

Student Volunteer Opportunities in Hydrophilanthropy: The Steps to Organizing a Successful Project

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Abstract: University students who travel internationally become de facto ambassadors not only of their country but also of their universities and colleges. Therefore, it is important that all hydrophilanthropy projects include awareness of cross-cultural differences and include community participation and involvement during the early planning stages. Schedules should not be so ambitious that the project cannot be completed in the allotted time period and multiple trips to the same community are essential to assess the effectiveness and sustainability of completed projects. Low-tech water supply technologies that are affordable, easily replicable, and require minimal or no outside monetary assistance are the keys to completion of a successful project.

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Recently, the United States has seen resurgence in volunteers, particularly among college students, including the first group of what some people call the “9/11 Generation” transitioning into college – young people more likely to volunteer in a sense of civic responsibility since the September 11 terrorist attacks (Corporation for National and Community Service 2006). Many colleges and universities now promote volunteering and community service among their students to instill an ethic of civic and global responsibility with respect to water related issues. For example, many universities offer academic courses that focus on global efforts to address water shortages, conflicts, and solutions in developing countries. These include Massachusetts Institute of Technology’s wheelchair design for developing countries, University of Oklahoma’s course in water technologies for emerging regions, Oregon State University’s Institute for Water and Watersheds certificate program in water conflict management and transformation, and the University of Nevada Reno’s course in international issues for water development. Student-led water-related non-profit organizations have sprung up on campuses: Engineers Without Borders, Engineers for a Sustainable World, Hydrogeologists Without Borders, Massachusetts Institute of Technology’s

Design That Matters, and University of Nevada Reno’s Student Association for International Water Issues.

This article will focus on efforts by Student Association for International Water Issues to both promote the development of water resources in developing nations and provide students with overseas experience in working with local communities. Tapping into the enthusiasm and passion of college and university students for hydrophilanthropy can result in a lifetime of volunteering.

Introduction to Student Association for International Water Issues

Realizing the need to improve water availability in developing countries, students from the Graduate Program of Hydrologic Sciences at the University of Nevada, Reno formed Student Association for International Water Issues in 2000 to promote research, education, and training on international water resource issues. Student Association for International Water Issues objectives are to:

- Organize, sponsor, and maintain discussions related to water resource issues in developing countries.

- Offer networking for students, scientists, and professionals that share an interest in international water issues.
- Provide members with hands-on, overseas experience working with local communities on water-related projects.
- Encourage students to share and discuss overseas experiences with Student Association for International Water Issues members and the surrounding community.

Although the student group originally consisted of graduate students in hydrology, the organization has broadened to include undergraduates and graduates in chemical engineering, natural resources, ecology, and other disciplines. All funding for overseas trips comes from grant applications used to purchase supplies and equipment (i.e., University of Nevada Reno's Academy for the Environment, Ann Campana Judge Foundation, and Rotary Clubs). Students pay their own transportation expenses through fundraising, including an African dinner with entertainment, silent auction, and presentation of work accomplished from recent overseas trips. Student Association for International Water Issues is registered as a 501(c)(3) charitable organization and since its formation has completed 16 projects in eight places: Haiti, Ghana, Kenya, Panama, Bolivia, Guatemala, Cameroon, and the Navajo Nation in the United States.

Similar to the Peace Corps, students in Student Association for International Water Issues discuss their cultural experience and lessons learned with local groups after their return. Venues include talks at Rotary clubs, church groups, Desert Research Institute, and conferences, such as the Geological Society of America and National Ground Water Association summit. Student Association for International Water Issues also runs workshops for students and interested community members, including well drilling demonstrations, water quality monitoring, and building fuel-efficient stoves.

Pre-Trip Preparation

Student Association for International Water Issues trip preparation typically starts four to six

months in advance, with identification of a project leader and bimonthly meetings with interested students. All details regarding trip logistics are compiled in a three-ring binder, including visa requirements, immunizations, security updates, disclaimer and emergency forms, funding sources, airfare, and material costs. Because of the continual turnover of students upon graduation, this helps with project continuity and ensures that future trips to the same location can be completed without starting all over again.

When students travel internationally, they become de facto ambassadors not only of their country but also of their colleges or universities. Therefore, the institution has a great deal to gain or lose by the behavior of their students. Travel is inherently stressful and issues can arise when groups of relative strangers share close proximity during an overseas trip (Ornstein and Nelson 2006). Prior to embarking on an overseas trip, Student Association for International Water Issues conducts numerous meetings as part of the team building effort and discusses appropriate behaviors and cultural sensitivity. There are many useful references on understanding cross-cultural differences (Maranz 2001; Moran et al. 2007; Shiraev and Levy 2010). For example, Africans readily share space and material possessions, but knowledge is not shared freely. In contrast, Americans share knowledge freely but money and material possessions are considered an individual's property. While students are focused on completing a water project during the two to three week overseas trip, other cultures often are placing a higher value on people and relationships. Knowing these cultural differences prior to arrival in country can be critical to a successful outcome.

Student Association for International Water Issues has also learned that having a schedule that is too ambitious can lead to failure to complete the project. Projects that could be completed in one week in the United States may take two to three weeks overseas, because time is often an abstract concept. For a project in Cameroon, arrangements were made to ship materials to the village two weeks prior to Student Association for International Water Issues's arrival in-country. However, upon arrival in the village, Student Association for International Water Issues found that the materials had not yet



Figure 1. Water quality testing by Student Association for International Water Issues volunteer and local community member of a completed well in Ghana, 2002.

been ordered. They were finally delivered two and a half weeks later, which was three days before the students' departure. But in the interim, Student Association for International Water Issues students were able to interact and build relationships with the youth in the community.

In addition, the resourcefulness and knowledge of the members of the community should never be underestimated. Although community members may be reluctant to speak up and suggest a better way of doing a task because the Americans are perceived as the "experts," villagers often have innovative ways of problem-solving with limited resources. When encountering problems while well drilling in Cameroon, the Student Association for International Water Issues liaison and community youth leader, Farmer Tantoh, delighted in calling for "brainstorming" sessions. Student Association for International Water Issues students also discovered in western Kenya that "bladders" – used bicycle tires – worked much better than duct tape in making waterproof piping connections.

Partners, Continuity, and Community Involvement

International aid efforts have become fragmented with too many aid agencies working in too many different countries (Easterly and Pfütze 2008). Celebrities have made Africa the new cause *du jour*. A Google search of NGO water projects in Africa results in over 187,000 hits. As a consequence, aid has been spread thin and efforts

to assess effectiveness and long-term sustainability of completed projects have been neglected. To maximize its effectiveness, Student Association for International Water Issues teams with existing in-country non-governmental organizations or local organizations, which have low overhead costs, and nationals or local personnel living or working in the area to provide post-project follow-up. For example, Student Association for International Water Issues projects in Ghana (Figure 1) collaborate with Desert Research Institute's West Africa Water Initiative project, a five year program integrating water, sanitation, and hygiene as well as efforts to eradicate guinea worm disease.

Continuity, which requires multiple trips to the same community over the years, is essential to assess the effectiveness and sustainability of completed projects. In the early stages of a project, the community must be involved so that the local people determine the technology which responds best to their needs within the limitations of site-specific conditions. It is only through participation that the community will develop a sense of ownership. Student Association for International Water Issues completed three water projects from 2004-2006 in a small village in western Kenya, in cooperation with the Rabondo Community Project (2010). This United States-based NGO has a Kenyan equivalent Community Based Organization formed with local village leaders and water committees. Prior to Student Association for International Water Issues's first trip to Rabondo, the community met numerous times to decide what water projects would be most effective and priority based on need. In addition, the community formed nine water committees, one for each area of need, with ample representation by women in the community. The completed Student Association for International Water Issues projects in Rabondo involved water well drilling, training local technicians to drill and maintain hand pumps, teaching hygiene education in primary and secondary schools and to women's groups, installing rainwater harvesting systems, doing geophysical surveys, and water quality testing.

For the well drilling project, women members of the community were trained in equal numbers with the men on how to operate the drilling equipment and install and repair the hand pumps.



Figure 2. Caretaker of community well in Rabondo, Kenya installed by Student Association for International Water Issues students and community trained water technicians in 2004.

The community provided labor and local resources (i.e., sand and gravel) for the borehole and pad construction, but most importantly the community decided how much each family was required to contribute on a monthly basis for the use of water from the wells. The water committee appointed a caretaker for each well, whose responsibility was to collect the monthly contributions from the families using the water and to oversee operation of the well during designated morning (10 am to noon) and afternoon (4 pm to 6 pm) hours.

As a result, the well that was drilled by Student Association for International Water Issues volunteers in 2004 and three subsequently installed wells by Student Association for International Water Issues students are still operational today (Figure 2). The monthly water fees collected by the caretakers are available in a bank account for future repairs, when needed.

From Low-Tech to Lower-Tech Solutions

Incremental and affordable improvements to household or community water supplies (Sutton 2008) enable communities to improve their water without waiting for help and funds from government agencies or NGOs. An incremental improvement could be as simple as partially protecting an open hand dug well with a pulley and fixed bucket, combined with clean handling practices and disinfection of the well water. When



Figure 3. Drill bit welded at local shop.

Student Association for International Water Issues started drilling boreholes in Rabondo, Kenya in 2004, it used a portable mud rotary drill rig (Lifewater International 2009). Once the local crew was trained, the equipment was donated to the community so more wells could be drilled. It became apparent that outside funding would be required to sustain the drilling efforts, because of mechanical breakdowns and the limited replacement parts in country. The cost of \$2,000 per well was beyond the means of the community, and well drilling was only initiated twice a year when students and volunteers from the U.S. were able to assist the community. So simpler drilling methods were investigated to reduce the cost per well so the community members could afford and would not require mechanical equipment.

The Rural Water Supply Network has published a Hand Drilling Directory that describes various manual drilling techniques and locations throughout the world where these projects are being implemented (Rural Water Supply Network 2009). The National Ground Water Association also has developed some basic guidelines for well installation as part of the Developing Countries Interest Group (National Ground Water Association 2010). The Student Association for International Water Issues students determined that a manual reverse circulation, percussion drilling method might be applicable for drilling water wells in western Kenya (Waller 2010). One advantage of this technology is the use of locally available materials that can be found in village hardware stores (1-1¼-inch galvanized and PVC pipe, a pulley, and rope). Drill bits can be made by village

welders using bolts, regular couplings and reducer couplings, and the discarded leaf springs of cars (Figure 3).

The drill bit with internal check valve is attached to the galvanized pipe followed by PVC pipe; the top of the drill string is attached to a handle and rope threaded through a pulley at the top of a tripod. Teams of four to eight people pulling on the rope provide the percussive force by lifting and dropping the drill stem and bit with quick, short strokes. The reverse circulation component of the drilling process involves moving the water and drill cuttings up through the inside of the drill pipe via the one-way check valve in the drill bit. Additional details regarding this drilling method can be found on the Water for All International website (www.waterforallinternational.org).

The purpose of the May 2006 Student Association for International Water Issues trip was to investigate the applicability of this drilling technology in Rabondo, Kenya (Figure 4). Two wells were successfully completed using this method by the Student Association for International Water Issues students and the water technicians in 2006, in the same amount of time (two weeks) that it took to complete one well, using the mechanized LS-100 drill rig. Since installing these wells in Rabondo in 2006, an additional ten wells have been completed in Kenya using this drilling method without funding from outside agencies or NGOs.



Figure 4. Community members and Student Association for International Water Issues volunteers drilling a water well in Rabondo, Kenya, using the reverse circulation, percussion manual well drilling method.



Figure 5. First completed well in Nkambe, Cameroon, with Student Association for International Water Issues students and Farmer Tantoh, leader of Save Your Future Africa.

In addition, the Student Association for International Water Issues students traveled to Cameroon in 2008 to drill one water well in Nkambe using this method (Figure 5). They teamed with a local organization, Save Your Future Africa, a non-profit local organization that works with youth volunteers to promote environmental protection, education, and sustainability. The youth volunteers who were trained during that trip have since completed three additional wells on their own relying solely on community support and funding.

Not all Student Association for International Water Issues projects involve well drilling, but all projects have the goal of using the simplest available technology to improve the community's water supply. Past projects have included capping a spring in 2005 in the Maasai Mara area of Kenya to prevent water contamination from cattle; installing 32 rainwater harvesting systems at churches, schools, and individual homes in January 2010 in a small village in Guatemala; and teaching hygiene education, the importance of handwashing, and disinfection of water using sunlight (the SODIS method) in Kenya and Cameroon at schools and women's groups. Although hygiene education is an often neglected aspect of water projects, research has shown that handwashing with soap can significantly improve health, with up to 47 percent reduction in diarrheal diseases (Curtis and Cairncross 2003). Without education on how to prevent water from becoming contaminated during collection, transport, and storage, a successful

clean water project may have no impact on the health of the users. Therefore, Student Association for International Water Issues projects try to always include a hygiene education component along with the construction of an improved water source.

Summary

Planning effective overseas trips with student groups and organizations requires close coordination with in-country NGOs and the communities being served to ensure that the decisions made as to which water supply technology best serves their needs comes from the community itself. In addition, the concept of self-supply and incremental improvements in the household or community water supply should be considered as integral parts of the water project to ensure that the introduced technology is affordable and easily replicable by the community with minimal or no outside assistance. The goal of any student organization or NGO doing overseas projects should be to make the community aware of potential low-tech technologies that may be applicable in helping to solve their water supply problems and then let the community carry on and implement their own solutions for improved water supply.

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