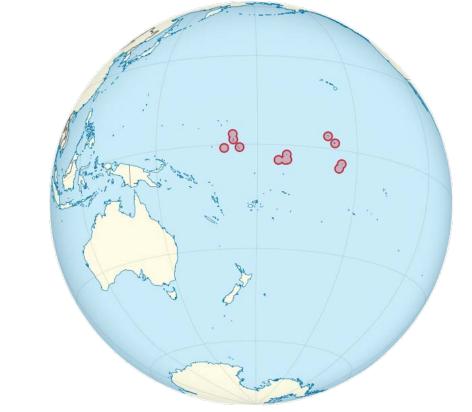


Elevated Composting Latrines in Tanaea, Kiribati

Donna Murillo (BME), Travis Wold (ME), Cynthia Teng (Undeclared), Xavier Alexander Hines-Coombs (RBE)

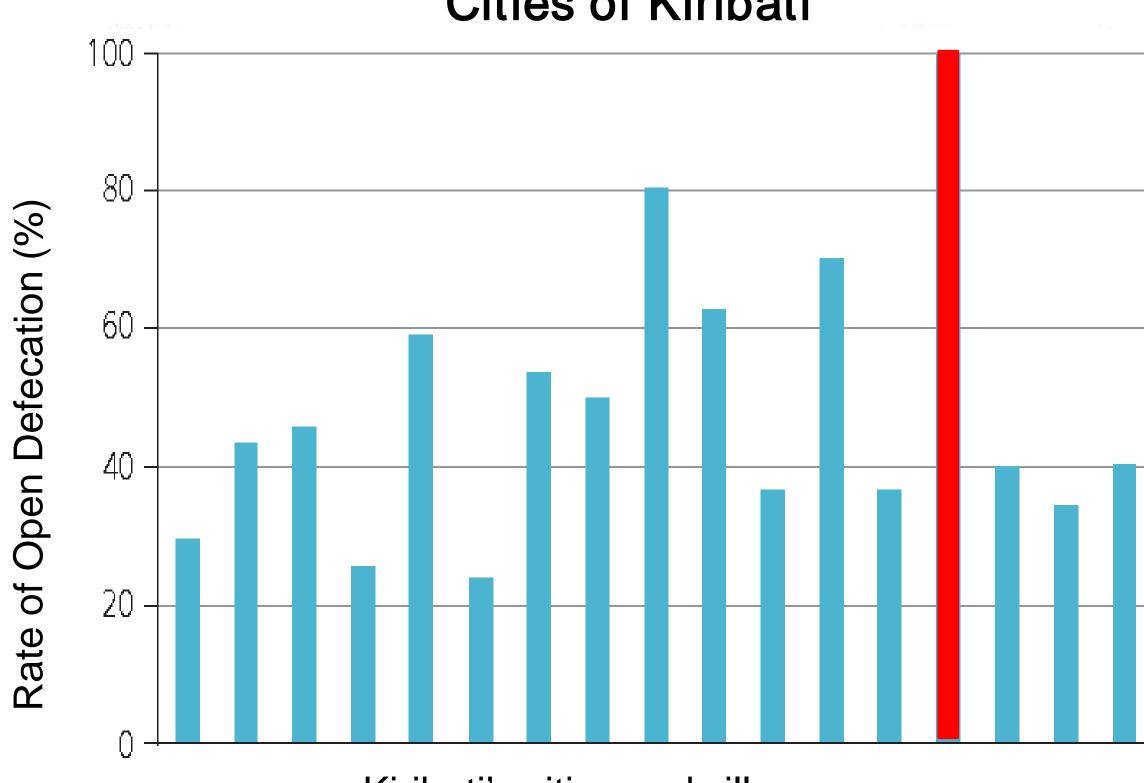




Diarrheal Outbreaks in Kiribati

- 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
- <u>65%</u> 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



Kiribati's cities and villages

Tanaea (red) has a 100% open defecation rate due to
the slow rate of sanitation progress within the Pacific,
its remote location, and ingrained cultural norms.



Sea levels surrounding Kiribati are rising at 3 times the global average per year, depleting already limited freshwater resources

Functions	Solutions	Specifications
Isolate waste from Groundwater	Elevated latrine chamber	1.5 meters above fresh water
Accommodate 280 citizens	1 Latrine per house (8-10 people; 0.429 cubic meters produced per year)	1.1 cubic meters per latrine 55 cement bricks
Drain Fluid	Vertical gaps unmortared, enveloped by sand	Gaps: 2-5cm wide Sand envelope: 0.5m (18 5-gallon buckets sand)
Privacy/Safety	3 Cement brick walls 1 cement door	1.8 meters tall (70 cement bricks)
Sustainable	Rotate latrines every 2 years	2 years of feces dries to usable compost within 120 days Dry compost may be sold or used in agriculture
Composting - maintain 30 carbon:1 nitrogen ratio	Adding leaves of high C:N balances low C:N of feces	Leaves (60C:1N) Feces (15C:1N 1 unit of leaves per 2 units of feces (0.5kg leaves per day)
Accessible	Ramp meeting standards of 2010 Americans with Disabilities Act	Grade less than 1:12 At least 36 inches wide (0.91 meters) Railing between 34 and 38 inches above

ramp (0.86-0.96 meters)

Elevated Composting Latrine Coconut husk Cement roof pipe for sheds rainwater ventilation Cement walls provide privacy and 3.50kg feces day⁻¹ safety dries to 1.05kg 1.8m (Door omitted in cross section) Ratio needed for composting 30 Carbon: 1 Nitrogen Appr. **0.5kg leaves per day** Ramp provides accessibility for all Max grade **1:12** Volume: 1.10m³ Time until full: 2 years 28% factor of safety 0.5m Sand 1.5m 2-5 cm gaps between blocks for Each system costs urine diversion only **\$72** Fragile fresh water source 2 meters below surface

Training and Education

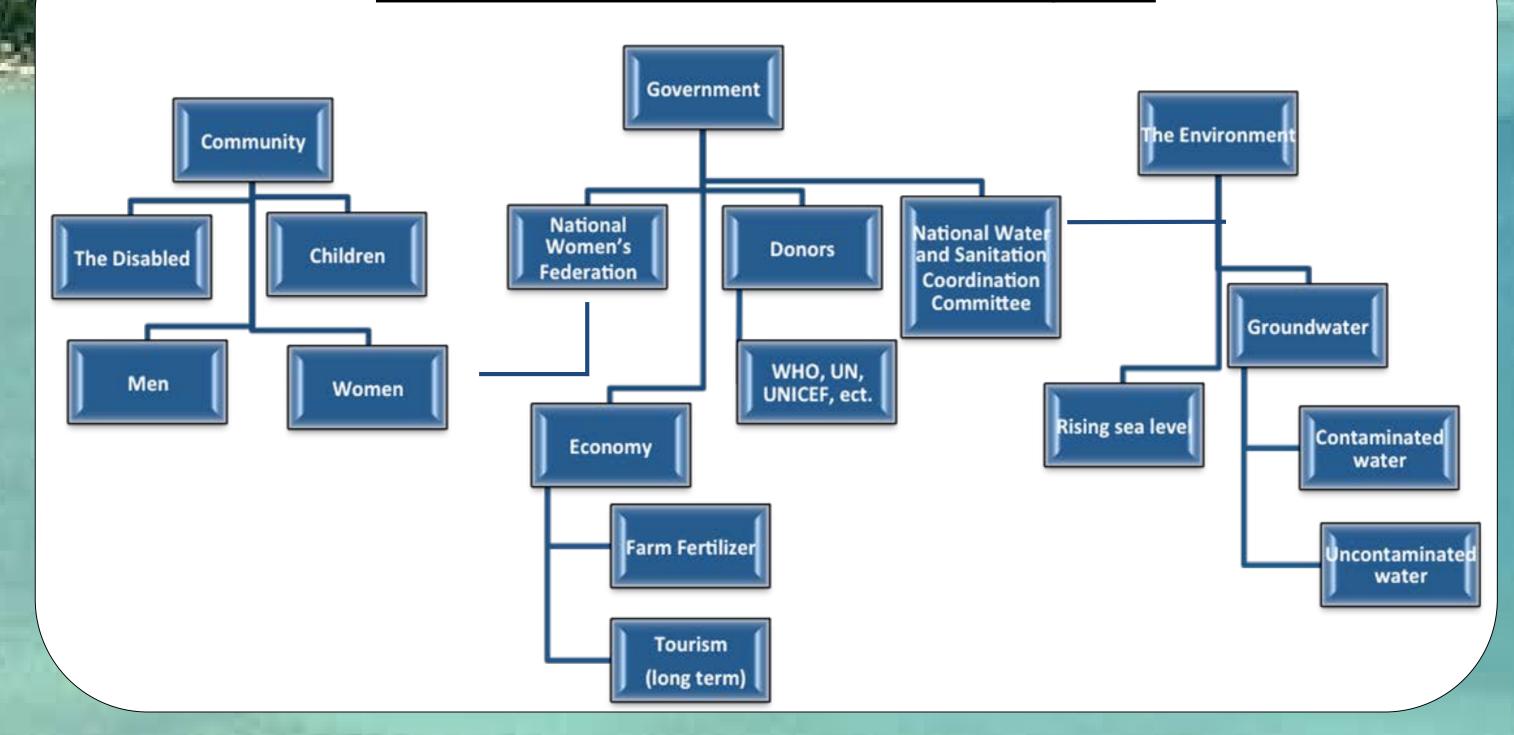
Education projects in personal hygiene at schools, such as SWASH School Water, Sanitation & Hygiene)

Education on basic hygiene knowledge for the community, in order to help them realize the connection between open defecation and diseases

Training sessions for community members on maintenance of latrines, i.e: when to start rebuild and how to repair damages

Responsibility to maintain and rebuild the system should be equally divided within the community between men, such as building latrines, and women, such as maintenance

Impact: Stakeholder Analysis



Assessment Plan

- I. Community Curriculum
- A. 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 in Tanaea Schools
 - A. Elementary schools will only focus on basic hygiene education and connection between open defecation and diseases.
- III.Elevated Composting Latrines
- A. Evaluate the use and maintenance of the latrines after 1 year of use.
- B. What work/repairs are required and what design alterations need to be considered; other interventions, if needed, to encourage use
- IV. Educating Community Members
 - A. Annually track the progress of each of our education initiatives.