

FILTERS FOR FAMILIES IN NEPAL

Nepal

Nepal is an incredibly beautiful, land-locked country in South-Eastern Asia. A day's journey will take you from lush, sea-level plains to the breath-taking Himalayan Mountains, including Mount Everest, the world's tallest peak. The hills of Nepal have provided the country with an impenetrable natural defense from invaders, European or otherwise, and the Nepali people are proud of their history of independence. However, those same hills have dramatically slowed the pace of development in the country, as the vast majority of Nepalis live in isolated rural communities, often only accessible by foot. Even today, more goods are transported by foot in Nepal than by all other means of transportation combined.



Mt. Everest;

Photo by Linda Smith; www.filtersforfamilies.org

Nepal is one of the poorest countries in the world; the annual income per capita is \$210, 42% of people live below the poverty line and unemployment is widespread. In addition, political instability and civil war have slowed the pace of Nepal's development. Day, week and month-long strikes, which close businesses and effectively halt all movement of goods across the country, are common-place. Demonstrations, uprisings by "Maoists" (revolutionary communists) and killings have claimed the lives of more than 10,000 Nepalis since 2001. In 2006, the Nepali King surrendered control of the army to the political parties of the previously disbanded parliament. The civil war was officially ended. However, unrest continues due to corruption, factions in the political leadership and the Maoists' continued use of violence.

As a result, it is difficult for governmental agencies and concerned NGOs to address health and sanitation concerns. It is estimated that 54% of Nepali children suffer moderate to severe stunting as a result of water-borne illness. Every year 44,000 children die from preventable diarrhea diseases.



Checking people for symptoms of arsenic poisoning during an awareness workshop;
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The Need

In the Terai region of Nepal, many tube wells – a major source of drinking water – have tested positive for arsenic. The arsenic occurs naturally in sediments from the Himalayas. Levels higher than 600 parts per billion have been detected (the United States Environmental Protection Agency sets a standard for arsenic in drinking water at 10 parts per billion). As many as 450 million people in Nepal, Northern India and Bangladesh are drinking contaminated water.

Arsenic is a slow poison; when taken in low doses, it may be seven or eight years before symptoms become apparent. The effects of the resulting arsenicosis can be very severe. Arsenic can cause thickening of the skin, liver disease, digestive problems and has been linked to cancer and diabetes. It also may cause nervous system disorders, such as tingling or losing sensation in limbs and hearing difficulties.



A man's hands show evidence of arsenicosis;
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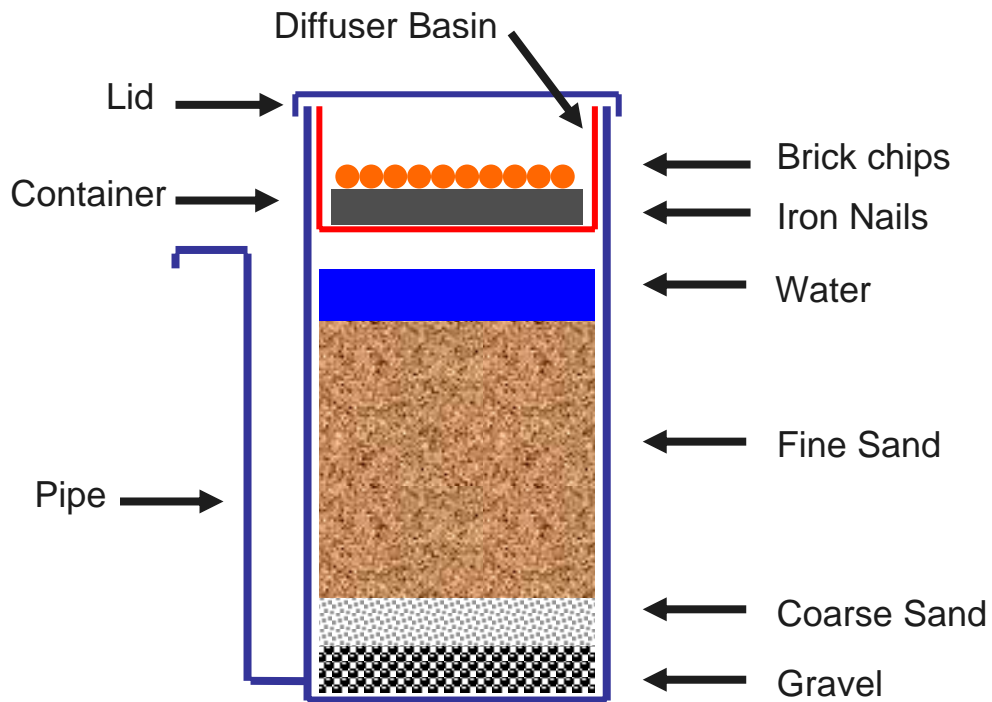
The Solution

An arsenic biosand filter has been adapted for use in Nepal. It is based on the SONO filter, developed in Bangladesh. Arsenic is adsorbed onto ferric hydroxide, which is formed as iron nails rust. The arsenic biosand filter has many advantages:

- It does not require the addition of any chemicals.
- Only the iron nails need to be replaced, after about two years.
- The filter is made of locally available materials and only costs about \$20 USD (filters are usually sold for less than \$5 and are given for free to extremely needy families).
- The flowrate is 15 L/hr, providing enough water for a large family.
- It also filters microbes, producing water that is safe for consumption.



Water is added to the top of the filter;
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Schematic of the water filter;
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1. Well-water is poured into the diffuser basin where it mixes with the iron nails, held in place by brick chips.
2. The water drips through the basin into the biosand filter. It is filtered through fine sand, coarse sand and finally gravel.
3. Clean drinking water flows out of the pipe ready for use!



Putting the pieces together in the diffuser basin;
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Arsenic poisoning in a young girl;

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A young Nepali girl, above, shows severe symptoms of arsenic poisoning in the picture on the left. Pictures of the same girl, on the right, show some improvement after she had 5 months of vitamins and drinking arsenic-free water. After one year, her symptoms will be even more reduced if her nutrition continues to be adequate and her water supply safe.

More about Filters for Families, Nepal

Filters for Families (FFF) was started by an American geologist, Dr. Linda Smith, in 2004. Currently there is a central office in Kathmandu and a permanent field office in the Nawalparasi district. FFF is working in 47 villages in 4 districts. In three years, close to 3000 filters have been distributed, helping some 29,000 people. Local NGOs (non-governmental organizations) are trained and paid to assemble the filters. A local women's NGO has been taught how to conduct arsenic awareness workshops in Nawalparasi, and others will do this in the remaining districts in the future. People with severe arsenicosis are given B vitamins. Donated vitamins are also distributed to children and pregnant and breast-feeding moms. Local NGOs are also being trained to conduct arsenic testing. Charging a low fee, they will be able to make a reasonable income from the testing. As a result, arsenic testing can be done for years to come.

FFF also provides nutrition workshops and will begin sanitation work in the near future. Problems from poor drinking water are compounded when nutrition and sanitation issues are overlooked.



An arsenic awareness workshop in a rural village;
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The Safe Drinking Water Foundation has educational programs that can supplement the information found in this fact sheet. Operation Water Drop looks at the chemical contaminants that are found in water; it is designed for a science class. Operation Water Flow looks at how water is used, where it comes from and how much it costs; it has lessons that are designed for Social Studies, Math, Biology, Chemistry and Science classes. Operation Water Spirit presents a First Nations perspective of water and the surrounding issues; it is designed for Native Studies or Social Studies classes. Operation Water Health looks at common health issues surrounding drinking water in Canada and around the world and is designed for a Health, Science and Social Studies collaboration. Operation Water Pollution focuses on how water pollution occurs and how it is cleaned up and has been designed for a Science and Social Studies collaboration. To access more information on these and other educational activities, as well as additional fact sheets, visit the Safe Drinking Water Foundation website at www.safewater.org.

Resources:

Filters for Families. 2007. www.filtersforfamilies.org.

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The University of Texas at Dallas. February 2005. Group Founded by U. T. Dallas Scientist Aims to Eliminate Arsenic from Water in Nepal. www.utdallas.edu/news/archive/2005/filters-for-families.html.

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<http://web.mit.edu/watsan/Docs/StudentReports/Nepal/NepalSloanABFReport2004.pdf>.