal pain, diarrhea, bloody stools, fatigue, weakness, and confusion, among a number of other symptoms (NCBI, 2009). Treatment mainly involves hydrating the patient with fluids and electrolytes and administering antibiotics to fight off the infection. However, increasing antibiotic resistance has been observed globally, which is a cause for concern (CDC, 2009; NCBI, 2009). Two types of vaccines are currently available, an oral and an injection, and are recommended for all travelers going from developed countries into developing ones (CDC, 2009; NCBI, 2009). Prevention guidelines stress the importance of clean water, adequate sanitation, and food supply protection (CDC, 2009; NCBI, 2009).

Typhoid fever and other diarrheal diseases are good examples of preventable, treatable diseases that can be controlled, but because of a number of factors, run rampant among the poor. In his book, *Infections and Inequalities: The Modern Plagues*, Paul Farmer outlines a number of the infectious
diseases that are either rarely seen or well-controlled in developed countries, in comparison to the same diseases in developing countries (1999). He writes about the “pathogenic role of inequality” mainly focusing on access to health care and medicine, but I argue it further to include access to clean water and improved sanitation facilities to prevent disease transmission (Farmer, 1999). Dr. Farmer argues that “many ‘tropical’ diseases afflict the poor; the groups at risk for these diseases are often bounded more by socioeconomic status that by latitude” (1999). By helping people out of poverty, they then have the ability to improve their environment in terms of roads, schools, clinics or hospitals, clean water, sanitation, energy, among a plethora of other developmental challenges. These improvements in infrastructure can then lead to better access to health care and eventually a better quality of life, as proved by the current health status of the developed countries.

Practicum Responsibilities

Feedback of site

The Offino North District is located within the Ashanti Region in south central Ghana. It has 3 larger communities (Akomadan, Afrancho, and Nkenkaasu) and has about 65 smaller and more rural communities. Each group went to different sites but we regrouped at the District Chief Executive’s (Kojo) home, which served as our headquarters, in Akomadan. We had originally wanted to do home stays, but because of logistics we decided to stay in a hotel in Techiman, about 30 minutes north of Akomadan. Keischa and I went out into various neighborhoods within Akomadan and Afrancho. We also ventured out to a more rural region, Asempanaye, a couple of miles south of Akomadan.

Positive/negative aspects

The only real criticism that I have for this trip was that it was too short. I wish we had spent more time in the district to collect more data. Our initial findings made me suspicious of the boreholes and I wanted to go back to the same boreholes to collect more samples, but because of time I could not.

One part of the trip that I did not expect was a tour of Elmina Castle at Cape Coast. It was a former slave trading post, the same one President and First Lady Obama visited during their visit to Ghana. The captured Africans were brought to the castle, placed in the cells for about 3 months, sold, and then shipped out to the Americas. It was a very moving and incredible experience to be someplace that was so beautiful and yet so terrible at the same time.

A plaque on the doorway leading to the male dungeon reads, “In everlasting memory of the anguish of our ancestors. May those who died rest in peace, may those who return find their roots, may humanity never again perpetrate such injustice against humanity. We, the living, vow to uphold this.”

The tour guide kept emphasizing that it is pointless to blame the “white man” because there were many Africans who profited and served as major players in the slave trade. He continually emphasized that we must forgive and move on to a better future, which is what our collaboration hopes to do: bring
people together from Ohio State, KNUST, and Offinso North District to bring about positive change in the lives of the people of Offinso North.

**Unique experiences or events**

From the first day in the district, each day held a surprise for me. The first day (Monday, March 21), we came back from collecting water samples from 5 different sources (a borehole, streams, and standpipes). While we were at the last site (a stream), the clouds were rolling in, threatening to pour down on us. We quickly collected the water and as soon as we got into the car the heavens opened and it began to pour. When we returned to the Kojo’s home, the power was out. I had to wait about an hour or so before the power came back. When I went to set up the incubator, I found that it was not working. I tried multiple outlets with different combinations of adaptors and convertors. With each failed attempt, my anxiety grew. Not only would I not be able to collect data, but I was borrowing it and did not want to return with a broken incubator.

Jamie and Charisma suggested I find the electrician and have him take a look at it. The team went on ahead to have dinner back at the hotel while Jamie, Keischa, and I waited at Kojo’s house for Augustine, Offinso North’s only electrician and plumber. He took it apart and after some tinkering he found the source of the problem and told us that he could have it fixed by tomorrow. When we came back the next morning, he had rigged the power box with wires from an old cell phone charger and had somehow managed to make it to work. He later told me that there was a problem with the transformer and it was relatively easy to fix once we got back to the states. I wish I could say that the incubator worked for the rest of the trip, but I cannot. Whenever it rained (and it rained everyday), the power would go out. I collected as much data as I could, but as Keischa would say, “TWA: that was Africa.”

My favorite story however, is nearly causing “an international incident,” as put by Jamie. Keischa and I were constantly changing strategies and thinking about best ways to collect data and where to go. We needed to stay within our IRB criteria, but we had some room to make changes. We
had stated four communities that were potential areas for our research, but we were trying to only aim at two. However, about midday on Tuesday, we were talking about going to Asempanaye the next day to see a more rural community. When the district planner asked what our plans were I told him that we were thinking of going to Asempanaye since we had already been to Akomadan and Afrancho. But after talking to some more people, we found out that the officials were concerned with a specific neighborhood within Akomadan. Canan is considered a slum within the district’s capital and their only source of water is from the stream. We had heard rumors that typhoid going around in this area, so Keischa and I changed our plans and decided to go to Canan.

Wednesday (March 23) morning, Keischa, Charisma, 4 people from the CWSA, and I set off for Canan. We went to their water source, collected samples, and surveyed people in the area. We then came back to Kojo’s house to test the samples and regroup. The samples need a 24 hour incubation period and so I had to put the last of the samples in that day. I wanted a few more so I convinced one of the CWSA officers, Fuseini, to take me to a few more boreholes and streams in the area. Some of the OSU team members tagged along. After collecting a sample from the high school’s borehole, we decided to go to a stream behind Kojo’s house. I am so grateful we walked back that way because Charisma out telling us that the chief and other leaders of Asempanaye had been waiting for us all day.

They had been told that we were coming and the chief had gathered together all the tribal leaders to welcome us. This was at 10 AM, it was 3:30 learned of it. We jumped into a van and sped out to Asempanaye. When we got out of the van, the chief was across the street and he began yelling at Fuseini. We apologized profusely. Fuseini explained that he wasn’t upset with us but with the District Assembly. One of the OSU team members had a buckeye necklace with him, so I gave it to the chief as a peace offering. It cracked a smile. He then had his leaders show us to all 3 boreholes, the one toilet facility in the entire town, the school, and the market. They kept asking us to come back to dig more boreholes, to build more latrines, to help with their markets. When we came back to the chief, I got
down on my knees in front of him and thanked him for allowing us to take a tour of his community. I also told him that I could not promise more boreholes or more toilet facilities, or anything like that. I did tell him that I would give all of my data and research to the people in the district assembly. I told him that I hope that it will help to initiate some action within his town.

I think that was the most difficult part of this trip. The people of Offinso North don’t see many foreigners and so when 20 of them come into their communities, into their homes and ask about water, sanitation, health care access, marketing, irrigation, and education, they naturally got excited. They saw us as people who would come and dig more boreholes or build more latrines or improve their market system or irrigation system. On Thursday morning a man from Canan rode his bicycle over to Kojo’s house to look for me, to ask if I could get them a borehole. I continually had to tell the people that I could not promise anything like that but I could promise to get the data to the district.

**Overall assessment**

The experience in the Offinso North District, as cliché as it may sound, has changed me. The fact that diarrhea is a leading killer of children under five years of age in developing countries is more than just a fact learned in the classroom, it is a reality that I saw in the flesh, the pain of loss and of hopelessness to help one’s child.

The Graduate Interdisciplinary Specialization in Global Health is a great program and I have learned a great deal from the interdisciplinary classes, but after taking this course, I understand that global health is so much more than the traditional notions of health. There is no health without clean water or sanitation facilities. There is no health when the roads are such that people cannot get to a clinic. There is no health if there is no access to medication. There is no health if there is no market to sell the crop from the farm so that a family has income.

The course and the time spent in Ghana have given me a taste for what I see myself doing in the future. I enjoyed working with Keischa and Michael because they allowed me to see the planning aspect
when it came to water access, while I could explain to them about water quality and its impact on human health. I learned so much from them, and from Charisma and Jamie, both in the classroom and out in the field. They led the team by their example: their patience, ability to remain flexible, and compassion for the people. This whole experience has opened up my eyes to see that health is so much more than the traditional medicine, dentistry, pharmacy, etc., though all those are important and crucial parts of health, to truly improve the quality of life the disciplines must work together to bring lasting change and empowerment for the people.

*(Other advice relating to travel)*

Flexibility is a must. Nothing will really go the way you plan, but you just have to stay flexible. Incubators will not work, the power will go out, the bus will get a flat tire but in the end things will work out.

On a more personal note, we were told to take medication that would help in case of diarrhea but at the beginning of the trip we had more problems with not having enough fiber. It may be a good idea to cover all those bases.

All of the students brought insect repellent to fight off the mosquitoes. Most of them contained DEET, however, I found a brand that did not have DEET and it worked just as well.
Our tour guide at Elmina castle at Cape Coast.
The inscription reads:

In everlasting memory
Of the anguish of our ancestors
May those who died rest in peace
May those who return find their roots
May humanity never again perpetrate
such injustice against humanity
We, the living, vow to uphold this
Meeting with David Kim and Dio Tay from Vestergaard-Frandsen’s West Africa Headquarters in Accra. They donated LifeStraw Families, LifeStraw Personals, and PermaNets to the Offinso North.

Keischa and I with our KNUST student, Eunice, and 2 members for CWSA, Ruth and Fuseini
Woman collecting water from a stream in Afrancho

Solar powered borehole in Akomadan

It was good that we came because we found out that it had been broken “for a long time”
Children and women at the stream gathering water and doing laundry

Apologizing to the Chief of Asempanaye for the miscommunication and giving him a buckeye necklace.
Girl collecting water from a borehole in Asempanaye

Performing surveys and taking GIS points in Asempanaye. Emmanuel and Fuseini act as our interpreters.
Our makeshift lab at the Honorable Kojo Appiah Kubi’s house in Akomadan

Keischa and I working in our “lab”
Keischa and I with the Hon. Kojo, we gave him the donations from Vestergaard-Frandsen, we hope that they can form a relationship to provide water treatment options for Offinso North

Ghana Sustainable Change 2011 group picture