

# D-Lab Development

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## Water Treatment w/ Susan Mercott

Water Rich - Safe Water  
Water Poor - Unsafe Water  
More than a billion people



Billion Number - people who lack access to improved water supply  
Public taps, tube wells, boreholes, protected wells & springs,  
rainwater harvesting

Unimproved water

All surface waters (rivers, streams, dams, lakes, ponds,  
canals, irrigation channels) unprotected dug well & springs, tanker  
trucks and carts, vended water



Tanker trucks and vended water, because they are in nether  
realm of not knowing where the source of the water is.  
As described by the United Nations

Access to an improved water supply

IS IMPROVED WATER SAFE WATER?

4 Water Qualities:

Microbial - Can Kill you quick  
Chemical - Can Kill you slow  
Physical/Aesthetic  
Radionuclides

Microbial is the biggest problem around the world  
Chemical second biggest problem  
Arsenic is a large contributor

Conventional Water Treatment Plant:

Source of surface water 2 sedimentation 2 coagulation 2  
sludge 2 Filtration 2 chlorine 2 communities  
out by Frog Pond used to be this kind of system

Non-piped water supply

Watershed 2 Human/Animal distribution system 2 Home  
Problem with possible contamination

64% of Women collect the water

And are primary caretakers of people who get  
sick with water borne diseases

Infectious Disease and its effect on children  
Not addressed?

Been around for a while  
Not going to infect people in  
developed countries  
Hard to identify the cause

## Small Scale Water Treatment (household)

Not Brita Filter (aesthetic/physical treatment mostly)  
"Luxury Water"

Mega systems won't work in rural area

Cost too much money

Government infrastructure/willingness

Access to energy for system (electricity)

Deer Island Waste Water Treatment Near Logan

airport

\$4billion for 2.5 million people

Engineers hadn't thought of how to scale for different environment or materials

P&G gotten into household treatment water market

Pur - "treatment plant in a packet" (EXPENSIVE)

Coagulant (pheric sulfate) + Chlorine (calcium chloride powder)



Open and put in 10L bucket, rapid mix, let settle

Chlorine contacts water for 30min, then safe to drink

Does it work in any water?

The particular combination P&G has is often perfect

There is no perfect though, not a one size fits all

## Safe Storage

Important aspect of water treatment

Water getting contaminated while in storage is a big problem

## Disinfection

Boiling, Sodis, Household chlorination

## Particle Removal Technologies

Cloth Filter - equivalent to sari filter

1 micron mesh, effective against guinea worm and cholera

## Ceramic Filter

Lifestraw - not that effective, clogs

Iodine based resin, okay for short term use

Not safe for longterm use

Water Ionizers - more of a first world product

## Combined Systems

## Chemical Removal Systems

Get an email a day from someone around the world with an idea to save the world. Maybe that's true. Has come to realize that there is no silver bullet, high tech or low tech, it is getting it implemented that is the challenge.

## Safe Storage Products

Standard size can go hand in hand with disinfection (ie chlorine dosing)

Partical Removal

## Pure Home Water

Started with the idea of providing safe household drinking water

Had been working on multiple technologies for a while

Now focusing one direction to encompass goal

offer range of products in Ghana to see what they liked

1. Reach people most in need
2. Be self-sustaining

Takes a lot of capacity to test whether water is safe or not

Check List vs Water Testing Laboratory

Reasoning behind Improved vs unimproved water source category

Improving the supply is one way (slightly indirect)

towards safe water

Having particles in the water, protects microbes from chemical (ie chlorine) treatment

Microbes can hide in particles

For Dissemination, focused on Cermaic Filter Pot

- Staff could do many products poorly or one product well

The ceramic filter was their best product, so focused on that

Manufacturing to bring the cost down

Local manufacturing to reach \$1/day people

Current manufacture is outside Accra

12 hours to get to Tamale

Transportation can damage ceramic filters

Local manufacturing to have greater

control over supply chain

Quality control

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