

# Not just beneficiaries: fostering participation and local management capacity in the Tojquia fog-collection project, Guatemala

M. Rosato, F. Rojas, and R.S. Schemenauer

FogQuest: sustainable water solutions, Kamloops, BC, Canada (melissa.rosato@fogquest.org/Fax:+1-250-374-1746)

## Abstract

The largest fog collection project in the world at this time is the FogQuest project in the village of Tojquia, in the Western Highlands of Guatemala. While much attention in the past has been devoted to developing the fog collection technology and finding and evaluating appropriate sites, there is also an opportunity in Guatemala to focus on implementation factors for long-term success in community fog-collection projects. Drawing from the themes of appropriate technology and integrated water-resource management, this paper details the participatory and management strategies undertaken by FogQuest in the ongoing fog collection project in Tojquia. Through a collaborative effort with the community association Mam Ma Qosquix, 30 large fog collectors are in place providing a daily average of 6000 liters of water to over 130 individuals. The current critical developments, it is argued, are to have a discussion on the successes and ongoing challenges in gender mainstreaming, to ensure women's participation and capacity building, and to ensure operation and maintenance capacity are built for the long term. Lessons learned include the importance of fostering trust as a precursor to collaborative effort and recognizing that an engagement will be for the long-term. True sustainability will be reached when the beneficiaries are themselves managers of a fog water collection system. By sharing our experiences we hope to encourage reflection on these important issues, which are relevant throughout the entire planning process, especially when establishing new initiatives.

## 1. Introduction

An ongoing project in the village of Tojquia in the highlands of Guatemala presents an opportunity to evaluate the human dimension of fog collection technology in the department where as many as 93% of the residents live in poverty and suffer from seasonal water shortages [10]. Best estimates indicate Guatemala-wide only 15 liters per capita per day (lpcd) are available for personal consumption, which falls below the 20 lpcd minimum required for basic

existence and well below the 200 lpcd for productive uses [1]. The Tojquia fog collection project aims to increase the lpcd for both personal and eventually productive uses, and contribute directly to poverty alleviation. The unique fog collection technology fits well with the small scale, context-specific solutions promoted by Integrated Water Resources Management and defined as appropriate technology. It is these kinds of solutions that will make a difference in achieving the UN's Millennium Development Goals (MDGs). The focus of this paper is to examine the participatory issues for planning and managing community fog collection projects, using the village project in Tojquia, Guatemala to draw out prominent themes in the literature. The importance of gender mainstreaming, training for Operation and Maintenance (O&M) and fostering local management are evaluated.

Project Area  
Tojquia Village, Huehuetenango District

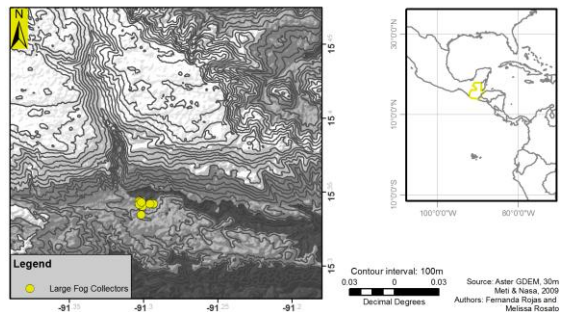


Figure 1: Map of project location, Guatemala

Initiated in 2006 [7], the current fog collection project is now providing water to over 130 people through 30 Large Fog Collectors (LFCs) [6]. Based on an evaluation indicating water resources were not communally managed in Tojquia, this project sought to uniquely implement LFCs at the household level, that is to say one or two are installed adjacent to one or several houses versus arrays of LFCs serving the community at large. This way ownership and responsibilities as well as benefits are clearly defined, and it is hoped fare better for project sustainability. Evaluation for effectiveness is ongoing. From the onset, this project placed locals at the forefront,

respecting their initial apprehension towards development projects. Instead a strong focus was placed on building trust as the key imperative. Upon completion of the first four LFCs with two willing families, the community association was ready to engage in a truly collaborative effort. All LFCs built since 2006 are functioning well giving the community confidence in the technology.

## 2. An Analysis of Stakeholder Participation in Tojquia – Gender Mainstreaming

An understanding of the role of community participation and community management is crucial to the management of a natural resource such as water. Attention to Arnstein’s “ladder of participation” model indicates the more decision-making and management power rests with the participants, the more genuine the participation truly is [5]. With genuine participation, mechanisms are established for enduring engagement and thus success [2]. This is specified by identifying the need to move past manual labour in water projects as the primary mode of participation [8]. In the rural highlands of Guatemala, a well developed and preserved sense of organization and strength in the family unit can be found. These organizational and social structures are usually comprised of the elders, councils and committees [3]. At the same time, issues of seasonal migration are historically entrenched and can have important ramifications for planning and management [4].

In Tojquia, it appears the community is well organized and has higher social capital than in other regions [7]. The villagers have organized themselves as a community association called Mam Ma Qosquix (New Awakening). This group has fulfilled legal requirements for incorporation under Guatemalan law, is comprised of at least 88 families, and has been active for close to 10 years. As such, the community is empowered and in a legal position to seek out financial and project assistance from different government sources. Membership rests on the belief in their founding principles, commitment to the group and collaborative participation. Meetings are scheduled during hours that are sensitive to women’s daily tasks, (as well-defined gender roles means women are the primary caregivers). This is especially relevant as there are at least 8 widows in the community of Tojquia. Meetings serve to

establish objectives, delineate roles, (there are biannual elections), and are documented formally. This allows opportunities for concerns to be raised and decisions are consensus-based and respected.

For the purposes of the fog collection project, a water subcommittee was formed and has been coordinating the activities on the ground in Tojquia from the beginning. This has worked well and our involvement has remained minimal, both for practical and strategic reasons. Despite initial hesitation, this has not seemed to impair the abilities of the group to make decisions regarding the identification of beneficiary families, keeping track of participating members, organizing work teams, and other tasks in collaboration with FogQuest members when needed. While this is positive, challenges do exist.



Figure 2: A village lady, Mercedes, sewing LFC mesh.

In Tojquia, there has been an emphasis to seek out women’s participation from the onset, though this has been difficult as men are the family representatives and more likely to attend and participate in community meetings where a woman’s attendance often indicates her widowed status. For fog collection, efforts to involve all women appropriately during the construction phase (e.g. by sewing the edges of the mesh for the collector) have provided for some engagement, yet also raises the possibility their involvement is “tokenism” [5]. How does an implementing agency both seek gender

sensitivity and respect local values when they include very traditionally-defined gender roles? This one issue demonstrates the challenges of applying theories in practice [9].

Respecting the local community's culture is not only appropriate, it is required to maintain trust and for this reason we have proceeded carefully. As one way to increase women's engagement in the project, the past several years have seen the community host several groups of 20+ individuals as FogQuest involves international students and others in the project. The women's traditional caregiver role is therefore brought into the project to carry out the cooking and other domestic duties, placing an important emphasis on their contribution to the needs of the large groups. Their increased contribution is recognized by the visiting members and also by the men of the community.

A narrow project aim necessarily limits the extent to which we can pursue issues of gender equality, though we seek to do this where feasible and possible. Many FogQuest and student volunteers who have been involved are females themselves who engage in gender-bending activities such as laboring, coordinating and leading, all with the respect of the village men. This serves as just one demonstrable example for women's participation. We hope this example of women's leadership can slowly open the discussion and possibilities to get women more involved in the technical aspects of building and maintenance and for overall empowerment. We recognize traditional and cultural barriers exist, but challenge these for the sake of improving local lives. Given the pattern of seasonal migration for labour and often extended absences by the men, the full inclusion of women is deemed essential for the ongoing operation of the water system.

### **3. Operation and Maintenance (O&M) Issues**

For agencies and small charities such as FogQuest, local organizational capacity is a precursor to initiating a project and this should be evaluated via a comprehensive village assessment prior to any construction. In Tojquia, the community association recognizes the need to manage resources directly, and so our strategy has been to involve different local work teams directly in the builds, by choice for training purposes, but also by necessity due to the limited number of experienced fog collector builders.

It is our recommendation that construction should be primarily undertaken by the locals as practice and training for the O&M that is required. In effect, the most recent builds in Tojquia have seen the locals take on more leadership and guide the process without the oversight once necessary. Their suggestion to mostly lead the next build session with only minimal involvement demonstrates the capacity that has been fostered and empowerment also.

However, it can be unreasonable to expect smooth operations to happen automatically. This is due to greatly varying capacity between community members, (case in point some owners are female widows with no experience in the build sessions). As FogQuest's mandate is to implement sustainable water projects, a continued responsibility for maintenance includes the development of local capacity to do so. Fog collector maintenance faces particular challenges inherent in teaching how to operate tools that may be unfamiliar to agriculturalists and developing a specific skill set such as tightening of the structure's cables. Safety training on minimizing risks is also essential as some men continue to be apprehensive about climbing ladders and preparing the cabling for the tightening procedure. It is recognized that not all participants will necessarily be able to maintain their own collectors, regardless of the amount of time spent on training. For this reason the development of clusters of specialists dispersed throughout the village is essential and should be organized around the water committee. In support of this, stocked toolkits have been prepared to ensure the essential tools are there. Increasing knowledge across a larger group is more challenging but necessary and an ongoing process. Future plans include increasing training sessions and, given the high illiteracy, visual manuals.

One encouraging prospect is the fact that several of the more adept villagers are undertaking basic maintenance without FogQuest involvement whatsoever. There is also local to local training happening which is very encouraging. Continuing to support and facilitate this local capacity development has been identified as a crucial objective in the next stages of the project. However, an additional barrier in Tojquia is the strong possibility the more capable young men, the ideal candidates for expedient capacity training, leave the village, as there are historical patterns of seasonal labour migration, and more recently economically attractive "outmigration" to the USA [4, 11]. The local reality dictates the

consideration of training a large pool of people, to the point where local to local training is more common and where O&M operations are viable in the long run despite migration patterns. There is evidence that payment for services, such as wage labour, exists in the area, and this creates potential jobs for those with a developed LFC building skill-set. We like to think that in the future neighbouring communities might seek out their own fog collection projects and hire the Tojquian labour force. Encouraging women to get more involved and emphasizing mutual support via the water committee are also important activities. These are but some mitigation tactics. The community should pursue what is most feasible and desirable with the support of the implementing agency. Further still, there are abundant possibilities to increase the productive uses for the fog water, through greenhouse agriculture for example, as economic development in this impoverished region is made possible by fog water.

## 4. Summary and Conclusions

The various applied issues outlined above indicate the complexity of ensuring community management and thus a sustainable water project in the long term. While solutions to problems require adaptive capacity at their core, some projected lessons presented here may be applied in the context of other water projects. An examination of a participatory approach was presented, indicating challenges lie with gender mainstreaming particularly in traditional cultural situations such as Tojquia. Community management and specifically the need to address O&M was indicated as a precursor to ongoing success. Clearly the management of a natural resource such as water by locals and efforts to achieve not only project success but sustainable development are a rich and expansive subject matter. The themes discussed here, and the Tojquia successes, should provide encouragement for those seeking to achieve the MDGs and to end poverty in the world, one small water project at a time.

## Acknowledgements

The project in Tojquia would not have been possible without a lot of help. We at FogQuest are especially grateful to our longstanding partners: Rotary Clubs in Canada and Guatemala, the International Development Research Centre, Round Square Schools International and Mr. Marco Antonio Ortiz and his warm staff at Tocosá S.A. in Guatemala City.

Our deepest gratitude goes to the people of Tojquia who have opened their hearts and homes to us, and who dare to pursue a better future.

## References

- [1] Gleick, P. H.: *The Human Right to Water, Water Policy*, 1(5), pp. 487-503, 1998.
- [2] Harvey, P. A., & Reed, R. A.: *Community-managed water supplies in Africa: Sustainable or dispensable?* *Community Development Journal*, 42(3), pp. 365-378, 2007.
- [3] IRC International Water and Sanitation Centre.: *Water supplies managed by rural communities: Country reports and case studies from Cameroon, Colombia, Guatemala, Kenya, Nepal and Pakistan*. No. 5-E. Delft, the Netherlands: IRC International Water and Sanitation Centre, 1997.
- [4] Lovell, W. G.: *Conquest and survival in colonial Guatemala: A historical geography of the Cuchumatán highlands, 1500-1821*. Montreal: McGill-Queen's University Press, 2005.
- [5] Mitchell, B.: *Resource and environmental management* (2nd ed.). Harlow, England; New York; Prentice Hall, 2002.
- [6] Schemenauer, R.S. and Joe, P.: *The collection efficiency of a massive fog collector*. *Atmospheric Research*, 24, 53-69, 1989.
- [7] Schemenauer, R. S., Rosato, M., & Carter, V.: *Fog collection projects in Tojquia and La Ventosa, Guatemala*. 4th Intl Conf. on Fog, Fog Collection and Dew, 22-27 July 2007, La Serena, Chile, 2007, pp. 383-386, 2007.
- [8] Schouten, T. In Moriarty P.: *IRC International Water and Sanitation Centre (Eds.), Community water, community management: From system to service in rural areas*. London: ITDG, 2003.
- [9] Singh, N.: *Equitable gender participation in local water governance: An insight into institutional paradoxes*. *Water Resources Management*, 22(7), pp. 925-942, 2008.
- [10] Steinberg, M. & Taylor, M.: *Guatemala's altos de Chiantla: Changes on the high frontier*. *Mountain Research and Development*, 28(3-4), pp. 255-262, 2008.
- [11] Taylor, M. J., Moran-Taylor, M. J., & Rodman Ruiz, D.: *Land, ethnic, and gender change: Transnational migration and its effects on Guatemalan lives and landscapes*. *Geoforum*, 37(1), pp. 41-61, 2006.