Diarrheal Outbreaks in Kiribati

- Kiribati - small island nation in the Pacific
  - Tanaea village is located in Tarawa, Gilbert Islands, Kiribati
- Kiribati suffers repeated diarrhea outbreaks, many caused by rotavirus
- Rotavirus affects nearly every child under the age of 5 years
- 65% mortality rate for children under 5 due to the prevalence of diarrheal diseases in Kiribati
- Rotavirus is the leading cause of severe, dehydrating diarrhoea among infants

Rates of Open Defecation Across Villages and Cities of Kiribati

![Graph showing rates of open defecation across villages and cities of Kiribati]

Elevated Composting Latrines

- Fragile freshwater source less than 2m below surface
- Elevated Composting Latrines in Tanaea, Kiribati

Elevated Composting Latrine

- Functions: Solutions
  - Isolate waste from groundwater: Elevated latrine chamber 1.5 meters above fresh water
  - Accommodate: Latrine per house 1 Latrine per house (8-10 people; 0.429 cubic meters produced per year)
    - Drain Fluid: Vertical gaps unmortared, enveloped by sand
    - Privacy/Safety: 3 Cement brick walls 5 cement bricks
  - Sustainable: Rotate latrines every 2 years
  - Composting - maintain 3 carbon:1 nitrogen ratio: Adding leaves of high C:N balances low C:N of feces
  - Accessible: Ramp meeting standards of 2010 Americans with Disabilities Act

- Specifications
  - 1.1 cubic meters per latrine (55 cement bricks)
  - Gaps: 2-5cm wide
  - Sand envelope: 0.5m
  - 3.50kg feces day$^{-1}$ dries to 1.05kg
  - Ratio needed for composting 30 Carbon : 1 Nitrogen
  - Appr. 0.5kg leaves per day
  - Time until full: 2 years
  - 28% factor of safety
  - Each system costs only $72

Training and Education

- Education projects in Kiribati
  - Training sessions for community members on maintenance of systems
  - Educational videos on open defecation and hygiene
  - Curriculum for elementary schools

Assessment Plan

I. Community Curriculum
  - Check after a year to ensure curriculum is followed through.
  - Science & engineering of this system, implementation of the design, and maintenance.
  - Connection between open defecation and disease

II. Personal Hygiene Curriculum
  - Elementary schools will only focus on basic hygiene education and connection between open defecation and diseases.

III. Elevated Composting Latrines
  - Evaluate the use and maintenance of the latrines after 1 year of use.
  - What work/repairs are required and what design alterations need to be considered; other interventions, if needed, to encourage use

IV. Educating Community Members
  - Annually track the progress of each of our education initiatives.