The Story of Ceramic Pot Filters and Pure Home Water

Credit: Alexandr Nishichenko

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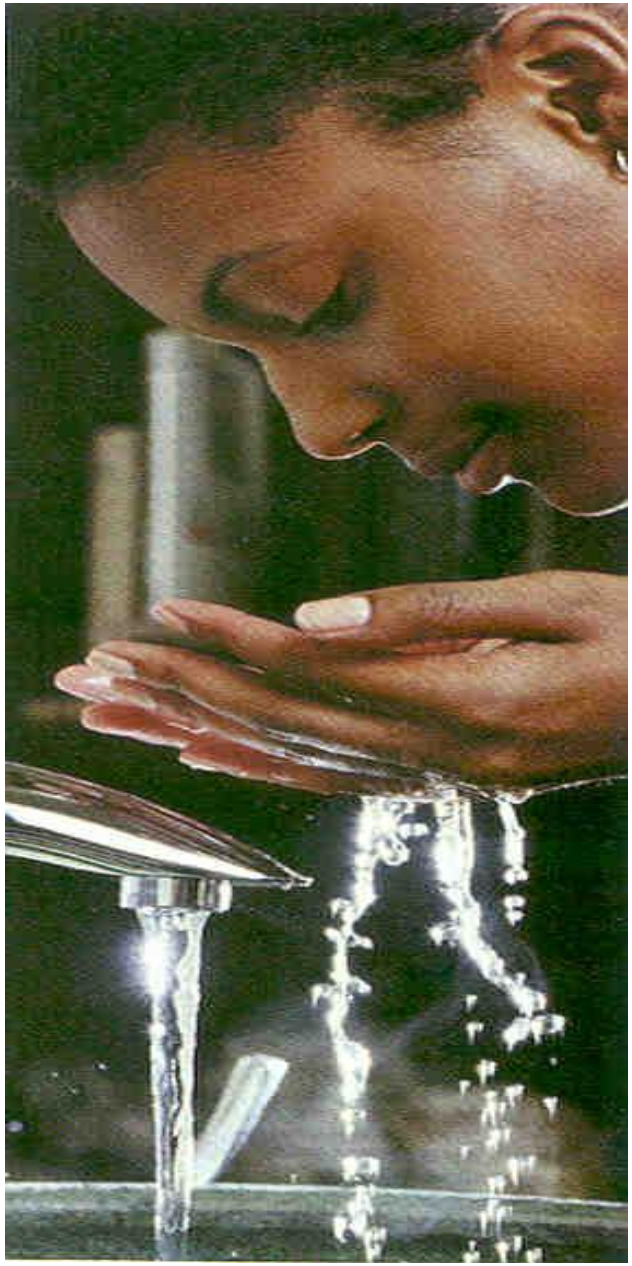
Water Rich - Safe Water



Water Poor - Unsafe Water

Sanitation Rich

Sanitation Poor

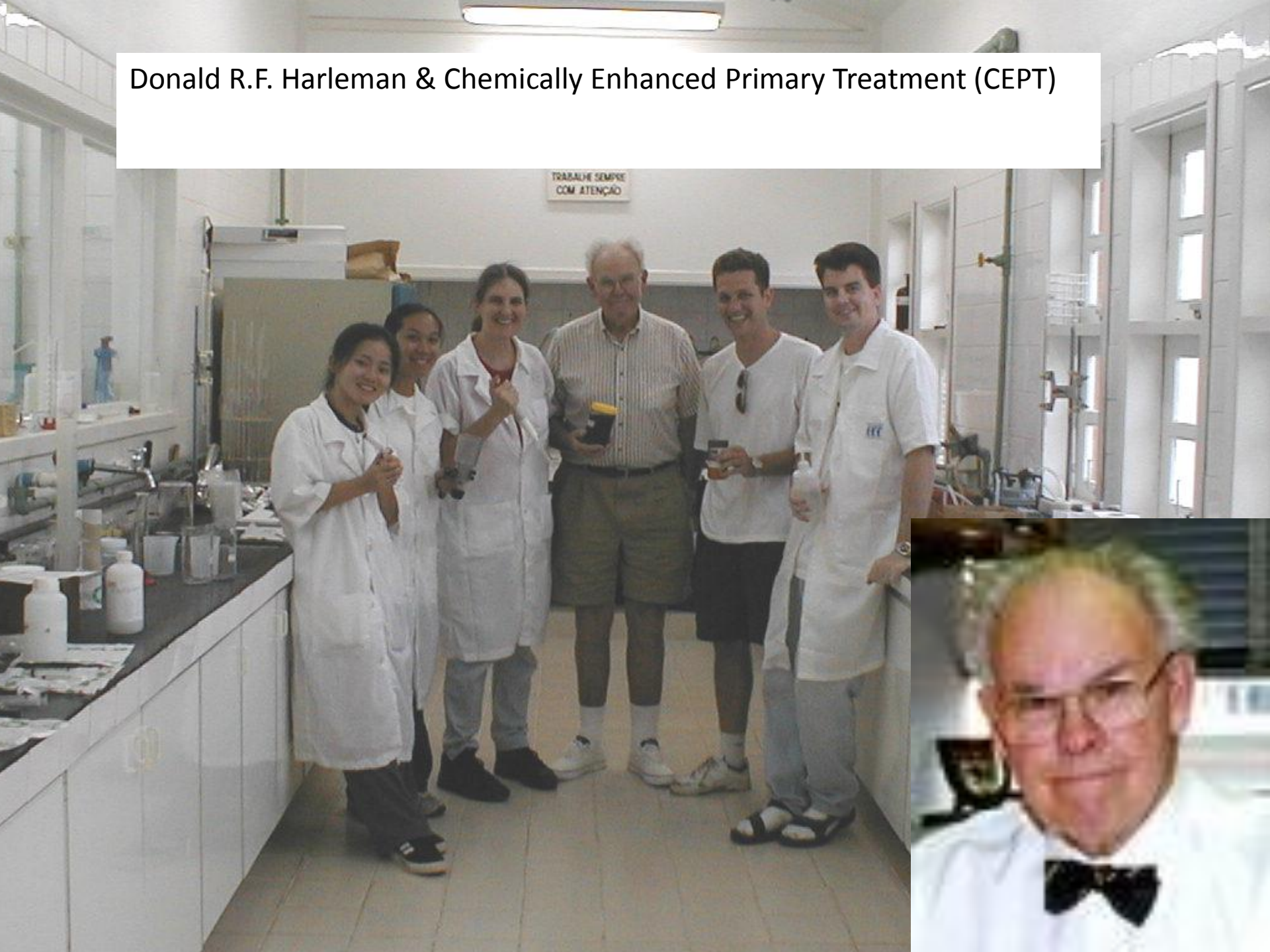
Toilet flushing in an average household uses 50 liters of water per day (WHO)

Conventional Industrialized Sanitation

Linear Flow

(Slide by Brian Robinson)

Donald R.F. Harleman & Chemically Enhanced Primary Treatment (CEPT)



I learned about the need for safe and accessible water from these women and others like them

2nd Intern'l Women & Water Conference - Kathmandu, Nepal

September 1998

Household Drinking Water Treatment and Safe Storage Technologies

Traditional unsafe storage

Stone Filter – Peru, c.1600 (Photo: Tom Clasen)

Post-tap filter for "luxury water"

A cluster of innovative technologies invented and disseminated only within the past 1 to 15 years that are explicitly designed to address the safe water needs of the billion+ people at the bottom of the economic pyramid.

They are distinct from 1st World post-tap devices that give "luxury water" to the rich, or to traditional water management practices, that may or may not give safe water.

Recent studies have shown health impact of household drinking water treatment and safe storage:

"safe water alone can reduce diarrheal and other enteric diseases by 6% to 50%, even in the absence of improved sanitation or other hygiene measures."

•Nath,K.J., Bloomfield,S., and Jones,M. "Household Water Storage, Handling and Point of Use Treatment. International Scientific Forum on Home Hygiene. Kolkata, India. 2006. http://www.ifh-home-hygiene.org

Examples of Household Safe Storage and Water Treatment Processes and Systems

- I. Safe Storage
- 1. Plastic or modified clay pot safe storage containers

- II. Disinfection
- 2. Boiling
- 3. SODIS
- 4. Household chlorination

- III. Particle Removal Technologies
- 5. Cloth Filtration
- 6. Ceramic Filters
  - Candle Filters
  - Pot Filters
- 7. Biosand Filters
- 8. Coagulation/Precipitation Only

- IV. Combined Systems
- 9. Coagulation/Precipitation + Chlorine Disinfection (e.g. PUR)
- 10. Filtration + Chlorine Disinfection (e.g. Gift of Water Filter)
- 11. Filtration + Disinfection + Aesthetics (Hindustan Lever, Pure-it)

- V Chemical Removal Systems

Safe Storage Products

CDC Safe Storage Vessel

Oxfam Safe Storage

Modified Clay Pot

Household Disinfection Methods

Boiling

Solar Disinfection (SODIS)

Household Chlorination

Particle Removal Technologies

Guinea Worm Cloth Filter

Kosim Ceramic Pot Filter

Biosand Filter

Combined Systems

Hindustan Lever-Pure-it

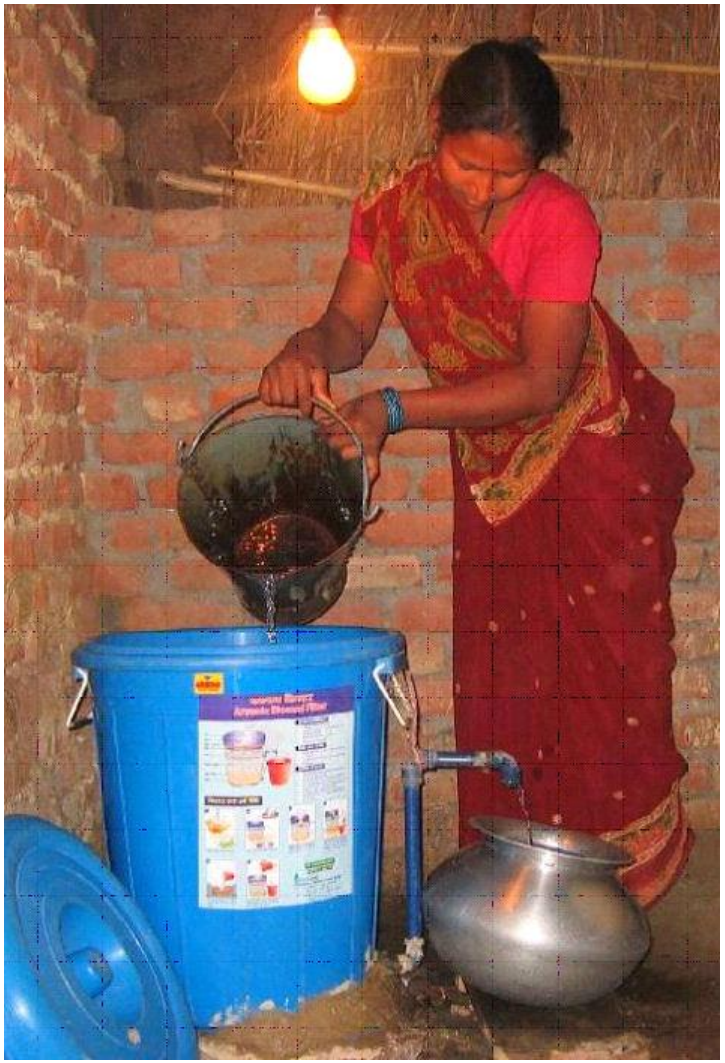
Proctor & Gamble - PuR

Kanchan Arsenic Filter

Chemical Removal Systems

Cyrstal Quest - Multiple Chemicals (e.g. copper, lead, fluoride)

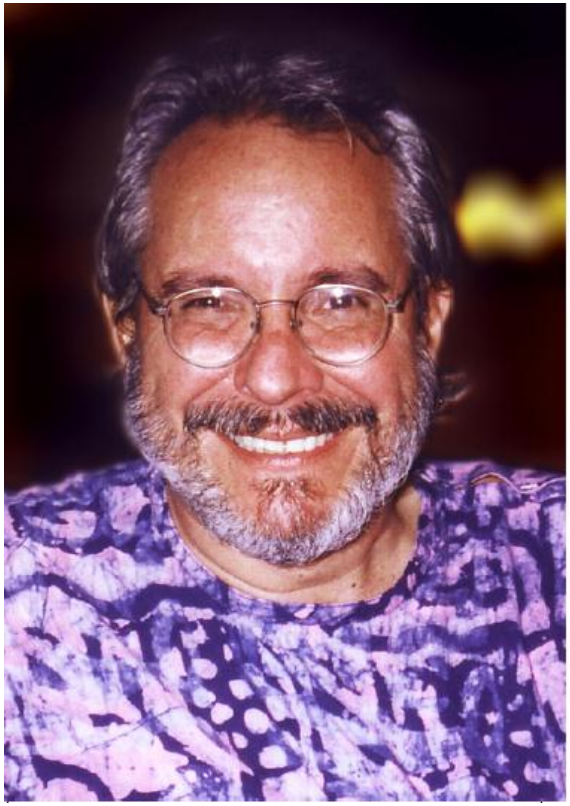
Kanchan Arsenic Filter – Arsenic



Ceramic Pot Filter
Dr. Fernando Mazariegos, Inventor

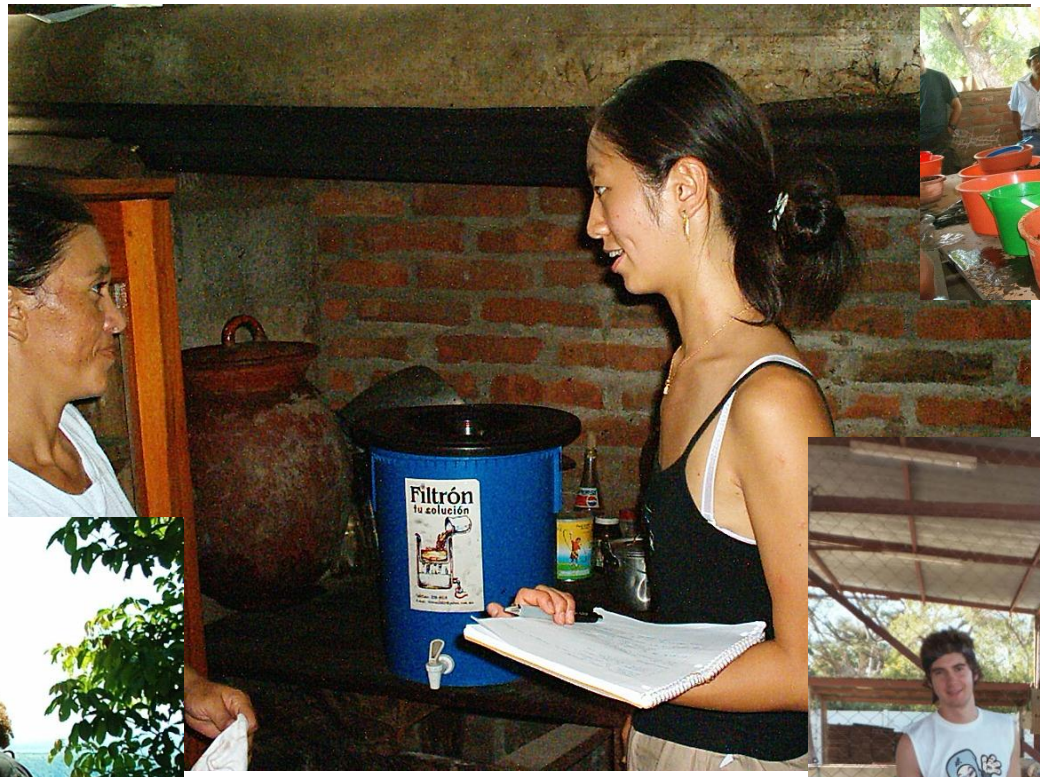
1981: Dr. Fernando Mazariegos of ICAITI (Instituto Centro Americano de Tecnologia Industrial, Guatemala, invented the ceramic pot filter coated with colloidal silver

1st Disseminators –
Ron Rivera & Manny Hernandez - Potters for Peace



Ron Rivera (1948 – 2008)

1st independent studies of the ceramic pot filter were conducted by MIT researchers. Ron felt that these studies set the stage for successful dissemination .



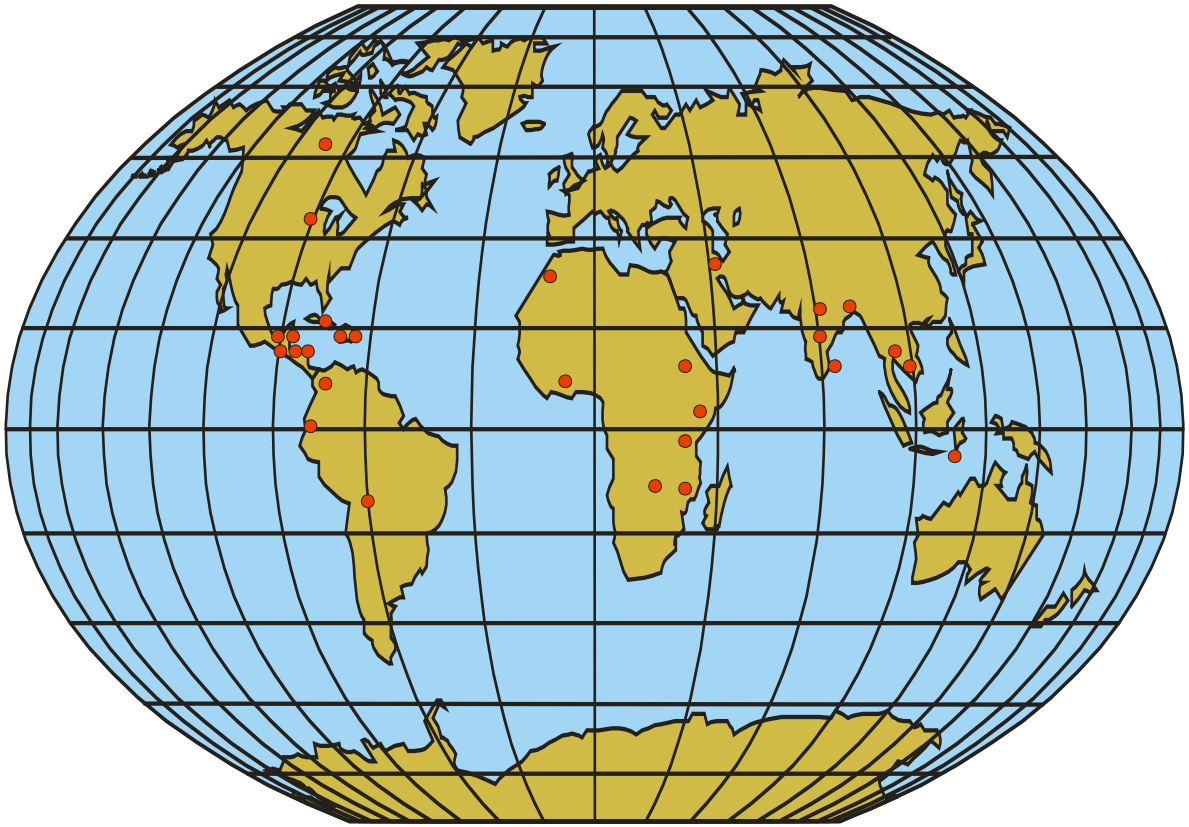
Some of my MIT students who worked with Ron Rivera/Potters for Peace in the early 2000s

Managua, Nicaragua Factory
1st Factory

Ceramic Pot Filter Factories Around the World

(Ron Rivera, Oct. 2007)

US
Canada
Mexico
Guatemala (2)
El Salvador
Honduras
Nicaragua (2)
Cuba
Haití (closed)
Dom. Rep.
Colombia
Ecuador
Bolivia



Iraq

Thailand
Cambodia (3)
Nepal
Bangladesh
India
Sri Lanka (2)
Bali

Morroco
Yemen
Sudan
Kenya
Tanzania
Mozambique
Zambia
Ghana
Tanzania

- Ron died of malaria in Nigeria in 2008 while building his 30th factory.
- His life's goal of 100 filter factories remains to be completed.

- Today, there are a number of people who are continuing this inspired work…

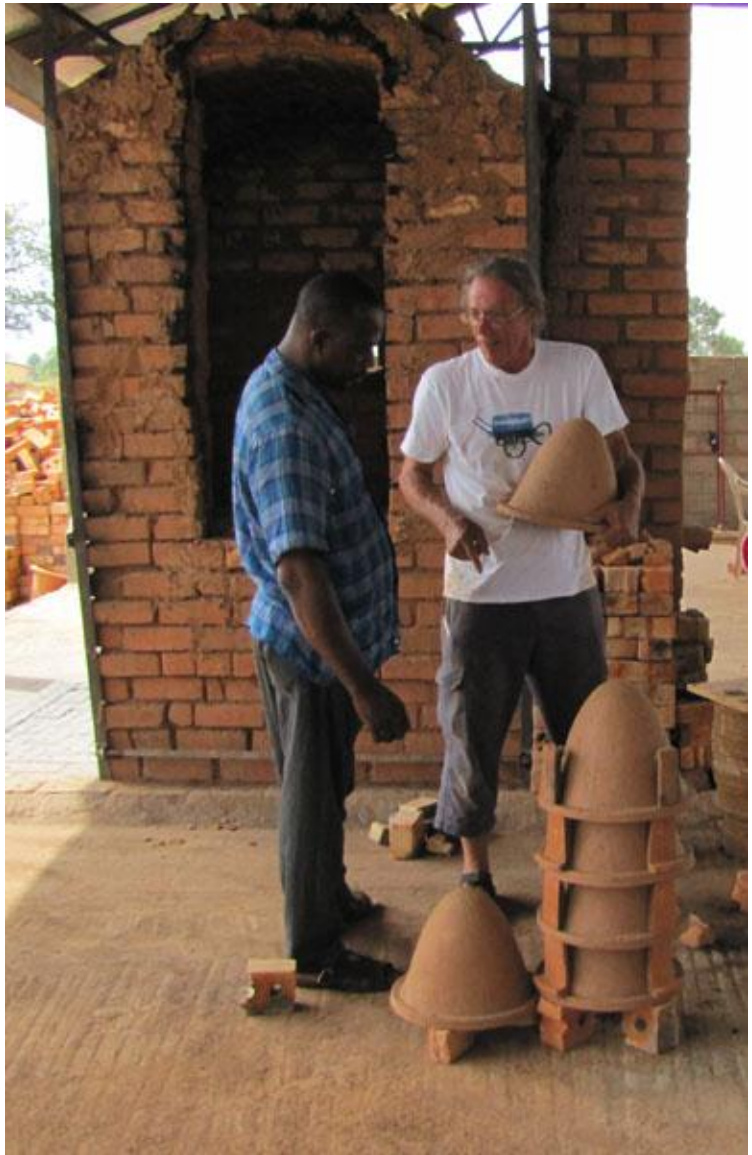
2012

- In just 10 years, due to the efforts of many dedicated people, we have gone from that single, first factory in Managua to 36 factories in 18 countries.

- For example…

Manny Hernandez has helped to build 7 factories in Cambodia, Honduras, Dominican Republic, Tanzania, Nigeria, Ghana and South Africa

Curt & Cathy Bradner (ThirstAid) have trained local entrepreneurs in Myanmar and built 8 factories



The new Ecofiltro factory in Guatemala has the capacity to produce 10,000 filters per month.

Cambodia has 3 competing ceramic pot filter manufacturers and has gone from 0% to 10% of the entire population using these filters in 10 years

Pure Home Water

Pure Home Water (PHW): a social enterprise founded in 2005 with 2 goals:

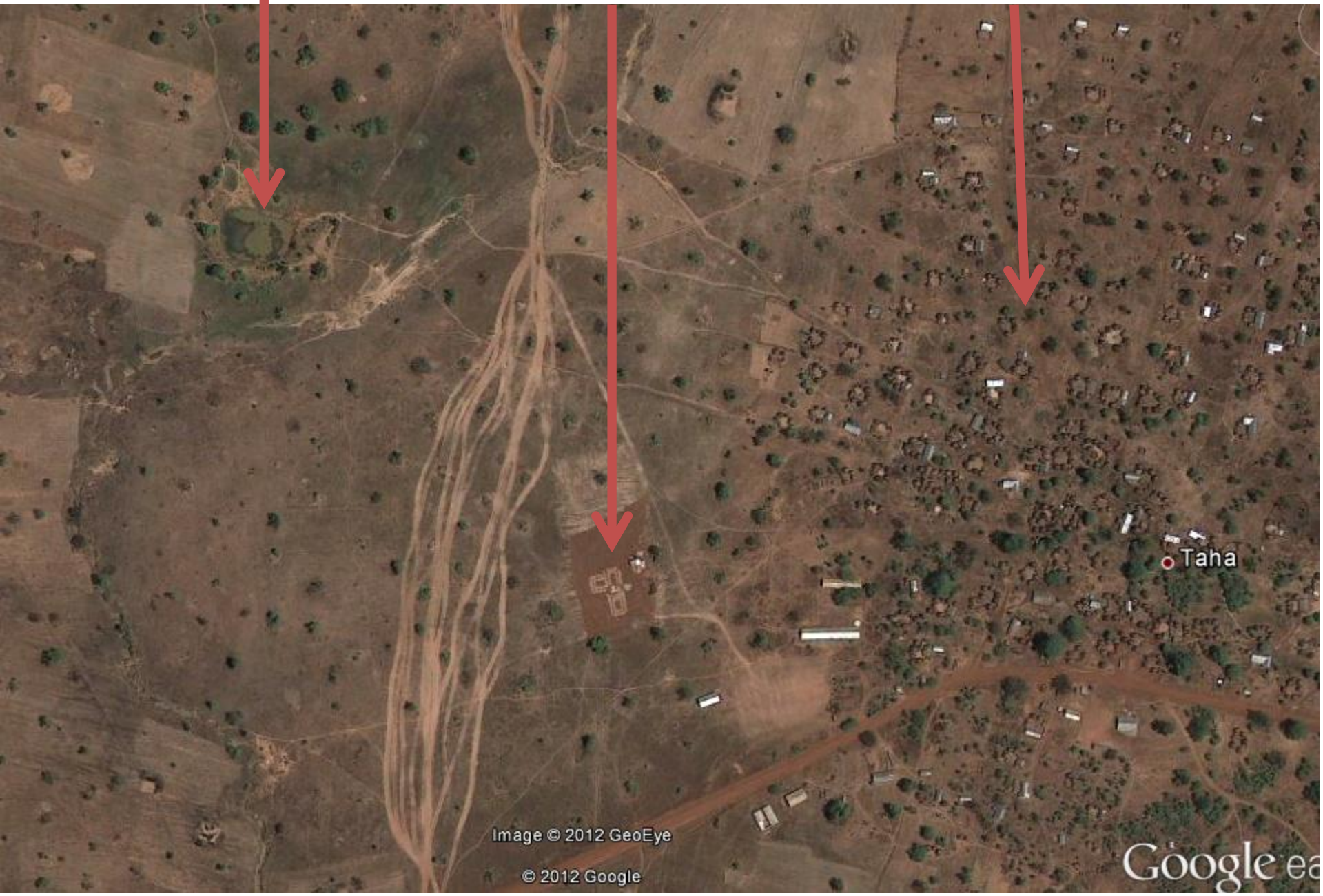
1. Provide water, sanitation, hygiene (WASH) services in Ghana, especially northern Ghana where the challenges are greatest;
2. Become financially and locally self-sustaining.

Our factory is on the map!

Close-up of Factory Land from Google Earth

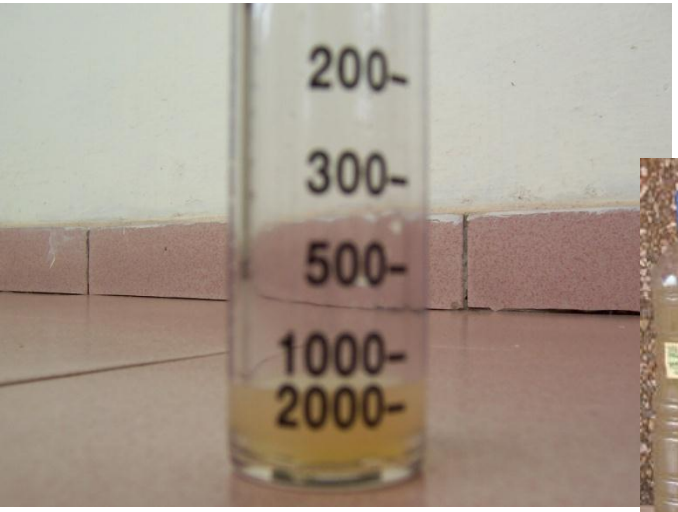
Highly Turbid Taha Water Supply

Taha Water Supply, Pure Home Water Factory Site and Taha Village



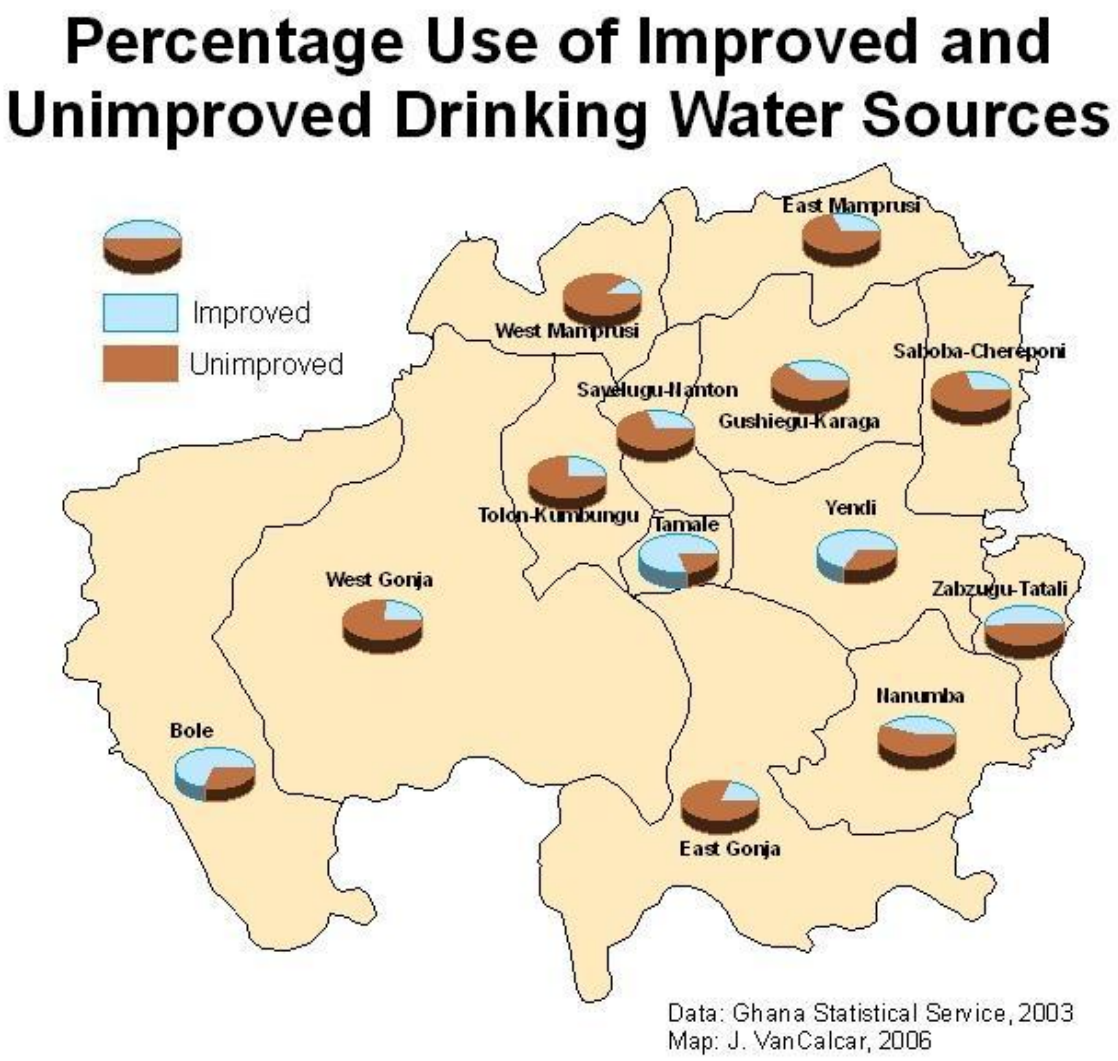
Views of Typical Local Water Supplies & Samples

- Extremely high turbidity, even in dry season



Turbidty Test (NTU)

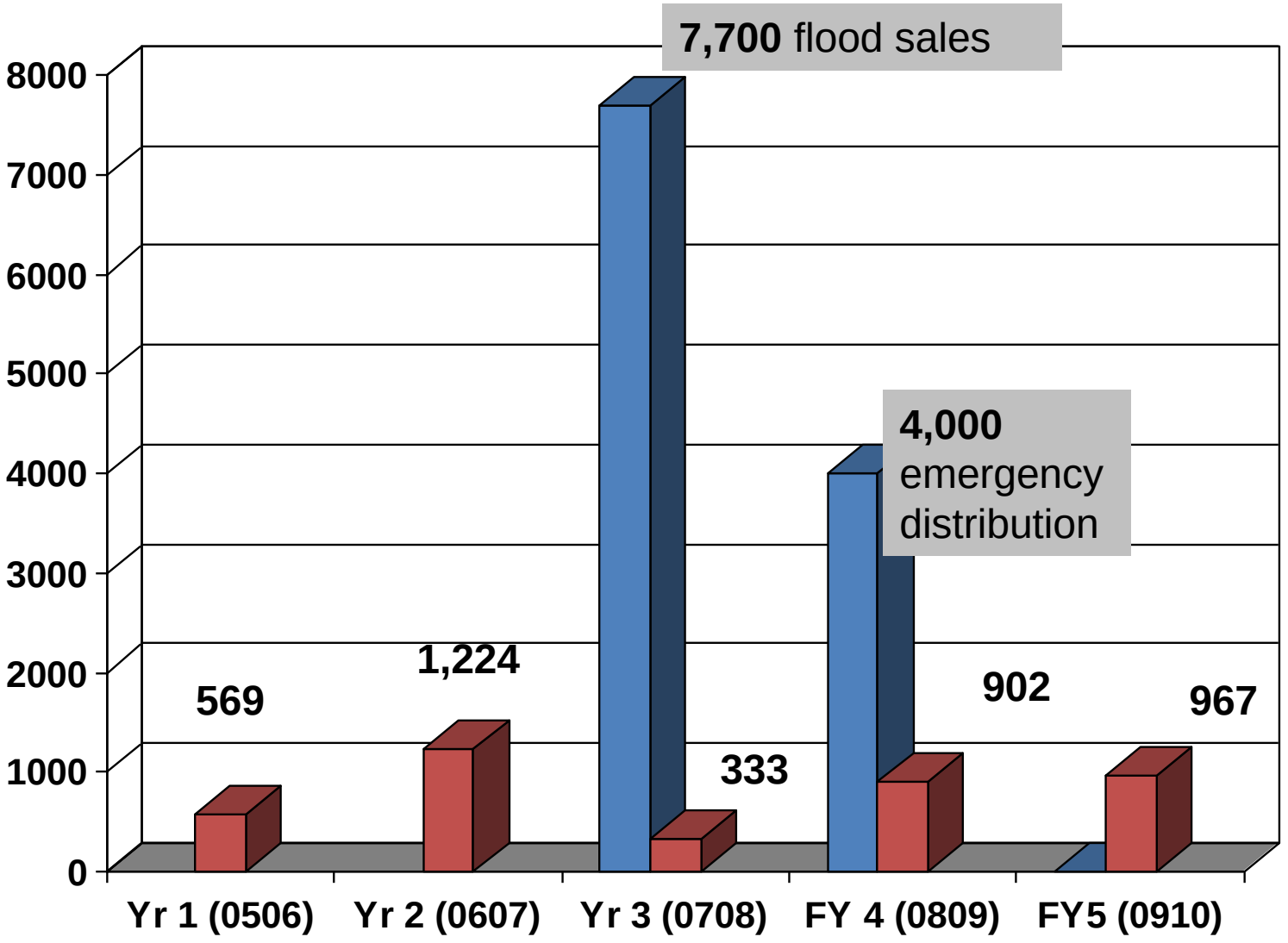
50% (0.9 million out of 1.8 million people) in Northern Region, Ghana currently use an unimproved source



- Improved Sources
  - Boreholes
  - Household connection
  - Public standpipe
  - Rainwater harvesting
  - Protected springs and dug wells
- Unimproved Sources
  - All surface water sources
  - Unprotected springs and dug wells
  - Tanker trucks
  - Vendor water

Accomplishments: Pure Home Water Filter Sales (2005 – 2010)

We have reached over 100,000 people to date!



2009 Guinea Worm Distribution - 4000 Filters Training, Dissemination, Monitoring

Woman from Yesapi, Central Gonja, with bandage covering guinea worm- infected foot

Local awareness of filtration is high!

Guinea Worm Cloth Filter

During Ghana's decades-long, successful Guinea Worm Eradication Campaign, millions of cloth filters were disseminated

Kosim Ceramic Water Filter

Uneducated, low income Ghanaians understand the benefits of filtration for safe water and accept ceramic filters as a step-up

High Rate CPF

Flow Rate	Bacteria Removal	Turbidity Reduction
9.6 L/hr	99.7 %	92 %

Flow Testing of Each Filter

Factory – make-shift lab for microbial indicator testing

Bacterial Testing of Each Batch of Filters

Present Status of the Factory

> 100 MIT engineering, business, urban studies, policy and public service students have assisted PHW

Is your family's drinking water SAFE?

Make sure! Use a Kosim Filter

by Pure Home Water

For more information, call **0273-643034**

or visit **purehomewater.org**

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Rotary Club of Sunyani Central
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Rotary Club of Everett, MA

Hygiene:
Tippy Tap Handwashing Stations

Pure Home Water YouTube Video

http://www.youtube.com/watch?v=W5-Hpn7VEg4

Which USAID Maternal & Child Heath (MCH) Priority Countries currently have ceramic pot filter factories?

#	Africa	Ceramic Pot Factory?
1	Benin	Yes – (but only 200 filters produced)
2	DR Congo	No
3	Ethiopia	No
4	Ghana	Yes
5	Kenya	Yes
6	Liberia	Pending?
7	Madagascar	No
8	Malawi	No
9	Mali	No
10	Mozambique	No
11	Nigeria	Yes
12	Rwanda	No
13	Senegal	No
14	Sudan	Closed
15	Tanzania	Yes
16	Uganda	No
17	Zambia	No
	Asia	Ceramic Pot Factory
18	Afghanistan	No
19	Bangladesh	Equipped in 2004, no production
20	Cambodia	Yes
21	India	Yes
22	Indonesia	No
23	Nepal	Solutions Benefitting Life – disk, not ceramic pot filters
24	Pakistan	No
25	Philippines	No
26	Tajikistan	No
27	Yemen	Yes

Clean water for all!

For More Information

http://web.mit.edu/watsan/meng_ghana.html

http://www.purehomeh2o.com

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" Safe Water for 1 Billion People"

http://web.mit.edu/watsan

Videos on Ceramic Pot Filters

- http://www.youtube.com/watch?v=NfIX4tttrjMAsdf [Potters for Peace]
- http://wn.com/CooperHewitt_Design_for_the_Other_90__Panel__Ron_Rivera [Ron Rivera]
- http://www.youtube.com/watch?feature=player_embedded&v=d4Aqln [Ecofiltro mission]:
- http://www.youtube.com/watch?v=UC9a12e7M0cWgkiQ [Ecofiltro's new factory]
- http://www.youtube.com/watch?v=lPvHtjRvWFM [IDE Cambodia]