

Improving and Evaluating the UV Tube for use in Mexico

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Outline

- Context/background
 - Project details
 - Field study
 - Results of field study
 - Future work
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Water Crisis

- Lack of clean water access
 - 1.8 million deaths due to diarrheal diseases
 - 90% of deaths are children under age of 5



Baja California Sur Peninsula

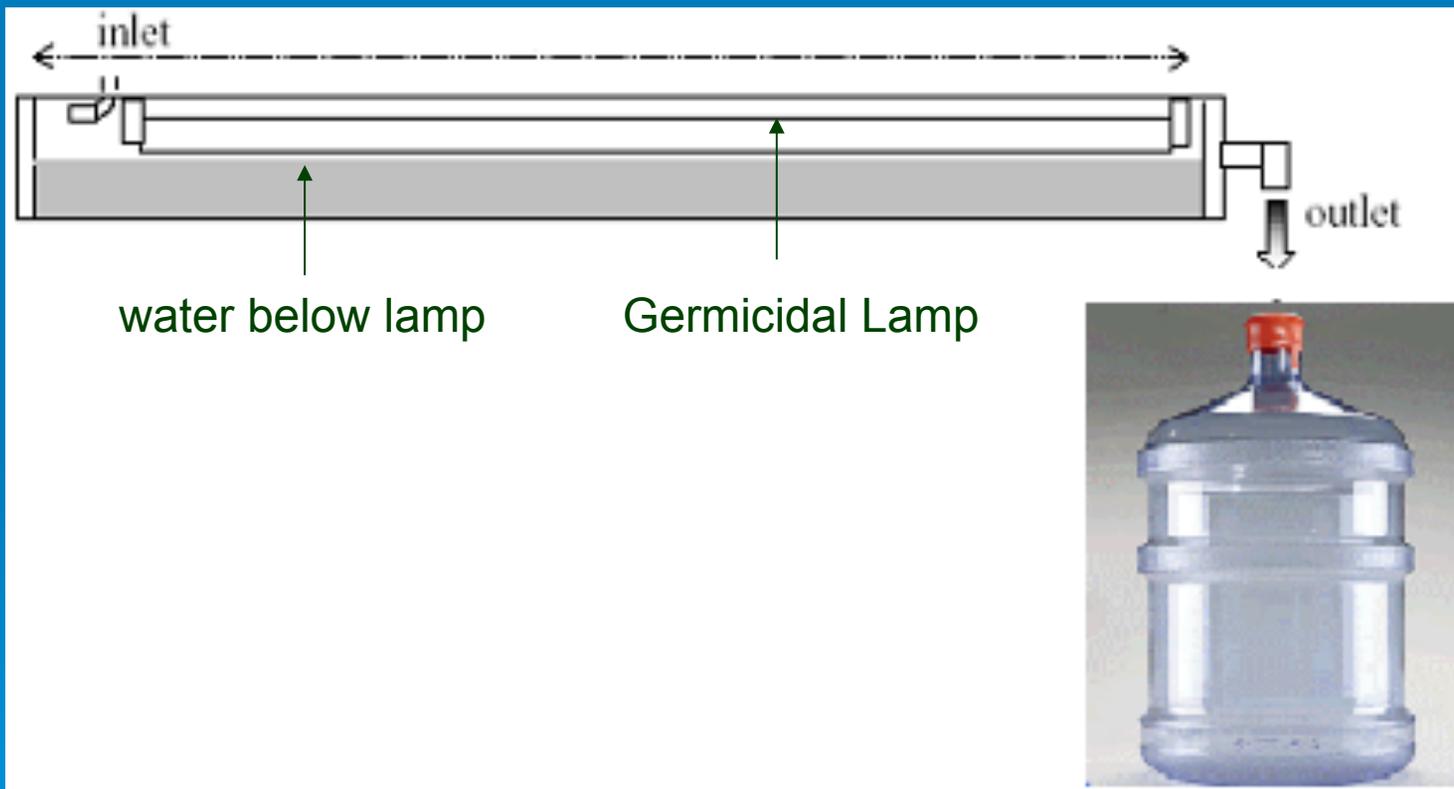
- Desert Landscape with mountain ranges and coast line
- Wealthier than other regions of Mexico
- Rural, small communities, family oriented
- 50% of wells tested contained E-coli
 - Indicates fecal contamination



UV-Tube Solution

- Point of Use water treatment
 - Uses UV light to disinfect water
 - Affects DNA of pathogens
 - Advantages
 - Faster
 - Effective (viruses, protozoa, bacteria)
 - Easy access (POU)
 - Actively being used in Mexico and Sri Lanka
 - Limitations
 - Need electricity
 - Less effective turbid water
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How the UV-tube Works



Project History

- 1999 – RAEL launches UV-tube project
 - 2003 – Pilot study in Morelos, Mexico
 - 2004 – Agua Salud student project to assess water quality
 - 2005 – Baja Sur pilot project launched with new design
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Early Design



Design implemented in
Morelos, Mexico



Community was involved
In the production process

Current Design to be Improved



- Effective
 - Room for improvement



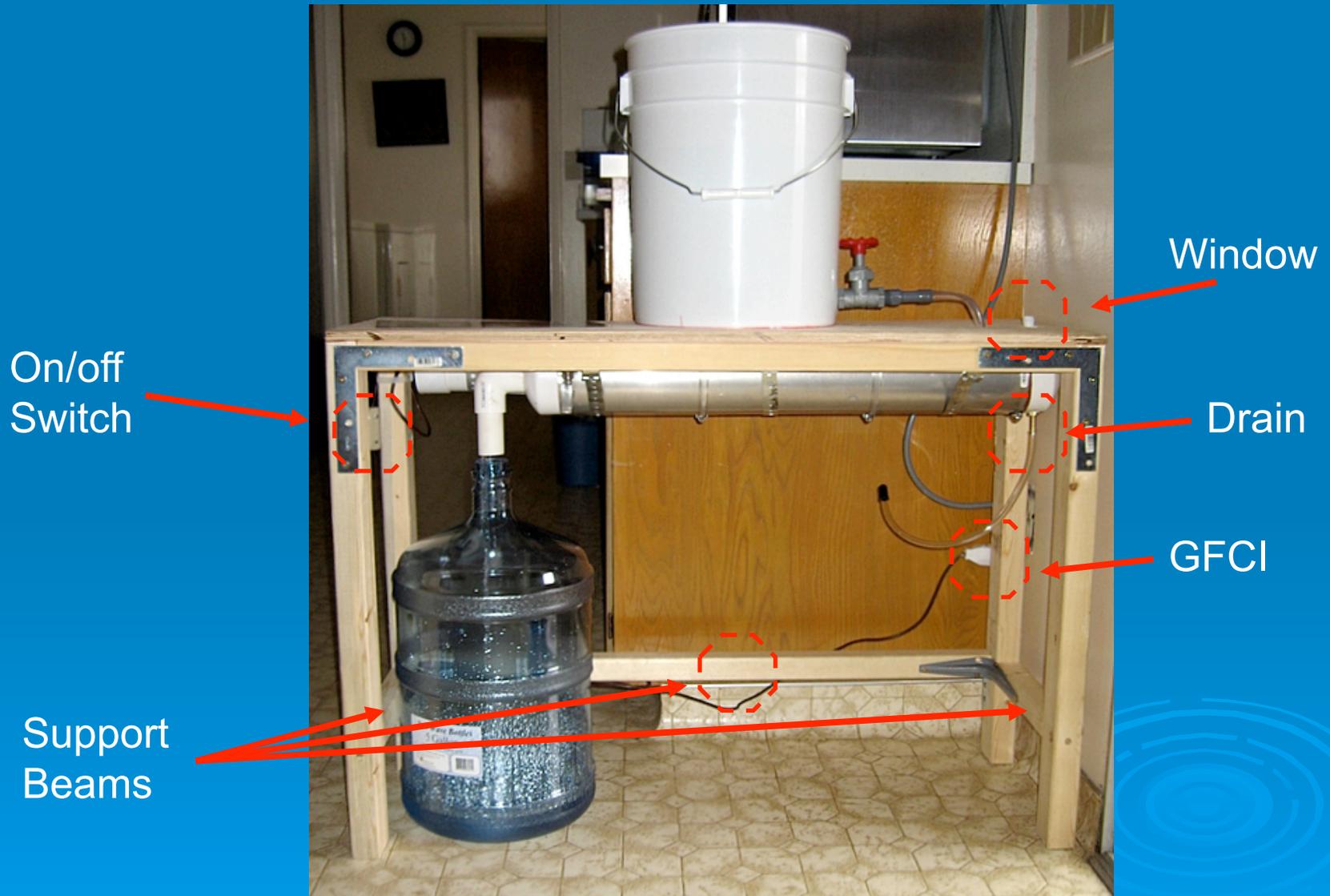
Our Design: Idea of Simplicity

➤ New design: Table Based

- Minimizing materials
- Ease of manufacturing
- Intuitive design
- Level
- Compact
- Aesthetics
- Fixed Height
- Stability



New Design



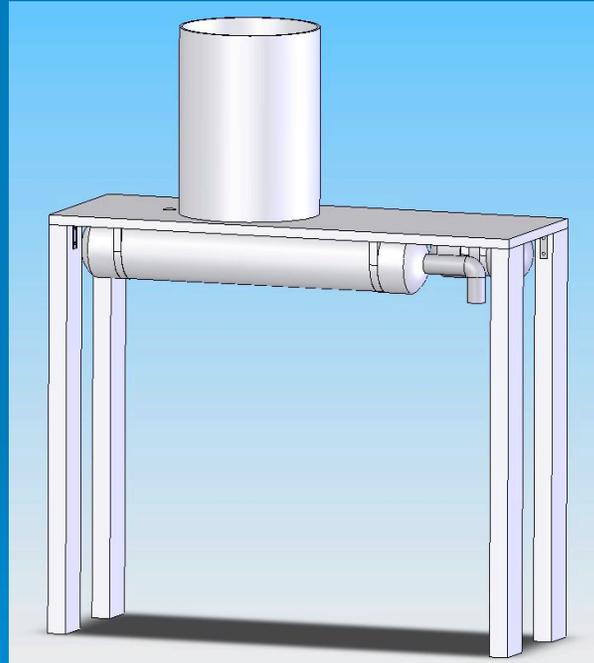
Major Design Modifications

- Table Based Design
 - Added 3 support beams for stability
- Drain Placement
 - Moved to back to avoid confusing it with the clean water outlet
- In-line GFCI
 - To prevent electrical shock
- Window Placement
 - Made window bigger to easily identify if powered on
 - Moved next to the bucket table top inlet hole for easy viewing

Design Obstacles/Lessons

- Table (“reinventing the wheel”)
 - Disproportionate amount of time spent on designing/ making the table
 - A professional made 3 tables in 2 days
 - Pressed for time to build and install tubes
- UV Tube Parts
 - Had to go to multiple hardware stores
- Troubleshooting
 - 2 Tubes would not power on locate source of problem

Design Iterations



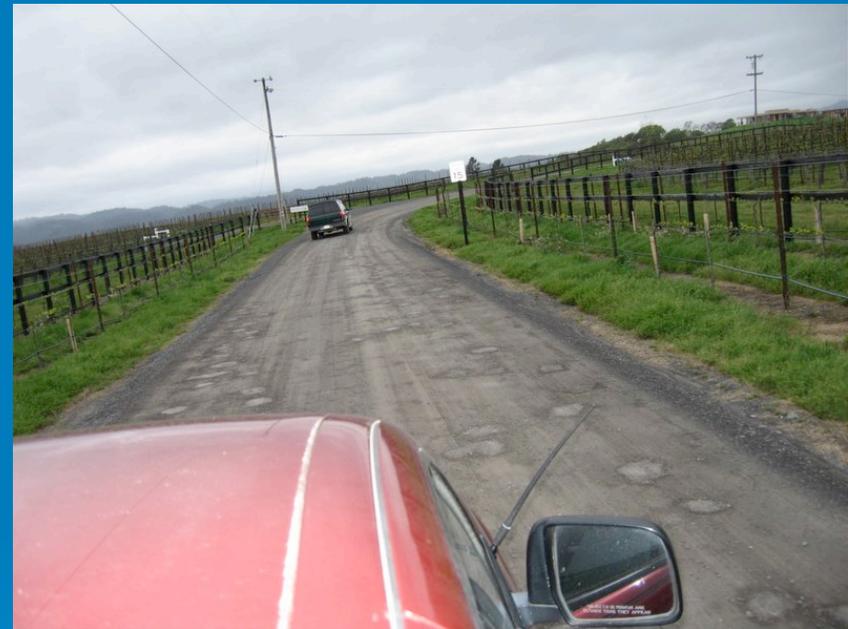
Implementation

- End-user as expert
- Approximation of end user
- Community selection:
 - Close ties to Mexico
 - Well water
 - Willingness to participate
 - (preferred) Lack of clean water



Household Selection

- Connection through UNIDO Conference
 - door to door-- describing project
- Near Santa Rosa
- Selected 2 families



Households: Family 1

- 6 people (4 kids)
- Teachers
- Parents born in Mexico, but in US since 1978
- Very willing to participate – initial contact (first adopter)



Households: Family 2

➤ Recruited

- 3 people
 - Grandparents and child
- Laborer
- Close ties to Mexico
 - In US since 1971



Pilot Installation

- Installed system in 2 homes
- Described project, how to use, asked them to use UV tube daily for 2 weeks
- Want their feedback



Interviews

- We returned 2 weeks later and interviewed them for feedback
- Questions on specific aspects of system:
 - ease-of-use
 - outlet
 - inlet
 - light
 - aesthetics
- To demonstrate use of system
 - report problems



Relevance of Pilot Study

- Rural areas
- No real water treatment problems
- Connections to communities with water problems
- Originally from Mexico
- Strong ties to community and family in Mexico
- Different socio-economic backgrounds
- Larger houses
- Different motivation for use



Key Recommendations

- Make indicator light more visible and closer to switch
- Make system more aesthetically pleasing
- Consider different materials or protective covering
- Adapt to perception of effective water treatment

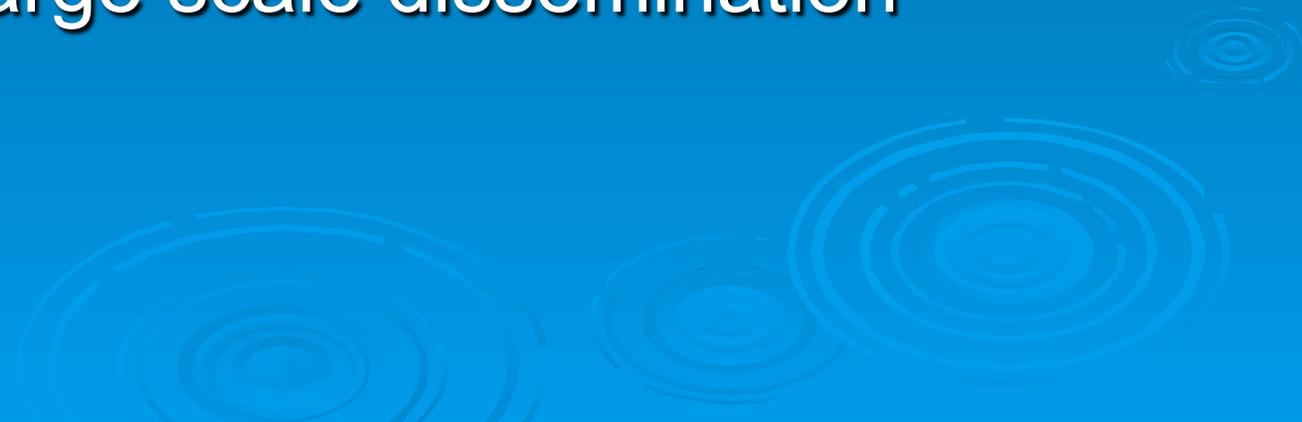


Key Recommendations

- Set affordable costs
- Cover for dust
- Make transporting water to the bucket easier
- Change the outlet so water doesn't spill or get contaminated



Future Work

- Baja - Summer 2006
 - Adapting materials
 - Incorporating a filter
 - Implementation in Baja
 - User feedback
 - Plans for large scale dissemination
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Questions?

