

AFFORDABLE HOUSEHOLD WATER TREATMENT SYSTEM

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THE PROBLEM

40% of villagers in Suco Holurua, a village in the Manufahi district of Timor-Leste are forced to collect drinking water from unimproved sources. Engineers without Borders have partnered with the non-government organisation WaterAid to devise solutions to this pressing issue. The people of Holarua are in need of a simple, effective, sustainable and affordable household water treatment system.

CRITERIA

- Low Cost
- Simple
- Sustainable
- Availability of Resources
- Use of Local Labour
- Treatment Capacity

TREATMENT CAPACITY

- 18 litres per hour
- 100% turbidity removal
- 100% protzoa removal
- 100% helminth (worms) removal
- 98% bacteria removal
- 70-99% virus removal

CONSTRAINTS

- Non-powered Solution
- Culturally sensitive

REFINEMENTS

- Square internal void reduces concrete volume
- Internal piping reduces breakages
- Combined diffuser strainer to remove large debris

SWOT

STRENGTHS

- Proven technology
- High pathogen removal rates
- Filter media is locally sourced
- Low maintenance
- Low operating costs
- Easy to operate
- High flow rate - 18L/hour
- Simple training package

WEAKNESSES

- Must be used daily
- 30 day run in the period
- Construction skills and tools required.
- Fixed system
- Moderate initial costs

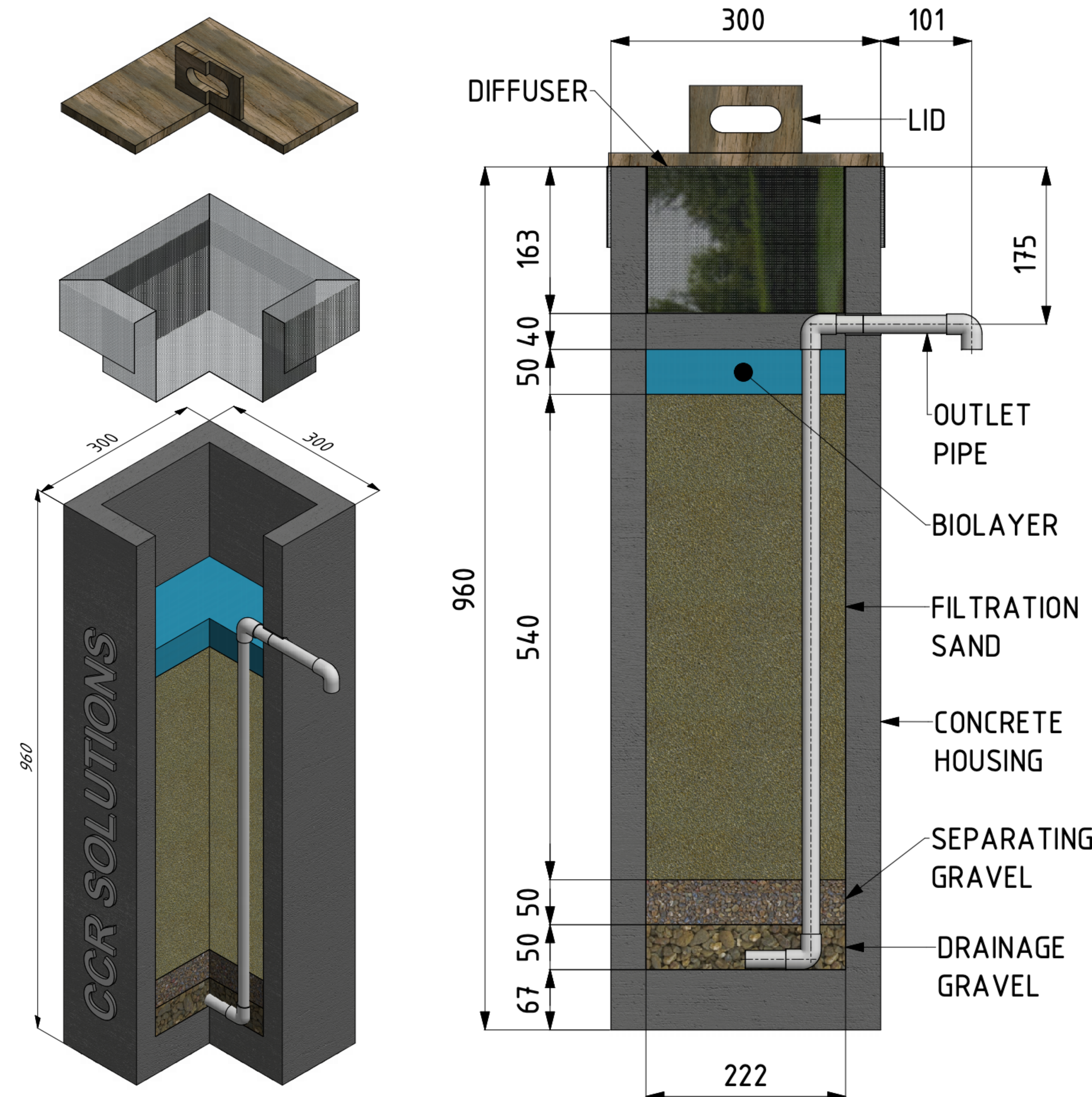
OPPORTUNITIES

- Enterprising locals can develop a local industry increasing local employment
- Opportunity for government and NGO funding to implement throughout other regions.

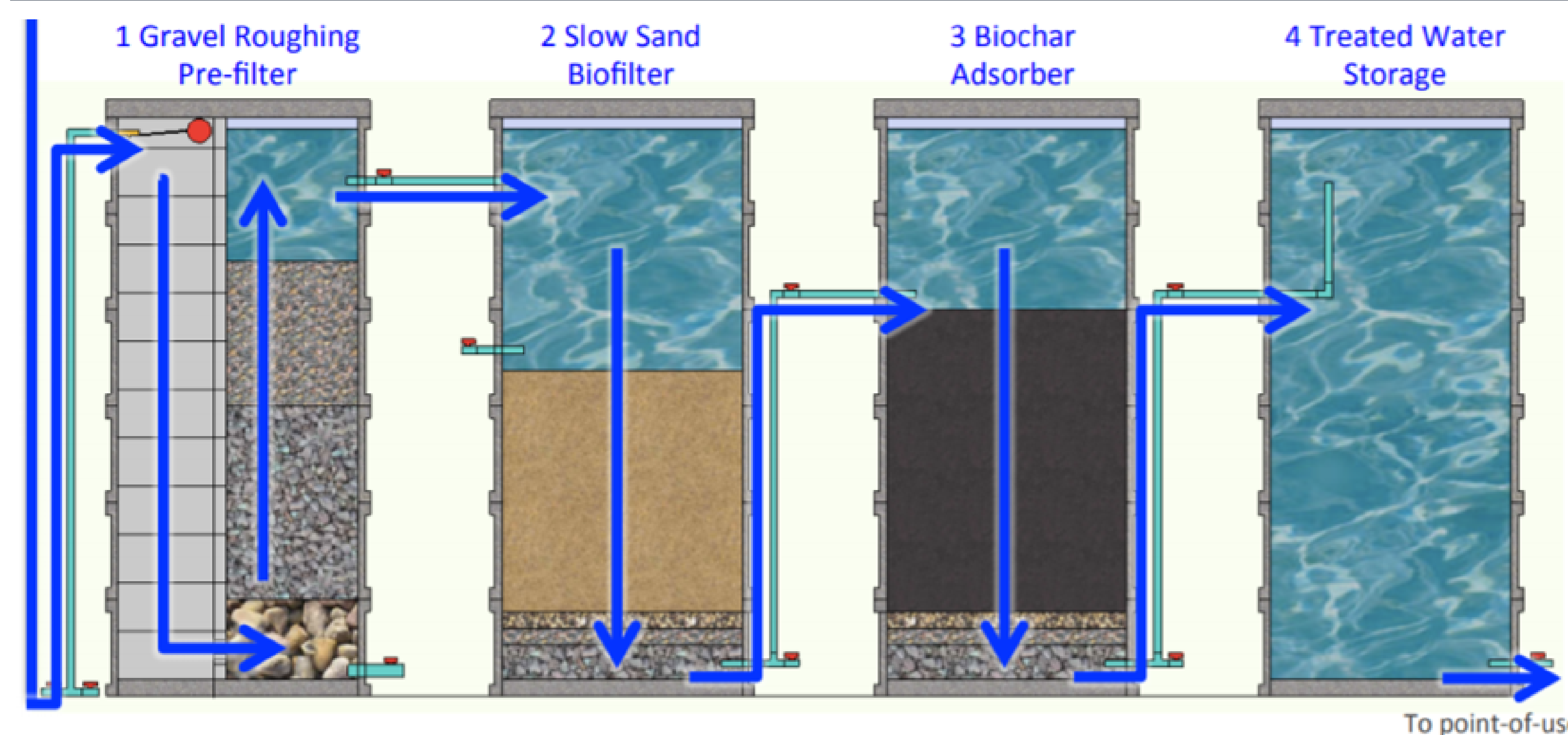
THREATS

- Fluctuating material costs and availability
- Alternate Technologies
- Government fixing water supply systems rendering system redundant

THE SOLUTION - BIOSAND FILTRATION UNIT



ADAPTABILITY/ SCALABILITY



ANALYSIS

ENVIRONMENTALLY SUSTAINABLE

- All construction materials from local suppliers
- Use of local materials for filter media and concrete aggregates
- Unserviceable filter housing can potentially be broken down to be used as aggregates for new housings
- Only thin top layer of sand needs to be replaced to renew efficiency of filter
- All waste products are inert

ECONOMICALLY SUSTAINABLE

- Initial Average Costs = \$15.42
- Maintenance Costs = \$0.56 per month for basic testing
- Long service life up to 8 years equates to less than \$0.03 per day for clean water for a large family

CULTURALLY SUSTAINABLE

- Design has no cultural affects that might be rejected by locals
- Biosand water filter design will not impact gender roles in Manufahi
- Sacred (Lulik) locations of Manufahi will not be entered or involved during the process of biosand filter construction

BENEFITS

- Reduction in health care costs
- Reduction in lost productive days for work and home activities
- Decrease in opportunity cost caring for sick children
- Decrease in school absenteeism due to sickness
- Opportunity for local industry creation

IMPLEMENTATION

- Contact Suppliers
- Develop Training Package
- Engage local NGOs
- Engage Community
- Procure Stores
- Production
- Delivery
- Follow Up/ Testing

SAFETY

- Low centre of gravity
- Lid for keeping out vermin and debris
- End cap on piping keeps mosquitos out of filter outlet