Project Expansion

AguaClara: Considerations for project expansion

Gemma Kite glk34@cornell.edu
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Introduction

AguaClara is a project coordinated through the Civil and Environmental Engineering Department at Cornell University and engages multidisciplinary students and faculty. The mission statement of the organization is to improve drinking water quality through innovative research, knowledge transfer, and design of sustainable and scalable water treatment systems (AguaClara). AguaClara water treatment plants are designed to treat turbid surface waters at the municipal scale, built using local materials, and operated without electricity. AguaClara partners with local institutions who build, operate, train, transfer, oversee, and monitor the water treatment plants to ensure long term sustainability.
Diarrheal diseases from easily preventable causes claim the lives of approximately 5000 young children throughout the world every day. Sufficient and better quality drinking water and basic sanitation reduce this toll dramatically (UNICEF). Distributing untreated surface waters as drinking water is one of the causes of waterborne disease. Point-of-use and municipal scale treatment schemes are two potential solutions. In recent years, conventional municipal water treatment and supply systems have been seen as an unsustainable and expensive strategy for providing safe drinking water in low-income communities in underdeveloped countries. This conclusion is based on the failure of conventional technologies, developed for use in the first world, that have been inserted in third world settings, which lack ready access to supply chains, trained technicians, and sufficient capital.

AguaClara's unique technology design includes completely gravity-dependent treatment, with no filtration necessary. The technology is designed for developing world settings. The simple, small, affordable but effective design allows for communities to finance the facility and even understand how the water is treated.

Currently, AguaClara technology has been implemented in Ojojona, Honduras, with a municipal scale water treatment plant serving 2,000 people. Two more plants are under construction in the Honduran towns of Marcala and Tamara, with populations of 5,400 and 3,500, respectively. AguaClara plants have a one-time construction and capacity-building cost of less than $20 per person. The monthly fee for operation and maintenance is approximately $1 per family. With the help of Agua Para el Pueblo, a Honduran Non-Government Organization (NGO), AguaClara technology has proven successful at producing potable water from turbid surface water.

The future of AguaClara

AguaClara is hopeful that its designs and technology will continue to be implemented in many regions throughout Honduras, and even branch into different countries and continents. In order to be able to promote AguaClara technology, the project has an open-source engineering foundation, understanding that sharing knowledge, design, and ideas is an important step to bringing potable water to everyone around the world. Additionally, the students are working on an automated design tool that will enable partner organizations to obtain detailed design documentation including 3-D CAD drawings of an AguaClara plant that is customized to the population, flow rate, and size of local materials that will be used for construction.

Before advancing AguaClara technology throughout various regions of the world, students question how going global can be done successfully. This includes building AguaClara treatment plants with local NGO support, incorporating participatory involvement from the villagers, and maintaining observation and technical support after completion of construction. All of these efforts need to be coordinated, but whether they are by one facilitator or many different key players, how the future of AguaClara plays out is a viable concern for many of the stakeholders in the organization.

Learning process versus blueprint approach

Currently, the AguaClara approach includes slow, thoughtful choices and decisions based on the outcome of previous work. For example, the AguaClara plant in Ojojona was inaugurated in January 2007 after construction was complete. Over the past year, two former Cornell students were hired as AguaClara interns to work in Honduras and monitor previously built plants as well as future project sites. Through the interns' and the AguaClara community partners' support, AguaClara has been able to observe the existing plant's functioning and progress in the Ojojona community. Meanwhile, the design and research teams have arrived at several changes to be implemented in future plants, and hopefully to be installed into the existing plants if feasible. This type of controlled project progress is called the learning process approach.

For a learning process approach, as outlined in Reasons for Success, "the capacities and orientations that are created must remain flexible, open to new information, ideas, and instructions" (Uphoff). Various social, political, and economic characteristics of a society are constantly changing, and the AguaClara innovations must be checked against these societal modifications to make sure the technology fits with the current times, and is adjusted accordingly, in order for AguaClara to remain effective. Especially important to AguaClara, the learning process approach proposes that the rural people involved should see themselves as "capable of and responsible for continual innovation," and not rely primarily on the NGOs or government persons involved (Uphoff). The best way to initiate the learning process approach is through a pilot program. Ojojona is very much a pilot program for AguaClara, as a lot of controlled thought and evaluation has been put into this town. As AguaClara has already started on this learning process approach, it should continue to ensure the success of all new plants. The organization needs to accompany the approach with creative leadership, effective local organizations, people's participation, an adaptive system for the project management, linkages with key local, regional, national, and international actors, and many more components (Uphoff).

Conversely, the blueprint approach was used in early rural and agricultural development projects around the world for a means to get project goals accomplished quickly and to affect the greatest numbers of people. Defenders of this approach may criticize the learning process approach for being too slow. However, the learning process approach begins slowly and systematically gains the knowledge and experience, "with the expectation that at some point a critical mass will be achieved and work can be accelerated productively" (Uphoff). At some point, AguaClara will become a well-oiled machine, where project planning, technological improvements and plant monitoring can be coordinated by dedicated, skilled personnel.

Taking AguaClara global is an initiative that requires a lot of coordination and thoughtful decision-making. The automated design tool will be available to anyone in the world who has access to internet, making the AguaClara technology extremely handy and a powerful instrument. An innovative technology tool will not treat turbid water by itself, as it also takes community coordination and participation, organization of local NGOs, and the AguaClara technology itself can be dispersed using a blueprint approach, the actual success of the project depends on several other factors not conducive to a quick and easy, impersonal process. Even as AguaClara goes global, it should consider the benefits of the adaptive learning process approach.

Technology is adapted, not transferred

The AguaClara technology has been suited to Honduras, thus far. The treatment plants work well for the characteristics of the water found locally. When this technology is used for various communities around the world, varying construction, geographical, cultural, and social implications will have to be considered. In this regard, technology is not likely transferrable, because it implies that the technology cannot be changed. AguaClara technology, however, can be adapted to various parts of the world to ensure that the project will be technically successful at treating water as well as being culturally accepted.

Construction materials are unlikely to be one factor that changes from region to region. Treatment and construction materials used in Honduras may not be as readily available, nor culturally acceptable, in other parts of the world. For example, more natural coagulants such as Moringa seeds are being used to treat water in more culturally appropriate ways in parts of Africa. Thus, when seeking out new regions and communities to implement the technology, local, knowledgeable people need to be involved in order to disseminate important information that can't always be internet-searched or read in a book.

While it is important to be able to share the knowledge and design tools worldwide, the powerful AguaClara technology needs to be properly adapted to new project sites. This can't happen in a quick and de-humanified blueprint approach. Additionally, it needs to be understood that the key to successful rural development includes the land, the labor, and the capital, or in the AguaClara case, not just the technology, but the organization of local NGOs, the participation of community members, and responsible parties that monitor the development of the AguaClara project.

Expansion ideas

The AguaClara project can not continue to find donors, monitor design and research, facilitate construction, and conduct a year long monitoring for each plant if the project intends to spread globally. There are a lot of tasks involved in the project and all of them are integral to its success. The main reason that AguaClara has been so successful with rural development is because it has considered all of these factors. So, while all tasks must remain within the scope of the AguaClara project, they will have to be distributed among other trusted players.

While the team is still discussing management approaches, it is important to remember that organization and participation is key to going global successfully. In previously studied agricultural and rural development projects, smaller committees comprised of community members and NGO representatives were formed to oversee different parts of the project. "Small organizations by themselves may be beautiful, but their impact will be limited if they are not joined in some larger enterprise" (Uphoff, 67). For AguaClara, there is a strong need to organize a hierarchical structure "that is animated from below even more than from above" (Uphoff, 67). While the AguaClara team can provide overall design and technical support, and a higher managerial component, the bulk of the work should be thought out by, organized by, and implemented by small committees. Ideally, each town would have one committee each for construction, maintenance, and evaluation. These town committees would be supported by a network of an inter-village committee and from NGO's like APP. Above this would be any support by government agencies or country committee, which would be in communication with the AguaClara team. While this is just a framework of how the AguaClara global project could be managed, many more details need to be figured out in order to achieve participatory management.

Financial considerations

An important consideration for project expansion is financial responsibility. The student-run group initially raised funds to build the plants in the communities. If the project expands to fabricating multiple plants in a year, however, the group will be overwhelmed with raising funds and will spend less time on the technology aspect and improving the design. Even now, there are financial issues within the communities that are affecting the efficiency of the plant and need to be addressed in order to expand the project.

One issue that has sparked much discussion within the AguaClara group is community ownership. Since AguaClara technology is still considered to be experimental by both the students and the Hondurans involved, the group takes great measures to ensure that no monetary burden of installing the treatment plant or treating the water falls on the community. This includes the majority of the capital costs of the plant, except for labor and materials, and the purchasing costs of alum. The community does pay a tariff for their treated water, which is in place before AguaClara, to support the local systems. It is used to cover the costs of plant operation and maintenance. After the first year, communities are expected to order and purchase their own chemicals, and this is usually accomplished by raising the tariff to include the chemical consumption. Ojojona has recently passed the first year mark, but has not increased the tariff. Consequently, there was a time when alum had not been purchased, the water was not being treated, and the community was back to the same situation as a year ago. John Erickson, an AguaClara intern working in Honduras, believes that this problem stems from political and organizational factors. Erickson believes that "several members of the Junta have political aspirations, and this likely makes them reluctant to raise the tariff," especially as elections are in the coming weeks. Ulterior motives from members of the governing body, as well as a lack of organization among the board, have impacted the functioning of the plant and jeopardized the health of the community. Several suggestions can be offered in order to combat the financial and social issues impeding plant operation.

In order to ensure that the people receiving the AguaClara technology will continue to support the functioning plant, a financial commitment can be made earlier. Suggested by the team, increasing the tariff before the one year mark to include chemical additives will likely improve the organization of the board and the community members' commitment. Unfortunately, this will negate the idea of an "experimental" year, even if the raise in tariff is only slight. Instead, get rid of the concept of the experimental year and raise the tariff to include chemicals when the first drop of treated water flows from the plant, or even gain approval for a raise in tariff at the onset of construction. Since Ojojona can be seen as the pilot program for AguaClara, the next generation of plants does not have to include an experimental year with free chemicals provided.

Ojojona has proven that even with a year to organize and prepare for a tariff raise, the transition did not happen smoothly. Perhaps this can be blamed on the poor organization and political motives of the board, but if the leadership cannot be held responsible to act for the health of the community, then measures need to be put in place that ensure the alum will not run out. This tactic requires a commitment from each community member even before they see that the plant operates and produces potable water. Consequently, this monetary obligation could be harder to attain. In the Malawi Self-Help Rural Water Supply Program, local village leaders were taken to the pilot project to meet with the local committees and to inspect the project. Once convinced of the benefits, they returned home and persuaded other residents to undertake the project (Uphoff, 230). AguaClara can utilize a similar scheme, involving local community members as advocates of the project. With improved community support at the onset of construction, it will be more feasible to obtain an increase in tariff immediately.

Community ownership of the water treatment plant is a key factor, like in most rural and agricultural development projects, as it requires groups to call upon their own resources and leads to trusting in their own capacities. While Ojojona has contributed labor and materials for the construction of the AguaClara plant, it does not pay for the capital costs of the facility. The community does contribute a great amount of resources already, however, it can be argued that having Ojojona finance the capital costs too will increase the social investment in the project, and create a more sustainable result. A suggestion for simultaneously improving the ownership of the plant and the sustainability of AguaClara expansion is implementing a "daughter and son mill" fund scheme developed in the Six-S groups in the Sahel. When a village receives funding to construct its own AguaClara plant, its members agree that part of the tariff that each member pays in return will go into a "son mill" fund and a "daughter mill" fund (Uphoff, 39). The funds in the "son mill" will be used for operation, maintenance and replacement costs on their plant, while the funds in the "daughter mill" will be given to another community to set up a new plant. This unique scheme ensures that "valuable capital facilities are maintained and extended in rural areas without additional outside funding" (Uphoff, 39).

Not only does this "son and daughter mill" fund scheme induce the community members to contribute more to their own plant, but this plan is conducive to horizontal project expansion. The people being serviced by the AguaClara plants would have to pay more than they do currently, but it is with the intention to help other surrounding communities benefit from clean water. Especially since a community would receive a fund to build its AguaClara plant from another town, giving back to a different community is a way to continue to support the project. If AguaClara were to adapt this type of funding scheme, the organization would have natural proponents of the project, as people will want to ensure that their "daughter mill" fund will go to an appropriate community through meetings and other social interactions. Consequently, the community members from one town could train the members at the next town on construction, maintenance, and operation of the plants. Most importantly, AguaClara would not have to continue to rely heavily on outside donors nor focus large efforts on project expansion in nearby communities, as the "daughter and son mill" funding scheme would benefit both areas. There are other potentially good funding schemes that would install more community ownership and require less focus on outside donors that could be evaluated, as both will increase the sustainability of the AguaClara project, including less involvement from upper management and more focus on the local people.

Conclusions

This evaluation was by no means comprehensive of all of the factors that contribute to the AguaClara project. Before AguaClara can go global, a re-evaluation of the current progress in Honduras will give the team helpful insights into how to cultivate a more successful development project, especially with respect to cultural and social values. Installing the AguaClara technology is only effective with help from local organizations, participation of community members, and creative management.

For the future of AguaClara, the project must maintain a learning process approach to building new plants, while being able to direct certain tasks to other key players. Just as financial considerations are important to understand and consider, there are also social aspects to the AguaClara project that should be evaluated. Such aspects include an easier method to survey community members, understanding community participation and the interaction with local leadership, and the social capital involved. After all, AguaClara is not just a drinking water treatment plant, it is educating a population on proper sanitation, on sustainable water use practices, and empowering a community to be able to drink their own water and be proud of this freedom.

Sources

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