2016

Biannual Report

ENGINEERS WITHOUT BORDERS-USA
UNIVERSITY OF MINNESOTA, TWIN CITIES

Message to the Chapter

Jesse Kasim
Engineers Without Borders,
University of Minnesota
President

Currently, 748 million people lack clean water, and 2.5 billion people lack adequate sanitation. Engineers without Borders at the University of Minnesota (EWB-UMN) believes that someone needs to take the initiative to change these startling figures, and that undergraduate students are uniquely poised to help bring about this change.

We've demonstrated the value of these beliefs through the success of our past projects and are continuing to let them guide our work in our three ongoing international projects. All three of the projects, which we have been working on this past academic year, have taken great strides toward sustainable implementations, as detailed in this report. This summer, these communities will be much closer to zero dependence on contaminated surface water sources. Looking towards the future, we've created a project search team to locate communities in need of EWB-UMN's abilities. We want to find the projects best suited to maximize our impact with our knowledge of engineering per dollar and hour spent.

During this process, our students are developing valuable project management and communication skills to make them leaders in their community after they graduate. After graduating, they have gone on to become doctors, researchers, practicing engineers, and more. Several have went on to lead global development initiatives such as ACARA and mentor other EWB projects.

We are incredibly thankful to have generous individuals like yourself that share our beliefs. None of this work would be possible without your phenomenal support. It is truly amazing to see the local Twin Cities community rally behind spreading clean and safe drinking water to areas around the world. Your support means more than sending a group of students to construct a water system – it means hope to the people of these communities.

Sincerely,

GLOBAL PROJECT ACTIVITIES

EWB-USA UMN is an organization that works on sustainable development projects internationally.

STUDENT INVOLVEMENT

Bolivia
20 people

Guatemala
35 people

Uganda
20 people

The BOLIVIA Program

Background

The Bolivia Program is currently working with the community of Yulo to repair and redesign the community's water catchment, which is a key element in their potable water system. The catchment collects water from a mountain spring in the hills outside of the community, and supports the potable water demand for the entire community.

Process

During the 2015-2016 academic year, our students have been working on a redesign for the catchment system that will meet all the needs of the community. The community is most concerned with the long-term reliability of the catchment, which is currently questionable due to damage from high flows during the wet season. The team has spent significant time analyzing the survey data they collected during their trip in August of 2015, which has led to the development of models of construction process.

In Late August, the Bolivia program will travel to Yulo to install the new catchment system. The construction of the new system will utilize the help of the community to establish project ownership. Additionally, our students will instruct selected community members about the operation and maintenance of the system so that those community members can maintain the system. This will be critically important because they will have the capacity to make repairs and adjustments if any complications arise.

Having a reliable system for potable water is a long-term solution to water accessibility within the community. Additionally, a community education program is to be implemented that promotes water safety, general hygiene practices such as teaching children to wash hands and to treat water before consumption. These practices will support the engineering efforts made by the Bolivia program to maximize impact.

Impact

With a more reliable source of water and a stable catchment system, opportunity cost is lost in the community in traveling to the catchment site for repair. The subsistence farmers of Yulo can now worry about how to harvest their abundant crops without being concerned about the safety and usability of their water.

The GUATEMALA Program

Background

For the past two years, the Guatemala Program has been working to bring the community of Xiquin Sanahi clean, potable water from a spring source two kilometers away. This water source is untreated and is only piped to one location in the community. As a result, there are high rates of waterborne illnesses, and women and children spend an average of 90 minutes per family carrying water from the central tank for daily use. Of the 800 people in the community, only 11% have private access to water year round, and only 58% of community members treat their own water.

Process

The Guatemala program has been working in Xiquin Sanahi for two years now. We have completed one data assessment and one implementation trip during this time. In phase one of this two phase implementation project, our group developed the foundation for a community-wide water distribution system to individual households. By installing a water pump, two kilometers of new piping, a chlorinator, and renovating a water storage tank, the community is now prepared for the network of pipelines to provide households with potable water.

We are currently preparing for phase two implementation. Several sub-groups are working on specific aspects of the system, including pressure break tanks and taps, CAD models, pipeline modeling, and statistical modeling. The pressure break tank and pipeline groups have been using data collected on the assessment trip to determine ideal locations for main distribution lines, and nearly have a complete map created. The pipeline group will also use the gathered GPS data to map individual distribution lines to households, and overlay the model with a satellite map of the community. The CAD subgroup has been working on designing tap stands for each household, and will soon take models from the pipeline subgroup and convert them to technical drawings. Finally, the statistical modeling group has been working to predict growth, and therefore future water demand in the community, as well as potential for system damage due to natural disasters.

Projected Impact

By putting treated water in family households, families will not need to spend time fetching water. Instead, this time can be put toward education, and working for additional income such as weaving and harvesting crops. By treating the water through chlorination and educating the community about the importance of clean water, we also expect the number of reported illnesses to decline due to contaminated water. As part of our project sustainability, we are also educating the community on how to maintain and fix the distribution system after we complete the project.

The UGANDA Program

Background

Hope Integrated Academy (HIA) is a secondary and vocational school that serves children in the rural village of Kyetume, Uganda. The school seeks to provide for and educate 350 children who are in need, orphaned, or marginalized, many of whom are victims of the AIDS epidemic. The school has experienced rapid growth in its student population in the last few years and does not have enough water to meet the needs of the students and staff. During the dry season, students spend a couple hours each day collecting water from a shallow pond for drinking, cooking, and bathing. HIA is concerned about the safety of the children walking along the highway to get to the pond. The pond is contaminated by runoff from nearby farms and the busy highway and leads to sickness in students and staff.

Process

In August 2015, we completed an assessment trip at HIA. Currently, we are working to expand the water supply at HIA by implementing rainwater harvesting systems on their dorms and classrooms to meet their growing needs. The team has quantified current and projected water needs based on the number of day and boarding students, livestock, and vocational projects including soap making and welding. From the daily water needs and current water supply, we have designed rainwater harvesting systems to sustain the school throughout their dry season.

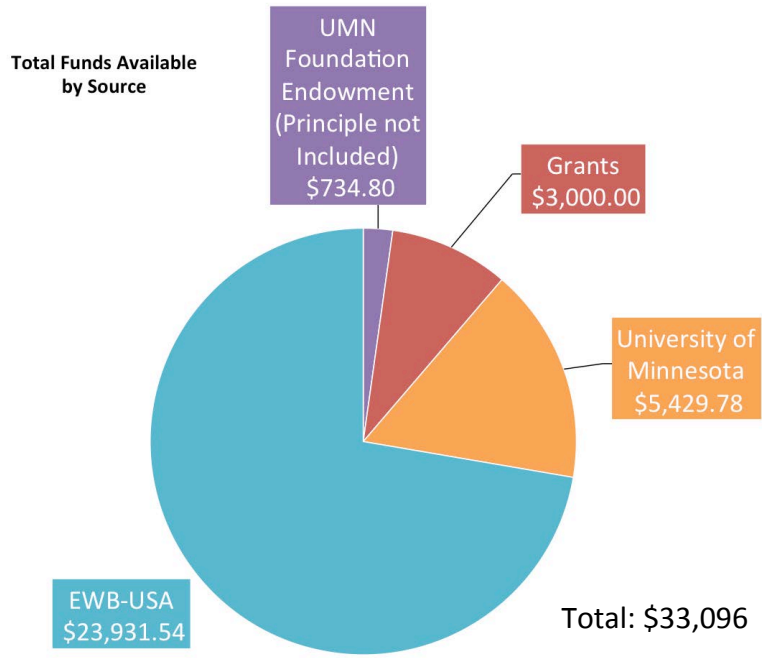
We have created a site plan of the buildings at HIA from survey and GPS data and optimized the placement of the rainwater collection tanks to efficiently get water to the dorms, kitchen, and shower facilities. Our tank team has been working on structural design for a 25,000 L brick and mortar tank including the foundation design, tap placement, overflow pipe design, and lid design. These tanks are a lower cost and longer lasting alternative to the plastic tanks currently used at HIA. In August 2016, we plan to travel to Kyetume to install gutters for rainwater collection on four new buildings and construct three 25,000 L tanks, which will provide over 2,500 L of water per day for the school.

Impact

By expanding the rainwater harvesting capacity at HIA, we hope that the need to collect water from the pond will be eliminated, and students will have a more convenient and sanitary source of water year round. Additional water will allow HIA to continue to expand the number of students served, and students will spend more time learning and less time collecting water. The impact of this project could mean that more children receive an education to grow into leaders who are able to promote sustainable social and economic development in their communities.

Statement of Financial Position

Snapshot as 03/31/2016



Total: $33,096

Estimated Project Expenses for 2016

Uganda	
Travel Costs	$9,010
Materials	$6,775
Total	$15,785

Guatemala	
Travel Costs	$6,410
Materials	$12,067
Total	$18,477

Bolivia	
Travel Costs	$11,510
Materials	$4,400
Total	$15,910

Total All Trips	$50,172