IPRO 325

Developing Affordable Solutions
for the World's Rural Poor

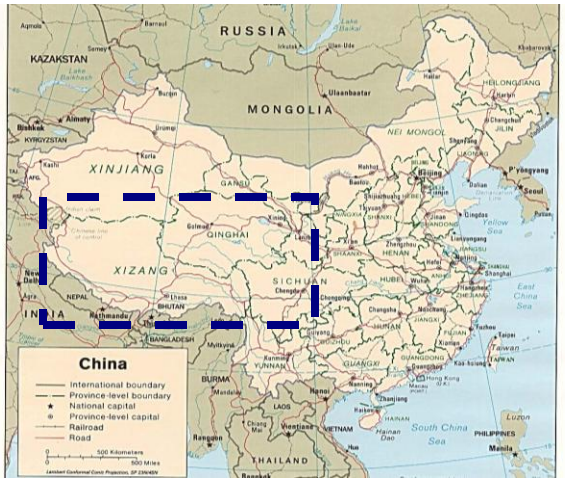
The Problem

3 billion people live on less than $2 a day

Team Overview

- **3 Subgroups**
  - Water
  - Cooking
  - Evaporative-Cooling
- **Location Interest Group**
  - Identified 3 regions for field testing & implementation
    - China, Nicaragua and Peru
  - Identifying potential sponsors
  - Fundraising

Trips planned for January & June 2008 to Nicaragua and Peru



Water Purification

Jessica Henson, Ashley Ono, Brian Schiller,
David Curtin, Ryan Witthans

Problem

- Tainted water kills 5 million each year
- Secondary effects on village
- Need for extremely cheap solution
- Current solutions don’t fit every village

SODIS method

Design & Build

A working prototype

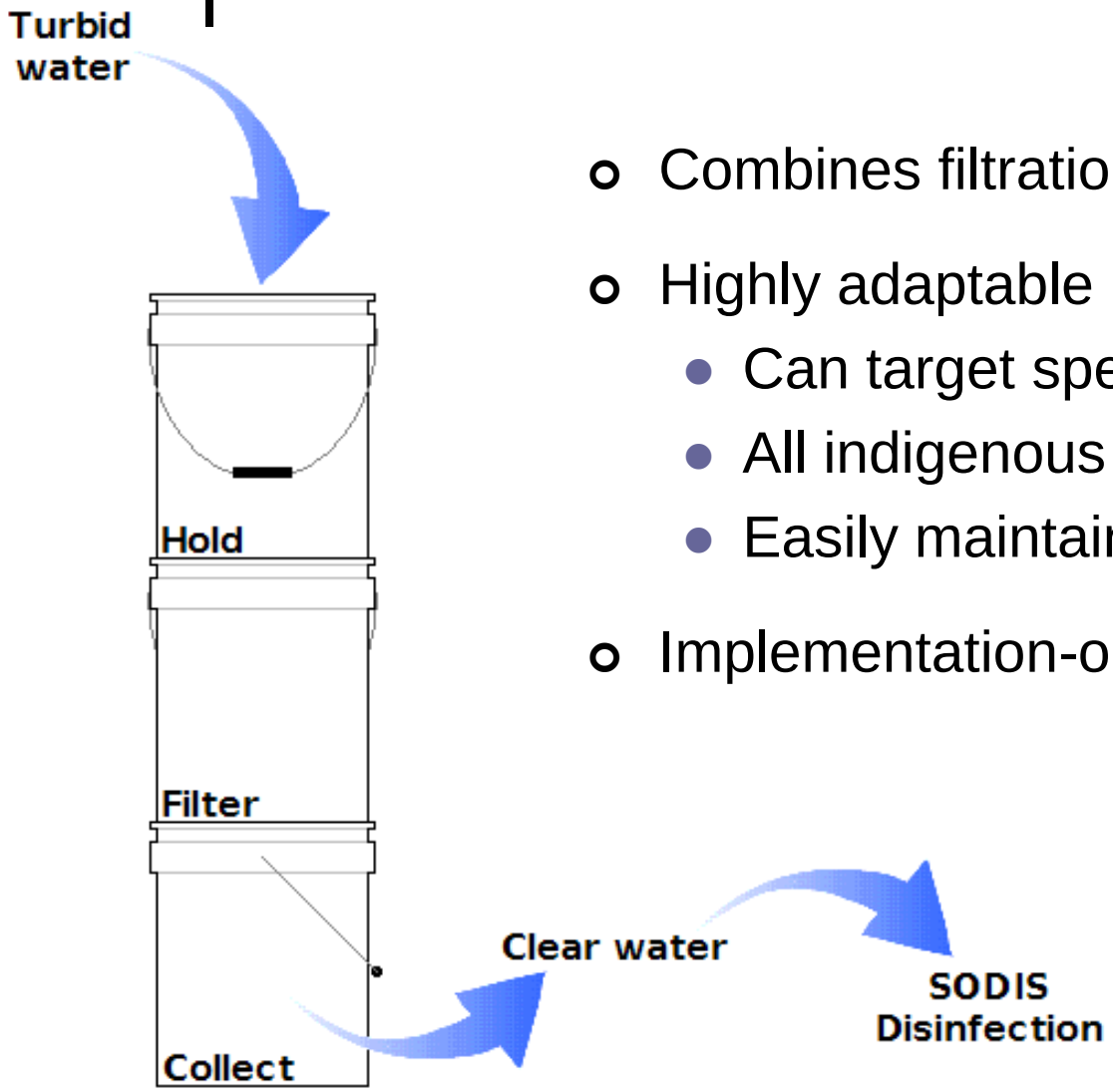
A “how to” manual

Testing

- Through various tests we will establish standards of maximum performance and efficiency

- Solar disinfection process
- Some drawbacks

Our Solution



- Combines filtration with SODIS
- Highly adaptable
  - Can target specific pollutants
  - All indigenous materials
  - Easily maintained
- Implementation-oriented approach

Progress

- Determined location resources and needs
- Examined current purification methods
- Developed a prototype
- Completed first round of testing

Future work

- Complete testing
- Create a field implementation manual
- Implement in real world situation

Cooking

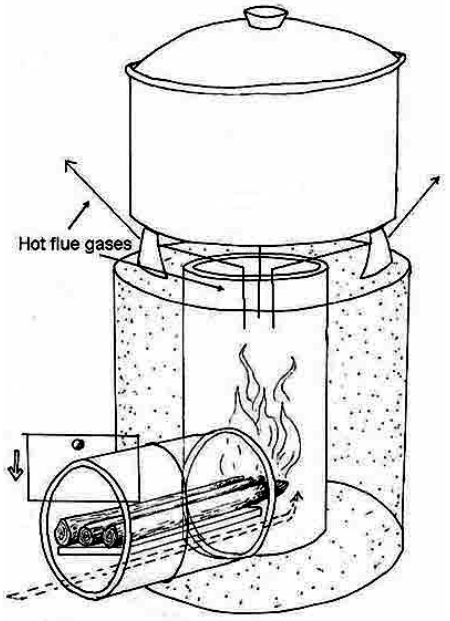
Curtis Aubry, Jaime McClain, Nick Przybysz, Ernest Dogbe, Ian Seagren, Heling Shi

Problem

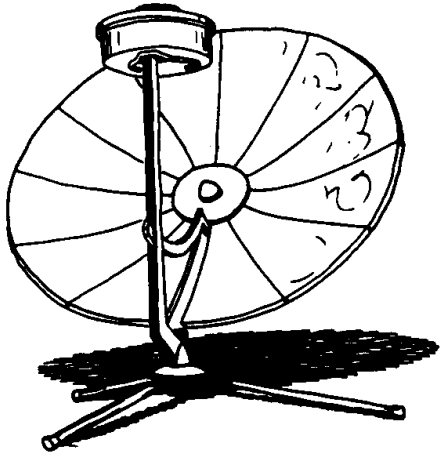
- 1.6 Million premature deaths each year caused by indoor air pollution due to cooking.
- Inefficient cooking methods such as open fire cooking, lead to social, economical and environmental problems.

Solution

- **Design & Build**
  - Conventional Oven
    - Improved Efficiency
    - Simple Construction
  - Solar Oven
    - Umbrella Design
- **Testing**
  - Conventional Oven
    - Time to boil, peak temperature, gas emissions, fuel consumption
  - Solar Oven
    - Time to boil, peak temperature, solar intensity, sun angle



Rocket Stove



Parabolic Solar Oven

Progress

- **Research**
  - Research has been conducted to identify:
    - Extent of problem
    - Types of ovens and current usages
    - Locally available materials
    - Existing projects in field
    - Testing Procedures
- **Design & Build**
  - Design nearing final design phase.
  - Construction beginning.
- **Testing**
  - Parameters have been defined.
  - Benchmark comparisons defined and acquired.
  - Testing procedures are being adapted.

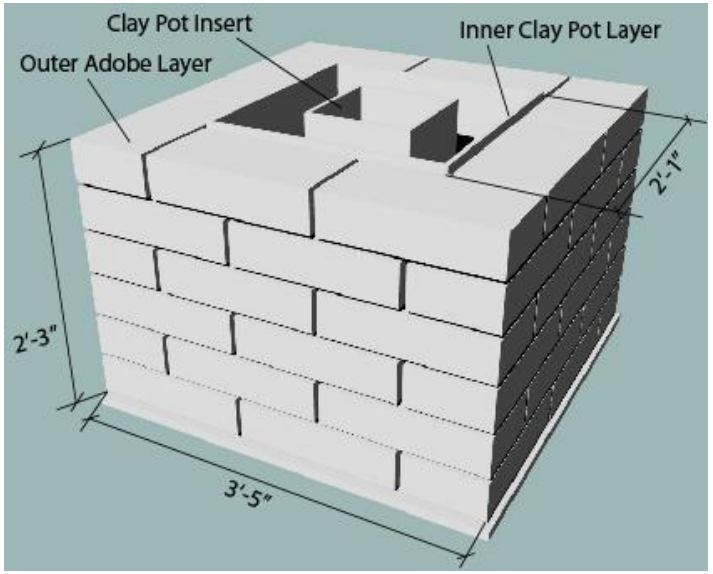
Evaporative-Cooling

Amber Heinz, Bryan Murillo, Eliza Bober, Phil Korol, Shreyas Dole, John Sullivan-Fedock

Objective

- **Problem**:
  - Food storage is a major issue preventing the advancement of the world's rural poor.
- **Solution**:
  - Our subgroup's objective is to develop and implement a more effective and efficient way for the world's rural poor to store food.

- **Design & Build**
  - A working prototype
  - A "how to" manual
- **Testing**
  - Through various tests we will establish standards of maximum performance and efficiency



Results to Date

- The outer layer is to be constructed of adobe bricks

The mixing process…

The brick making process…

Results to Date

- The inner layer is to be constructed of clay pots


Each side must be rolled out into a slab and dry until “leathery”


The sides are then assembled…


The pots must sit for 1-2 days before entering the kiln


Professor Steve Stanard made two circular pots for the group

Testing

- **Benchmarks**
  - leaving the fruits and vegetables open to the elements
  - a standard cooler
- **Tests will include:**
  - Varying the sizes and shapes of the inner layer
  - Varying the saturation levels of the sand
  - Testing covering methods and materials