

Towards a Sustainable Design

Chocantariy, Guatemala



Engineers Without Borders™-USA (EWB-USA) is a non-profit organization established in 2000 to partner with developing communities worldwide in order to improve their quality of life.

For more information, contact administrator@ewb-usa.org or call 303-772-2723

Project Cost

\$3,400
(pilot phase)

Chapter

University of California at Los Angeles

Background

The community of Chocantariy lies along the Pacific ridge of Guatemala directly adjacent to the Continental Divide. Due to its geographic position, appreciable rainfall occurs only six (6) months of the year and is dry the other six (6) months of the year. Since the community is next to the Continental Divide, the streams dry up shortly after the rains cease, which creates a tremendous stress on the community to meet its daily need.

A Feasibility Study conducted last year showed a groundwater supply system is too expensive for the community to operate and maintain therefore making the system unsustainable. Rainfall collection systems are currently being pursued as a low cost alternative for increasing the drinking water supply in a sustainable fashion.



The Need

During the rainy season, surface water is readily available. During the dry season, however, the women and children in the community walk more than a kilometer (one way) to collect buckets of filthy drinking water. The need for greater quantities of relatively clean water is ubiquitous throughout the community and is arguably the greatest community need in Chocantariy.

The EWB-USA Response

Preliminary Site Assessment

Fifteen months ago, a team of four from EWB-UCLA traveled to Chocantariy to meet with a group of community-elected representatives, conduct a preliminary site assessment, perform a baseline health survey, and meet with water professionals and contractors about possible solutions. Upon returning the UCLA, the team initiated a Feasibility Study for a proposed groundwater supply system.

Feasibility Study and Household Survey

Six months ago, a team of ten from EWB-UCLA traveled to Chocantariy as part of a Feasibility Study. The primary reason for the visit was to conduct a household survey with questions aimed at assessing the capacity to pay operation and maintenance (O&M) costs associated with the pump system. The optimized pump system design consists of a 10-hp submersible groundwater pump with a 5-hp surface transfer pump. The estimated depth of groundwater (~800 feet with a cone of depression) plus the upland lift (an additional 700 feet) dictated the need for large pumps to

move the minimal allotment of water required for basic human needs. The anticipated monthly O&M costs are estimated at 200% the capacity to pay by the community as determined by the household survey. The proposed groundwater supply system was therefore deemed technically feasible, yet financially unsustainable. The proposed groundwater system has been abandoned for a cheaper, more sustainable solution (i.e., rainwater collection) in an effort to ease some of the community water stress.

Moving Forward

Simple, household scale rainwater collection systems have been proposed. Each system consists of a tile or tin roof (existing) with PVC pipe collecting rainwater and routing it to 5,000-liter cistern(s) constructed of cast-in-place concrete. More than enough rainfall occurs (>1 meter per year) to fill the designed storage. However, the system will only meet two (2) months of demand as year-round storage is impractical.

The proposed pilot-project serves three objectives: 1) help meet community drinking water demands in a more sustainable fashion than currently exists, 2) provide a cultural exchange for EWB-UCLA volunteers who travel to Chocantariy to help implement the design, and 3) demonstrate a sustainable technique that could hopefully, one day, be implemented by all households in the community. This pilot project is not the end all solution, but it could ultimately lead to a low cost, sustainable solution consisting of blended rainwater and groundwater.