

## NATURAL WATER DECONTAMINATION BY BIOSAND FILTERS

*Biosand filters are used to treat contaminated water at the domestic level, based on gravity and natural bacteria*

### OVERVIEW

- Organization data:
  - ✓ Name: **BlueEnergy**
  - ✓ Organization type: **International Solidarity Association**
  - ✓ Year of foundation: **2004**
- Beneficiaries : **6,000 people in 15 villages, 700 farmers**
- Donors and financing: **French Water Agencies and private foundations**
- Location: **Bluefields area, Nicaragua**
- Beginning date: **August of 2008**
- Motivations: **To allow the residents of Bluefields to drink safe drinking water in this city without a water distribution or wastewater treatment network**

### CONTEXT AND ACTION

**Summary** | In Bluefields, on the southern Caribbean coast, more than 90% of the population has no access to safe drinking water. Residents consume water from rustic wells built manually behind their houses, permeable to city flows and nearby effluents, and poorly maintained. Lacking latrines, most families defecate in the open air. These poor hygienic conditions cause environmental damage, favor diseases development in populations and basements contamination. Thus, 99% of these wells are contaminated with pathogens of faecal origin.

That is why since 2008, BlueEnergy has been building and installing water filters in this region. This technology, developed by the Canadian NGO "Center for Affordable Water and Sanitation Technology", is used in Nicaragua and Latin America. BlueEnergy is working with them to adapt this system to the context of the region.

These filters are a simple and inexpensive technology, and help to eliminate up to 98% of pathogens in water that cause chronic and acute diseases, such as E. Coli. Their construction requires only cement, copper pipe, sand and gravel, preventing from chemical pollution. A slow mechanical filtering process, associated to the natural creation of a bacterial layer on the upper centimeters of sand, allow entrapment and elimination of pathogens. These filters require very little maintenance and are functional for decades.

To ensure the sustainability of this project, it has been associated with the installation of deep wells, to facilitate access to groundwater, as well as the construction of latrines, diminishing soil contamination.



### Local challenges |

- People drink water that is not safe to drink and are affected by diseases related to the pathogenic risks of these waters;
- Bluefields has no water distribution network or wastewater treatment;
- Pollution of basements due to the lack of latrine and adequate septic tank;

### Local responses |

- Implementation of biosand filters on a family scale: combination of biological and mechanical actions to eliminate pathogens from the water. In 11 years, 1,140 filters have been built;
- Construction of dry double pit latrines with urine and faeces separation;
- Development of deep wells to facilitate access to less polluted groundwater;
- Sustainability of the project: training of the population and dissemination of good health and hygiene practices.

## BENEFITS

**Environmental |** This water treatment by filtration avoids the use of boiling water treatment, i.e. the local combustion of wood to heat water, deforestation and CO<sub>2</sub> production.

**Social |** The vital need for access to water is secured. In Nicaragua, water is considered unfit for consumption if the number of E. coli colonies is greater than 10 per 100 mL. Traditional wells have extremely high contamination rates while in water filtered by biosand filters, rates are under 10 colonies. Studies have shown that the use of this technology reduces diarrhea cases by 30 to 47% at all ages.

**Economic |** The filter avoids the purchase of purified water, which is often economically inaccessible to families in the region. The filter can last for decades.



« This filter allows me some extra resources and prevents me from being sick often... we now know that we can drink this water with confidence. »

**Victorino LEON, Bluefields inhabitants**

## SUCCESS FACTORS

- Good acceptance of the use of the filter by the beneficiaries, who use it correctly;
- Easy maintenance (a simple flushing of the filter is necessary if the flow rate is slowed down);
- Support for the state-recognized Neighbourhood Water Management Committees, which manage the distribution of water from wells, their maintenance and transmit good practices and hygiene methods.

## OBSTACLES

- Biosand filters must be used continuously, otherwise dry sand and bacteria destroying pathogen die. However, families are often and for a long time absent when working in the fields;
- These filters are heavy and difficult to transport, and are only suitable for sedentary families.

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