Designing for Sustainable Sanitation

Judy Hagan - judyhagan@twowetfeet.com
Michael Brown - mbrown13@gmail.com

2.6 billion people without adequate sanitation	**=**	**Up to 380 billion kg of faeces/yr into the environment**

Sustainability of affordable sanitation
Affordability of sustainable sanitation

Sandy soils, high water tables
flooding and floating housing

We are not done with sanitation design

Floating Communities of Tonle Sap

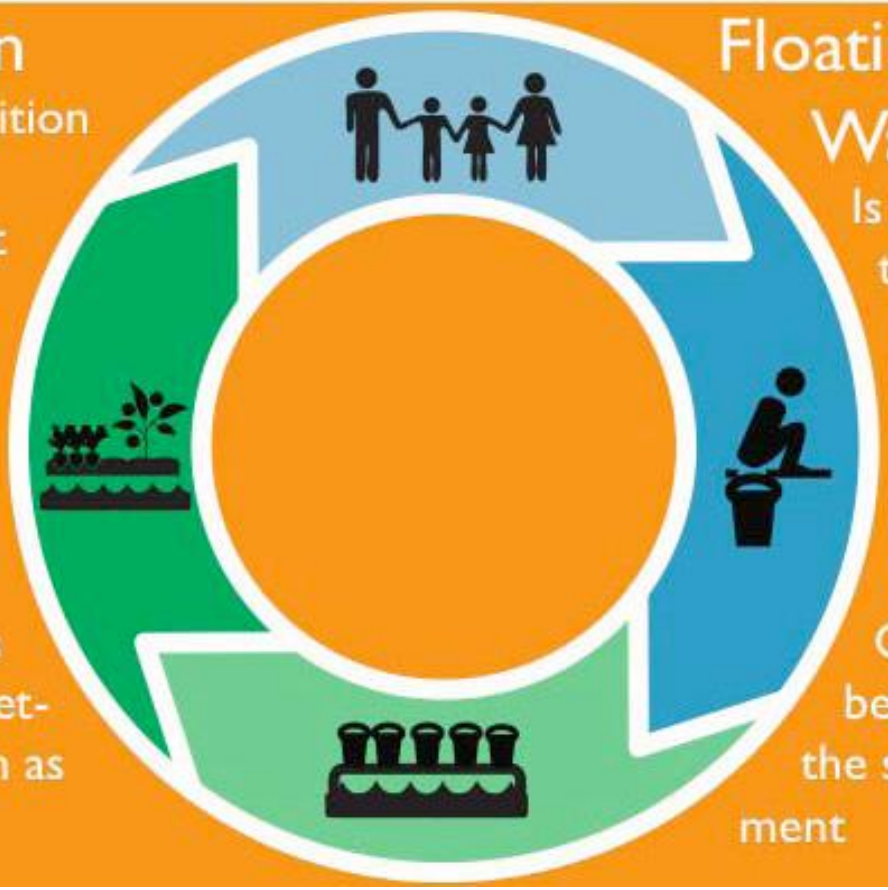
Tonle Sap Floating Toilet Project

Floating Garden

Increases income, nutrition and food security and completes the nutrient cycle.

Floating Community Waste Cycle

Is a three step process to improve the water quality and incomes of floating communities.



Waste Treatment Station

Treats waste and turns it into a safe and marketable commodities, such as fertilizer and biogas.

Floating Toilet

Captures human waste before it can degrade the surrounding environment

Design Approach

Goal was to develop sanitation options that are:

culturally appropriate, *affordable,* sustainable

Design requirements:

local production, **local materials and expertise**

Holistic considerations from the start:

gendered, ***considered whole of cycle***, always working towards self-sustaining market delivery

Toilet Design Process

Research

Review of existing sanitation technologies and options

Urine Diversion Desiccation toilets – reduced storage, robust treatment system

Data collection

Household and market surveys, water quality analysis

Open defecation, high pollution, high interest, cheap cement and buckets

Consultation

Ongoing discussions with community on concepts, options, designs

Anal and menstrual washing, squat style, above floor, adjusted hole size

3 Hole Urine Diversion Desiccation Toilet (UDDT)

1. Faeces collected dry in bucket, ash added, stored for 6 months
2. Urine diverted
3. Wash water diverted - from menstrual hygiene and anal cleansing

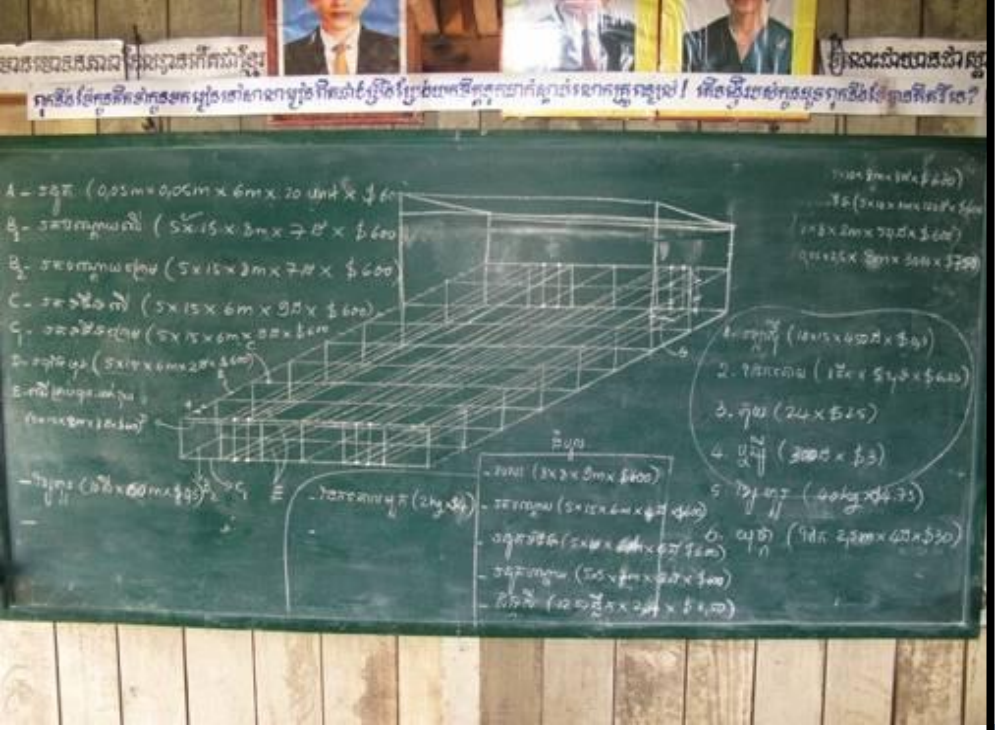
Consumables: soap, ash, water

Materials: cement, bowl from market as cover, pvc pipe, reused buckets, wood or metal frame constructed locally

Cost: ~35USD

Floating Community Waste Management Station

- Built as a demonstration of what is achievable within the Tonle Sap Environment.
- Designed to:
  - Act as platform for trials of several different treatment methods.
  - Integrate with energy and food production.
- Desiccation and storage waste treatment process currently under trial.

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Floating Garden

- Community lead trial using common vegetables.
- Using the waste management station as a foundation for trial.








WASH conference 2011

End Goal: Sustainable sanitation for floating communities

(and other communities in Challenging Environments)

1. Community lead design and trial ☑
2. UDDT using local materials and methods ☑
3. Waste treatment linked with energy and food production — Under trial
4. Commercially sustainable — Foundation in place

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