

## REVIEWED PAPER

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**33rd WEDC International Conference, Accra, Ghana, 2008****ACCESS TO SANITATION AND SAFE WATER:  
GLOBAL PARTNERSHIPS AND LOCAL ACTIONS****Power of knowledge in executing  
household water treatment programs globally**

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*This paper presents a case study of five organizations from five countries: Haiti, El Salvador, India, the Philippines and Pakistan, demonstrating that knowledge transfer can be a catalyst for locally-driven water programs for the poor. Each organization received training and technical consulting from the Centre for Affordable Water and Sanitation Technology on Project Implementation for the Biosand Filter. Each then established an independent project resulting in cleaner water for 156,000 people in six years, and widespread biosand filter acceptance among users. Lessons learned are that knowledge transfer can result in effective, sustainable and scalable technology implementation; transfer takes place one person at a time, making education at all levels crucial; pilots/demonstrations are essential motivators to technology adoption; involvement of mainstream government can result in faster implementation and widespread acceptance; and technology training is not enough. Organizations need to learn how to plan, implement and monitor programs.*

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The following case study is an illustration of successful household water treatment (HWT) programs, initiated by five different organizations in five countries: Haiti, El Salvador, India, the Philippines and Pakistan through the use of education and training and the open content distribution of training programs.

**Players**

The process of knowledge transfer was initiated by CAWST, the Centre for Affordable Water and Sanitation Technology, a Canadian NGO. Over the last six years CAWST trained over 2,400 individuals in HWT, and in particular, on a specific technology called the biosand filter. Although CAWST teaches many HWT options, this particular technology has been the one selected by most of the trainees for implementation. The biosand filter is an adaptation of a conventional slow sand filter. One of the reasons it has been adopted so widely and quickly is that it can be built by people with minimal skill and with materials that are usually locally available. While the training is specifically designed with several critical steps and design parameters, people can learn how to build, install, operate and maintain the filter in a relatively short period of time. Under normal circumstances, the knowledge required for this can be transferred in a four or five day workshop using various learning techniques.

Among the individuals trained by CAWST were:

- Arshad Baryar, Director, Koshish Welfare Society – a Pakistani NGO which sought a water treatment solution for the villages it served.
- Tal and Adele Woolsey, co-founders, Clean Water for Haiti (CWH) – an NGO created to promote and advance HWT in Haiti. Leslie and Chris Rolling now lead CWH.
- Michael Lipman, President, South Asia Pure Water Initiative, Inc. (SAPWI) – Michael and his wife, Kathy Forsberg, are members of a U.S. Rotary Club. They formed SAPWI to bring biosand filters to poor communities in Kolar, Karnataka, India.
- Gemma Bulos, founder, A Single Drop (ASD) – an NGO focused on water advocacy and education to inspire unified action for water stewardship in the Philippines. ASD expanded the scope of its vision after learning of the biosand filter.
- Rene Martinez, Director, Asociación Agua Viva de El Salvador – trained in biosand filter production prior to CAWST's formation in 2001. Since then, has participated in CAWST trainings to advance its program. Agua Viva is connected to the U.S.-based NGO, Living Water International (LWI).

## Activities

Subsequent to the initial training, Agua Viva and SAPWI focused primarily on project implementation in specific communities, while ASD, CWH and Koshish focused additional effort on training other organizations as a means to promote HWT more broadly in their countries of operation. Implementation by each organization generally started with a small pilot project (e.g. five biosand filters in the case of Koshish). It was the success of these pilots (such as Agua Viva's observation of less turbidity in the water after filtration) that convinced the organizations to move ahead with their projects.

Both CWH and SAPWI reported that filters were initially placed in schools, health centres, churches and in the homes of community leaders. SAPWI used its connections with local Rotary members to facilitate this implementation. Koshish, on the other hand, used a network of village health workers at the Pakistani Union Council level to introduce filters to the community. According to Koshish, "Each Union Council usually comprises 20-25 villages and each village has one to three female health workers. Training is provided for the female health workers in each village, and an agreement is made that the health workers will receive a biosand filter free of charge in exchange for promoting the technology, facilitating the installation of at least 20 filters, training the users and following up on the operation and maintenance of installed filters in the village. Users receive a guide to assist them in the maintenance and troubleshooting. Health workers and a technical person (usually a mason) also assist if problems arise. As a last resort, there is a telephone 'hotline' where users can call Koshish to ask for advice and assistance. If necessary, a Koshish staff member visits to fix the problem, but this is difficult due to distances and cost of transportation."

All the HWT projects include an educational program, utilizing training materials developed by CAWST to train a "Community Health Promoter" to help the local communities use the filters properly. In addition, SAPWI provides children with a bar of soap to encourage hand-washing.

In addition to training, CWH supports other Haitian organizations by sharing experiences, and selling materials to construct filters at cost. In India, SAPWI has developed an Adopt-A-Village Partnership program which generates funding in the U.S. to provide filters for the most impoverished people in the Kolar District. ASD started its introduction of the biosand filter in the Philippines by organizing four workshops which were delivered by CAWST and assisted by ASD staff. More than 50% of the 91 participants were from large international aid organizations or health workers from local government agencies. Because of the demand, ASD decided to become a full-service Water Education Training Center that introduces affordable water technologies to other organizations. In less than a year, ASD conducted thirteen biosand filter workshops, training over 250 community facilitators and eight ASD staff members as biosand filter trainers. ASD focuses its training on existing implementing organizations, or alternatively, receives a grant from a funding agency to help develop community-based water organizations called Water P.O.D.S. (People Offering Deliverable Services).

## Outcomes

Together these five organizations have improved the drinking water of 156,000 people in less than six years. One biosand filter installed in a household serves six people on average (See Table 1). This average was verified by a 2007 CAWST survey of 186 HWT implementers world-wide.

Furthermore, all organizations reported widespread user acceptance and good filter performance. Koshish states that users were satisfied with the water quality and no one got sick. CWH adds, "We are able to see visible improvements in the health of community members over time, especially in communities where a saturated [biosand filter] installation has occurred within six months." Demand for HWT now outstrips the organizations' abilities to supply.

<b>Implementing Organization</b>	<b>Number of Biosand Filters Installed in Households*</b>
Koshish Welfare Society	14,000
Clean Water for Haiti	6,600
Asociación Agua Viva	3,600
South Asia Pure Water Initiative	1,500
A Single Drop	300

\* On average, one filter can provide clean water to a family of six people.

## Lessons learned

The most significant learnings reported by the organizations involved are that:

1. Knowledge transfer through a system of international, national and community-based organizations can result in effective, sustainable and scaleable technology implementation. Communications and messages can be adapted to fit the local context at each step of the program; each organization can act independently using its own support networks; community ownership can be engendered; and a feedback loop can be established to enable continuous program improvement.
2. Technology transfer takes place one person at a time. Person to person communication is the key. Education at all levels is crucial in raising awareness...awareness of the need for water treatment, hygiene and sanitation; and in the correct implementation of solutions, including the proper production, operation and maintenance of HWT.
3. Pilots and demonstrations where people can see the results are essential motivators to technology adoption. The ease with which the biosand filter can be piloted in various communities is one of the reasons for its widespread global distribution in a short period of time. There are now over 180,000 biosand filters in 49 countries.
4. Involving mainstream government and other organizations resulted in much faster implementation and widespread acceptance. The Koshish program now has the support of the political leadership of the Province of Punjab, the Federal Government, and the local leaders.
5. Training organizations have discovered that technology training is not enough. Organizations need to learn how to plan, implement and monitor programs. CAWST now offers training programs in all these areas, and in water quality testing. Furthermore, training programs can be adapted in order to achieve better adoption rates. CWH raised its implementation success rate of students after training from 10-20% to over 80% by adding a "Project Implementation" component to its program

## Challenges

The major challenges now being faced by these organizations are (a) financially sustaining what has been started, (b) ensuring good quality control, (c) following up and monitoring existing installations and programs, and (d) overcoming resistance by external organizations.

Koshish states "At present there is a huge demand, but we need to limit response to what can be managed effectively, in order not to become over stretched." The Koshish program needs to become financially sustainable so the organization has temporarily suspended subsidizing filters and will restart by "selling" at full cost, which may include operating and administration costs.

Good quality control requires well trained work teams and often additional costs. Agua Viva states, "Our biggest challenge is to train the work teams." And Koshish currently transports sand 400 kilometres for use in its filters, adding to overall costs. The expense is worthwhile however for good quality sand.

Both CWH and ASD believe that one of their greatest challenges at this point is to follow up on all of the biosand filter projects that have been initiated. CWH suggests, "We need to visit the filters again and ensure that users have proper user education." ASD concurs, stating that as a training organization, "We have many people trained, a growing number of projects and a small staff to train, monitor and evaluate. Traveling around the many [Philippine] islands is time consuming and cost-prohibitive."

Koshish also faces objections to the biosand filter from water treatment experts in Pakistan. These objections are based on a limited number of tests showing low bacterial removal. "Interaction with high level experts from different organizations can be difficult as we feel we are lacking in knowledge and expertise to be able to talk at the same level, despite the fact that we have constructed and installed many filters which are operating properly and supplying people with safe water. We will need additional professional training and support," reports Koshish.

## Plans forward

All of the organizations are confident that they can meet these challenges, and each has significant plans for the future. Agua Viva's plans are to triple its current output and install 60,000 filters in total.

SAPWI's programs include a joint effort with Rotary District 7980 in Southern Connecticut to collect money at weekly Rotary meetings to finance over 1,000 filters for 411 schools and 120,000 children in the Kolar District. The organization is also expanding the program into Bangalore, India. It obtained financing for the Rotary District Governor in Bangalore to create a similar program for schools in the area involving 500 filters. SAPWI makes themselves available for groups interested in clean water and gives many presentations, promoting the biosand filter and the Adopt-A-Village Partnership program.

CWH states, “We have become a leader in Haiti and have made it a goal to pass our knowledge on to others that are starting projects so that they might have a faster start up time and eliminate some of the problems that we encountered. We try to set a goal of about 100 filters installed every month and are close to reaching that target consistently.”

Koshish’s long term objective is to cover the whole population of Punjab with HWT. Koshish states, “40 districts out of the 110 districts of Pakistan suffer acute problems with water supply and/or quality. We need to reach all of them. We will concentrate on the villages in our area. At the same time, we will train civil society organizations working in other areas to disseminate the technology and reach the other districts. We also plan to investigate how to start business-based dissemination through entrepreneurs constructing and installing filters.”

ASD’s ultimate goal is to be a model of financial independence to the Water P.O.D.S. it mentors by being financially sustainable itself. ASD also plans to provide additional training and mentoring in rainwater harvesting, integrated watershed management, spring development, pump repair, and emergency preparedness for natural disasters so that communities and organizations can continue to develop sustainable water and sanitation solutions, after their biosand filter program is completed.

CAWST will support all of these organizations in their plans. CAWST currently provides 371 organizations in 49 countries with services in technical consulting and training and acts as a global centre of expertise in water and sanitation for the poor. In 2008, 40% of CAWST’s International Services resources will be directed to the development of Centres of Expertise like ASD in five countries: India, Nepal, Zambia, the Philippines and Haiti.

## **Conclusions**

These activities, results and plans all started with a simple four-day course on biosand filter implementation by CAWST, followed by the open content distribution of training programs and materials that enabled good quality program implementation at the community level. This provided the catalyst for the organizations involved to get started, seek out required funding, and to overcome initial challenges on many levels. The knowledge acted as the foundation for innovation (e.g. CWH developed a lighter biosand filter which is now the standard world-wide), and continuous technical and training support has enabled them to scale up. Not only, are these organizations involved implementing biosand filter projects, and offering training programs, they are also actively involved in the development and support of other civil society and government organizations that wish to do the same.

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## **Keywords**

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