LIZ’S REFLECTIONS AFTER RETURNING FROM UGANDA:

My first interaction with DelAgua and its bacteriological field testing kit happened a couple years ago while taking Water, Sanitation, and Hygiene in Developing Countries, a graduate course taught at Rollins School of Public Health, Emory University. In preparation for our lab, my professor assigned the manual as reading. While we did not end up using one of the kits, the manual was used as our introduction and guidelines to the in lab membrane filtration we would perform. Now, two years later, I finally got my hands on an actual field kit and actually got to use the manual as it was intended.

I remember feeling momentary relief when I walked into the ChangeALife Kampala based office and saw the huge DelAgua box, immediately followed by excitement. Prior to leaving for the research project, everyone was eager to tell me about their horrible experiences shipping things to Africa. Geoff reassured me that all would be well and it was.

We opened the box in the office and did an inventory. We grabbed up all the manuals for further reading back at our homestay. It seems ridiculous now, but at first we were so gentle with it, concerned that we would mess up the calibration or ding the exterior.

I mention calibration because we had some difficulty with reaching the right temperature range, but most of that was due to a lack of familiarity with the sensitivity of the dial.

In retrospect, all of the problems that we ran into during this project were mentioned specifically in the manual and video, e.g. charging the kit at every opportunity.

I believe that it was more an issue of internal communication than faulty equipment. In the end, we never met a problem that we couldn’t troubleshoot, although there were a couple of frantic emails sent at odd hours to our DelAgua support staff.

It almost felt like Geoff, our DelAgua contact, was one of our advisors, the way that he would walk us through the potential problems, the corresponding cause, and the appropriate troubleshooting approach. When we had issues finding non-chlorinated water to use in the media, Geoff sent us some tablets to de-chlorinate the water.
Besides worrying that we were going to break it, our first two weeks conducting on site testing were spent working out the best way to sample and process within the window. Timing did not really become an issue until we started to increase the number of samples we were processing. We split our time between taking the kit with us when we did household surveys and sampling and bring the samples back to our "home base", where one group member would process the samples as they came in. In the field, we found that we worked better when one person had the kit and moved in between households being surveyed.

A difficult part of the taking the field kit out with us during our household survey was that it attracted a lot of attention, especially from kids. Membrane filtration is not the most glamorous process to explain to a 10 year old, but I gave it my best shot and they seemed to understand the basic idea. The fact that we were using methanol to expedite the sterilization process and mobility of the kit only added to their intrigue. What little kid doesn't want to see someone set stuff on fire? Kids just tended to hover, at time practically over the kit, which can be very distracting and made me a little paranoid about the integrity of the processing at times.

I believe our greatest obstacle was the level of contamination that we found. The colony counts we were getting using 10 mL of sample required that we dilute it. This became a challenge in the field because we had to carry distilled water and sterile pipettes with us, which introduced more avenues for contamination. As you can tell, there is a general theme of over worrying about contamination. I believe that this stems from the fact that my previous testing experiences had only ever occurred in sterile, white tiled laboratories. There was an image in my mind of what membrane filtration should look like and it took me a while to see that it could just as easily and effectively be performed outside the laboratory as in. That realization was a real milestone in my research experience.

**ALAYNE’S REFLECTIONS:**

During the summer of 2014 Duke University partnered with ChangeALife Uganda to send three Duke University students to the rural community of Migyera in the Nakasongola District of Uganda. I was lucky enough to be selected as one of these students. The villages within the Migyera Town Council often face water shortages during the dry season and ChangeALife has been working to assist the Town Council in developing solutions for this problem. We were tasked with the goal of discovering how water was being used and to determine the current level of water quality, both at the source and the household level.

Answering the key questions of the project consisted of several components including an extensive household survey of the area and collecting bacteriological and chemical water samples at the household and source sites. The water samples will reveal both treatment and usage practices as well as any potential contamination by metals. In particular we were looking at effectiveness of household treatments and testing for arsenic and fluoride. The DelAgua kit was used for all of our bacteriological testing and was invaluable to our in-field research. As we were working in a remote area, it was impossible for us to bring our samples back to a lab so we were able to either carry the kit with us from site to site or use it at our base of operations. With the kit we specifically looked for fecal coliforms. The presence of these coliforms let us know how effectively the household water was being treated by the consumers. Paired with the household survey we could cross-reference this with the methods the household stated they were using for water treatment.

While our full analysis has not yet been completed, fecal coliforms were present in almost every household that was tested. We will be conducting analysis over the next year to determine key areas of concern and identifying next steps that ChangeALife can use in their partnership with the Migyera Town Council. It is our hope that the work we have completed will be the first step in improving water quality within the community.

[Image 61x665 to 205x780]
[Image 61x340 to 205x461]
[Image 391x409 to 534x610]
[Image 227x61 to 534x259]
Ultimately the DelAgua kit was a life-saver for us. It allowed us to get immediate, high quality results during a rural field assignment and was a huge step over the original plan – small one use tests kits that would only detect contamination. Being able to look for specific contaminating factors was really important. Plus, Geoff was always available via email to help us troubleshoot any problems that arose while we were in the field including having to recalibrate several pieces of equipment. Geoff was even able to send us the recalibration solution so we could ensure that our instruments were providing accurate readings. Even though the kit was awesome, the support we got from Geoff was more than we could have ever hoped for. His knowledge and experience was invaluable, especially as a couple of us were new to performing field tests.

**FRANCIS’ REFLECTIONS:**

Our work in Uganda started as a project proposal from a Duke alumnus, Jeff Chandler. Jeff serves on the boards for both the Nicholas School of the Environment and ChangeALife Uganda (CALU), our client. Jeff and CALU approached Duke, and together have constructed a proposal for a Masters Project, the capstone for the Professional Master Degree at the Nicholas School. My colleagues and I had to submit an application to be considered for this project. The project appealed to me because of the opportunity to work in the field of international development while focusing on water quality and quantity in an arid region. Most of my previous experience is in physical hydrology, so I was excited to learn about microbiological testing through this project. I saw this as the chance to get my foot in the door and prepare myself for similar positions that may arise after graduation.

Partnering with DelAgua was extremely beneficial for our work, allowing us to fine-tune and focus our bacteriological testing. The initial plan was to use test strips; however, using the DelAgua field kit was a more appropriate alternative for our work. The field kit allowed us to pinpoint, and quantify, the specific bacteria with which we were concerned. This allowed us to provide additional, more relevant information above our client’s previous request.

Our work was being conducted in rural Uganda, an area where access to electricity is highly sporadic. It was a great advantage to only have to charge the battery in the kit once a week as we did not have a constant power source. Aside from dealing with unreliable power sources, our biggest challenge was finding sterile water to use for processing our samples. This was the primary frustration during the first few weeks of our work. We were unable to get into the full swing of processing until we were able to find a reliable source of bottled water. Once we finally found a source that met the testing parameters, we got into our stride with processing samples. Most of the time we had the DelAgua kit set up in a vacant room at the nearby health center. Other times when we had to travel farther to field sites we would take the kit with us.

This was a unique experiment as our mode of transportation was motorbike, or “boda boda” in Luganda. Sitting on back of the motorbike hugging the kit was one of the more nerve racking experiences for me, but the portability of the kit allowed us to visit these rural sites and still process them within the necessary time constraints.

I believe one of the most important aspects of our work is determining where the water is most likely to be contaminated. If we can pin point the areas of concern we can more strongly recommend ways to remedy the problems. With the work we conducted in the field and continuing back in the lab at Duke we are hoping to provide suggestions to our client CALU on how to improve the water quality conditions within the home as well as provide ways to help the community properly treat water. The DelAgua kit was essential to our work and for a first time user it was extremely easy to understand.

WWW.DELAGUA.ORG