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PROGRAM UPDATE

UGANDA

By: Kimberly Kuhn
Uganda Program Director

The Uganda Program ended the Fall 2019 semester with our first implementation trip to the community of Nakyenya. The travel team included members Rosa Delgado, Spencer Everet, Britta Johnston, Will Krovrik, and Emily Moore, along with professional mentors Bill Clunie (PE), and Helena Houllaer (CG). Our goals were to drill a bedrock well and install a handpump and apron slab.

The trip presented both successes and challenges. We decided to drill a borehole in Lwensinga, a neighboring town with a promising water supply. On its way to the drill site, the drilling rig became stuck in the mud. Helena Hollauer consulted her colleagues from the EWB Maine Professional Chapter and concluded that the contractors could drill at the location where the rig was stuck. The travel team quickly negotiated new land-access agreements, and drilling commenced.

The contractor drilled a 103 meter borehole with a yield of 2,500 liters/hour. They did not provide bentonite (a clay that expands in contact with water) to seal the borehole, and the team stressed its necessity to prevent contaminants from entering the borehole. While the bentonite made its long journey from Kenya to Nakyenya, the travel team had to return to Boston before construction could be completed. Fortunately, Lydia Kyokaali, our project engineer based out of the in-country office, supervised the apron slab and handpump installation. Thanks to her help, Nakyenya now has a hand pump and access to clean water while we work on designing a larger distribution system.

The trip opened several design opportunities for our program. We re-evaluated our previous beneficiary

analysis based on the new well-yield and determined that we needed to limit the capacity of our distribution system. The program is now designing the system for two tap stands: one in the Nakyenya Town Center and one in the Lwensinga Town Center. After modifying the scope of our project, we began several design tasks, including creating a hydraulic model of the distribution system, sizing a submersible pump, and determining a power supply for the pump. We are also researching construction designs of the tank and tap stand based upon our previously completed project in Bbanda.

A 103 meter deep well also poses significant pressure design challenges. The change in hydraulic head between the borehole water level and our proposed tank location is too high for standard HDPE pipes. We are currently considering alternatives to address the high pressure in our transmission main, and our next step is to begin a hydraulic model for the distribution mains.

Just as our design was gaining momentum, the COVID-19 pandemic uprooted our lives and sent us to our homes in all corners of the country. Despite being apart, our program has continued to work diligently on the design process by successfully switching to weekly remote meetings. Members' dedication to the project is greater than ever during these difficult times. We're proud of their continued engagement and willingness to work collaboratively under challenging circumstances.



PROGRAM UPDATE

PANAMA

By: Mitchell Martin
Panama Design Lead

This semester, the Panama program has reached several milestones. In late February and early March, we traveled to Las Delicias, our partner community of five years, for the final implementation trip. The project, a drinking water collection and distribution system, is nearing completion. On the trip, we signed a community partnership agreement with the nearby community of La Pedregosa and assessed the community and their needs for an improved drinking water system.

We were fortunate to travel to both communities as planned before Northeastern transitioned to online classes and communities in Panama were placed under lockdown due to the COVID-19 pandemic. Since then, the Panama program has been holding its usual weekly meetings via Microsoft Teams and has continued to make progress on work for both communities.

The final phase of construction in Las Delicias consists of a new water source capture, a water filtration system, and a transmission main to connect the filtered water to the existing distribution system. While in-country, the travel team worked with the community to explain our designs for these system components and began construction. The team oversaw construction of the source capture weir and filter box, and surveyed the proposed transmission main route. The team completed all planned tasks: visiting and documenting all of the significant water sources in the community, meeting with the community and water board, and meeting with representatives from a construction company that is currently building a set of wind turbines on the hill where the main water sources for the system are located.

Work for the La Pedregosa project has shifted into high gear. Currently, we have four subgroups working on the La Pedregosa project. The Maps group is working to analyze and present geospatial and hydrologic data that was recorded while on the trip. The Alternatives Analysis group is working on creating a report detailing several possible engineered solutions for the water scarcity encountered in country. The Climate Research group is working to quantify the effects of climate change in the region, predict future hydrologic and climatic conditions, and ensure that the nearby and ongoing wind turbine construction has not and will not damage the community's water sources. Finally, the Administration group is working to apply for grants and other sources of funding to pay for the upcoming implementation trips in La Pedregosa.

After the trip, members in the Las Delicias Design group designed fixes and improvements for a few small leaks in the previously implemented break tanks, and they were sent to the community; however, community members have suspended work on the water system until the pandemic ceases. We are currently working on compiling a complete set of as-built drawings and an operations and maintenance manual for the entire system. These documents are essential components in our pursuit of sustainable projects, as they will help facilitate the proliferation of knowledge about the water system within the community for the next several decades.

Construction in Las Delicias was originally expected to be completed by winter of this year, which would have allowed us to perform a trip over winter break that could serve both as a monitoring and evaluation (M&E) trip in Las Delicias and a first implementation trip in La Pedregosa. Though the exact dates when such a trip will be possible is not yet known, the Panama program is carefully monitoring regulations and guidelines from university officials and the governments of both the United States and Panama, and is planning to travel to both communities for M&E and implementation, respectively, as soon as safely possible.



A town meeting in the communal kitchen of the Catholic church

PROGRAM UPDATE

GUATEMALA

By: Max Magee
Guatemala Program Director

This academic year, the Guatemala Program has been hard at work finalizing plans for Phase I of our school building project in the community of Chuixil. Phase I involves regrading the site and construction of the main school building. The program has also made significant progress on Phase II: developing preliminary plans for the schools' bathroom and wastewater systems. Unfortunately, the Coronavirus pandemic interrupted plans for an implementation trip this April. The program is in discussions with the In-Country office to begin remote implementation.

At the end of Fall 2019, the Guatemala program had developed an implementation Phase I report for the construction of the school foundation and walls. Upon receiving feedback from EWB USA, the program decided to expand Phase I to include roof design. This adjustment required a new set of structural calculations, which led the program to recruit additional support from structural engineering students from the Civil Engineering Department. With the help of these students and a new professional mentor, Ron Burns, the school design was completely redone in the spring of 2020.

The school building was modified and simplified. The new structure incorporates a moment frame design which uses rigid beam connections to improve structural stability and reduce stress from a potential earthquake or hurricane forces. The implementation Phase I report was submitted for review midway through the semester. The structural team is currently working on updating CAD drawings according to the report feedback. The final Phase I report will be submitted by the end of the summer.



The implementation Phase II report also began this semester. The Phase II team is divided into five groups: Bathroom, Greywater, Leach Field, Piping, and Septic Tank. All groups have developed initial designs and are working to incorporate them and create an implementation report for Phase II.

The program had planned an implementation trip for Phase I of the project over spring break, but it was pushed back to April due to the availability of the EWB Guatemala in-country office. By the end of March, both Northeastern and EWB USA had cancelled non-essential travel due to Coronavirus, and the implementation trip was postponed. The program is planning to begin implementation remotely with assistance from the in-country office.

The Guatemala program is committed to begin construction as soon as it is safe to do so. Chuixil is a remote village, and it is in the community's best interest to avoid interactions that could spread the virus from the larger cities and communities. Local EWB officials are optimistic that construction will remain feasible, and with proper preparation, work could begin as early as June. The program will be working with local construction crews and the local EWB office to organize remote implementation and make headway on the project.



Render of Updated School Design

MEMBER SPOTLIGHT

Uganda Spotlight



Harrison Dubois has gone above and beyond to help the Uganda Program enter the implementation phase. Harrison is a third-year Environmental Engineering student who joined EWB to connect with engineers with similar interests.

Harrison has led the pump and power group, a subgroup of the Construction and Design Team. They were tasked with sizing a submersible pump for the Nakyenya water distribution system, as well as determining a power supply for the pump. Harrison researched and sized various pumps for the distribution system and began a comprehensive analysis to size a solar array to power our pump. Harrison has taught other members how to size pumps to lower the pressure in our transmission main, which has allowed us to consider alternatives for the project design.

Harrison's favorite part about EWB is getting to work with people who care about others and take pride in their work. "I find it rewarding to dig through unfamiliar problems, knowing that the solution is really going to improve the lives of people halfway around the world." Harrison has enjoyed being able to stay involved in the Uganda Program during the pandemic. He states, "The continuity has been really nice when so much else has stalled or been put on hold recently." Members like Harrison have allowed us to continue our work and a sense of continuity during these tough times. Thank you for all your hard work, Harrison!

-By Kimberly Kuhn

Panama Spotlight



Rachel Cohen is a first-year computer science and physics major who joined the Panama program last fall. Since she joined, Rachel has taken huge initiatives. She leads the administrative group for the Panama program that focuses on applying for grant funding and participating in contests and challenges posed by EWB-USA and the Northeastern College of Engineering.

Along with diligently writing grant proposals to fund our chapter's projects, Rachel helped create an EWB Rube-Goldberg Machine as a response to a challenge posed by the Northeastern College of Engineering. This device worked using gravity to mechanically move a coin through a series of components that represented key areas of EWB's mission. In addition to raising money for the chapter, her work on this machine will be promoted in a video by the College of Engineering if not for the COVID-19 pandemic.

Rachel recently stepped into the chapter-wide role of Webmaster and has since created an entirely new website for our chapter, up to date with all the content necessary for student members, professionals, and donors to refer to.

Rachel participates in EWB to get to know people outside of her major in a field that she's passionate about and to be a part of projects that have an actual impact on people's lives. Her hard work, dedication, and optimistic attitude have been evident since she started and make her a great part of our program. Thank you for your contributions, Rachel!

-By Alyssa DuBois

Guatemala Spotlight



Terenia Hankewycz has been an incredibly valuable member of the Guatemala program. She is a third year civil engineering student who joined in January 2020. She has stood out for her dedication and hard work on the structural design of the school, both during and outside of meetings.

Terenia joined EWB as a part of a larger structural group recruited from the Department of Civil & Environmental Engineering. This structural team helped to redesign the entire school building in a single semester. Designing a safe and durable school proved to be a unique challenge, requiring multiple redesigns and complex calculations. The Guatemala program is incredibly grateful that Terenia and the other structural engineering students were able and willing to share their expertise.

In her group, Terenia focused on the load wind forces could apply to the structure. She verified that the building's columns and walls were the right size to handle external and internal forces, also assisting with calculations to ensure that the foundation slab was properly sized for the site grade.

In addition, Terenia worked on the Revit model (photo in the program update), keeping it up to date throughout many design iterations. Finally, she helped assemble the CAD drawings for the Phase I report, continuing to work hard during the coronavirus confusion.

Terenia is proud of the work that the structural team has accomplished this semester. Despite some stressful time-crunches, Terenia is glad that she joined the program and says she has learned a lot. Thank you, Terenia, for all that you have done for the Guatemala program!

-By Max Magee

TRAVEL PERSPECTIVE: UGANDA

By: Britta Johnston
VP of Administration

I would have thought that driving through a capital city with no street signs or marked lanes would be a disaster, but watching the vans and boda bodas weave effortlessly through the dusty haze of Kampala streets, I realized I was entering a world completely different from the one I had always known. I was initially nervous about traveling to such a new place and worried about all the unknowns of our planned construction and in-country meetings, but I was quickly reminded of our program's motto: "Don't mind the dust, just enjoy the view". I did my best to concern myself with the necessities of our trip and appreciate the beauty of my surroundings; everything else just fell away.

We spent our trip overseeing the drilling of a new well. Even though our drilling location and construction timeline changed daily, the community was there, ready to discuss and learn about these changes in hours-long public forums without complaint. We sat side-by-side at the construction site; exchanging stories and sharing jackfruit from the nearby trees as we watched the drilling unfold. This time spent getting to personally know the people of Nakyenyei was invaluable, and because of our new understanding of its users, the

system we are designing will be able to better serve the community.

Seeing the community's surprise and excitement that we had returned made me realize the importance of our work and EWB's unique emphasis on sustainable development. We spent a good portion of the trip investigating broken down hand pumps previously constructed by other organizations or community members. Seeing the unfortunate result of these efforts reaffirmed our teams' commitment to capacity building within the community. We dedicated ourselves to training community members on the operation and maintenance of the implemented hand pump and other functioning hand pumps around the community. They were eager to learn and even proposed developing a course for Water System Maintenance at the local vocational school.

Traveling to Uganda and working alongside so many community members made me appreciate all of the preparation that was put into the trip ahead of time. Our work in-country would have been impossible without the countless hours our program had spent at Northeastern designing our project and preparing us for in-country meetings. I returned to Boston extremely grateful for the flexibility and generosity the Nakyenyei community had shown us and excited to start our design work for the next phase of our project.



William Kovarik with the Water Board—the community-based organization

PR AND RECRUITMENT

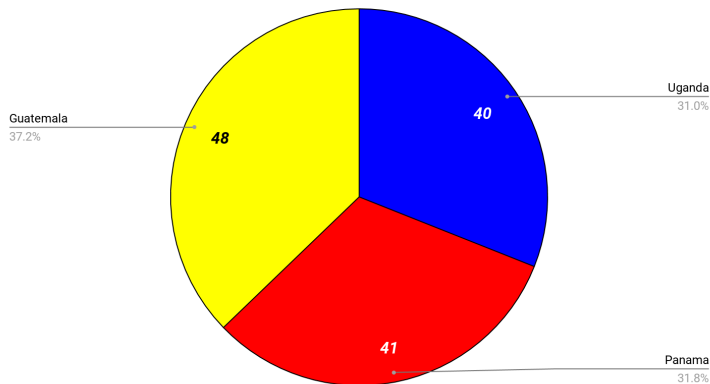
By: Rosie Delgado

In January, we kicked off the decade with a series of tabling events: the Winter Involvement Fair, STEM Clubs/Orgs fair, and the Spring Freshmen Open House. EWB-USA NEU was glad to welcome back members returning from winter-break or co-op, and give a warm welcome to new members at our Spring General Body Meeting. This spring, we had 94 new members sign up for our mailing lists to receive information regarding meetings and special events. In total, EWB-USA NEU has 129 due paying members. A membership breakdown across our three programs is shown below.

After Northeastern transitioned to online-instruction, all three EWB-USA NEU continued to meet remotely over Microsoft Teams. As a result, we are able to continue being productive despite EWB-USA travel restrictions.

Although some of our tabling events were cancelled, our spring and summer active member count is steady. Our Teams meetings are open to all members whereas in the past, summer meetings were limited to members who were on-campus and able to attend in-person meetings. Moving forward, we are excited to see how this experience can help us expand membership outside of our traditional methods.

EWB-USA NEU Spring 2020 Membership Breakdown



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Vice President of Development: Matt Burmeister
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Uganda Design Lead: Jeff Ling
Panama Program Director: Lisa Sangree
Panama Design Lead: Cassia Lockwood
Guatemala Program Director: Madeline Rogers
Guatemala Design Lead: Lauren Grove

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Panama - Mike Sanders



Guatemala - Ron Burns



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