

**Clear Cambodia/charity: water
Trip Report
Svay Chrum Village, Svay Rieng Province, Cambodia**

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charity: water Staff: Technical Advisor Steve Chee

Clear Cambodia Staff: Savath Mao, and Chhorvy Vann. Clear Cambodia is the long-time in-country implementing partner for charity: water in Cambodia

Cambodia Stats:

- 15.5 million people
- 79% in rural areas
- 69% of rural people with access to improved drinking water
- 30% of rural people with access to improved sanitation

Savath has been working for Clear Cambodia since 2010, but has been working for different NGO's since being trained as a nurse in the refugee camps. He has a passion for helping to improve the lives of women and children. He currently is the program manager, and spends over half of his time in the field, visiting each provincial office and working with the provincial managers on making sure they implement efficiently without sacrificing quality. Chhorvy used to be a teacher, but has been working in different NGO's usually involved in training and capacity building. She was with Hagar for many years, and joined Clear in 2012 to be the school program manager, helping to take the early program and develop it further.

Intervention:

The BioSand Filter (BSF) is a household-scale, intermittently-operated slow sand filter invented in its current form by Dr. David Manz while he was at the University of Calgary in early 1990s. Slow sand filtration is typically used on a massive scale with filter beds as large as football fields to service large urban centers. They are frequently used as one step in a multi-barrier treatment scheme (e.g. filtration followed by disinfection). Historically slow sand filters were operated continuously which helped keep the biological layer moist and flourishing. The basic processes that occur in the sand column of the BSF are the same as those used in the large scale facilities. What is unique about the BSF is its design that is able to sustain a biological layer between uses. Two elements of the design contribute to this preservation of the biological layer. First, the BSF is designed to hold 5 cm (2 inches) of water above the top surface of the sand column. Second, a diffuser level prevents entering water from disturbing the top layer of sand. The aim behind these design elements is to provide the greatest protection to the biological layer and the most beneficial environment for its growth. The biological layer needs a continuous stable water environment, and standing water, which includes basic nutrients, such as organic matter and oxygen.

This filter is made of concrete on the outside with layers of sand used for water purification on the inside. The water is filtered by both the sand and by a biological layer that develops at the surface of the water. This layer is known as the biofilm. It is made of many organisms like algae, plankton, protozoa, and bacteria. Together, these organisms actively trap and break-down organic matter, including other disease-causing organisms, making the water

safe to drink. The BioSand Filter can purify between 20 and 60 liters per hour and can last for decades with simple maintenance.

Clear Cambodia takes a number of factors into consideration when choosing which communities should benefit from the Water Filter Program. Firstly, the community must engage with the program, actively participating and collaborating with the Clear Cambodia team. The community must be accessible by road, have a poor water source and need filters in order to access clean water. Sometimes the government of a particular province will suggest specific communities that are in greatest need of clean water. Clear Cambodia will verify the information provided and then decide whether a community is a good candidate for one of its projects. Within the community, Clear Cambodia offers BSFs to families who have poor water sources and who indicate that they need and want a filter. In some cases, the best solution is a community-wide system, almost always co-located with a school. It was such a school project we visited. The forthcoming joint effort between FP and charity:water is concentrated on school projects in order to maximize impact and scale.

Effectiveness

Slow sand filters have been shown to remove almost all the disease-causing organisms found in water. The Bio-Sand Filter has proven as effective as traditional slow sand filters, in both laboratory and field tests. The filter has been tested by various government, research, and health institutions, as well as by non-governmental agencies. Overall, these studies have shown that the Bio-Sand Filter removes:

- More than 90% of fecal coliform
- 100% of protozoa and helminths 50-90% of organic and inorganic toxicants
- Up to 67% of iron and manganese
- Most suspended sediments

Observations

The project was well maintained and fully functioning. Local community members were highly supportive and knowledgeable about the system and considered it transformative for the community. Representatives of both Clear Cambodia and charity: water were confidence-inspiring, articulate and motivated. Interactions between the representatives of the two organizations were collegial and respectful.



Large school Biosand Filter. Capable of delivering clean water to over 1000 people



Clean water exiting the filter.



Hand wash station as well has faucets for children to fill up personal water bottles.



Filter has been in use since May 2015. Requires very little maintenance, which is done by stirring the tank once every few months.



New latrines that were also built as part of the same water project.



charity: water staff Steve Che describing the filtration process. The system is gravity fed and the water is piped into the first tank and then starts the process of filtration. The BioSand filter removes 99% of bacteria!



The smaller scale “at home” version of the BioSand filter.



Water is poured in the top of the filter.



Clean water exits the bottom all due to the power of gravity.



Well/rain catchment system which is the source of the family's water. A few houses now share the BioSand filter for their clean water needs.