

Water Distribution System in El Tesoro, Guatemala

Abstract

More than forty percent of the rural population in Guatemala lack access to clean drinking water in their homes. However, it is not due to a lack of trying that the people of Guatemala do not have water. Rather, many rural areas lack the technical and financial support needed to successfully set up a water distribution network, and the governments in the area do not prioritize support for these systems either. In El Tesoro, the community in which this project occurred, the community has been trying to get a water distribution system for over 30 years without success. The community has organized some projects on their own and some with outside NGOs. Unfortunately, these projects failed, prompting El Tesoro to partner with Engineers Without Borders (EWB).

EWB-Guatemala and this university's Engineers Without Borders Student Chapter worked together with the community of El Tesoro and many Professional Engineers and Faculty to provide the technical and financial support that the community required to implement their first successful water distribution project. The project team worked to design and implement a sustainable water distribution system that would empower the people of El Tesoro with access to clean water in their homes, something they have long dreamed of but never had.

The student team recruited a team of incredibly knowledgeable mentors that included professional engineers and faculty members. Every mentor had an important role to play in guiding the students through this learning experience of designing the project. In addition to the guidance of mentors, students had to pull from knowledge they gained in classes, work experiences, and self-directed research. The project team also drew on the expertise of the Guatemalan engineers and builders from EWB-Guatemala; these team members played a crucial role on the project team.

To have a successful project, the team had to assess design constraints different than those normally considered in the United States. One major constraint was material type and availability. In rural Guatemala, there is no easy access to large machinery, and there is limited access to some of the common construction materials in the United States. Due to this, materials had to be selected that would keep the project cost low, be readily available in rural Guatemala, and be familiar to the Guatemalans that would build and maintain the system. To accomplish this, the design team worked closely with the surveyors whose knowledge helped to inform the design and the Guatemalan builders who have decades of experience in building and maintaining similar water systems.

A key factor considered was the sustainability of the project. To serve the most vulnerable in the community and ensure that the entire community benefits from the system, the monthly cost for each household to use the system had to be kept low. This made the project more expensive to implement, but these up-front investments made the system cheaper to operate and therefore more sustainable. Funds for the project were contributed by a number of partners, including fundraisers that the student team put on. Another element of sustainability was community trainings on system management and health and hygiene. These trainings drew on lessons learned from other water projects in Guatemala to ensure that the community was equipped to use their system effectively and safely for a long time.

In addition to the main objective of the community of El Tesoro obtaining clean water, the student team grew immensely as engineers as a result of this project. The team learned invaluable lessons that are not found in the classroom. From the in-depth technical knowledge on designing a water system to the overall lessons in the engineering/design process, the students gained knowledge and skills they will forever carry forward in their engineering careers.