



Improving agricultural practices as a way to meet the Millennium Development Goals:
a demonstration project in the Shimo la Tewa prison in Mombasa, Kenya



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Wageningen University and Research Centre and LeAF



This presentation

- A wetland-lagoon system for wastewater management at Shimo La Tewa Prison, Mombasa – Kenya
- One step further:
 - integration of agriculture and sanitation in the Boys prison to support a novel but old-fashioned Ecosan approach

Conclusion



Shimo la Tewa Prison Mombasa, Kenya

a constructed wetland lagoon system for improving the sanitary situation



UNEP-GEF WIO-LaB PROJECT

*ADDRESSING LAND BASED ACTIVITIES
IN THE WESTERN INDIAN OCEAN*

Coastal Development Authority, Mombasa
Mombasa Water & Sewerage Company
Kenya Marine and Fisheries Research Institute
Dar es Salaam University, Tanzania



a “do something project”
with very well defined goals



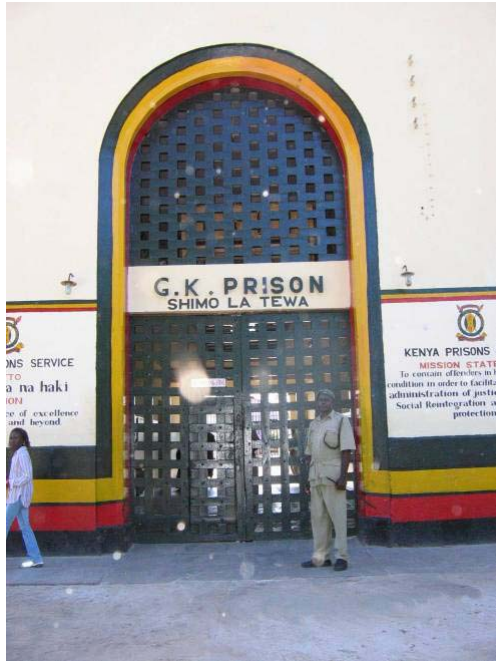
Some headlines of the Project

1. coupled wetland-lagoon STP
2. education and awareness
3. learn to manage the system
4. reuse in agriculture and aquaculture
5. reduce pollution

The prison

- Inmates:
 - Main prison for man: ca. 2.200 pers.
 - Woman prison: ca. 300 pers.
- Shima Annex Prison
 - Farming, gardening activities: 300 pers.
- Boys prison: 300 pers.
- Staff quarter
 - About 1500 staff and family
 - Close to the prisons, but scattered over the area
- Total surface ca. 250 ha





Some pictures from inside

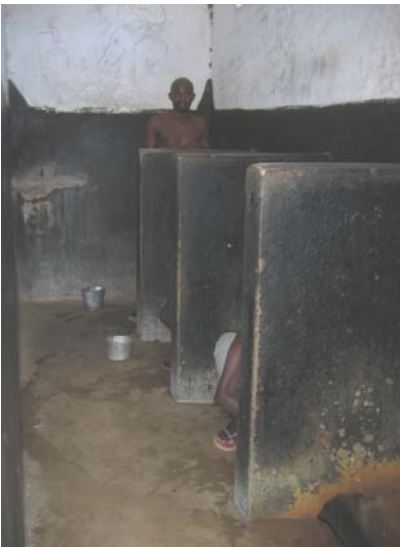
It is quite unique I could take pictures inside so freely!



Inside a cell



Toilet facilities



Discharge through a separate sewer system: very concentrated waste water, separate urinals



Outside room for day use

The open gutters were originally designed for rain discharge (monsoon climate!)

Now also "Grey water"

Education, training are important part of prison life



One of the inmates, will be a good tailor when he comes out

Payment every year at Christmas



The metal workshop



Paint workshop



NAIROBI CONVENTION

WIO-LAB in Kenya



Addressing Land-based Activities in the Western Indian Ocean

OFFICIAL LAUNCH OF THE SHIMO LA TEWA WASTE WATER MANAGEMENT PROJECT, MOMBASA ON 29TH AUGUST, 2008

- Improving sanitary situation in the main prison
- Improvement and construction of:
 - Sewage system
 - Large septic tank
 - Subsurface constructed wetland
 - Fishpond

Ready end of October 2008



Project Coordinator
Dr. Nesbert Mangale
Managing Director
Coast Development Authority (CDA)
Mombasa, Kenya
Tel: +254 41 2224490/06
E-mail: cda@cdakenya.org; md@cdakenya.org

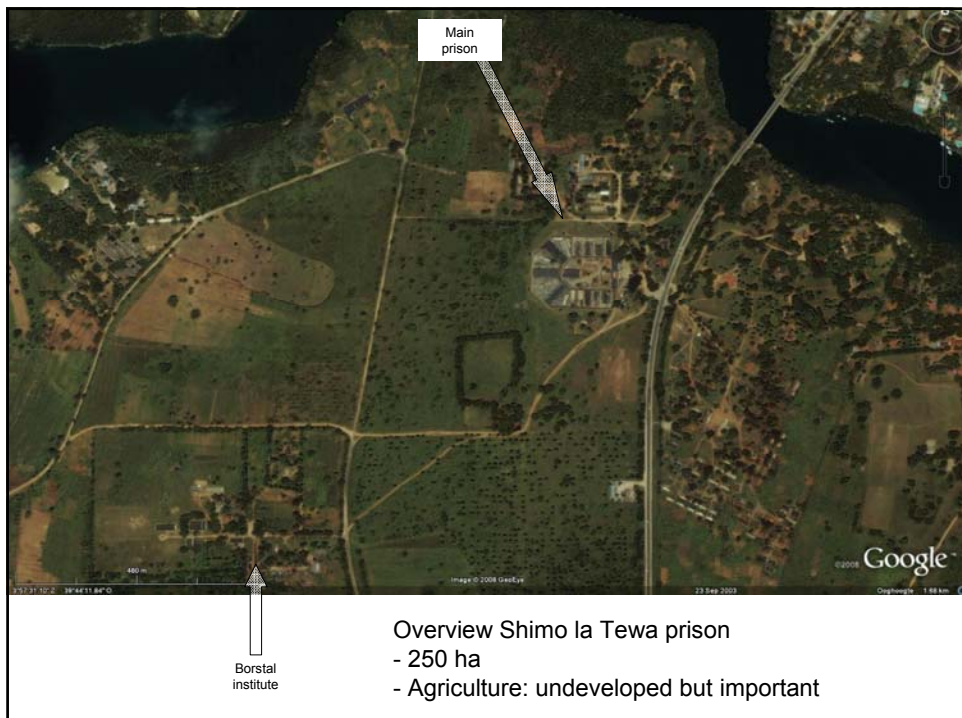
Could we make one step further?

The chosen solution:

- is only for a part of prison
- does not fully use reuse potential

Exploration of the way to go:

- source separation and reuse of wastes
- use Ecosan / Ecological Engineering principles
- integration of agriculture and sanitation



Key ideas

- What is the difference between animal manure and “human manure”?
- Solutions should be based on local agricultural practices
- How much is this influenced by cultural and health aspects?:
 - A prison is different from the “outside world”

A project in Shimo la Tewa Boys prison or Borstal institute

- *300 boys*
- A special and attractive platform for a demonstration project on a small scale
- *Knowledge can be replicated in other Kenyan prisons and abroad*



Education even more important then in the Main prison

Agriculture in prison



Plant nursery



- Mrs Lina E. Bonto

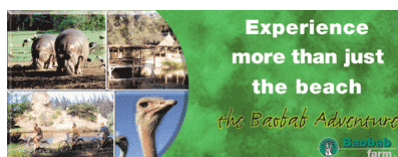
The main Shimo la Tewa Prison sewage gang



Supervising officer:
Salim O. Mwatimbo

Prisoners:
Tonny Aden
Peterson Mykhongo
Johne Njorogie

Dr. Rene D. Haller Baobab Trust



Learn how to sustain a family on 1000 m²



**Nguuni
Environmental
Education Centre**

**Farmer Field
School Training
Programmes**





Learn how to grow fish on the home farm



Kenyan Prisons Service Mission Statement



Baobab Trust



dr. Haller

a good neighbouring partner in:

- logistics of black wastes
- seeking solutions in production of biogas and manure
- education of inmates in farming, aquaculture: how to set up an honest business in rural areas

For more information on Baobab Trust and dr. Haller:

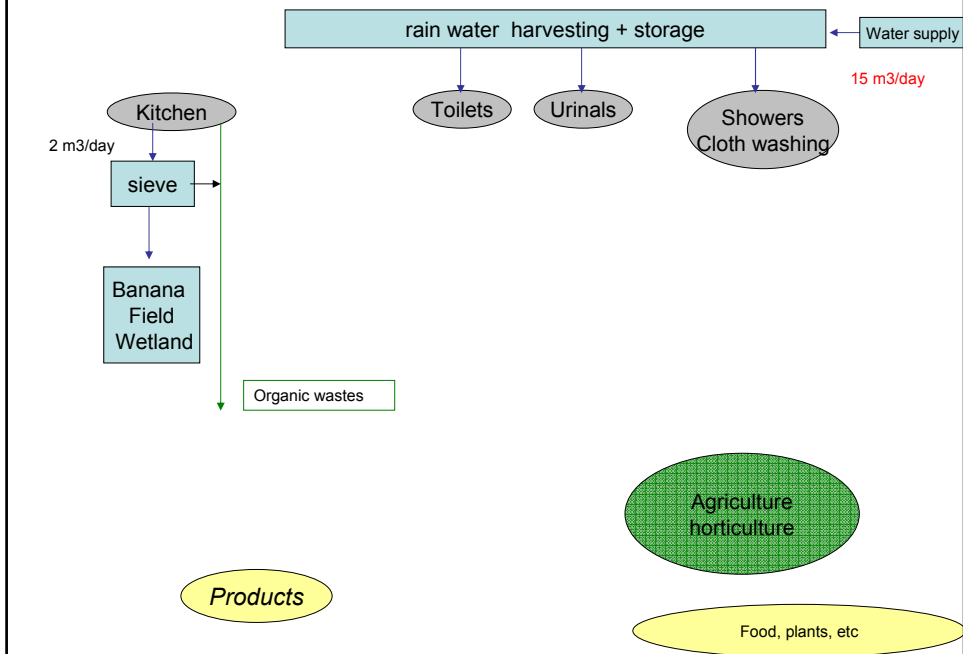
www.thebaobabtrust.com/

www.iees.ch/EcoEng032/EcoEng032_IntHaller.html
<http://www.thehallerfoundation.com/>
<http://www.bamburicement.com/rehab.htm>

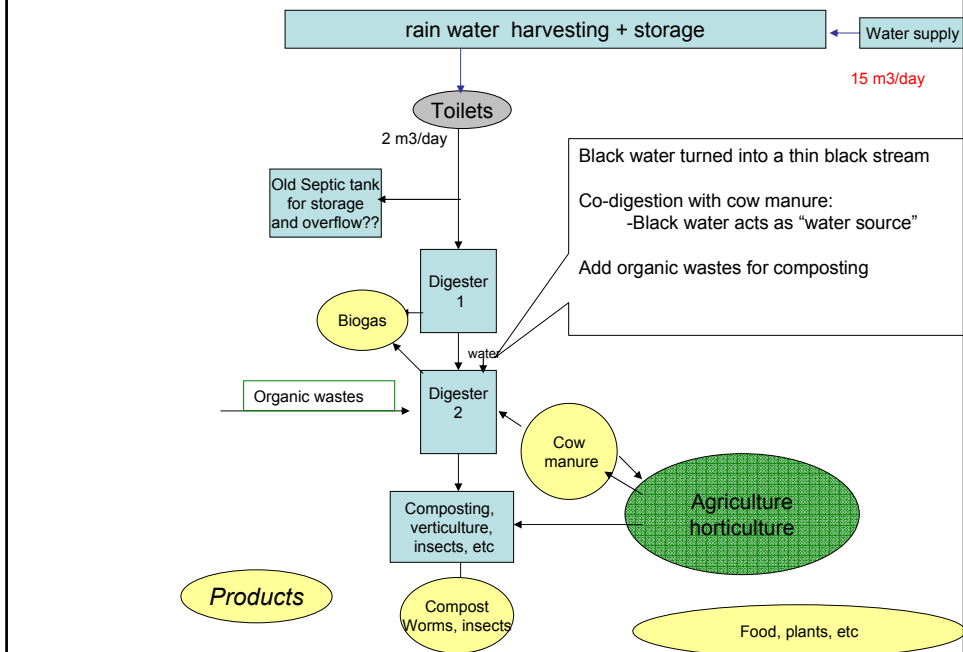
Ghanese Students Wageningen University

- Frederick Tettey-Lowor
 - Exploration of civil aspects, making pre-design
- Nelson Opoku
 - Overview of agriculture in prison
 - Possibilities of the integration of agriculture and sanitation

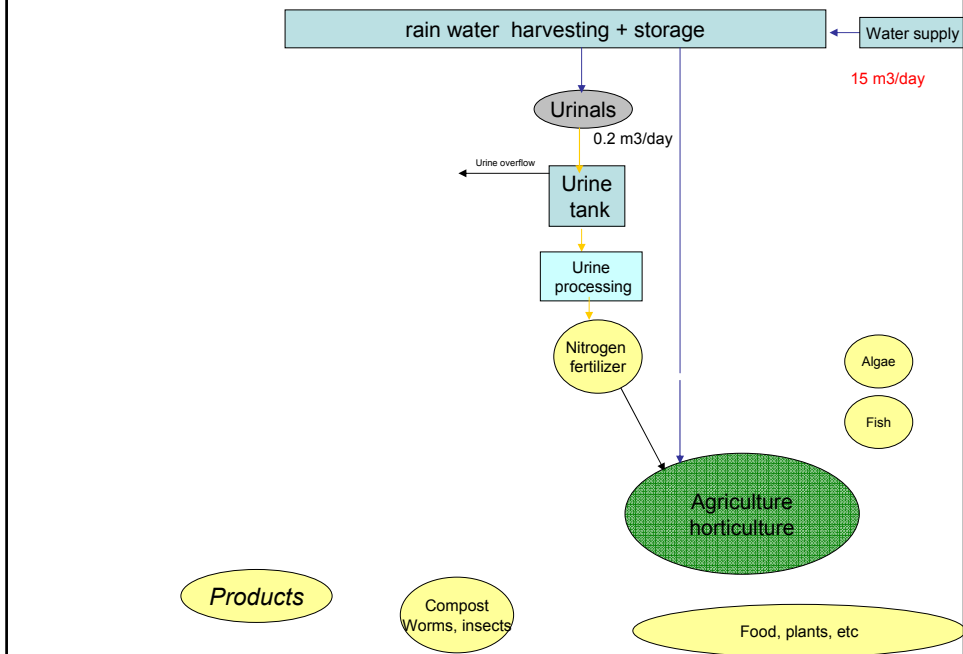
Borstal institute Sanitation pilot project: Closing the nutrient cycle – process scheme



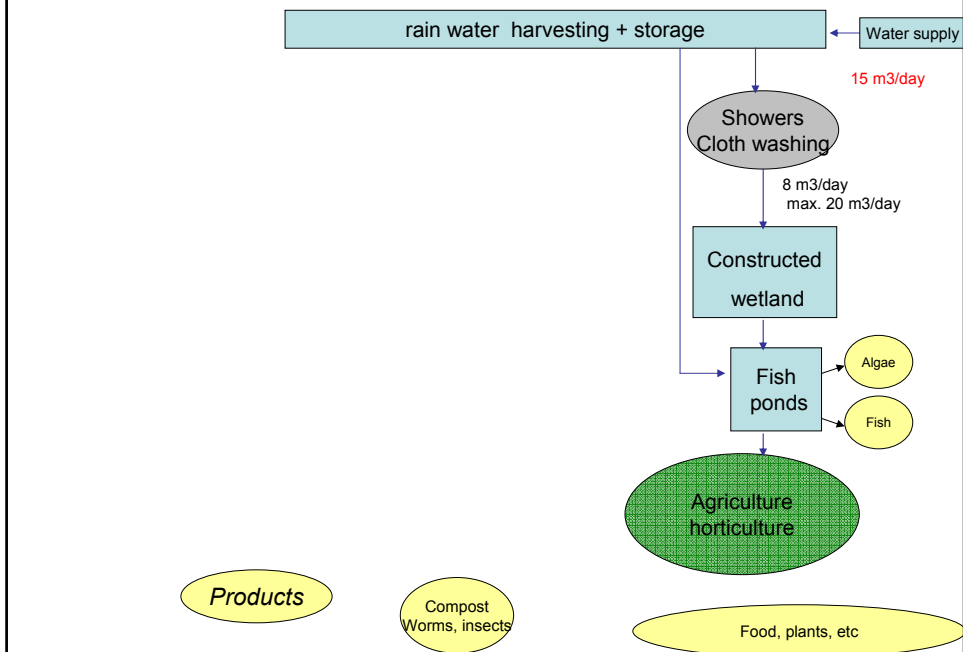
Borstal institute Sanitation pilot project: Closing the nutrient cycle – process scheme



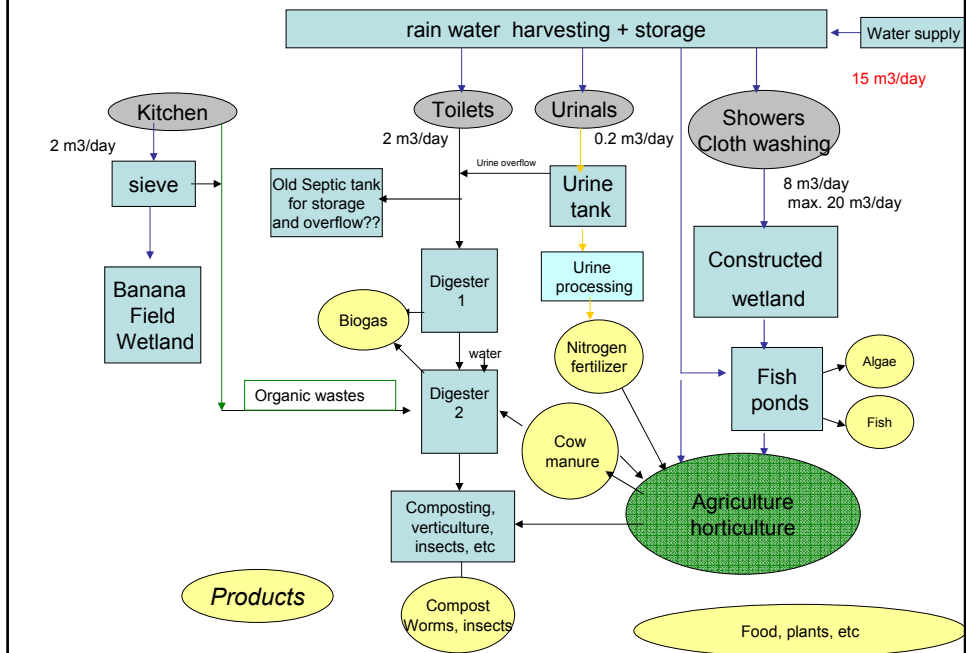
Borstal institute Sanitation pilot project: Closing the nutrient cycle – process scheme



Borstal institute Sanitation pilot project: Closing the nutrient cycle – process scheme



Borstal institute Sanitation pilot project: Closing the nutrient cycle – process scheme



Quantities

- **Rainwater harvesting**
 - 2 tanks of 50 m³. Why no bigger underground storage?
 - One third of water need
- **Sanitation**
 - 4 Ecosan toilets, amount black wastes:
 - 1700 l/d (design 2000 l)
 - ? Urinals, 50 % of urine separated
 - 200 l/d (design max 400 l/d)
- **Grey water**
 - Shower plus cloth washing 42 l/person.day = 42 m³/day
- **Kitchen**
 - 6 l per person per day: 2 m³/day

Status of the Borstal institute project

- Project set-up has been approved
- There is money:
 - € 59.162 funded by Aquaforall
 - plus expert cost, etc.
- A good local team
 - Coastal Development Authority
 - Kenyan prison systems
 - Mombasa Water & Sewerage Company
 - Ministry of Agriculture
 - Baobab Trust
 - Local companies Green Water, JuanGuvu Ltd
- Through several reasons:
 - Project start slow
 - Project management
 - Phasing of the project
- **But:**



Mrs Kireri,
Officer in charge of the
Shimo la Tewa prison



Mrs Solomon,
Officer in charge of the
Borstal Institute



Mrs Bendera,
Project leader CDA

Teachers, officers of the boys prison staff of CDA



Photo: Nelson Opoku



Local workshop



Visit to the Baobab demonstration farm



Boys selected to be involved in the project

Photos: Nelson Opoku

Borstal Institution Boys prison of Shimo la Tewa



www.waterharmonica.nl