

WATER SUPPLY IN DEVELOPING COUNTRIES

NEWSLETTER

FEBRUARY 2018



BACKGROUND

In 2012, Purdue faculty from various departments created the service-learning course 'Water Supply in Developing Countries'. This class utilizes the diverse skill sets of students from a number of disciplines including Agricultural Economics, Biology, Civil Engineering, Environmental and Ecological Engineering, Food Science, Industrial Engineering, Chemical Engineering, Solar Energy Technology, Natural Resources Social Science, and Nursing. Through the application of our combined perspectives, we aim to collaboratively address the complex issue of water security around the world.

To confront this global issue, our team began by directing its focus on the La Vega region of the Dominican Republic outside Santiago. Alongside community members and school administrators, our interdisciplinary Purdue team implemented its first community-scale drinking water system at the Ana Julia Diaz Luna primary school in Las Canas, Dominican Republic. With the support of Aqua Clara International, we utilized a comprehensive approach by addressing public health issues and sanitation education as key components of successful implementation.

Local educators and community members of Las Canas participated in this design and implementation process. A group of community partners, referred to as 'El Patronato', took a proactive role by collaborating with our team to create the water treatment system. Additionally, they formed a self-identified governing board to oversee maintenance and management of the system in Las Canas. Moreover, local educators aided in the design of a Water, Sanitation, and Hygiene (WASH) education program to encourage the development of healthy behaviors. Finally, our team worked alongside key stakeholders in the communities to develop economic guidance aimed at sustaining this effort. Our team suggested various strategies that they could use to generate revenue to reinvest in maintaining and improving the system.

Through our attempt to achieve water security, we were able to understand the importance of cultural influences, intentional community collaboration, public health education, and monitoring and evaluation of a system. This knowledge can be implemented into each students' personal and professional career. As we continue our work in the Dominican Republic, we build on these lessons learned in an attempt to improve effectiveness in our future endeavors and to better address the multi-factorial issues presented in international development projects. As we finalize our implementation process, we hope to use these experiences to build a framework that will develop a methodology aimed at increasing global access to potable water.

FALL 2012

- Recruited and formed the 'Water Supply in Developing Countries' class
- Gave an extensive health and economic survey to Las Canas
- Compiled survey data; revealed water usage trends

MARCH 2013

- Established connections with Las Canas
- Assessed on-site water infrastructure in Las Canas
- Administered educational programs for water, sanitation, and hygiene (WASH)

JUNE 2014

- Implemented water treatment system in Las Canas
- Trained community members on system maintenance and operation
- Conducted health education at Ana Julia Diaz school in Las Canas

MAY 2015

- Promoted use of system in Las Canas
- Reviewed initial assessment of future community partners
- Established connections with new community leaders for future systems
- Collected data in preparation for choice of new community partners

MAY 2016

- Collaborated on-site with community partners
- Worked with Las Canas leaders to integrate rainwater into treatment system
- Gathered final necessary metrics for system implementation in other communities

MAY 2017

- Integrated rainwater collection into treatment system in Las Canas
- Implemented water education in La Vega schools
- Worked with Los Peladeros community leadership to establish governance structure for their imminent water treatment

DECEMBER 2017

- installed a potable water system in the community of Los Peladeros - uses UV disinfection, solar panels, a cartridge filter, and an auto-chlorinator
- Plumbed a hand washing station for Los Peladeros
- Visited health clinics and delivered education materials
- Confirmed functionality of Las Canas system

MAY 2017 TRIP

In May of 2017, the Purdue team returned to the Dominican Republic. During our week-long trip, we prioritized improving the existing system in Las Canas. Due to cultural oversights made by the Purdue team, the original system design was ineffective and did not meet the community needs. Because of this, we learned that the system was not being used. The water source for the original system was groundwater; this has a hard, metallic taste that the community found unsuitable for drinking. After investigating this issue, we adapted to their preference and implemented a rainwater catchment system. While this challenge presented a setback initially, it also served as an important lesson on thoroughly assessing environments prior to implementing interventions.

As some students worked on the reconstruction of the Las Canas system, others went to surrounding communities to continue forming relationships and gathering data for future systems. Meetings were conducted to discuss logistics such as location, maintenance, management, and desired distribution structure.

When planning for this trip, a priority in our comprehensive approach was implementing WASH education in the schools. A set of education modules were presented to the staff of the four primary schools. The topics included water, water borne illnesses, safe water storage, and safe water usage. Lesson plans containing the combination of lectures and interactive activities were designed to keep the school children engaged in the topic.

We also took the time to visit primary care clinics in these communities. Through this experience, nursing students had the opportunity to gain a better understanding of the illnesses most profoundly affecting community members in the Dominican Republic; waterborne illnesses, diabetes, and hypertension. In addition, our nursing students gained an understanding of how healthcare professionals responded to these diseases. Furthermore, educational materials on common health concerns were distributed to the clinics for staff to provide for patients.

In the end, the trip was extremely successful. Our team formed valuable relationships, provided health education, and prepared communities for the work that would follow in future years to bring water security. In Las Canas, successful alterations were completed to adjust the water taste. Our trip ended with a lovely ceremony at the Ana Julia Diaz Primary school. None of this work would have been possible without the dedication of interest, resources, and labor from the community and our class members.



A bonding moment between the principal of Ana Julia Diaz Luna primary school in Las Canas, and Dr. Ernest Blatchley III.



The Purdue students and faculty after being presented with medals and a certificate of appreciation in December 2017.

DECEMBER 2017 TRIP

In December of 2017, Purdue students and faculty traveled once again to the La Vega Region of the Dominican Republic along with a representative of Lafayette Rotary Club, Jack Kelley. The primary goal of this trip was to successfully install a water treatment system in Los Peladeros. During the construction of our second system in the Dominican Republic, we adjusted our design methodology to meet the needs of the Los Peladeros community. Solar panels were used as a more sustainable energy source. UV disinfection, a cartridge filter, and an auto-chlorinating device called 'Zimba' were utilized to clean the water. It was important for the school to provide water for the students as well as to be able to distribute it to those living in the community. The profits gained from distributing the water outside of the school will be used to maintain the system. In addition, we installed a hand-washing station sourced with clean water from the system. At the end of the trip, Los Peladeros hosted a community-wide celebration for the opening of the system, and everyone danced and enjoyed the potable water together.

While installing a functional system and hand-washing station was the primary focus of the trip, the team also worked alongside the teachers and principal of Los Peladeros to implement a demographic survey of the community. Through collaborative training sessions, the teachers and the Purdue students formulated culturally consistent questions and discussed survey-administering methodologies. These surveys will be used to gather data on the health of the community and their current habits in relation to water, sanitation, and hygiene.

While visiting in December, the water system in Las Canas was updated with a 'Zimba' auto-chlorination system. The 'Zimba' has no moving parts and does not require electricity. Our team also provided system training and maintenance to the management and maintenance team at Las Canas. Finally, while in the Dominican Republic, some of our students visited health clinics and distributed education materials about relevant health information such as STIs, cardiovascular disease, and depression. While this trip was incredibly busy, it was extremely successful. We are looking forward to traveling again in May 2018 to check in on Los Peladeros and Las Canas, and to continue working to provide water security to more communities within the Dominican Republic.



The sun shining off of the solar panels installed in December 2017 in Los Peladeros.