

Chapter 17

Implementing BioSand Filters in Rural Honduras: A Case Study of His Hands Mission International in Copán, Honduras

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EXECUTIVE SUMMARY

Access to clean water for drinking and sanitation is an urgent issue that the world is facing. According to the United Nations (UN), approximately one billion people live in extreme poverty, and almost 2.6 billion people live without the basics of adequate sanitation. Over the past two decades, the BioSand Filter has proven to be an effective and efficient point-of-use device to purify water to a potable level in developing countries. The success of this device is due to its simplicity, use of appropriate technology, and sustainability. This chapter discusses a case study of His Hands Mission International's work installing these filters in the villages of rural Honduras. It focuses on the implementation, adoption, diffusion, and impacts of these filters, providing insight to the system's factors of success. These factors provide information that can be utilized to improve the chances for success of similar system implementations around the world.

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ORGANIZATIONAL BACKGROUND

The UN estimates 1 billion people in the world live in conditions of extreme poverty. Providing access to clean water for drinking, washing and other types of consumption is crucial for reducing this number. Access to clean water sources is a vital element in achieving many of the UN's Millennium Development Goals, including eradicating extreme poverty and hunger, reducing child mortality, and achieving universal primary education (UN Water, 2006). Specifically, there is great need for water treatment systems in the rural, mountainous villages of Honduras. A 2004 study that researched the deterioration of water quality in rural Honduran villages reported that 95% of all households studied experienced water quality deterioration to below drinking standards at least once. The study goes on to explain that "water quality deterioration happened regularly and frequently" in these villages (Trevett, 2004). This deterioration poses a serious issue to the rural villagers of Honduras because it results in diarrheal diseases and perpetual illness (Trevett, 2005; Aycock, 2012) which negatively impact the villagers' economic and societal development. A recent development that has led to progress in the challenge of providing clean water around the world is the design of cost-effective and sustainable point-of-use (POU) water treatment systems.

Many different POU systems have been created and successfully implemented in the developing world. Some examples of treatment systems that have been widely utilized include Chlorination, Solar Water Disinfection (SODIS), and the Biosand Filter (BSF). Chlorination is a system that involves adding specific amounts of dilute chlorine to raw water in order to purify the water to drinkable standards. This treatment process is effective and simple; however, the taste of the water and access to chlorine can become an issue (Arnold, 2007). SODIS is a treatment process that involves filling PET-bottles with untreated water and placing them in direct sunlight for six hours, allowing the UV rays to kill diarrhea causing pathogens. SODIS is low-cost and easily executed, but it requires a large amount of direct sunlight (Oates, 2003). The BSF utilizes the principles of slow-sand filtration on a household scale to purify water. The BSF is very effective at removing pathogens, but requires a larger amount of construction and initial investment. A 2008 study comparing POU water treatment systems reported a 31% diarrheal disease reduction from SODIS and Chlorination, and a 47% reduction from BioSand filtration (Sobsey).

The BSF was developed by Dr. David Manz in the early 1990's at the University of Calgary in Alberta, Canada (Kaiser, 2002). The system utilizes slow-sand filtration on a household level to treat water to drinking-level quality. The BSF (Figure 1) is constructed via pouring concrete into a steel mold and letting it cure. Once the

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