



AGUACLARA LLC: INDIA CHALLENGES AND OPPORTUNITIES

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OVERVIEW

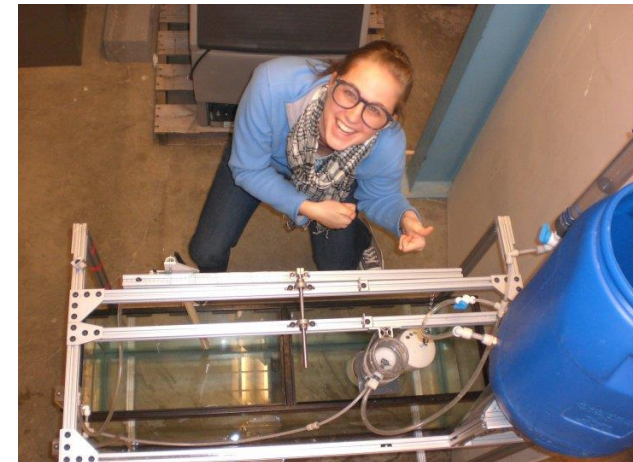


- Intro to AguaClara LLC
- India Project Details
 - Challenges
- Opportunities

AGUACLARA LLC



- AC LLC social enterprise that disseminates water treatment technologies to enable resource-poor communities around the globe to have access to safe water on tap.
- Design, Training, and Capacity Building
- Founded by AguaClara Alumni in 2012
- Started working in India in May of 2013



NEW STRATEGY



- Strengthen our in-country presence
- Starting an India office
- Lowering operating cost

AGUACLARA LLC IN INDIA



- Projects funded by Tata Cornell Initiative (TCi), Tata Trust, Indian Government
- Partnered with Pradan based in Ranchi
- Working in four locations in the state of Jharkhand

AguaClara in Jharkhand



Jolhakarma 2013



Durgunia
2013



Ronhe 2014



Gufu 2014



SUB-SURFACE WATER OPTION



- Lowland sanitary well in a protected watershed ensures sufficient water year-round
- Heavy metal contaminants are unlikely
- Water is has low turbidity year-round, with low-level spikes during the rainy season
- Water is only treated for low turbidity levels and pathogens

Village Water Supply

Trained community members operate filters.

guaClara



Solar pump keeps operation



Chemical dosing ensures disinfection and precise doses, even as flow rates change, without operator intervention




Potable water on tap









Coagulant
Poly
Aluminium
Chloride

Disinfectant
Chlorine

The image shows a water treatment setup on a wall. It features two cylindrical tanks, one labeled 'Disinfectant' and one labeled 'Coagulant'. Each tank is connected to a network of white PVC pipes and clear plastic tubing. Two red-handled valves are visible at the top of the tanks. The entire system is mounted on a light-colored wall, with a yellow protective sheet visible on the right side.

Disinfectant

Coagulant



Coagulant

Disinfectant

Hydraulic flow measurement ensures chemical flow automatically adjusts to pump flow rate, delivering accurate dose without operator intervention



STACKED RAPID SAND FILTERS (SRSFS)



- 2010 : Invented by AguaClara
- 2011: First applied in Honduras
- 2014: Scaled down and applied in two Jharkhand villages



BACKWASHING THE LFSRSF



CHALLENGES



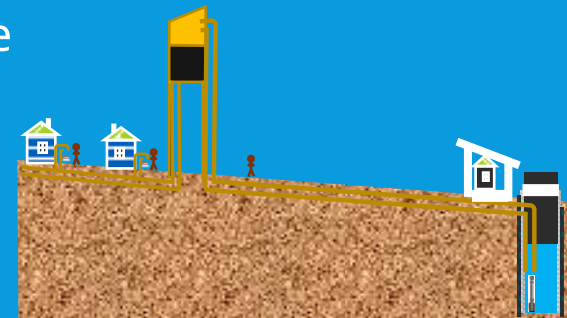
- Lack of technical expertise within partner organization
- Fabrication
- Logistical challenges
 - Work stoppage
 - Political activity
- Communication with partner



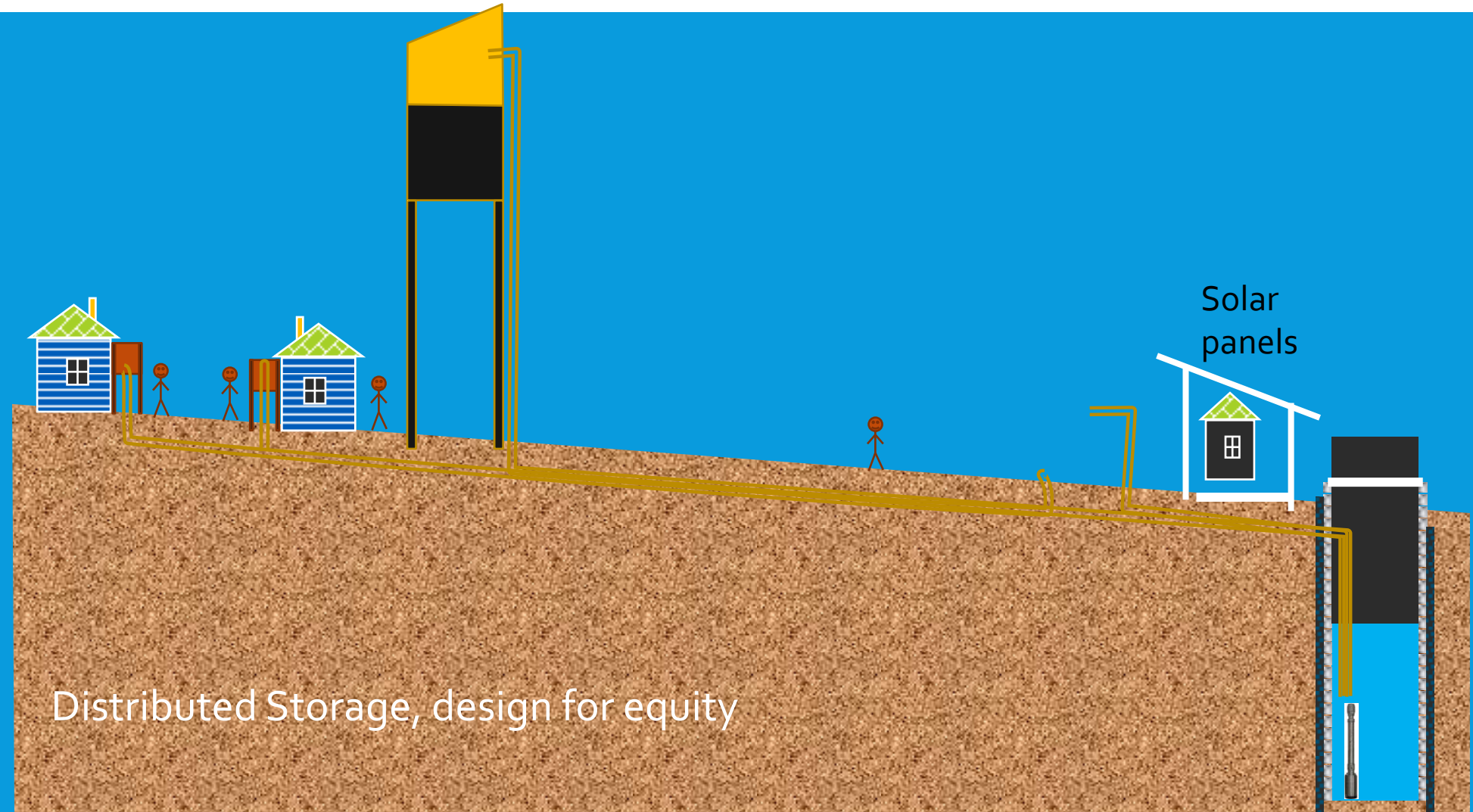
SCALING UP SAFE WATER ON TAP IN INDIA



- Subcontracting or hiring a civil engineer
- Working with Tata Projects to mass produce the filters and chemical dosers
- There are many opportunities to improve upon the traditional infrastructure models
- World Bank opportunities
 - September 9th presented the project to the World Bank
 - currently writing a proposal for rural villages with 300-500 people

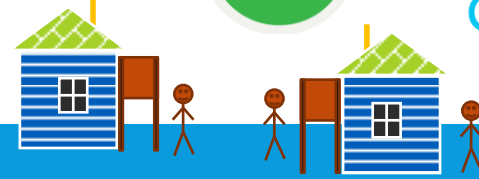


INNOVATIONS ON VILLAGE WATER SUPPLY SCHEME



Distributed Storage, design for equity

COMPARISON: OVERHEAD TANK AND DISTRIBUTED STORAGE



- Single large civil work
- Household water use limited by inability to store water
- No provision for hand washing
- Intermittent supply
- Distribution system needs to be designed to deliver water in short burst
- No incentive to save water
- Inequitable distribution

- Eliminate large civil work
- Households have control of their own water use
- Incentive to not waste
- Equity improved through flow restrictions
- Waste eliminated by float valve on each tank
- Water arrives whenever solar pump runs
- Less costly distribution system

NEW RESEARCH TO PILOT IN THE FIELD



- Groundwater solutions: Removal of arsenic using stacked rapid sand filtration
- Low Flow Plant for High Turbidity (<1500 People)
- Foam filter
- Wastewater treatment (UASB)

THANK YOU



HOW MANY LITERS DOES EACH FAMILY GET PER DAY?



- $70 \text{ L/person} * 5 \text{ people/household} = 350 \text{ L}$
- How many buckets does the family have?
- Some other questions we should ask
 - Is it sunny or cloudy?
 - Does the water come 1 or 2 times per day?
 - Was the distribution system designed for equity?

BUDGET ESTIMATES FOR CAPITAL COSTS



Item	Rs
Treatment Plant Room	75,000
Filtration System	216,000
Dual Coagulant/Chlorine Doser	18,000
Turbidimeter	24,000
Chlorine Test Kit	5,000
<i>Subtotal</i>	<i>338,000</i>
Solar Pump & PV array	300,000
Sanitary Lowland Well	580,000
Pump Control House	50,000
Distribution System	750,000
Overhead Tank	400,000
Transport	360,000
Training	120,000
Overhead	426,600
Total	3,324,600
Population	500
Cost per Person	6,649



LFSRSF FOR SUBSURFACE WATER TREATMENT



- Each filter requires 1/6 as much water to backwash as compared to Rapid Sand Filters and requires 1/6 as much area
- No electricity required for treatment
- Minimum of moving parts
- Operator can easily learn to backwash and maintain the filter

OPERATING COSTS



- Operating cost for Safe Water on Tap
 - Household Monthly Chemical cost
70 L/person/day = ₹5 per month
 - Labor cost = ₹40 per household (highly dependent on scale!)
 - Households are willing and able to pay a rate that allows for savings