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Water for Africa

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- (1) Strengthen scientific basis for decision-making
- (2) Enhance capacity in developing countries
- (3) Provide training and learning opportunities for faculty & students
- (4) Improve health & well-being of households



Making water work...

... for public health

... for economic development

... for the long term



Current paradigm



Photo: Jon S. Paul



Photo: Amy Pickering

~890 million people using unimproved sources in 2008 (JMP)



Photo: Sara Marks



Photo: Sara Marks

Non-networked solutions



Photo: Amy Pickering



Photo: Amy Pickering

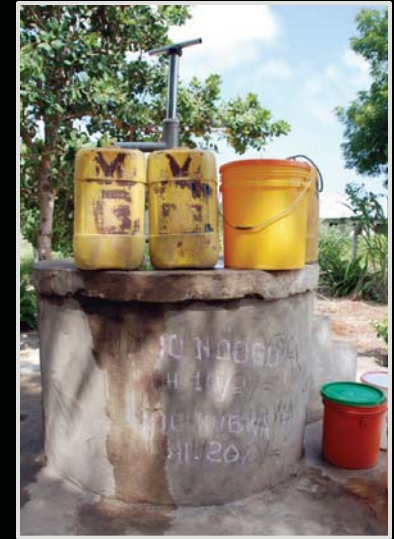


Photo: Isaac Weaver



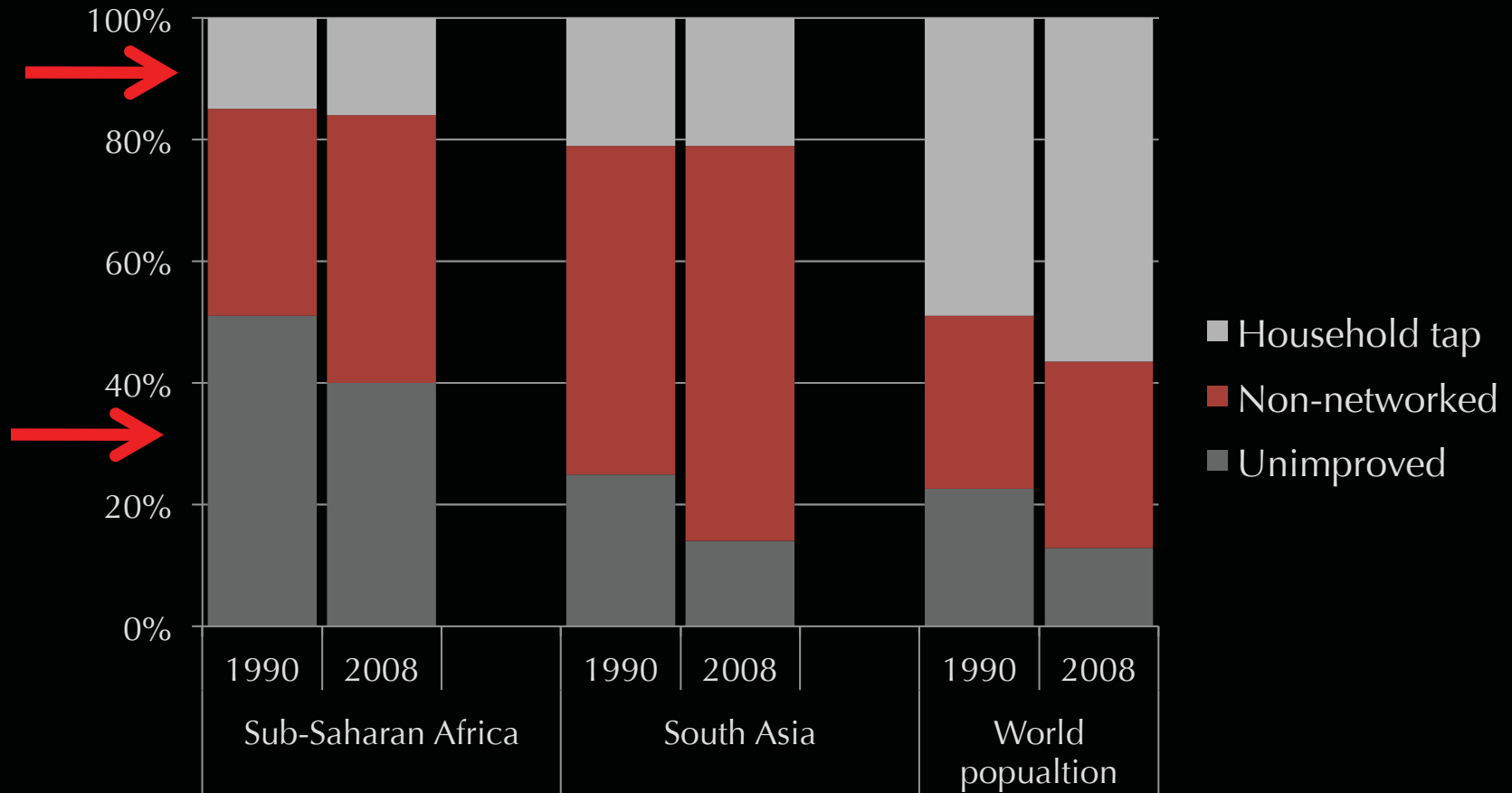
Photo: Jenna Davis

*~2.1 billion people
using improved point
sources in 2008
(JMP)*



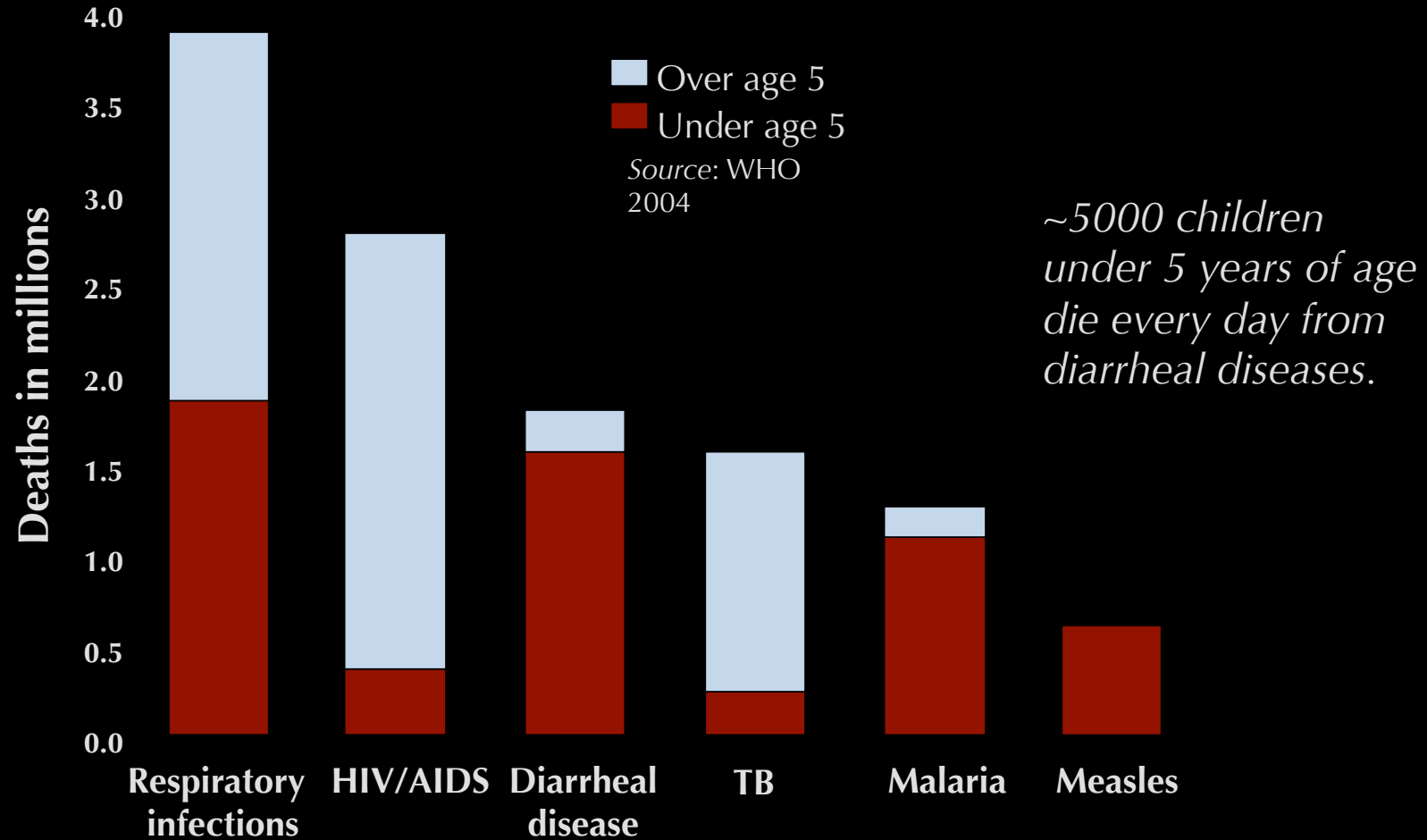
Photo: Amy Pickering

Non-networked solutions



Data source: Joint Monitoring Program

Limited health benefits



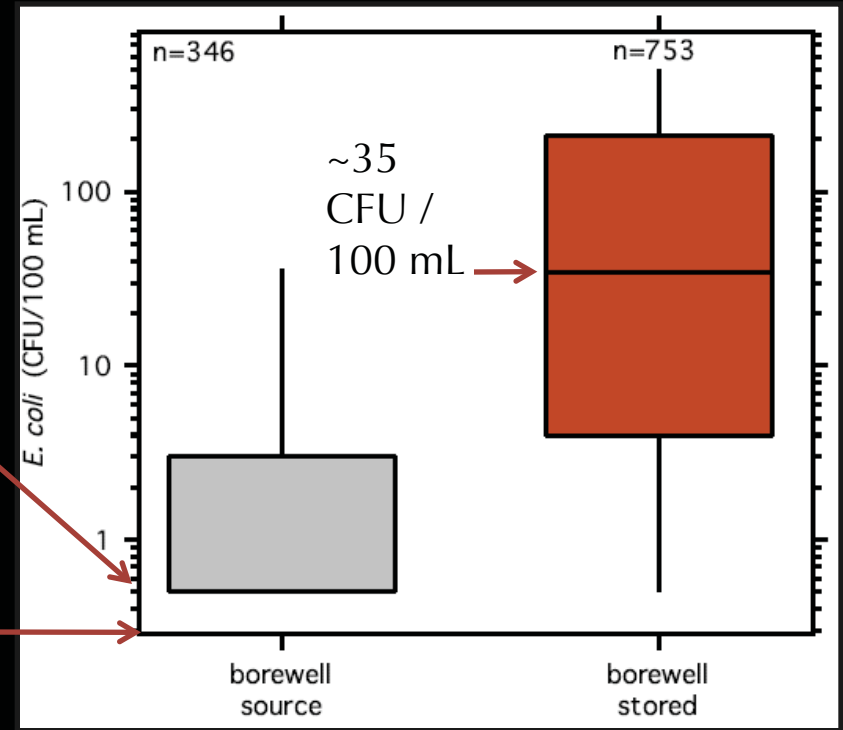
Leading infectious causes of death, 2002

Water is vulnerable



0.5 CFU/100 mL
(detection limit)

WHO
standard



E. coli in borewell water at source, stored in home: Dar es Salaam, Tanzania

Water is heavy



Photo: Amy Pickering

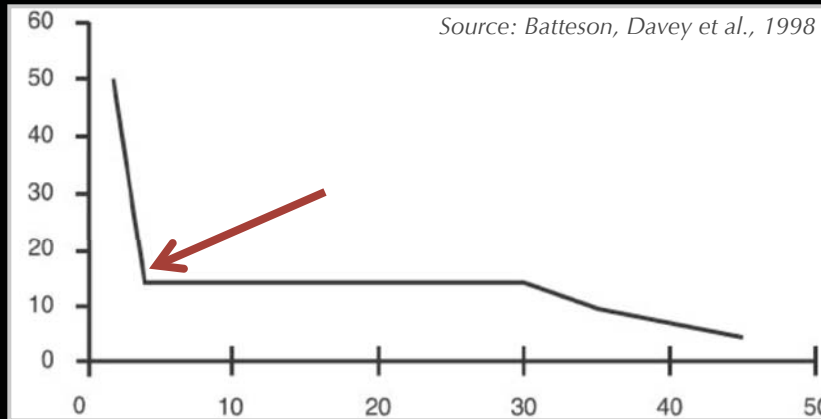


Photo: Jenna Davis



Photos: Amy Pickering

Liters/
capita/
day



Fetching time (minutes)

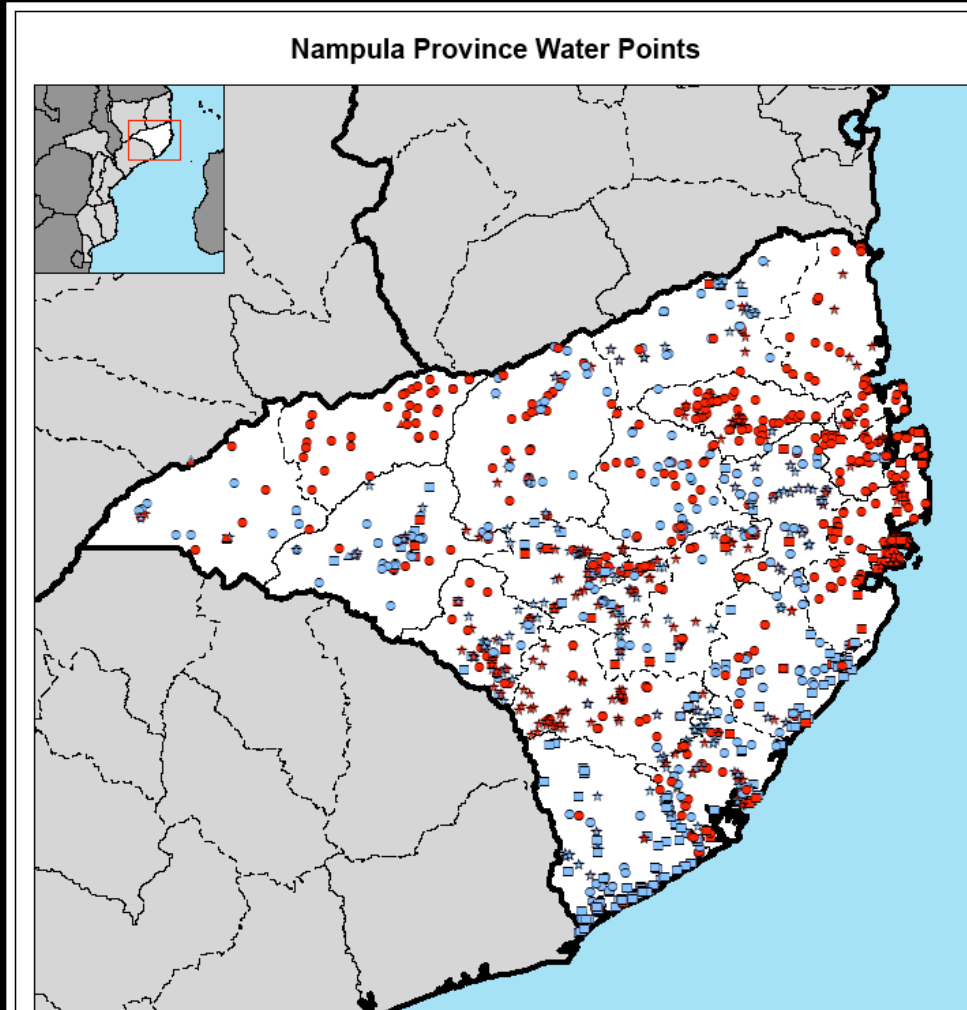


Photo: Amy Pickering

Time and money costs

	Median time cost / HH / year (days)	Median price paid per m ³ of water (US\$)	Median water use (liters / person / day)
Household tap (<i>n</i> =361)	1	0.44	31
Public tap(<i>n</i> =161)	76	1.90	13
River (<i>n</i> =317)	61	0	10

Sustainability challenges



Legend

Water Points, Functioning?

● Mechanical borehole, Yes	★ Well, Yes
● Mechanical borehole, No	★ Well, No
■ Manual borehole, Yes	▲ Protected Spring, Yes
■ Manual borehole, No	▲ Protected Spring, No
	▭ Provinces
	▭ Districts

Of 1521, water points:

- 44% functioning
- 19% “with deficiencies”
- 35% completely out of service

Similar to all of sub-Saharan Africa

Water, Health & Development

STANFORD UNIVERSITY

Home

Faculty

Research

Academics



Faculty



Meet faculty working on WHD-related research.

Research



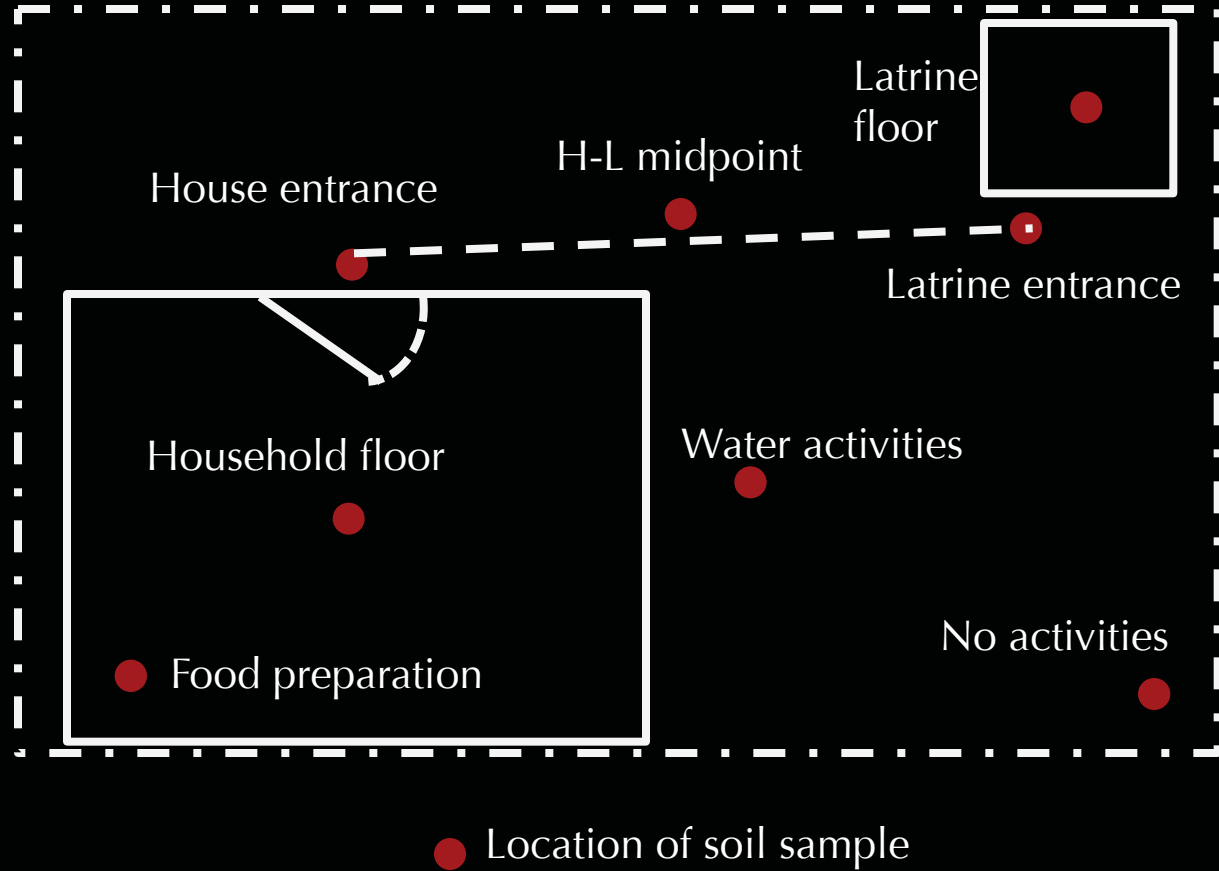
Learn more about current WHD research projects at Stanford.

Academics

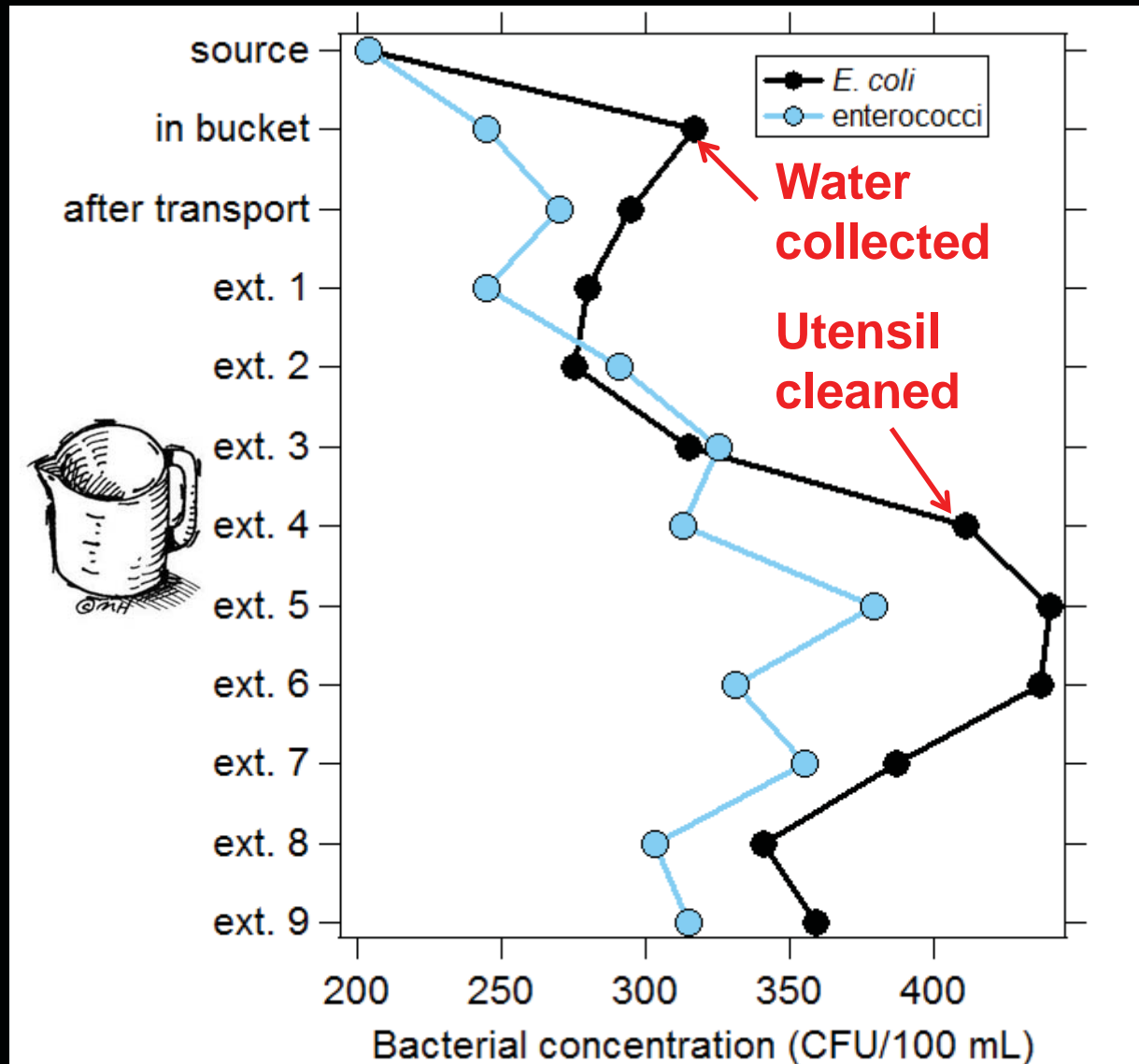


Information about WHD educational opportunities.

Mapping household risk



Following the water















Testing interventions

“Low” ≤ 10 CFU/100mL
 “Medium” 11-100 CFU
 “High” > 100 CFU
 Respondent's water (CFU per 100mL *E. coli*)

Median value
 for HHs in
 neighborhood

MAJIBU YA SAMPULI ZA MAJI
 NAMBA YA KAYA: _____

<p>Maji Yaliyohifadhiwa Katika Kaya</p> 	<p>Majibu ya kaya hii: _____</p> <p>Wastani wa Majibu kwa Maji ya Eneo: _____</p>	<input type="checkbox"/> Vijidudu Vingi Sana  <input type="checkbox"/> Vijidudu Vingi  <input type="checkbox"/> Vijidudu Vichache 
<p>Kisima cha Kaya</p> 	<p>Majibu ya kaya hii: _____</p> <p>Wastani wa Majibu kwa Maji ya Eneo: _____</p>	<input type="checkbox"/> Vijidudu Vingi Sana  <input type="checkbox"/> Vijidudu Vingi  <input type="checkbox"/> Vijidudu Vichache 
<p>Bomba la maji la kaya</p> 	<p>Majibu ya kaya hii: _____</p> <p>Wastani wa Majibu kwa Maji ya Eneo: _____</p>	<input type="checkbox"/> Vijidudu Vingi Sana  <input type="checkbox"/> Vijidudu Vingi  <input type="checkbox"/> Vijidudu Vichache 

Water for livelihoods



- 2/3 of ~5700 households in Colombia, Kenya & Senegal earn income from water-using activities
- Productive use -> cost recovery
- Wealthier households benefit more

Expanding household-level service



Photo: Deepti Chatti

PROGRAM SUMMARY #4

Water and sanitation loan program

- Loan amounts available: 3000 – 10,000 Rs.
- Purpose: Household water connection, toilet installation, and/or underground drainage connection
- Repayment period: 24 months
- Interest rate: 1.67% average per month, declining basis (20% annual)


Sample loan A: Household water connection

Amount borrowed: 3,500 Rs.

Average monthly repayment amount:

- + 146 Rs. in principal
- + 30 Rs. interest
- + 20 Rs. health insurance
- + 40 Rs. administrative charges

236 Rs. per month total, for 24 months




Sample loan B: Toilet with underground drainage

Amount borrowed: 7,000 Rs.

Average monthly repayment amount:

- + 292 Rs. in principal
- + 61 Rs. interest
- + 20 Rs. health insurance
- + 40 Rs. administrative charges

413 Rs. per month total, for 24 months



Sample loan C: Water connection and toilet with drainage

Amount borrowed: 8,500 Rs.

Average monthly repayment amount:

- + 396 Rs. in principal
- + 63 Rs. interest
- + 20 Rs. health insurance
- + 40 Rs. administrative charges

539 Rs. per month total, for 24 months




Photo: Valentina Zuin

WaterCredit program:
>50,000 loans issued, 97% repayment rate
90% female borrowers





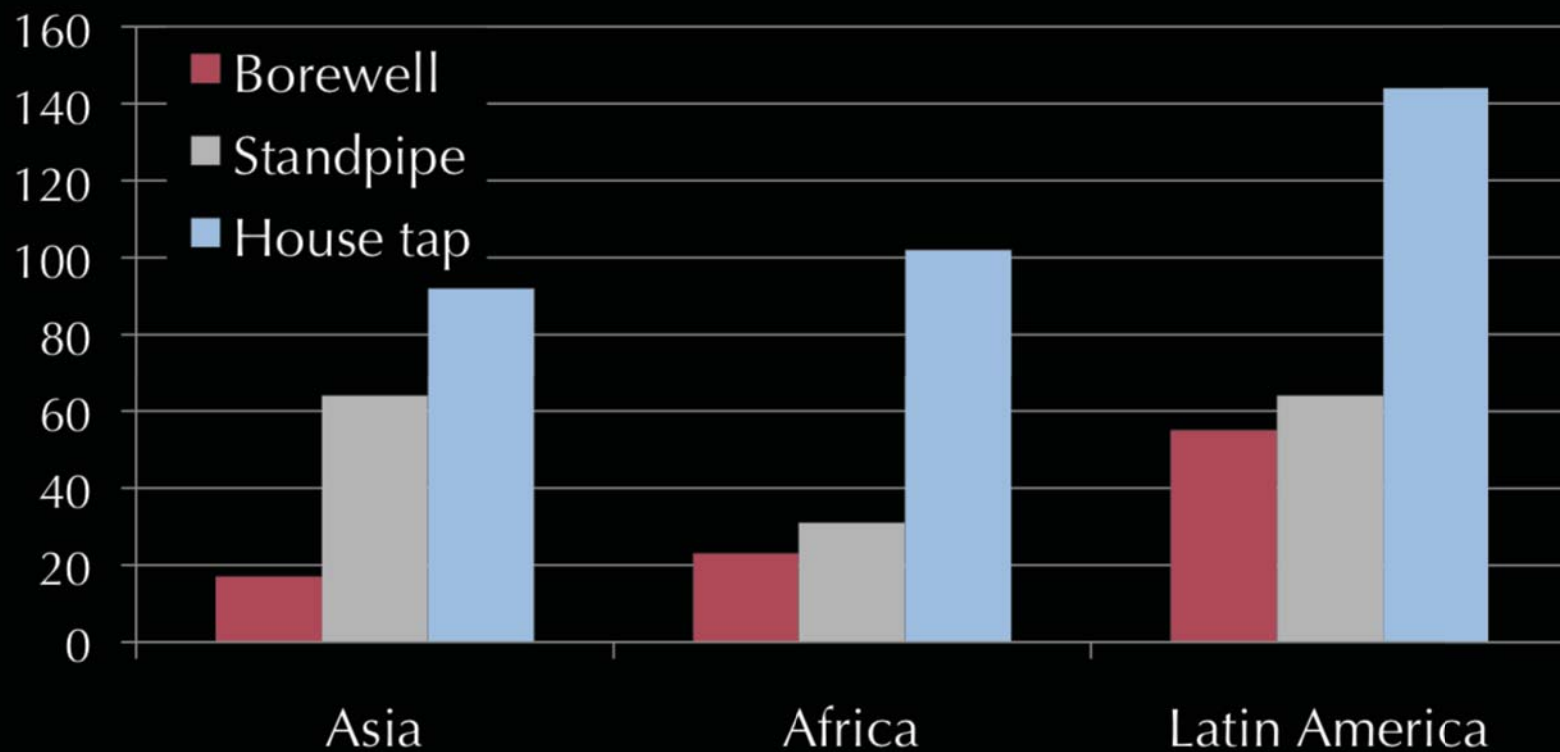


Photo: Amy Pickering



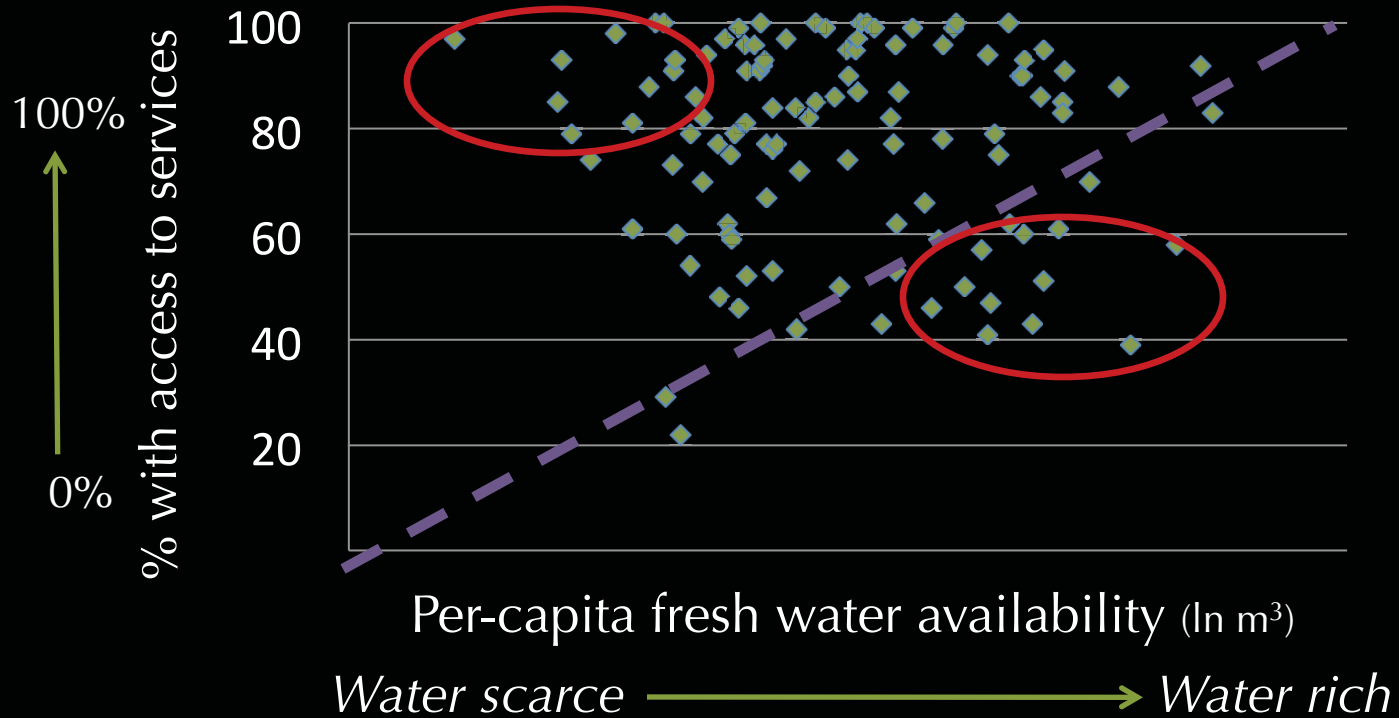
Extra slides

Median construction cost *per capita* (US\$), improved water supply options (2000)



Source: World Health Organisation, 2000

Access to water services by freshwater availability



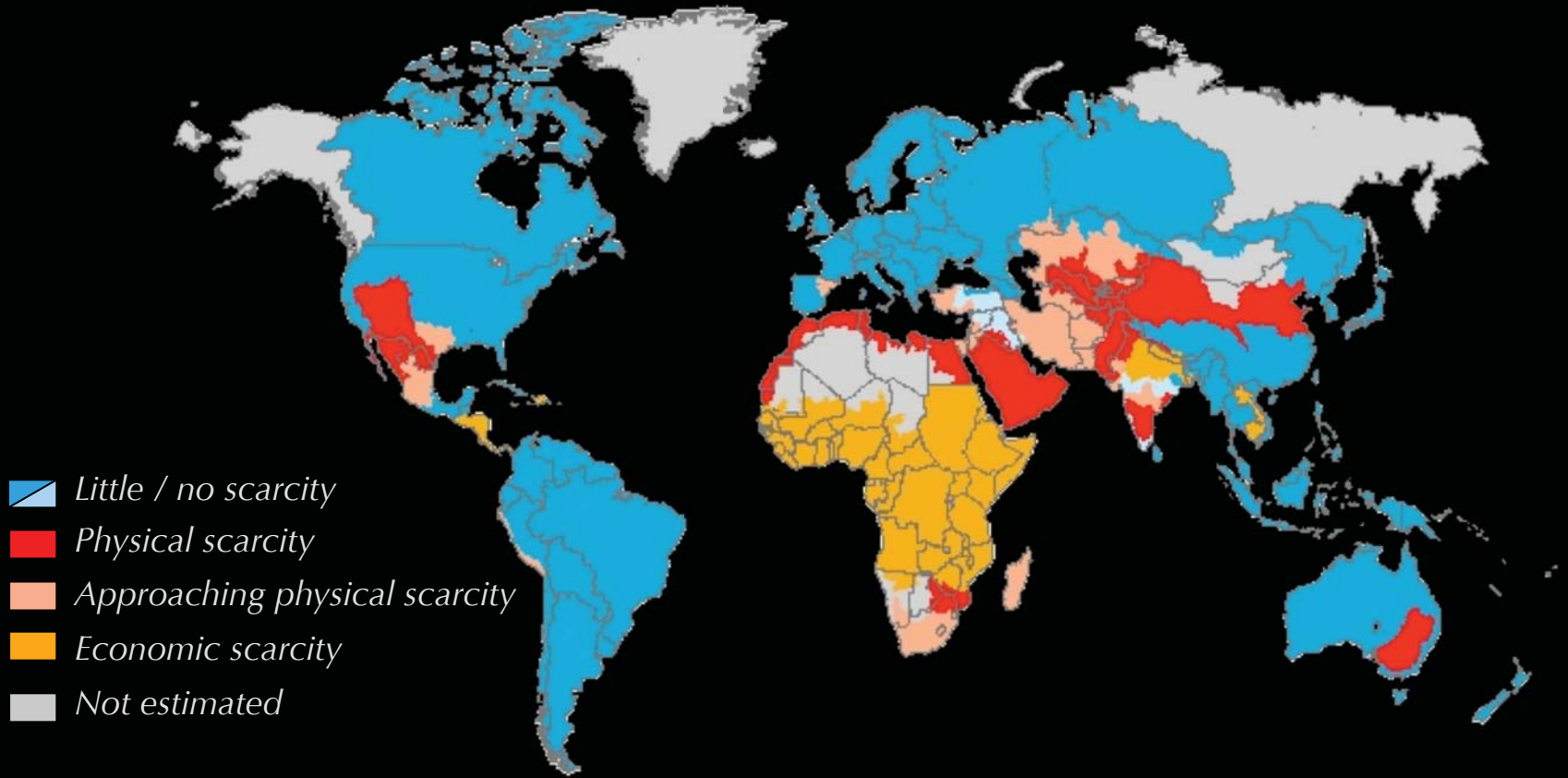
Data source: UNICEF/WHO Joint Monitoring Program, 2004

Are simple solutions really cheap?

Ave. handpump life (yrs.)	Total handpumps installed	Number working in Year 20	% working in year 20	% built in year 20 that are replacements
5	55,100	17,200	31%	80%
10	55,100	31,800	58%	58%
20	55,100	45,300	82%	27%

Initial Conditions: 1500 HPs installed in Year 1; a 6% annual construction capacity increase; max lifespan is 2x avg. lifespan; normal O&M, but no rehabilitation considered.

Freshwater availability



Source: De Fraiture et al., *International Water Management Institute*



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