Sustainable Sanitation for

Anna Tengnäs
Vanessa McGrath
Neslihan Sönmez

Supervisor :
Florent Chazarenc

Ecole Des Mines De Nantes

21.07.2011

Outline

Context

Scope

Method

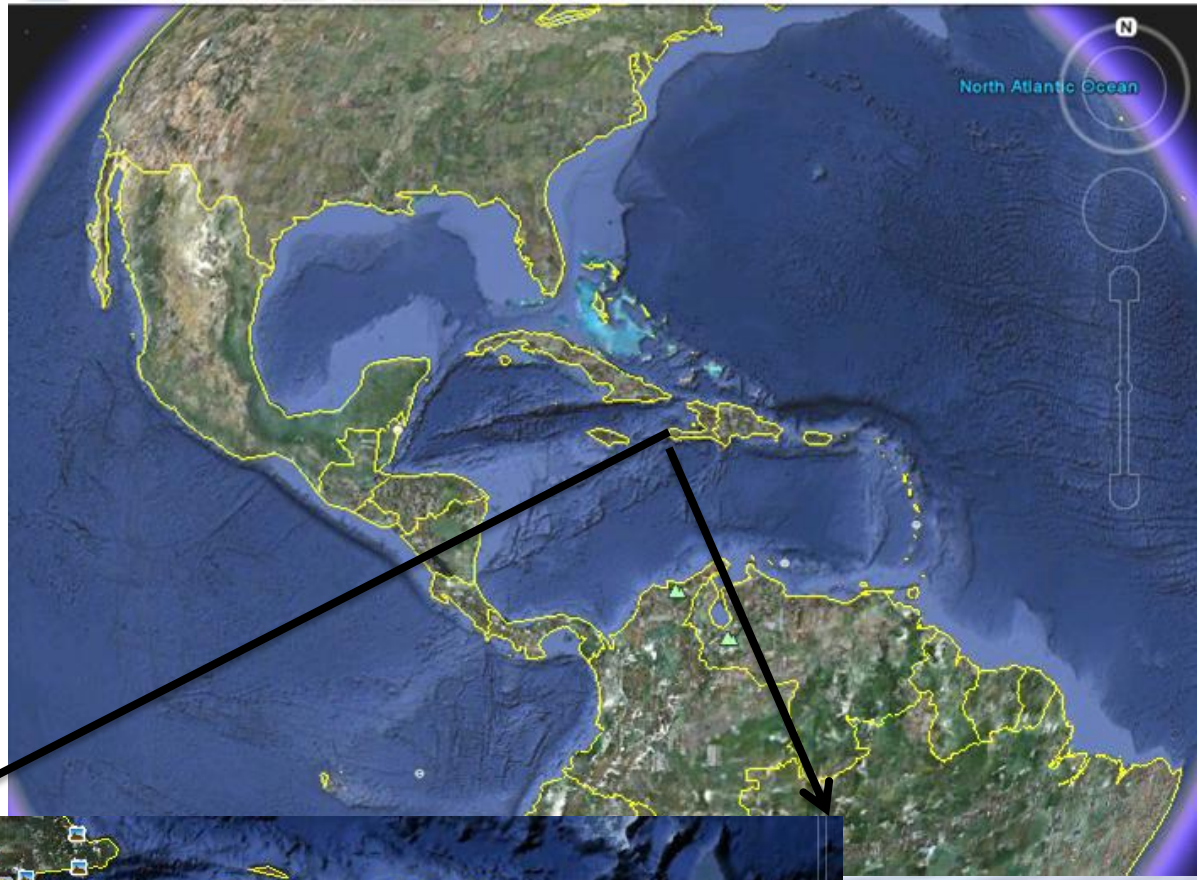
Results

Conclusion

Perspective

1. Context
2. Scope
3. Method
4. Main results
5. Conclusion
6. Perspective

Haiti



PESTEL ANALYSIS

Political

- Semi-presidential republic
- Ranked consistently as one of the most corrupt nations in the world (World Corruption Reports,2010)

Economical

Social Issues

- Third hungriest country in the world
- 9.8 million population
- Half of the population is under 20 years of age

Technological

- There is no developed technological sector

Environmental

- Tropical climate (wet and dry seasons)
- Most of land used for agriculture
- Half of the country has a slope of 40 % or higher

Legal

- Legal system suffered from a lack of administrative and financial capabilities

Haiti Earthquake

220 000 lives
300 000 people injured
1.5 million homeless

On January 12, 2010

A magnitude of 7.0

Corail Camp

- Context
- Scope
- Method
- Results
- Conclusion
- Perspective

one of the largest IDP camps, 5300 people

212,916 m^2 total area
40m^2 /person

Corail Camp

SPHERE standards

- 1 toilet per household is ideal
- 20 people per toilet
- 50 people per toilet is acceptable if no pre existing
- 50 m to toilet

Since 2010 approximately 5.2 billion $ spent for Haiti

41 toilets

130 people per toilet

Reference :(WASH Cluster, 2011)

Sanitation Problem

"You can assume no waste water system exists anywhere"
Julio Urruela, Monitoring Specialist for the WASH Cluster, May 10, 2011

Sanitation Problem

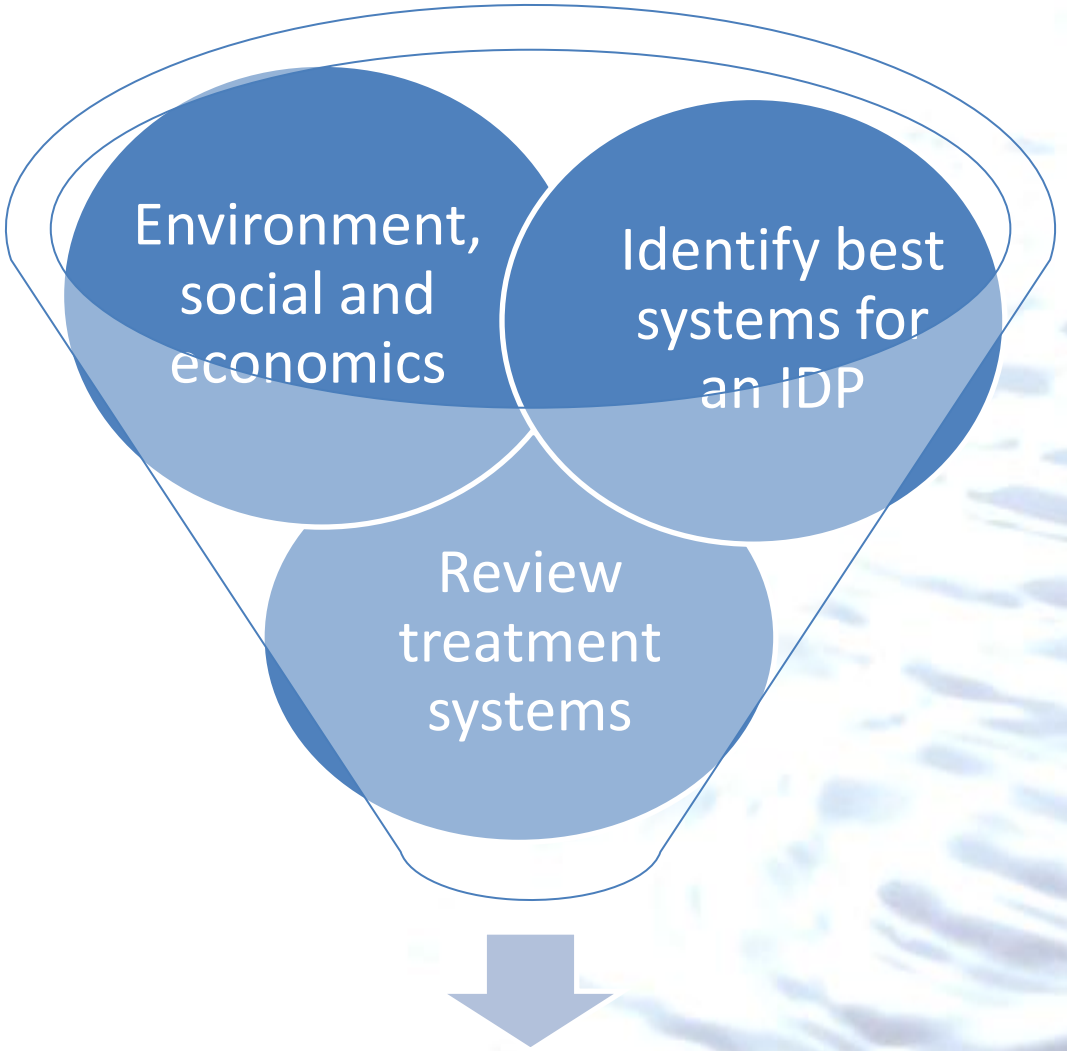
Environmental Impacts

In Corail Camp

Health Impact

- Cholera is one of the main threats in Haiti currently
- 779,000 cases and ***11,000*** deaths predicted due to cholera between ***March 1*** and ***November 30th, 2011***

Objective



Sustainable mid- to long-term solutions

Scope

- Waste water treatment (black water)
- *Stand-alone* units and *decentralised networks*
- Mid- to long-term solution

Bringing sustainable sanitation to Haiti

- Context
- Scope
- Method
- Results
- Conclusion
- Perspective

Literature Review

Comparison and Selection

Design

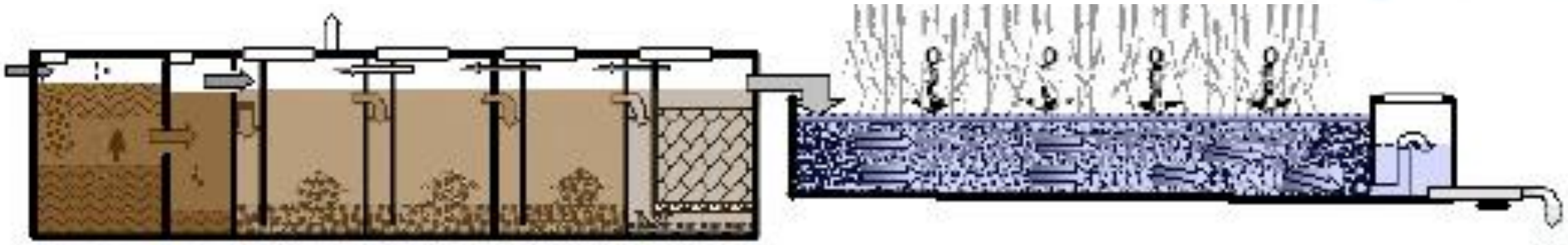
Simulation

Implementation

- Pathogen Removal
- Energy Requirement
- Space Requirement
- Construction cost
- Time to Implement

What is DEWATS?

(Decentralised Water Treatment System)



Settling tank

- 25–50% BOD removal
- Sludge stabilisation
- *Worm eggs removal*

Anaerobic baffled tank

- Anaerobic digestion process
- 70–90 % BOD removal
- Sludge stabilisation
- Biogas production
- *Bacteria and virus removal*

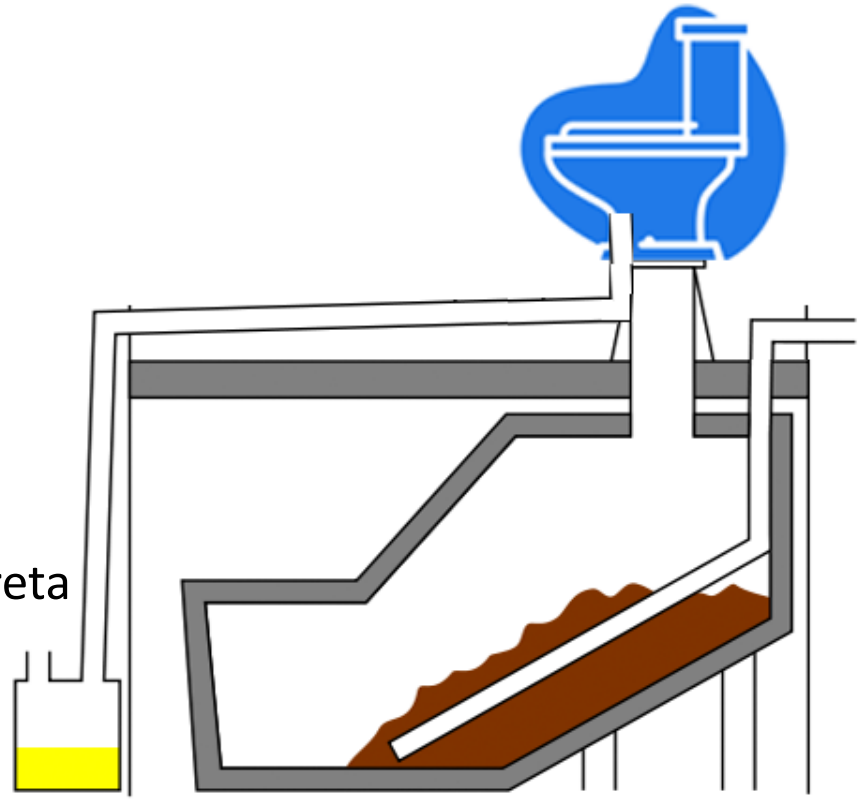
Anaerobic Filter

Tertiary Treatment

- Wetland, pond or vortex
- 70 to 95 % BOD removal
- Effluent for irrigation
- *High pathogen removal*

What is a composting toilet?

- *Stand-alone* system
- One unit for 25 people
- Aerobic degradation
- Ventilation needed
- Volume reduction of excreta
- Urine storage



Design and Simulation

DEWATS

Influent Characteristics

MS Excel Spreadsheet

BioWin Simulation

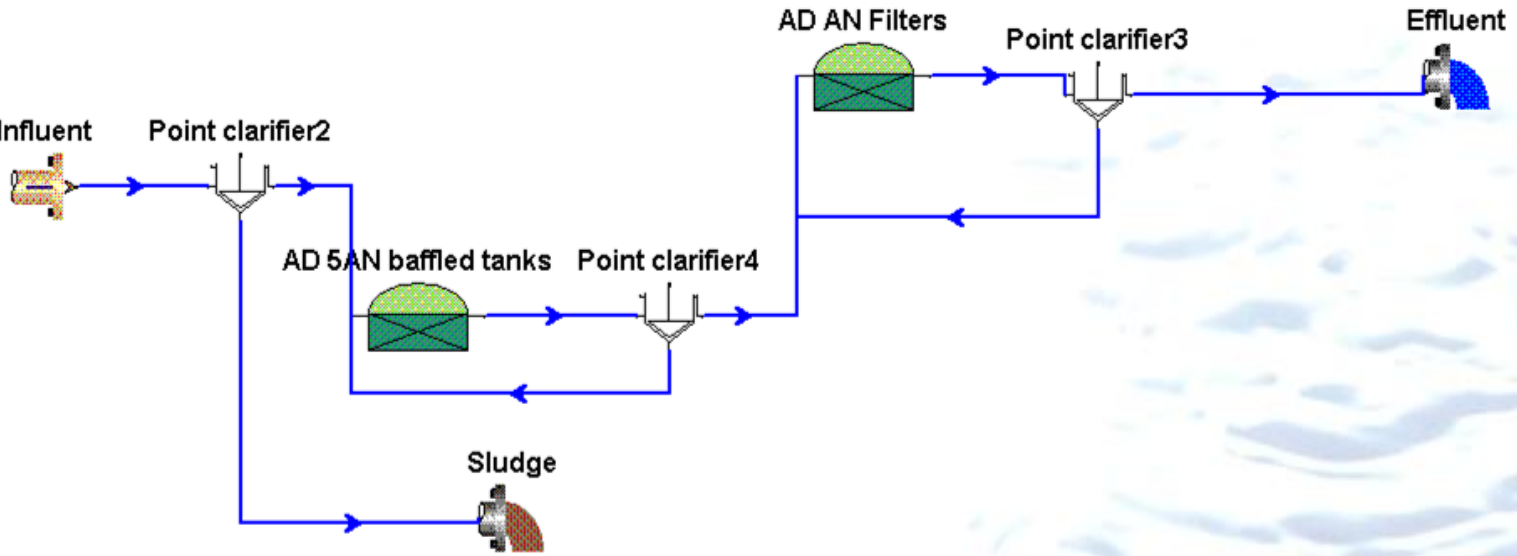
Composting Toilet

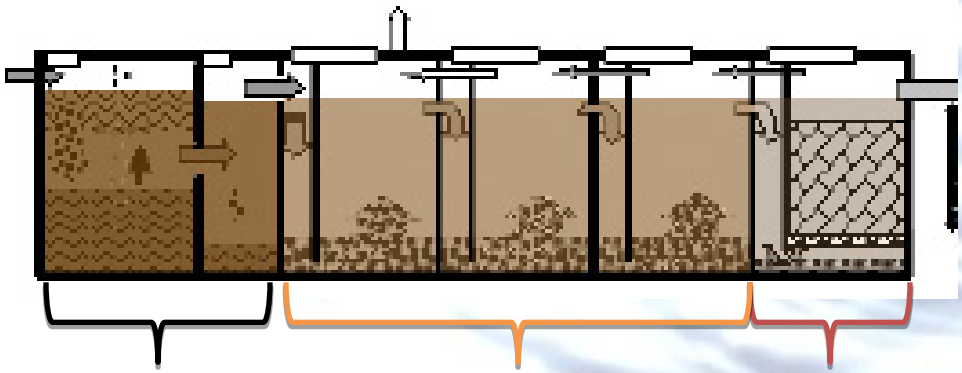
Influent Characteristics

MS Excel Spreadsheet

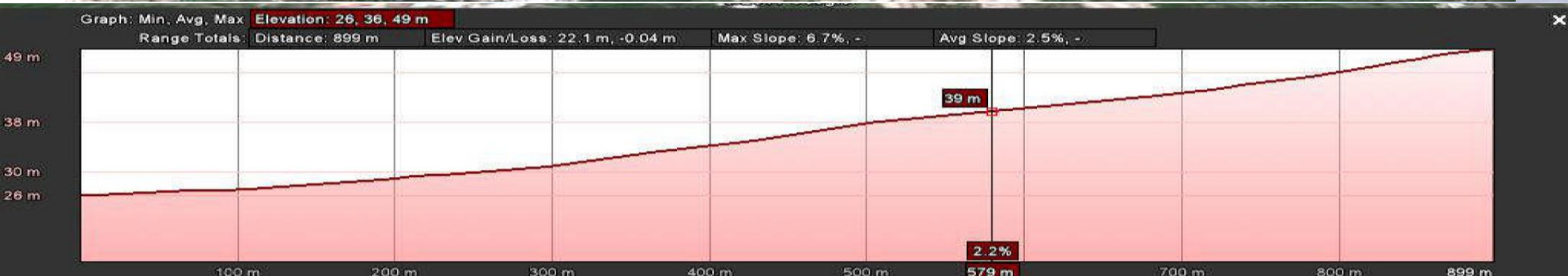
BioWin Simulation

- Context
- Scope
- Method
- **Results**
- Conclusion
- Perspective

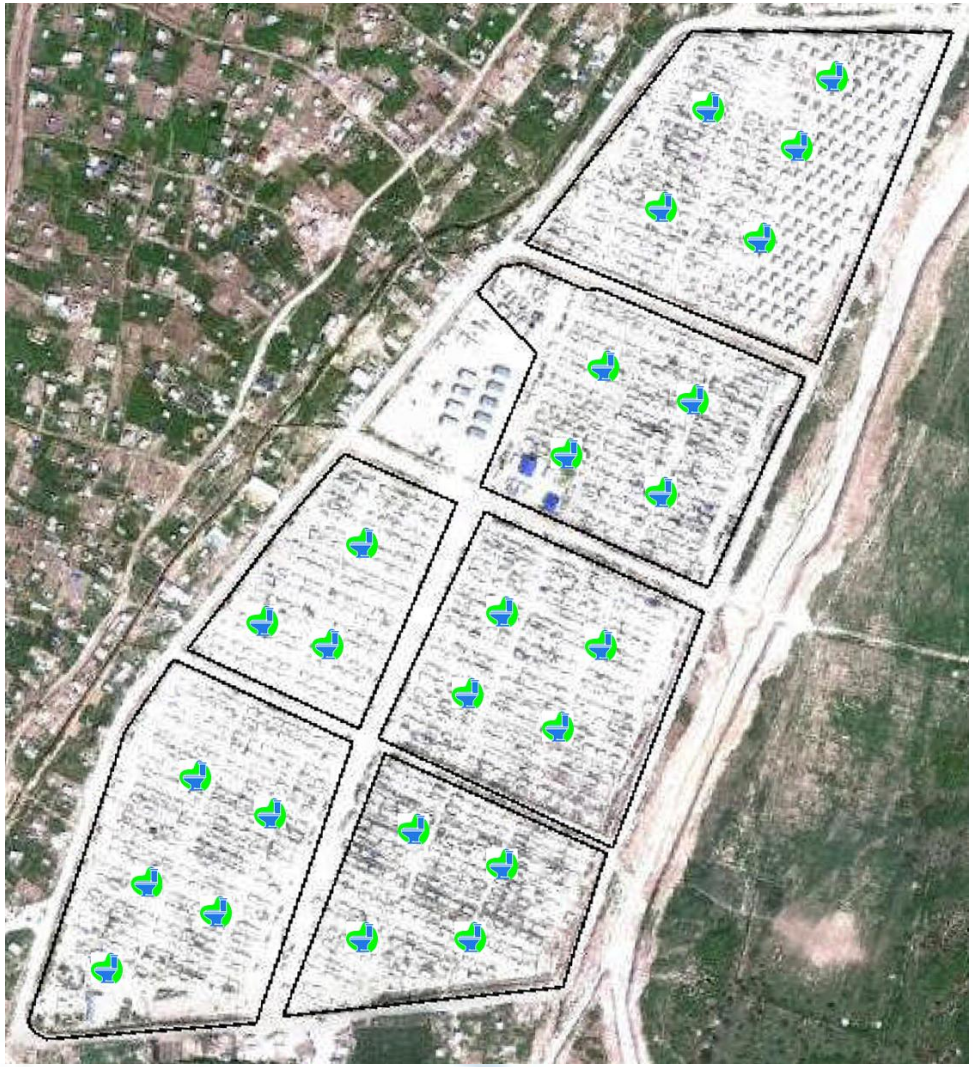




Implementation at *Corail Sector 4*



Implementation at *Corail Sector 4*



Conclusion

- Alternatives to current sanitation systems
- Improve pathogen removal
- Decrease de-sludging requirements
- Social and economical benefits from by products

Challenges, Limitations and Added Value

- Context
- Scope
- Method
- Results
- Conclusion
- Perspective

- Limited data available
- IDP camps considered temporary
- Initial design and simulation only
- Added value for Auroville CSR
- Improved emergency responses

THANK YOU

- Context
- Scope
- Method
- Results
- Conclusion
- Perspective

Further questions can be forwarded to:

wastewatermanagement@ymail.com