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The Tojquia, Guatemala Fog Collection Project 2006 to 2016

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ABSTRACT

FogQuest began working in the Western Highlands of Guatemala in 2005 with the construction of 4 Large Fog Collectors (LFCs) in La Ventosa. In October 2006, 4 LFCs were constructed in Tojquia. Six more LFCs were added to those in Tojquia in 2007 and the project rapidly grew to 35 LFCs. This is about 1400 m2 of collecting surface providing about 7000 L of fog water per day in the six-month long dry season. Tojquia is at an elevation of about 3300 m a.s.l. and suffers from serious water shortages, especially in the winter. These 35 LFCs remain operational and productive after 10 years of providing clean water to homes in the village. The continued involvement of the people of the village of Tojquia has been vital to the success of this project. The FogQuest approach is to have several FogQuest members teach, organize, and guide the villagers in the initial construction process and then to have the community members as active participants throughout the evolution of the fog collection project. FogQuest does not take in large numbers of volunteers to build the fog collectors for the community. This approach has given the project vitality and the people of the community have organized a water committee to not only maintain the fog collectors but to initiate construction of new fog collectors. It is not changes in the technology of collecting fog water that are required for the adoption of this water resource but rather a careful choice of location and patient and considerate guidance leading to strong partnership building with the peoples of the communities.

1. INTRODUCTION

In a growing number of countries around the world, efforts have been made to develop fog collection projects in order to supply clean water to vulnerable communities without access to a traditional and clean water source. However, these efforts do not always end with a successful project, which might be defined in part as the provision of a sustainable water supply and at the same time the evolution of an active and empowered local community. Fog collection projects do not have to last forever to be considered successful. They may be urgently required for a number of years until such time as a conventional water supply may become available and, as such, very successfully provide clean water in often very challenging conditions.

This paper will present the experience of one of the most successful fog water collection projects of the planet, Tojquia, Guatemala, based on some of the actual social conditions (motivation, future interest and commitment) and will also look at possible future activities in the community.

Figure 1. Two Large Fog Collectors (LFCs) in Tojquia

2. FOG WATER PRODUCTION AND USE

Tojquia is located in the western highlands of the department of Huehuetenango, Guatemala, at an elevation of 3300 m near the top of Chuchumatanes Mountain. During the dry season (November to April), fog is the unique source of fresh water that the community, who are descendants of the Mayan culture, can use for their vital daily activities. In contrast, during the wet period (the rest of the months) many of the families have traditionally used buckets and

containers below the roofs of their homes (virtually every day), this allows them to gather large amounts of water to use not only for drinking and cooking but for cleaning and to supply water to their animals. This traditional use of runoff water from the roof during heavy rains in the wet season continues, even though a cleaner source of rainwater from the large fog collectors is also available.

It is important to mention that before the large fog collectors were built in Tojquia many women, in the dry season, had to walk to old wells located far from the village at the valley bottom in order to obtain water just for the family's needs. Before 2006, women and their daughters had to walk to these faraway locations and they could only carry containers of 16 liters, so this meant that women had to do this trip 3 or 4 times a day to supply their families with water.

The long-term commitment by FogQuest to working in the village of Tojquia began after FogQuest had done investigations in a number of parts of Guatemala using Standard Fog Collectors (SFCs) (Schemenauer, R.S. and P. Cereceda, 1994). It is important to keep in mind that installing the one-square-meter SFCs not only evaluates the amount of fog water that might be collected at a location it also evaluates the commitment and involvement of the people of the community to the water project. If they are unable to contribute to the measurement program with the SFCs and ensure the security of the SFCs, then it is unlikely they will be able to adequately support a fog collection project using Large Fog Collectors (LFCs) (Fig. 2) (e.g. Schemenauer et al. 1988; Schemenauer and Joe, 1989; Klemm et al., 2012). Moreover, the villagers became true collaborators in a highly participatory process. With a foundation based on trust, the so-called beneficiaries came to make suggestions and lead decisions – rendering them co-creators of this water supply (Rojas et al. 2014). The men and women of Tojquia exhibited a commitment to the project and a work ethic that was vital to the ultimate success of the project.

Fig. 2. Repairing an LFC by the community in 2015

3. COMMUNITY ORGANIZATION AND EXTERNAL INVOLVEMENT

The Tojquia project has a diversity of participants: the people and family units in the community; the leadership of the community; the Mam Ma Qosquix village association; the Canadian NGO/Charity FogQuest; different funding entities supporting the community through FogQuest (clubs of Rotary International, schools, churches, individuals, etc.).

After ten years of continuous work by all of the participants linked to the project, the community of Tojquia has made significant progress in several aspects that have resulted in this becoming a successful sustainable water project.

3.1. Water Committee

A new water committee was formed in 2015, which was accepted by all the people after a collective vote. Within their responsibilities were: (1) keep a record of any problems with each LFC installed in the community; (2) keep an inventory of the materials and tools delivered by FogQuest on each visit to the community; (3) keep in contact with FogQuest volunteers and leaders and; (4) inform the community about upcoming visits of FogQuest volunteers to Tojquia. The leaders of this committee in 2016 are:

Table 1: Water Committee in Tojquia

Position	Person
President	Bernardo Lucas
Vice President	Lázaro Hernandez
Treasurer	Tereso Gregorio
Secretary	Gerónimo Jacinto
Spokesperson	Demesio Gregorio

3.2. Collecting funds for maintenance

One of the most important ideas that came up in 2015, during a visit to the community, was the creation of a village fund that allows the people to correct maintenance issues with the fog

collectors that occur over time, like clamps, cable and hosepipe replacement. The people of Tojquia will also pay for a part or the entire cost of new meshes when they are required for repairs or the construction of new fog collectors that the village may initiate. It is true that raising enough money to pay for the entire cost of several new LFCs would be a difficult task for the community right now, but over time the input they could offer would become larger.

After discussing the village fund within the community and looking for each family's acceptance, the saving format consisted in a bi-monthly fee of 10 to 20 quetzales (local money), delivered at the meeting held every 2 months. This will not only allow the community to save for the maintenance of the LFCs but it empowers the people, making this project their own. The operation of the village fund continues to work well.

3.3. Searching for funding sources

In order to maximize the involvement of the community in the project, the people of Tojquia think that it would be a good idea if FogQuest, in the future, train or teach the community how to ask for local and national funds (in Guatemala), all this is to support the maintenance of the projects and, in the long term, the community itself could create the development of new initiatives within Tojquia and in neighbouring villages.

Fig. 3. Tojquian woman during a fog event

4. SUCCESS FACTORS

As we have seen in the development of this discussion, the success of a fog collection project depends on a number of factors, which may vary depending on the location, culture, religion and availability of financial resources. We can, however, identify four elements that are key to the success of this particular project: (1) the flexibility of FogQuest to adapt to the local needs and idiosyncrasies; (2) co-creation, technology transfer and subsequent management; (3) the strong dedication and empowerment of the community collaborating in the project; and (4) the presence and active participation of a local organization and village leaders.

5. OBJECTIVES FOR THE NEAR FUTURE

In remote villages progress is not measured by speed or the undertaking of huge projects but rather by steady advancement. On the next visit to Tojquia later in 2016, the volunteer team of FogQuest will work to further strengthen the progress achieved to date.

The objectives will include:

- Listening to the people of the village to hear their experiences in the last few months.
- Assisting them as they initiate maintenance to the LFCs or changes to the water storage system.
- Facilitating training in obtaining local and national funds.
- Linking the local elementary school into the project in order to promote environmental education and the efficient use of fog as a water resource.
- Discussing a long-term goal of establishing a greenhouse that utilizes the fog water for growing winter vegetables.

6. DISCUSSION

Years of joint work in Tojquia and a gradual and responsible transfer of knowledge have achieved one of the most successful fog water collection projects in the world. Clean water has been provided for 10 years and the strength of the support for the project within the community is stronger than it has ever been. The success or failure of a project of this nature is determined in large part by the effective transfer of knowledge from the facilitating organization to the community and the empowerment of the community in the development and sustainability of their own projects.

In recent years there have been a number of efforts to develop materials or fog collector structures that are purported to have better fog water yields than the double layer of inexpensive Raschel mesh described by Schemenauer and Joe (1989). Rarely are any costs reported for these proposed materials or structures. If one is speaking about a fog collection project in the developing world, improving the yield of the already highly efficient Raschel mesh is not an important factor. Far more important is cost, which is a real factor and, as well, since these projects are typically in complex mountainous terrain, knowledge and experience in choosing an appropriate site for the fog collectors, something that can make a very large difference in the water yield obtained. In addition, as has been discussed in this paper, it is ultimately the involvement of the people in the village that will determine whether a project succeeds or fails. It is their work on a continuing basis that will determine whether the fog collectors continue to function well and whether the water is moved and stored in an effective way and in a way that ensures that it is clean and safe to consume.

7. ACKNOWLEDGEMENTS

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