

## Problem



Global aid and development organizations often rely *at best* on self-reported, manually-collected data for feedback on program effectiveness.

700M people, many in hard-to-reach areas, still lack access to safe water, resulting in nearly 2M preventable deaths annually in children under five years. This is despite the Millennium Development Goal 7C to cut in half the number of people without access to safe water by 2015.

## Solution



Prototype 2.5L Purifier

PotaVida is developing a solar water purifier which measures cumulative solar UV exposure of a hydration bag and indicates when the water is disinfected. It also provides user feedback on whether the sun is bright enough for this process to occur. The embedded electronics can easily implement data-logging, and a short-range wireless link can upload data to a smartphone.



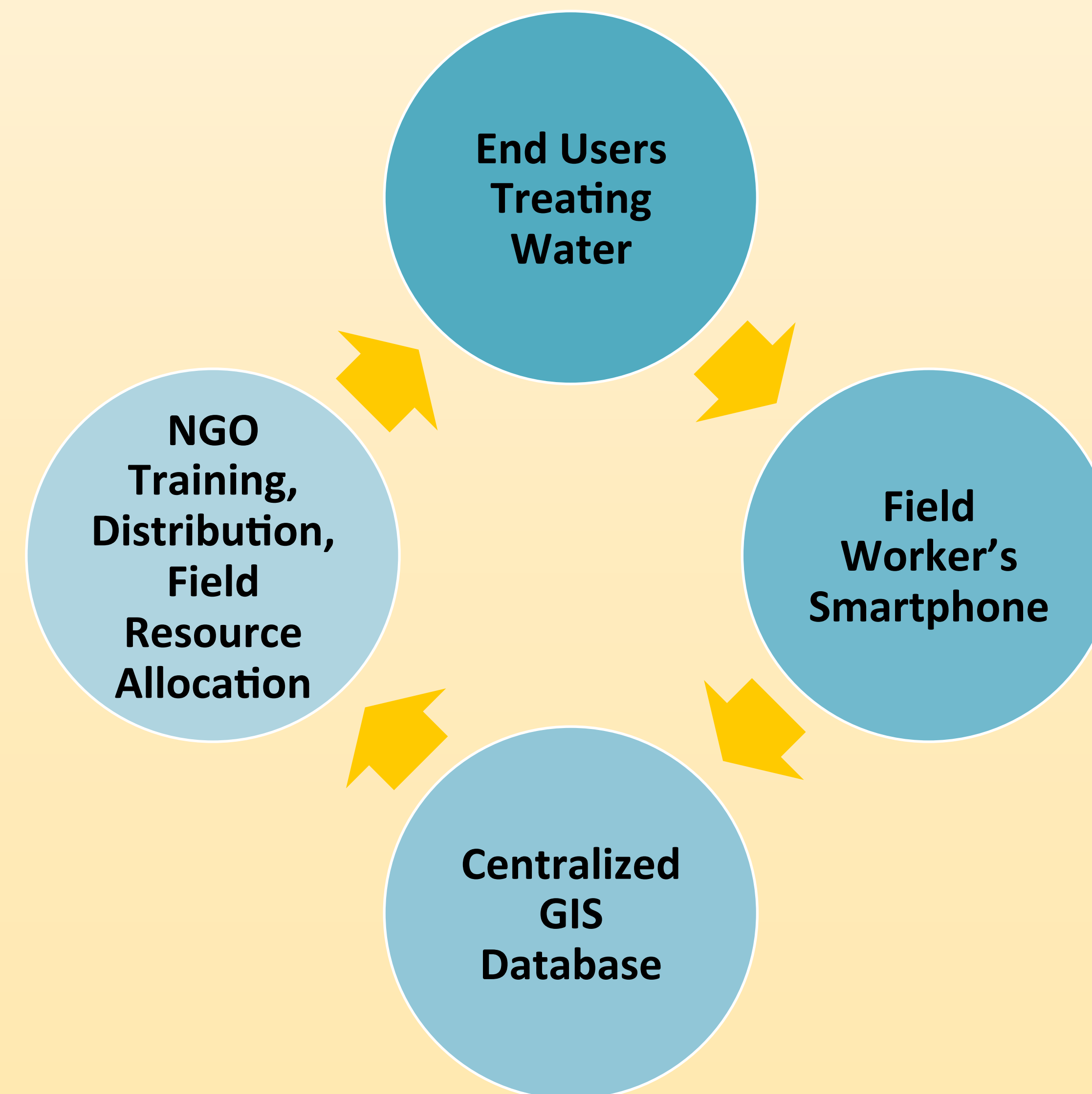
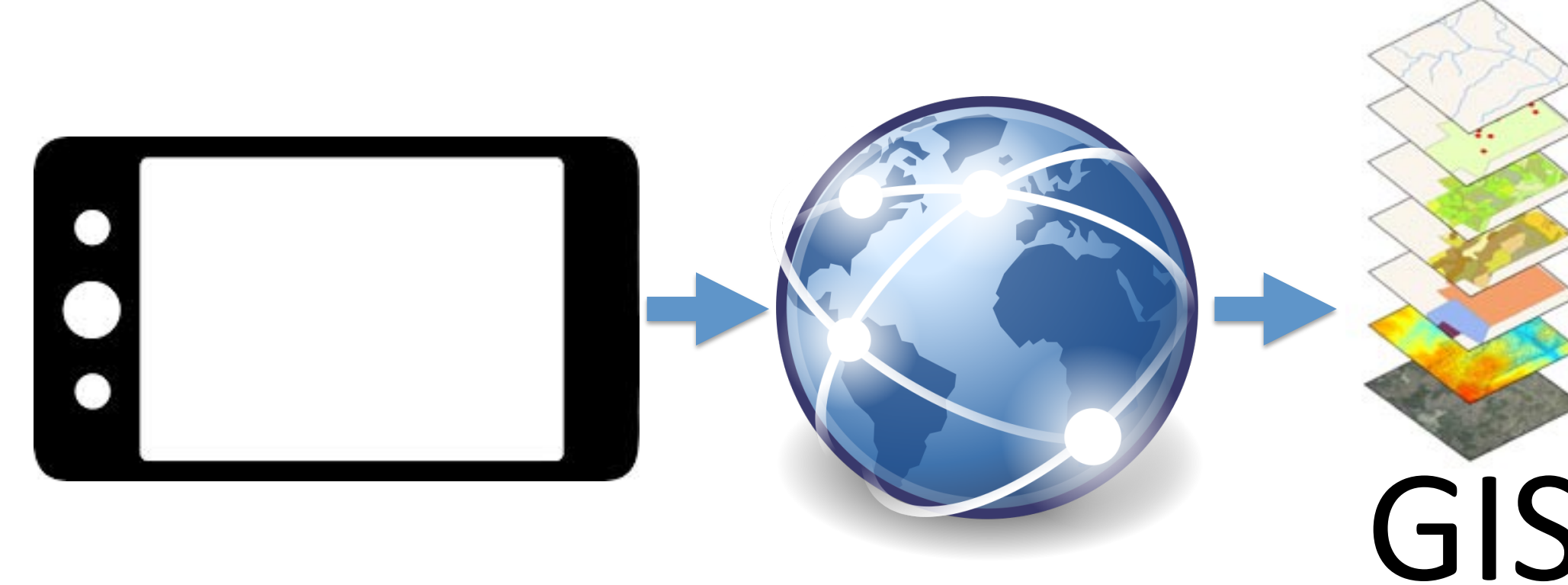
Fill bottles with water, and close the cap



Expose bottles to direct sunlight for at least 6 hours (or for two days under very cloudy conditions)

## Cyber-Physical System

Uploaded data is geo-tagged and consolidated in a GIS database, where it is combined with program implementation data to drive (possibly automated) decision making processes based on usage outcomes.



## Opportunity

Embedded systems with wireless communication capabilities are increasingly low-cost and low-power. Devices built for consumer electronics can be leveraged for in-situ data logging.

## Solar Water Purifier

- 3-6 hours per batch in full sun
- Can be used for transport and storage
- **Nothing to replace or refill**, with a 5-year shelf/working life
- Less than \$20/unit for 5-10L
- Logs user interactions & UV measurements

## Project Status: PotaVida, Inc.



**Charlie Matlack, CEO**  
Electrical Engineer  
Product design & circuit fabrication



**Jackie Linnes, Ph.D.**  
Bioengineering  
User-centered design  
Field experience in Nicaragua & Zambia



**Tyler Davis**  
Public Policy Analyst  
Field experience in Indonesia & Mexico

### At A Glance

**Focus:** Water sanitation and hygiene

**Status:** Alpha Prototyping

#### Traction:

- 1<sup>st</sup> Place, international design contest sponsored by Rockefeller Foundation
- Seed grant from MIT D-Lab
- 1<sup>st</sup> Place & Best Innovation, U of Washington Business Plan Competition 2011
- Pilot innovation funding from World Vision US

#### Partners:

- World Vision USA and Zambia
- Aquamira Technologies

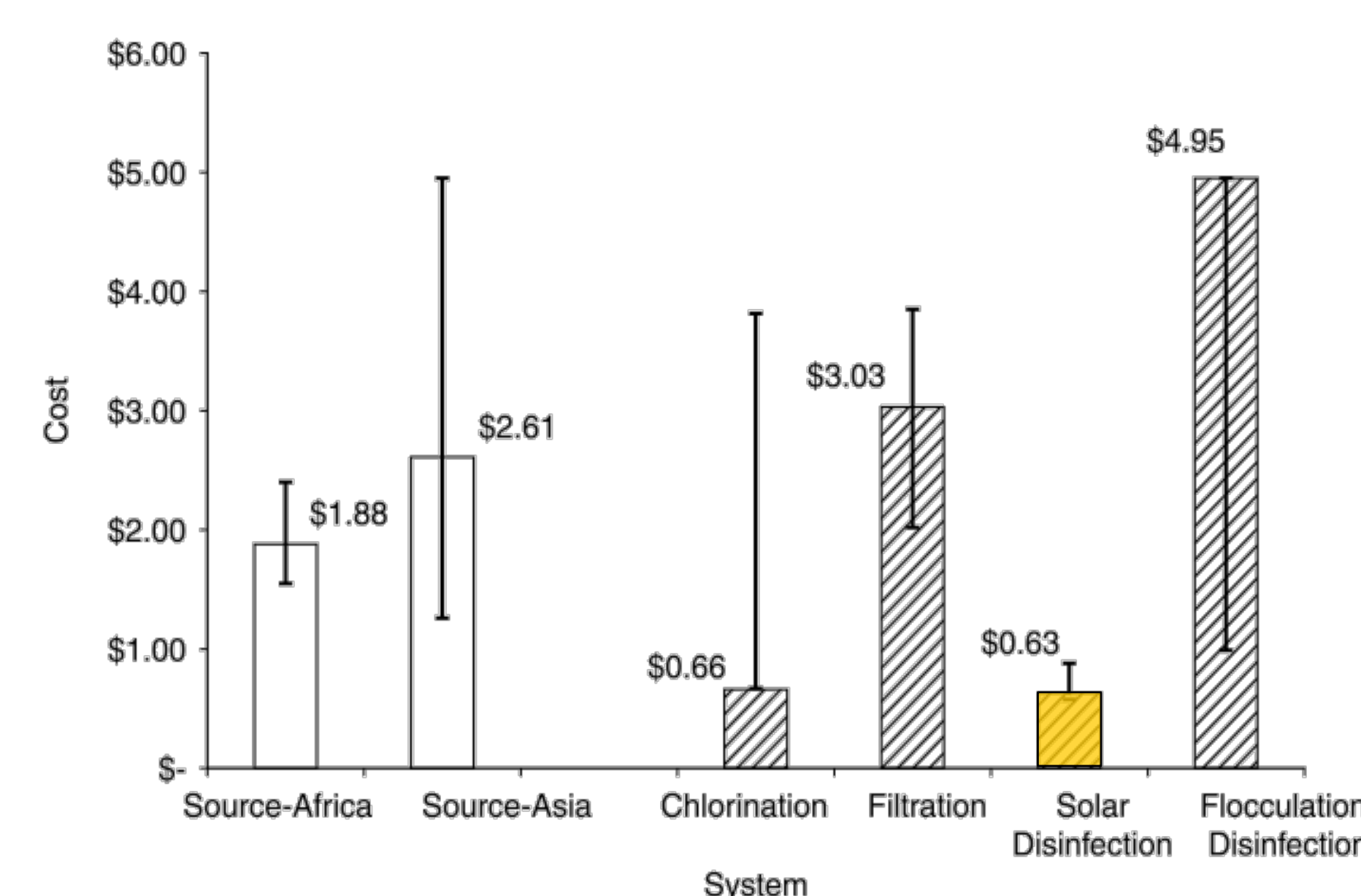
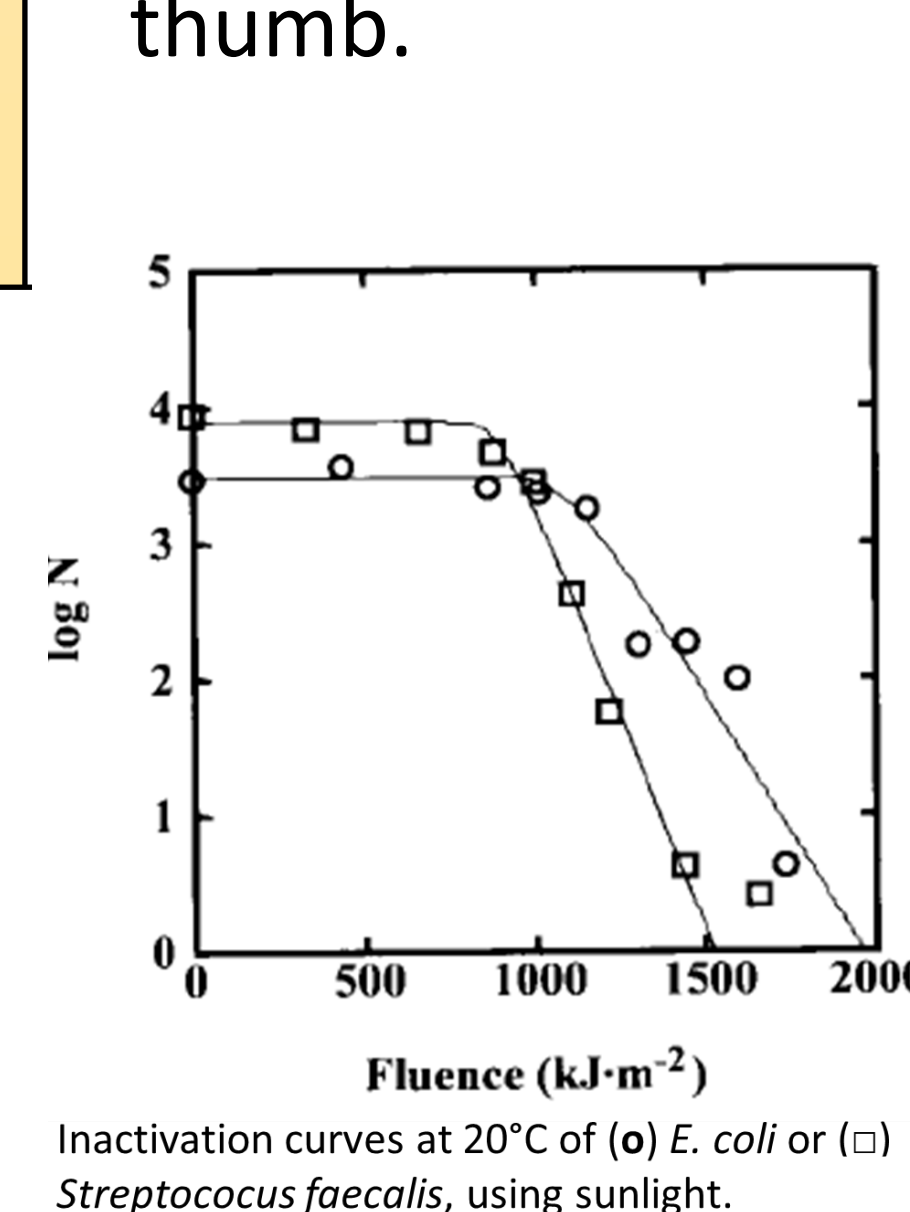


Recent trip to Bimbe, Zambia, in partnership with World Vision Zambia.

## Solar Disinfection

Taught worldwide and endorsed by the WHO, UV disinfection using sunlight can be very inexpensive.

However, without real-time feedback, users can only rely on rules of thumb.



Matlack, Charlie, Howard Chizeck, Tyler Blake Davis, and Jacqueline Linnes. "A Low-Cost Solar Disinfection Indicator for Safe Water." In *IEEE Global Humanitarian Technology Conference*. Seattle, WA, 2011.

Wegelin, M, S Canonica, K Mechsner, T Fleischmann, F Pesaro, and A Metzler. "Solar Water Disinfection: Scope of the Process and Analysis of Radiation Experiments." *AQUA* 43, no. 4 (August 1994): 154-169.

Clasen, Thomas, Sandy Cairncross, Laurence Haller, Jamie Bartram, and Damian Walker. "Cost-Effectiveness of Water Quality Interventions for Preventing Diarrhoeal Disease in Developing Countries." *Journal of Water and Health* 5, no. 4 (December 2007): 599.