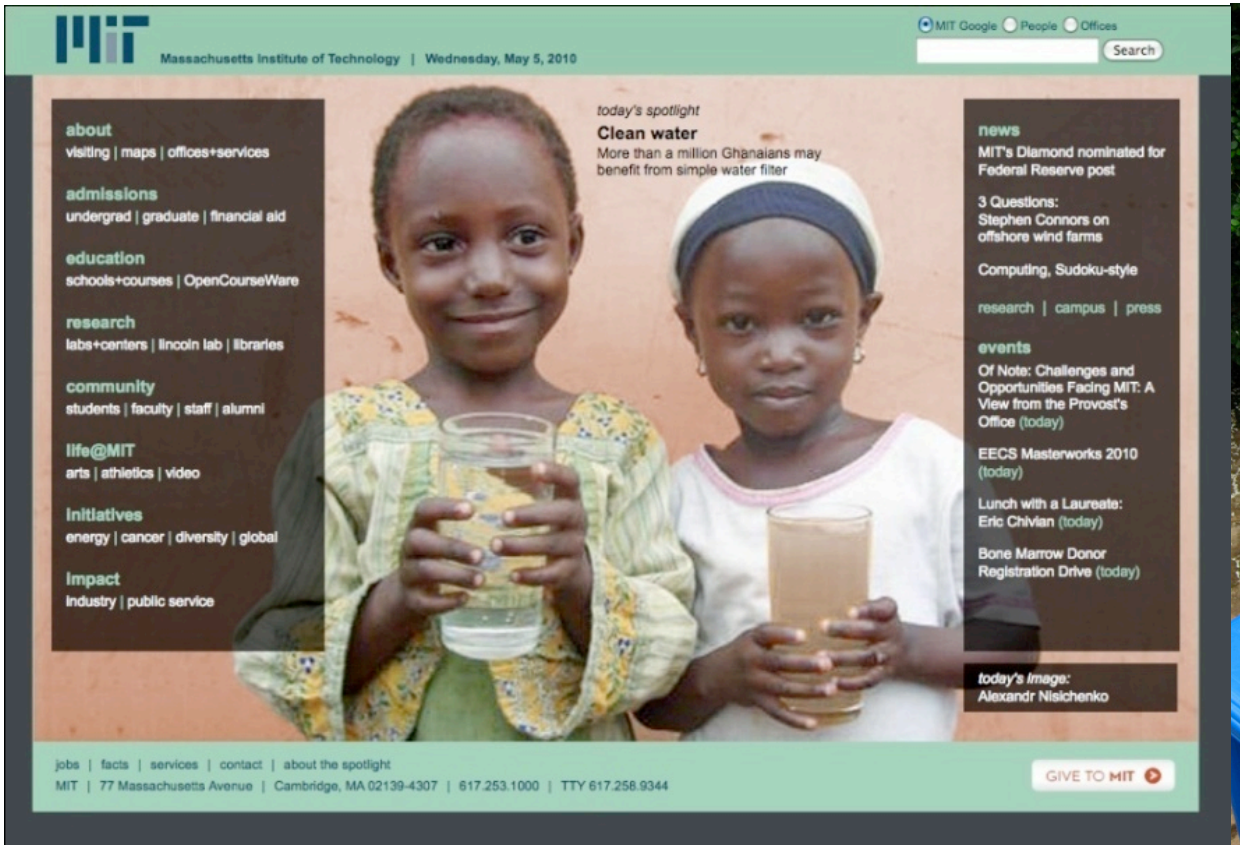
Massachusetts Institute of Technology

Pure Home Water, Tamale, Ghana

Susan Murcott
Senior Lecturer, Civil and Environmental Engineering Dept.
Vice President for Finance - Infinite Mile Awards

June 5, 2012



Credit: Alexandr Nishichenko



Credit: Josh Hester

Donald R.F. Harleman

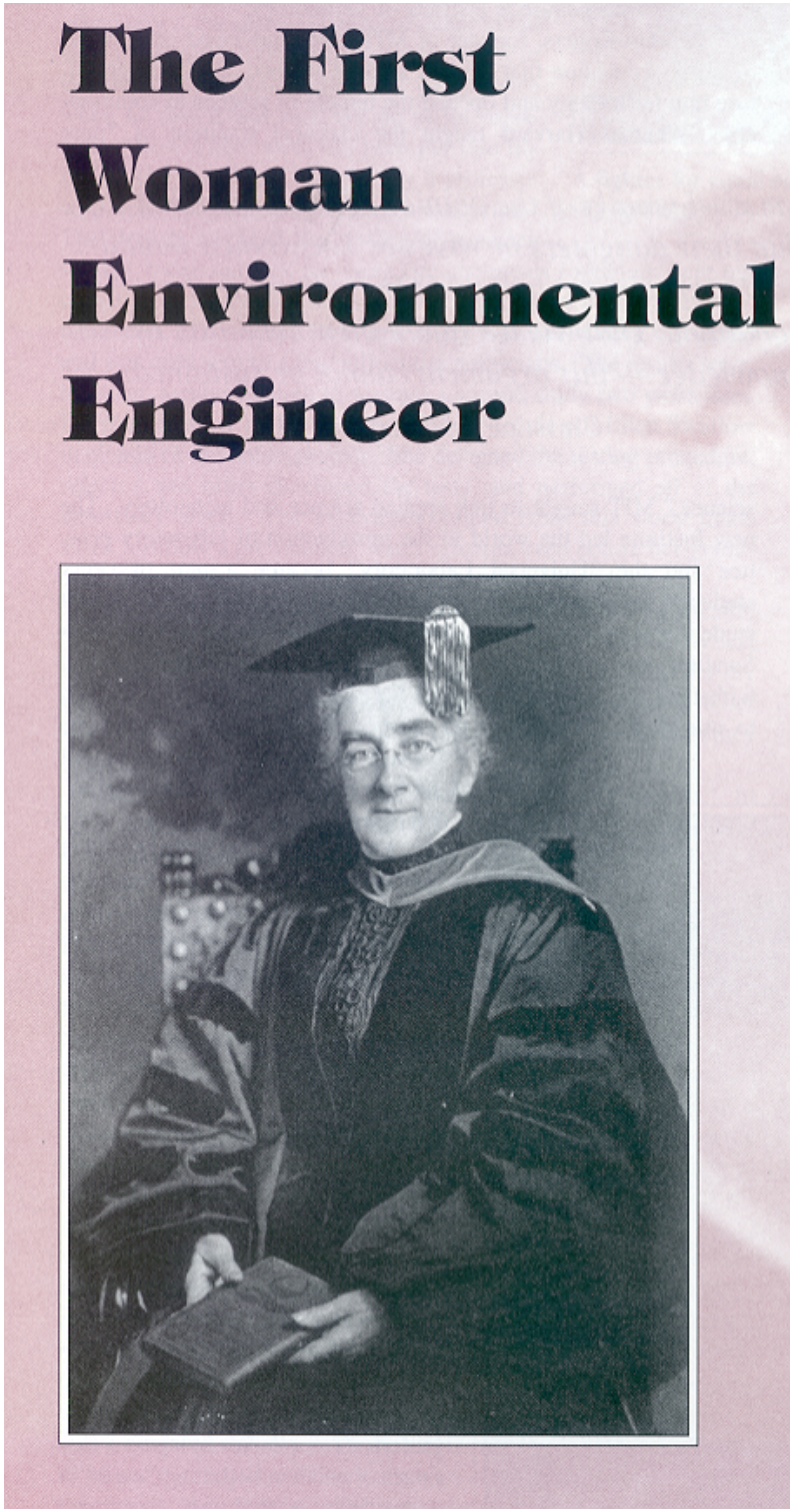
Wastewater Treatment in Megacities of the Developing World



Ellen Swallow Richards



Image courtesy of MIT Museum



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

September 1998





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

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)

Since 1998, I have led MIT student teams in engineering, planning and business projects on water/sanitation in developing countries.







This initiative is called

Safe Water for 1 Billion People

(H2O-1B)

A commitment to equity and basic well-being for all that targets

the “bottom billion”



World Population
7,017,932,716 (6-5-12)

Donate to H2O-1B

Search H2O-1B

Safe Water For 1 Billion People

GLOBAL WATER & SANITATION PROJECTS

MIT M.ENG. H_2O-1B	DOCUMENTS	MIT	GLOBAL



TECHNOLOGIES

- Household Treatment
- Water Supply
- Water Treatment
- Sanitation
- Hygiene

IN THE NEWS

MEDIA

STUDENT BLOGS

WATSAN FACEBOOK

COURSES

- MIT OpenCourseWare (Murcott)
- MIT Water Courses
- Global Water Courses

WEBLINKS



GLOBAL WATER MAPPING

- Drinking Water Supply & Treatment Mapping
- Sanitation Mapping

INTERNATIONAL HWTS NETWORK

- HWTS Network Tools
- HWTS Monitoring & Evaluation
- Network Conference Proceedings

METHODS

- Water Quality Standards & Guidelines
- Low Cost Field Testing
- Microbiological
- Physical
- Chemical
- Radiological
- Surveys
- Units of Measurement

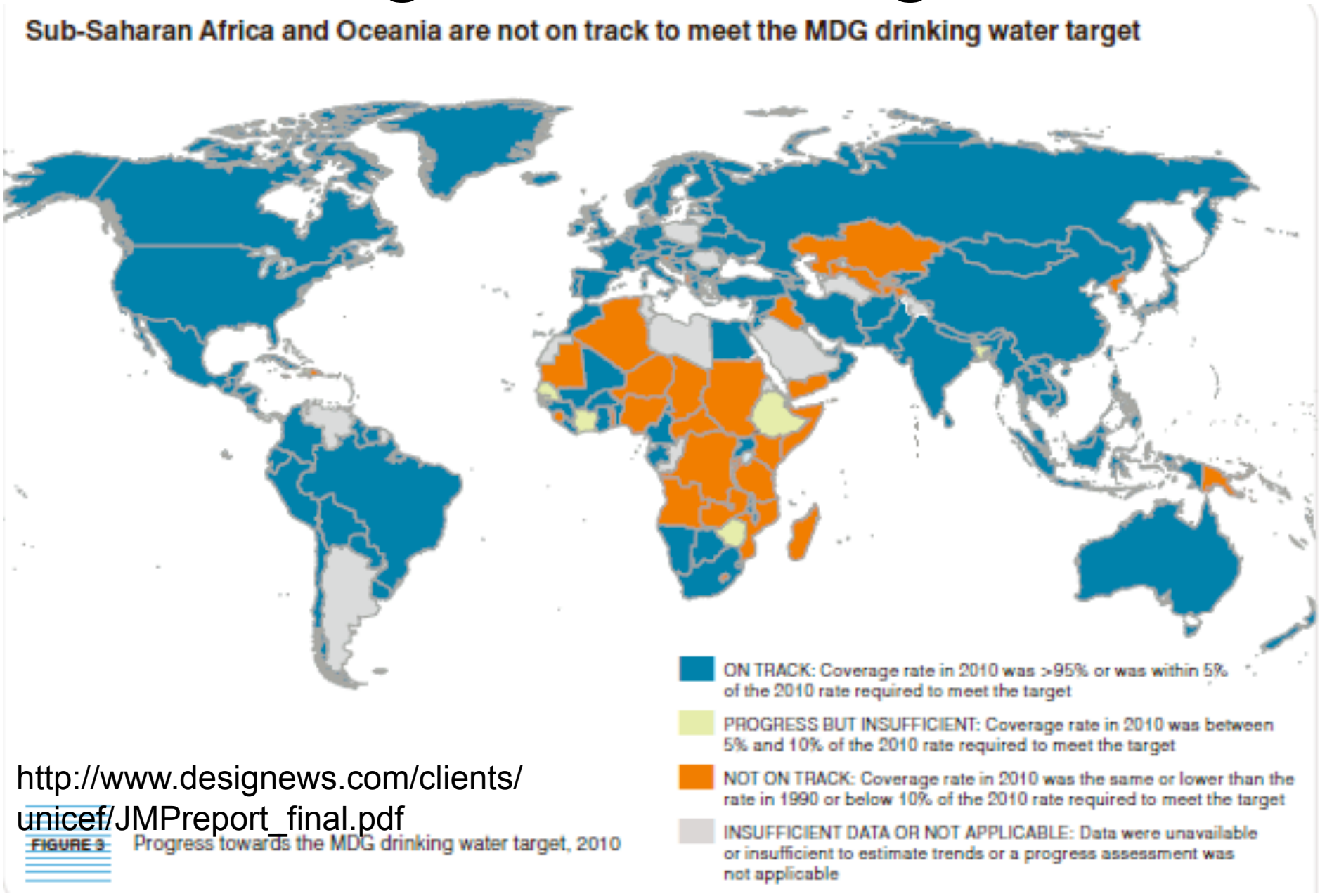
About H_2O-1B | M.Eng. Program | CEE | Contact

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http://web.mit.edu/watsan

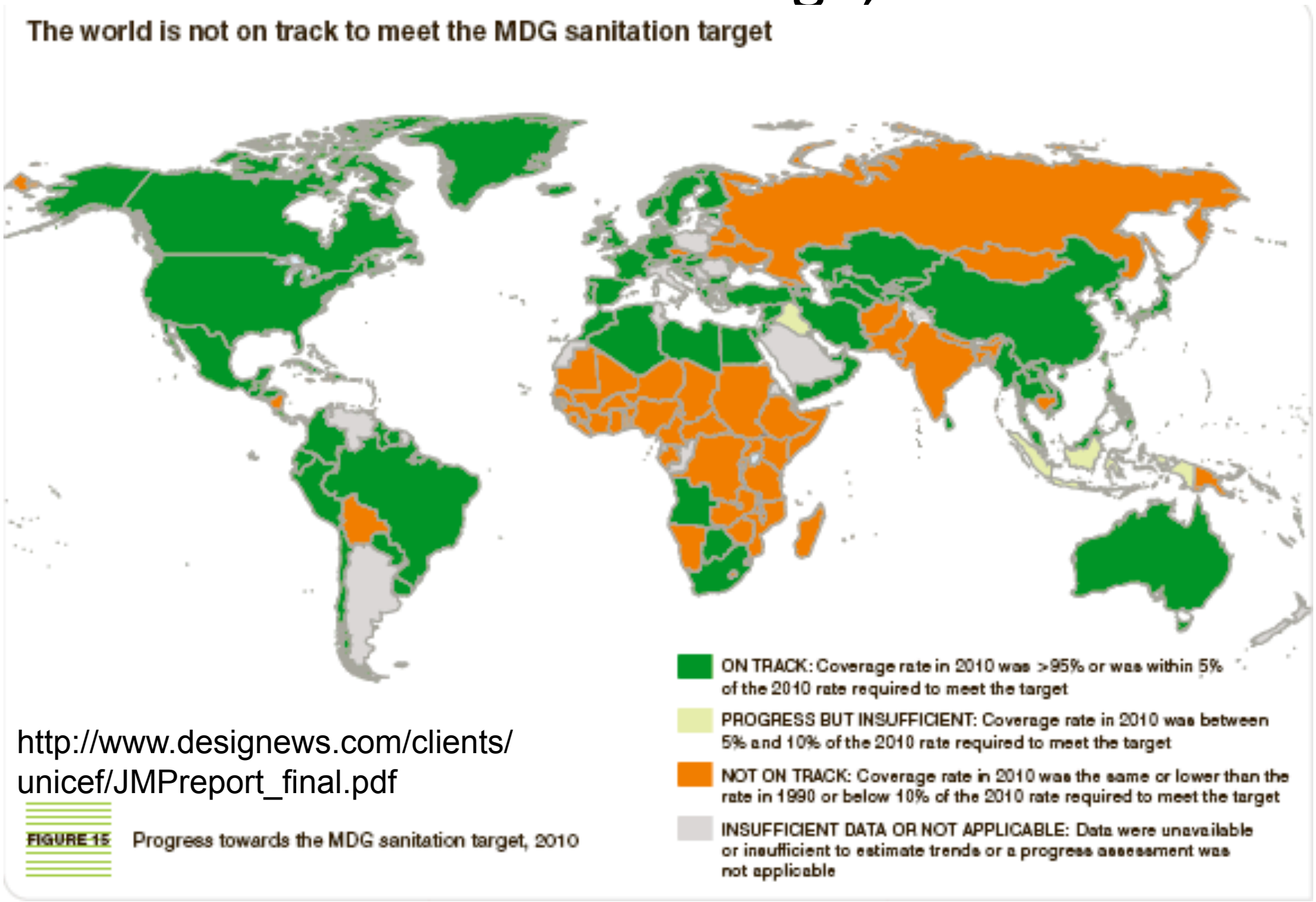
Drinking Water Coverage, 2010



http://www.designews.com/clients/unicef/JMPreport_final.pdf

FIGURE 3 Progress towards the MDG drinking water target, 2010

Sanitation Coverage, 2010



http://www.designews.com/clients/unicef/JMPreport_final.pdf

FIGURE 15 Progress towards the MDG sanitation target, 2010

Drinking Water Ladder

Surface Water	3%	• All surface waters (rivers, streams, dams, lakes, ponds, canals, irrigation channels)
Unimproved	8%	• Unprotected dug wells & springs • Tanker trucks and carts • Vended water
Other Improved	35%	• Public taps • Tube wells & boreholes • Protected dug wells & springs • Rainwater harvesting
Piped Supply on Premises	54%	• Household connection inside or outside user's dwelling

(UNICEF/WHO, 2012)

Significant Sanitary Risks

- In 2012, the U.N. estimates that 783 million people (11%) use unimproved sources.

- But Onda et al (2012) estimate an additional 1.2 billion (18%) use water from sources with "significant sanitary risks."

What are “significant sanitary risks?”



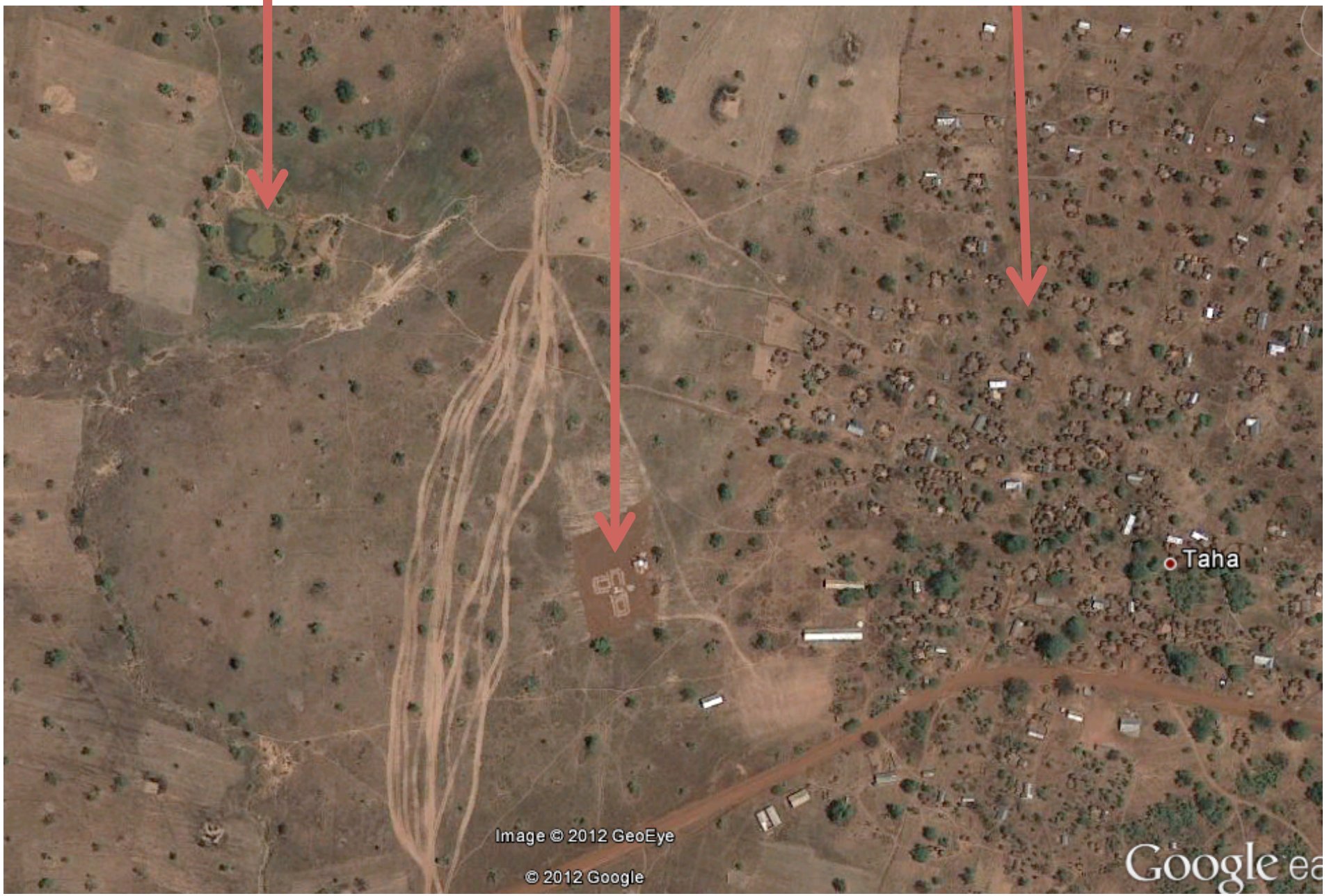
Taha Water Supply – water supply for the village adjacent to our factory

Our factory is on the map!

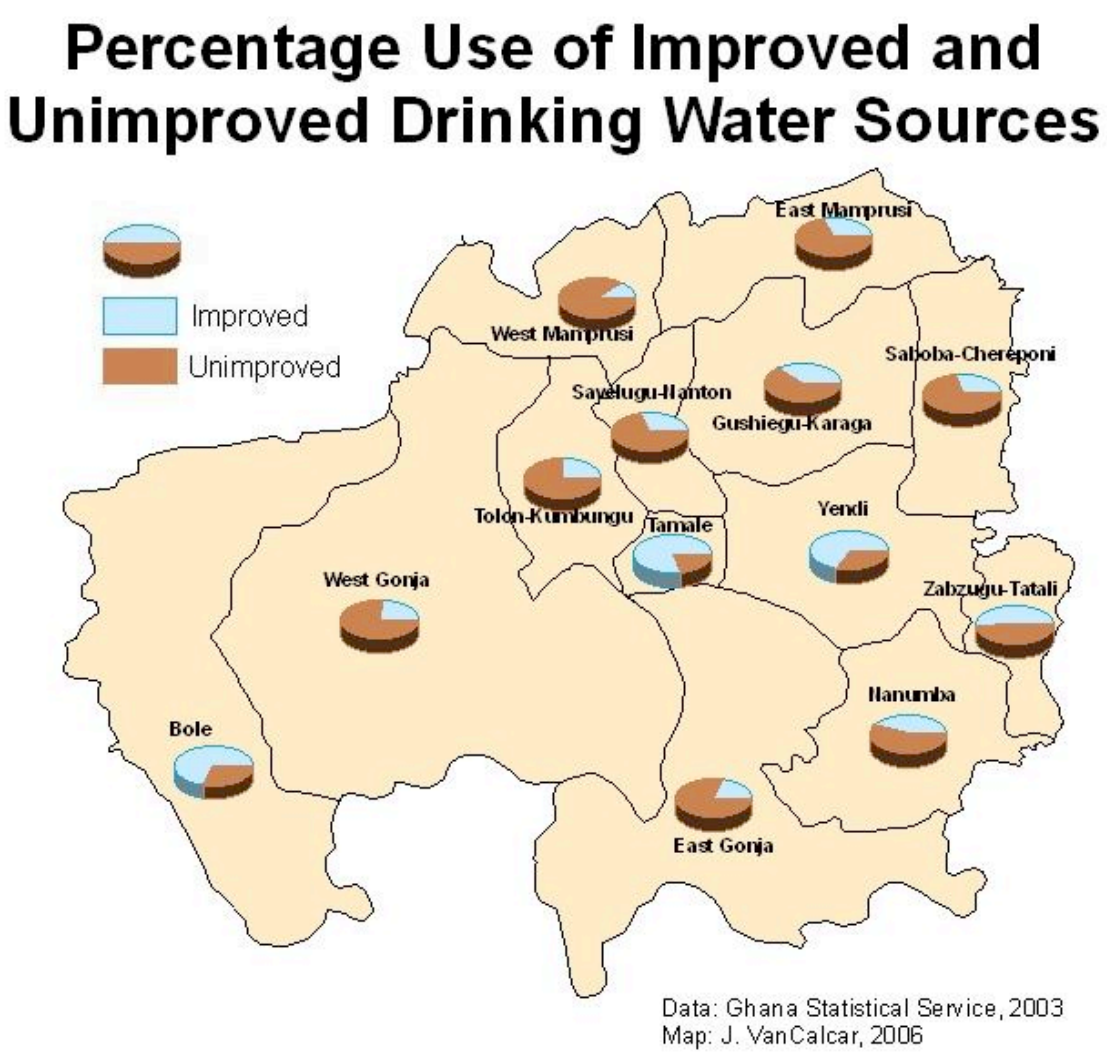
Close-up of Factory Land from Google Earth



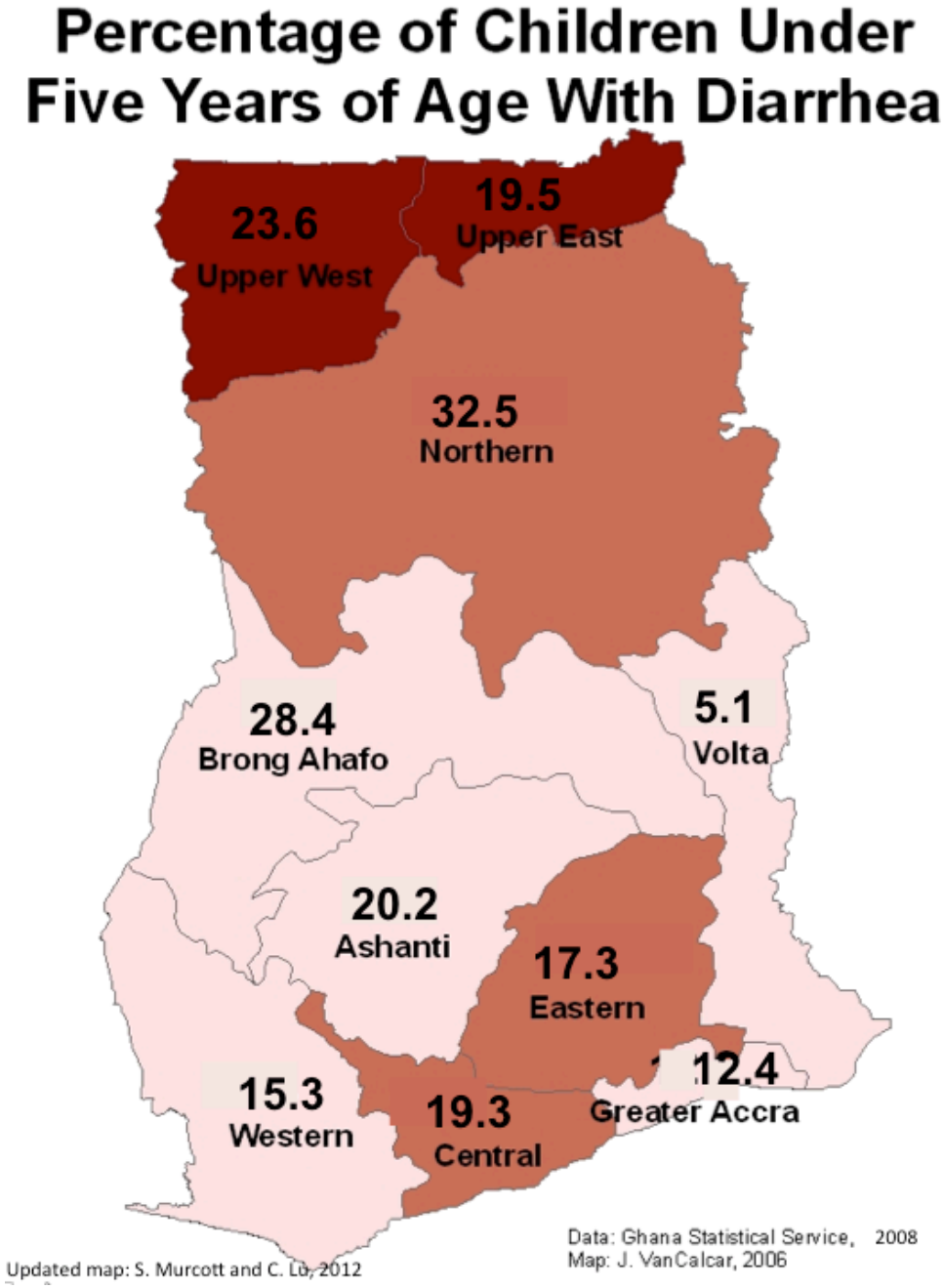
Taha Water Supply, Pure Home Water Factory Site and Taha Village



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



The Northern Region and Brong Ahafo, two of Pure Home Water's target regions, have the highest rates of diarrhea prevalence in Ghana, 33% and 28% respectively.

Pure Home Water

- Pure Home Water (PHW): a social enterprise founded in 2005 to provide safe drinking water via household water treatment and safe storage (HWTS) in Northern Ghana.

PHW has 2 goals:

1. Reach people most in need of safe drinking water, sanitation and hygiene (WASH), especially in Northern Ghana, the poorest part of Ghana
2. Become financially and locally self-sustaining



Pure Home Water's Product:
Kosim Ceramic Pot Filter

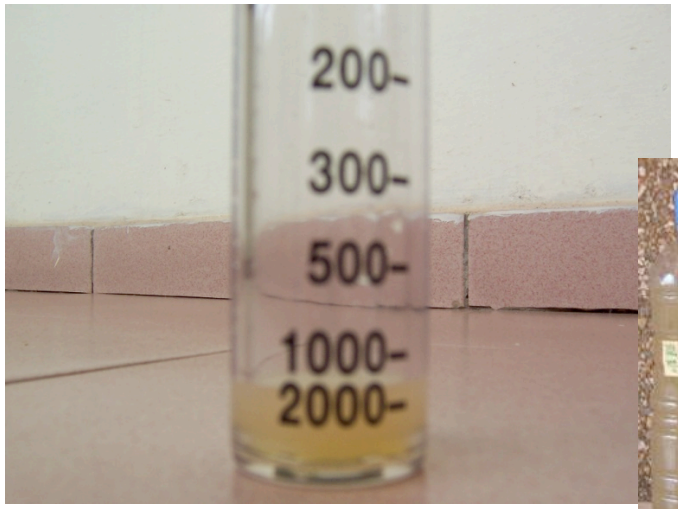
Since 2006, we have focused on disseminating the *Kosim* ceramic pot filter in Ghana





Why did we choose a ceramic pot filter?

- Extremely high turbidity, even in dry season, in the widely used surface water supplies



Turbidty Test (NTU)











Why did we choose a ceramic pot filter?

- Culturally compatible – rural water in Ghana is universally stored in large clay vessels





Credit: Rachel Peletz

Home Filtration works!
Before and After



Credit: Alexandr Nishichenko

Factory Production and Construction Progress: we have gone from working in a grass hut …



Credit: Steve Buchele

To a completed main factory building with roof, windows, doors, rainwater tank



Factory Budget Summary (2012)

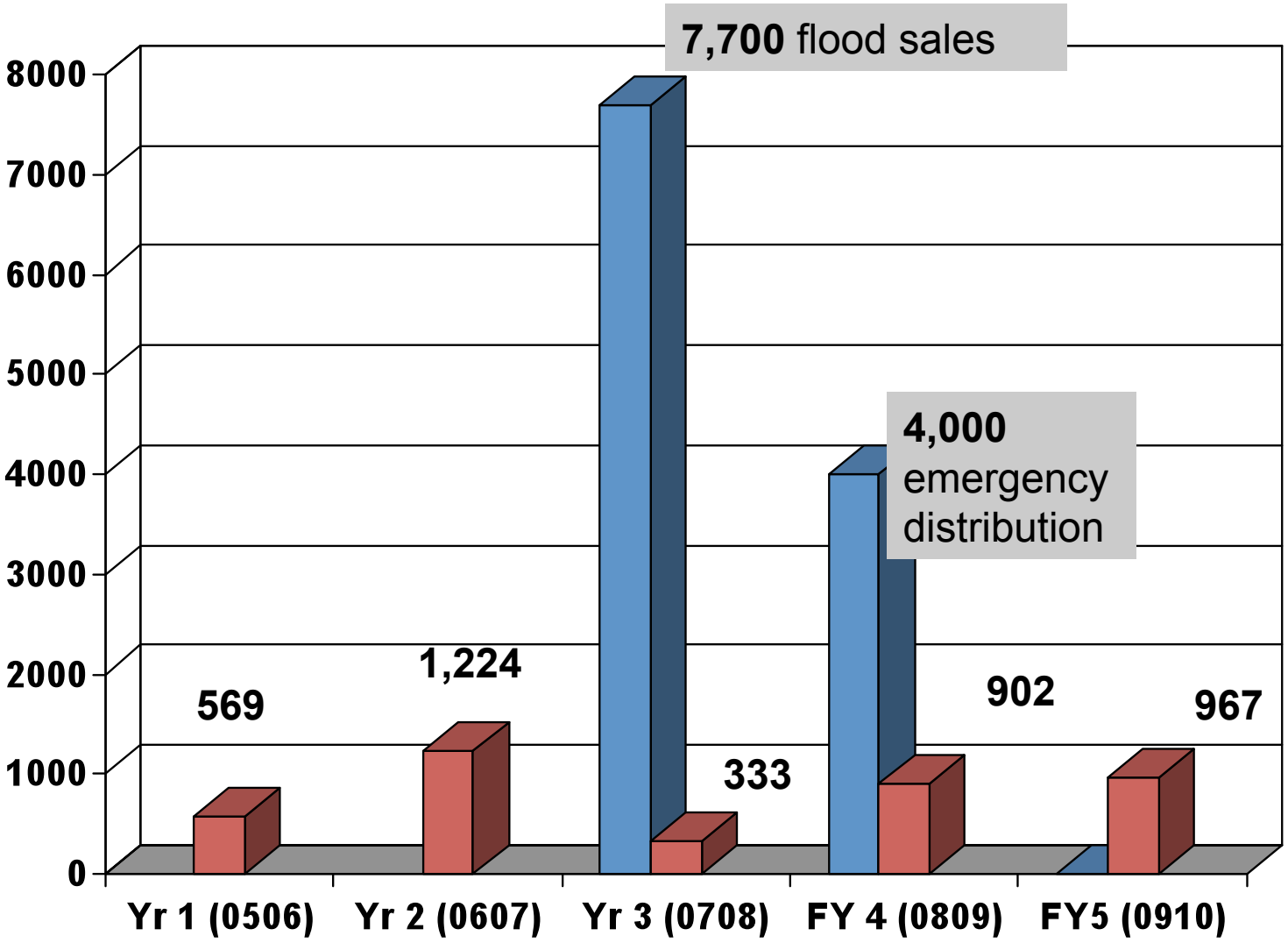
ITEM	US$
Total amount spent to construct factory to date	$150,000
Estimated budget for 2012 for Filter Production, Factory Construction and Expert Consultants	$169,000
Amount we are currently seeking to raise in 2012	$200,000

Pure Home Water is currently seeking funds to complete factory via:

- **Charitable donations (e.g. Gerard Health, Arch Chemicals)**
- **Project proposals (e.g. Hilton, USAID, PATH, Rotary)**
- **Filter sales**

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

We have reached over 100,000 people to date!



Accomplishments

Accomplishments: Our filters have helped the 25+ year old Guinea Worm Eradication Campaign to eradicate guinea worm from Ghana



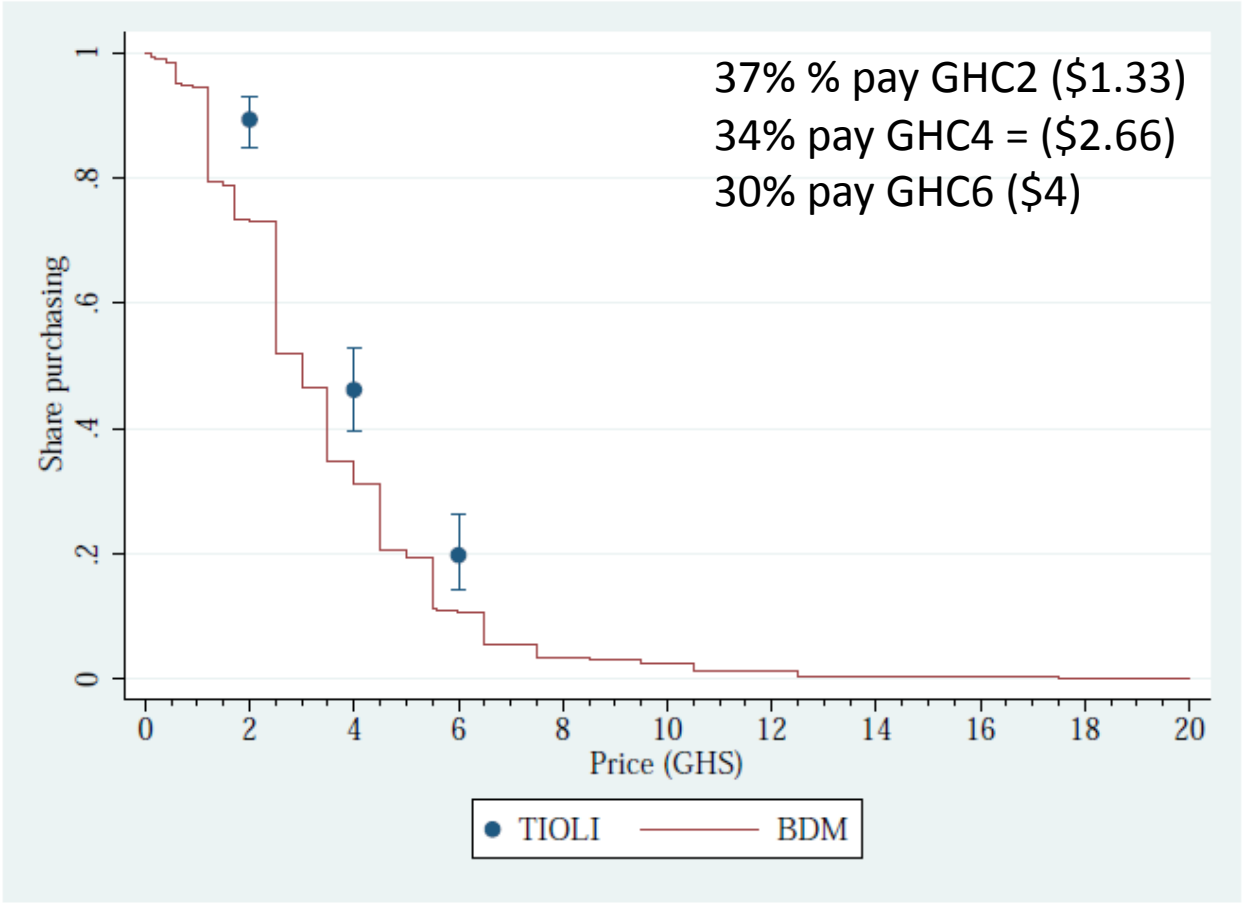
Challenges

Local Capacity to Sell Filters



Local Capacity to Buy Filters

Figure 3: BDM-TIOLI Comparison



Notes: the solid line plots the share of BDM respondents with bids at or above the indicated price. The markers indicate the share of TIOLI respondents who purchased the filter at the offered price with 95% confidence intervals. 603 BDM observations. 645 TIOLI observations, of which 238 at a price of 2, 219 at a price of 4 and 186 at a price of 6.

BDM = Becker Degroot-Marchak Mechanism – provides an exact measure of willingness to pay

TIOLI – take it or leave it

Berry, Fischer and Guiteras, 2012. Eliciting and Utilizing Willingness to Pay: Evidence from Field Trials in Northern Ghana. Innovations for Poverty Action. Working Paper. New Haven, CT.



Implementation Strategy
Sale vs. Free Distribution?



Direct Sales



Free Distribution by Large NGOs

Connections between Pure Home Water and the Office of the VP?

- Water is like money – just as all living things cannot exist without water, institutions cannot exist without money



How has the Office of the VP supported Safe Water for 1 Billion People and Pure Home Water?

- Accounts Payable: Cathy Cherico
- Procurement: Lucia Sanders

Accounts Payable: Cathy Cherico and others have helped us handle unconventional expenses!

Money Transfers (2010) - S.Murcott to PHW			
		S.Murcott	MIT Repayment
Date	Item	US$	US$
12/28/2009	Delta Airlines-Manny Hernandez ticket, pd by S.Murcott	$2,275.90	repaid - part of $18K+ received on 4/28/10
2/17/2010	Wire transfer-SM Acct rent advance 18 months @ GHC 150/mo	$2,200.00	
3/29/2010	Wire transfer - SM account_factory O&M	$10,000.00	
4/21/2010	Wire transfer from SM account to Kickstart, Nigeria for block press	$2,160.05	
4/28/2010	MIT Reimbursement - Factory Construction Expenses		$18,961.66
5/21/2010	Wire tranfer-SM account- advance for factory construction-summer '10 in anticipation of G.H.Foundation grant	$15,000.00	
	TOTAL	$31,635.95	$18,961.66
Exchange: US$1 = GHC 1.40			

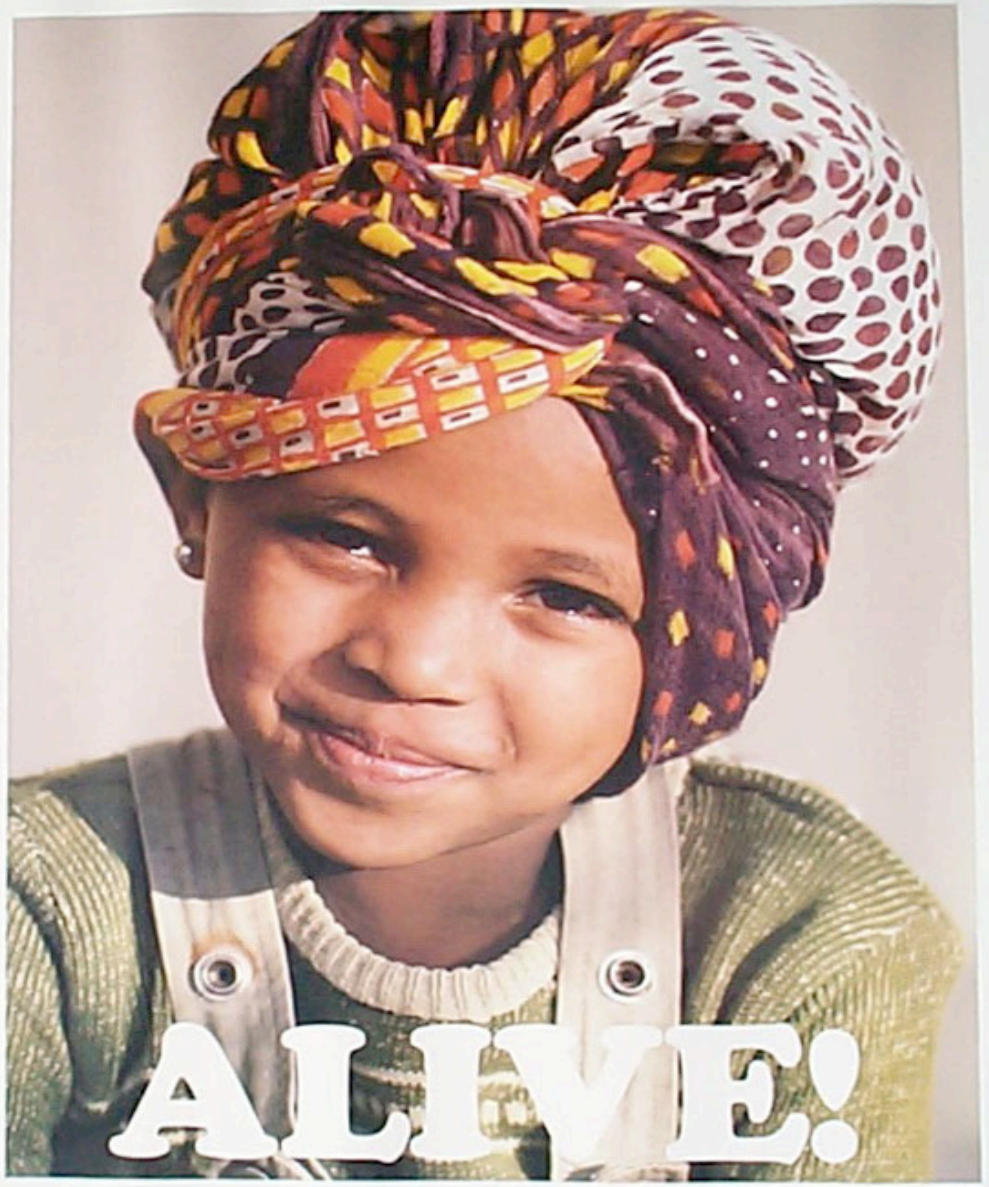
How to Serve?

- Michael Howard
- Ann Harvey
- Giovanna Bortolamedi
- Scott Rolph

Proposed MIT Motto for the 21st C.

Mind, hand and heart

What Would You Like to be When You Grow Up?



More on
“Pure Home Water”

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

http://www.purehomeh2o.com



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More on
" Safe Water for 1 Billion People"

http://web.mit.edu/watsan



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