How the Water is Cleaned?

Pure Water FOR THE WORLD

Several factors determine the best approach to water purification in rural communities in countries such as Honduras. Most significant among these are:

- **Cost.** Villagers in rural third world countries cannot afford expensive techniques.
- **Reliability.** The purification system must operate for years with essentially no maintenance.
- **Power.** The ideal system will not be dependent on external power or sunlight to function.
- **Location.** Extensive field experience has determined that locating the water purification in the home produces the most effective results.
- **Simplicity.** Education of the consumer and follow-up monitoring by trained personnel are essential to success. The simpler the system, the better the outcome.
- **Availability.** The equipment must be constructed from materials readily available in-country.

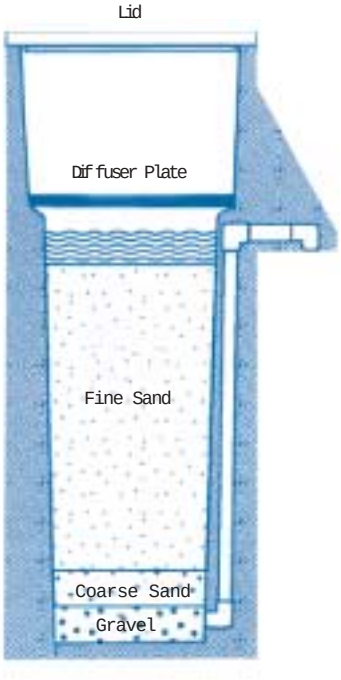

Diagram of a water filter

Satisfying all of these requirements has led **Pure Water for the World** to advocate slow sand filtration as the preferred methodology. Slow sand filtration has been in widespread use in large and small communities in Europe and America for centuries. On a small individual household scale, this technique is ideally suited to the requirements of rural populations in developing countries.

The intermittent slow sand filter shown here was developed by Dr. David Manz of the University of Calgary, Alberta. It has been extensively tested in laboratories at the University of Calgary, MIT and Dartmouth College, and has proven economical and effective in thousands of field installations. In its commercial format, it is about the size of an office water cooler, constructed of concrete and plastic pipe, and filled with multiple grades of sand and gravel.

The cement container filled with sand and the plastic pipe exiting at the bottom of the filter and returning up the outside combine to form a "trap", similar to the trap under a sink. As water in both sides of a trap seeks a uniform level, the height of the outlet of the pipe is adjusted to maintain approximately 2 inches of water on top of the sand in the container. As polluted water is poured into the container through a diffuser plate that controls the rate of flow, clean water that has traveled through the sand filtration process exits the pipe into a clean water receptacle.

The removal of harmful contaminants and pathogens takes place on the top surface of the sand 2 inches below the water surface. A natural biomass layer of microorganisms present in the contaminated water forms at this sand interface, which in turn actively degrades further organic material and removes it from the water that then filters through the layers of sand. The resulting water flowing from the outlet pipe is free of contaminants, clear in color, clean in taste and smell and safe for human consumption.

Many technical reports have been published attesting to the effectiveness of intermittent slow sand filtration. These reports confirm that under optimal operating conditions, the bio-sand filter is capable of removing 97% of fecal coliform, 100% of giardia cysts, 99.98% cyptosporidium oocysts, 100% of worms, 100% of parasites, and up to 90% of organic and inorganic toxicants from contaminated water.

No moving parts. No external power or sunlight required. Effective in intermittent usage. Centuries of proven results. Low cost. Simple construction in-country with locally available materials. All-in-all, the slow sand household filter can and will make a measurable difference in family health and peoples' lives.

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