

WEFTA GUATEMALA TRIP April 14-20, 2012

WEFTA Members:
Blanca Surgeon
Matthew Earthman

Site Review – Macalajau WEFTA Funded Project

We visited site with Jamil Barton of Habitat for Humanity Guatemala (HFH). Upon arriving, met with community members and were provided lunch.

Leaders of the community then guided us to several homes that have been renovated with HFH and WEFTA funds. HFH has installed new wood stoves and water filters in all 89 community houses. WEFTA has installed new latrines in each home. The new latrines were constructed with concrete floor, covered toilet, and vent.



First home we visited has a new, vented wood stove, concrete floor, and Ecofilter water filters. This family has installed rain catchment system and cisterns, but there are only a few families who have been able to afford the catchment and cisterns. They also showed us their new latrine.

Several other homes were visited—all have newly constructed latrines, water filters (Ecofilters) and wood stoves. Many homes do not have concrete floors yet, but are scheduled for the future.

Our driver Erik, from Habitat Guatemala

The ecofilters are essentially gravity filters that last approximately one year and are then replaced. Maintenance includes washing the filter every 3 months before replacement.

The latrines have been constructed out of sturdy lumber, providing stability and a locking, closing door for privacy. Latrine trenches were constructed dug to depth of 2-3 meters and sand and gravel layer at bottom to act as minor filter. Each latrine takes community approximately 1 week to construct

After tour, village submitted a proposal to WEFTA concerning a water catchment system for other families. The area enjoys rain most of the year. Proposal was scanned in and is attached.

Summary/Conclusions

The work at Macalajau looks very good, and the funding for latrines has been put to good use. The new facilities provide privacy, are more sanitary, and are safer than the hastily constructed, older latrines. HFH has also done a great job with their four-step program to help out the very poor.

Program includes:

- 1) Install vented, wood stove to help respiratory illnesses
- 2) Provide Ecofilters for water treatment
- 3) Provide latrines for health and safety (WEFTA support)
- 4) Install concrete floors for cleanliness and avoid diseases.

Sites with Active Proposals:

Ixcamal

Ixcamal is a small community near the town of San Marcos consisting of 118 houses (families) and approximately 600 persons. The town has requested assistance with the construction of latrines to help improve way of life/sanitation/privacy. From a discussion with Don Santos Thomas, auxiliary mayor of the village, only some houses have latrines. Many families do not have any type of latrine.

Upon arriving on site with Habitat for Humanity (HFH) personnel (Jamil, Lucia, and Santos), were given a tour of the village and shown existing facilities. Latrines in community are in disrepair, and do not appear to offer much privacy.

After the tour, we met with village leaders and community members for brief discussion on the problem and community goals. Village leadership appears to be highly organized, and elects representatives on yearly basis. Don Santos of community, Santos of HFH, and Blanca discussed organization and methods of WEFTA, and the proposed construction methods for the latrines if funded.



The community working in Ixcamal

Meeting Highlights:

- Santos, with Habitat for Humanity, explained how each family will be responsible for digging of latrine trench (manual labor). Went on to discuss how HFH will enlist technical company for digging, and will get quotes to minimize costs of materials, etc.
- Blanca discussed with community how no money will be required for project materials. WEFTA requires the labor/time for construction from the community, as well as training, in exchange for the funds.
- Don Santos of Ixcamal brings up the community's water project currently under construction. The community bought a parcel of land and they are digging an infiltration gallery on the site. They need help with materials to take the water to the homes. We explained that WEFTA

funding takes time, we cannot send them money for a project that is currently under construction. We needed to see the whole plan and would have liked to help with the plans for the infiltration gallery and design of the distribution. They are doing it on their own based on what they think is right.

After the meeting, we visited the water project site where the villagers are busting out existing, dry spring box and attempting to dig down a new one for better water. Community has been working on the project for 1 week.

Summary/Conclusions

Blanca and Matt agree that the community seems organized, and are willing to provide labor for project. There is a dire need for latrines—existing latrines are unstable and do not provide privacy. We recommend funding the latrine project.

Santa Rosa la Laguna

Santa Rosa la Laguna is a small village in the district of Uspantan with approximately 76 families and a population of 380. The village is located to the west of the town of Uspantan, and is situated within the lower cloud forest region of the district.

The village is centered within a topographic low which contains a shallow, year round lake used for watering livestock and minor irrigation. This topographic low is essentially a bog—groundwater in the area is present at depths of less than 5 feet, and the ground is continually moist and saturated. However, much of the village residences are located in the drier areas surrounding the bog, hydrologically up-gradient. This layout, and more specifically, the placement of the village's latrines, has introduced contamination to the groundwater located within the topographic low, and this shallow water source is no longer safe for human consumption.

Regional Geologic Setting

Very little geological work has been performed in the Uspantan area. The regional geology of central Guatemala was studied by Jack L. Walper and discussed in a 1960 American Association of Petroleum Geologists paper titled *Geology of Coban—Purulha Area, Alta Verapaz, Guatemala*. Walper prepared stratigraphic sections in the areas surrounding Coban to the west of Uspantan, information from these studies allowed a regional stratigraphic sequence to be prepared for the area, and was utilized by WEFTA volunteers in this study. From the work of Smith, Central Guatemala is located within Paleozoic and Mesozoic marine sediments, dominated by limestones and transgression/regression sequences of fine grained shales and siltstones. These older sediments have been overlain by Pleistocene volcanic sediments, including ash fall tuffs.

A more recent geophysical study was conducted in Uspantan by a group of Swiss researchers studying the active fault near the town. As part of the study, the team conducted a geo-electrical survey of the subsurface beneath the town of Uspantan. The results of the study indicate that Uspantan is underlain

by a 60-foot thick package of ash, which acts as the local aquifer. The study also concluded that the ash is recharged at least partially through deep-seeded water traveling through the fault. As Uspantan is underlain by both Cretaceous limestones (Ixcoy) and Jurassic silts and shales (Todos Santos), it is hypothesized that the deep-seeded water is sourced from the lower Todos Santos.

Local Geology

Utilizing the information from the Smith and Swiss studies, it appears that Santa Rosa la Laguna is located within the Cretaceous Ixcoy limestone formation. This unit has recorded thicknesses of up to 1,500 feet in some areas, and can act as an aquifer by storing water within fractured and karst zones.

This unit is underlain by the Todos Santos formation, which is a unit consisting of fine grained shales, siltstones, sandstones, and thin limestones. This unit should also act as an aquifer unit.

Santa Rosa la Laguna Water Situation



Santa Rosa enclosed well, still contaminated

Santa Rosa la Laguna currently utilizes shallow, open wells near the lake and in the center portion of the village as their main sources of water. The village currently has three wells—two of the wells are open to the air—these are unprotected from the elements, and animals and other debris often enters the wells. One recently constructed well has been covered to protect the water, which prevents debris and wildlife from entering the water source, but this does nothing to address the contamination of the groundwater.

Potential Options

Santa Rosa la Laguna was initially visited by WEFTA and United by Friendship (UbF) volunteers on April 18, 2012. During this site visit, the status of the village and organization of the leadership was reviewed, and the water situations was explained to us. After the initial assessment, it was apparent that there are four options that could address the water quality issue in the village:

1. Installation of an up-gradient, shallow well.

This option was addressed after speaking to village leaders about wells that previously existed on a hillside above the village. According to the villager, two wells with depth to waters of approximately one meter existed beneath the main road to the northwest of the town. After this discussion, WEFTA volunteers surmised that precipitation could be traveling along the top of the bedrock within the overlying soils. This was investigated on the 2nd site visit to Santa

Rosa conducted on April 19, 2012. During this visit, two holes were dug within the soil on the up-gradient hillside to depths of approximately 4 feet. During the digging, fat clays were encountered, and no saturated zones were observed. This indicates that any precipitation present up-gradient from the village will be located at depths exceeding 5-6 feet, and in unknown quantities. To investigate this option further, a larger digging team with equipment/manpower to reach greater depths, in excess of 6 feet, would be necessary.

2. Installation of a deep water supply well

This option would involve the drilling of a water supply well to access a deeper, uncontaminated aquifer in the region. From the geology of the area, it appears that in to ensure the water has not come in contact with the shallow, contaminated water present in the central portions of the village, the well should be advanced through the Ixcoy limestone and enter the Todos Santos formation. As the stratigraphic position of the Ixcoy could not be determined in Santa Rosa, the depth of the well could exceed 1,200 feet to reach the lower unit.

This option is very expensive, and positive results cannot be guaranteed. Unless outside funding can be obtained, this option is too expensive and risky to be funded by WEFTA.

3. Rainwater Catchment

Santa Rosa la Laguna is located within the lower cloud forest, and receives rain throughout the year. With the amounts of precipitation the community receives, it appears that the installation of a rainwater catchment systems could provide ample water for the villagers. The engineers of the Uspantan district are familiar with the construction of rain catchment systems, and could provide useful insight into how to design a functional and efficient system.

4. Treatment of Existing Shallow Groundwater

Santa Rosa la Laguna has a reliable, year-round source of water located within the central portions of the village. If this water could be treated to remove nitrates and fecal bacteria, this would be the most direct and effective option for addressing the water issues at Santa Rosa la Laguna. However, a treatment system necessary to treat the communities water would be very expensive, and require extensive maintenance and training for the villagers. Bacterial contamination could be treated through the use of UV light systems, however nitrate contamination cannot be effectively treated without the use of large-scale wastewater treatment plants. Given the size of the community, this option does not appear to be viable.

Conclusions

It appears that the most viable option to address the water problems of Santa Rosa la Laguna involve the installation of a rain water catchment system. The frequency of precipitation in the area would allow this system to provide ample drinking water to the community. This option, weighed against the expense and risks of the other alternatives, appears to be the most effective means of helping the community.

We are open for the discussion in this very challenging project. There is no central system and no distribution system in the village. Some families have shallow wells in their property. Most families utilize the existing village wells for drinking water and for bathing, washing, doing laundry at the

site. The current wells could be left in the community and improved with areas where people can come and do their laundry as we saw in other villages. But the homes people can use the rain catchment and cisterns for drinking water.

WEFTA was asked repeatedly by the villagers to help them. Perhaps we can work in partnership with the United by Friendship volunteers to fund a solution.