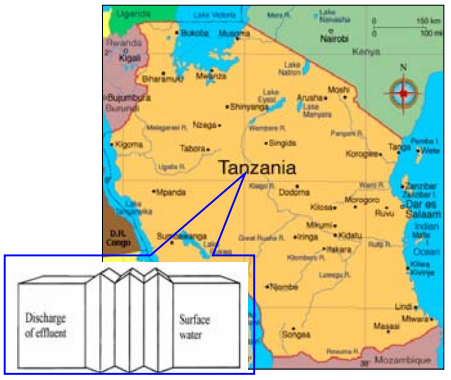
THE POTENTIAL OF WATERHARMONICA CONCEPT IN TANZANIA



"The bridge between treated wastewater and surface water"

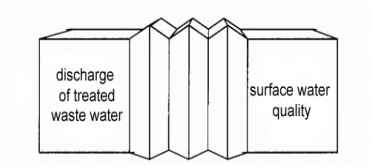
Presented by: Hamidar Chanzi

IBP 2004/5 - Environmental Science, Saxion University – Deventer

Waterboard Hollands Noorderkwartier, July 11, 2005

Waterharmonica

a Dutch initiative



LeAF

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- Methodology
  - main objective and step model
- Tanzania and the human waste situation
  - pit latrines and Ecological Sanitation
  - water pollution
  - treated waste water is a resource!
    - polluter pays!
- The concept of the Waterharmonica
  - The Waterharmonica in Tanzania
- Conclusions and follow up?

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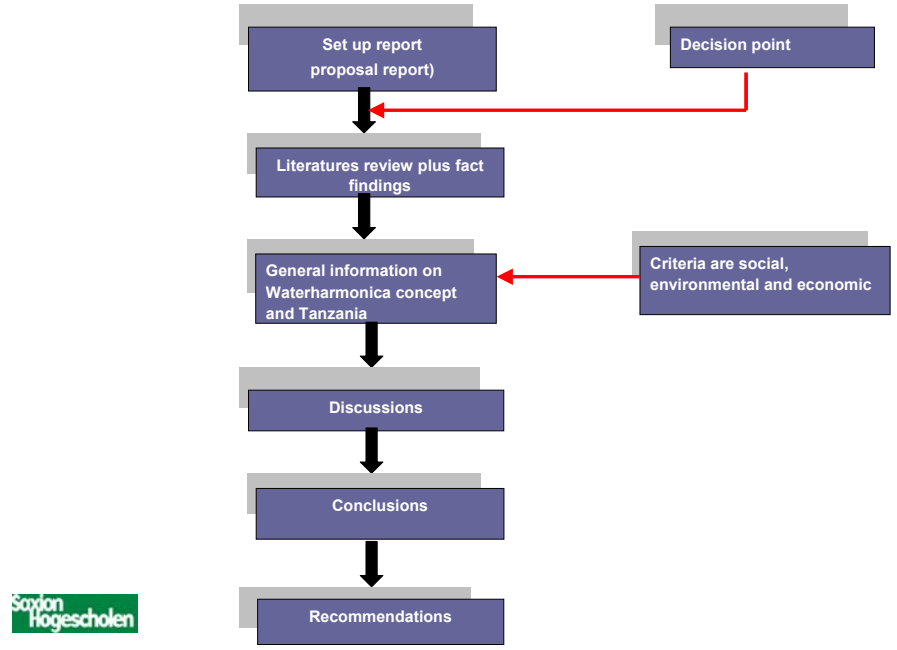
Main objective:

How can we use the basic ideas from Waterharmonica to use the “wealth of used drinking water” for poverty alleviation in Tanzania (local community)?

- Sewer system
- Type of sewage treatment
- Surface water quality, waterborne diseases
- How to organise?

Steps model



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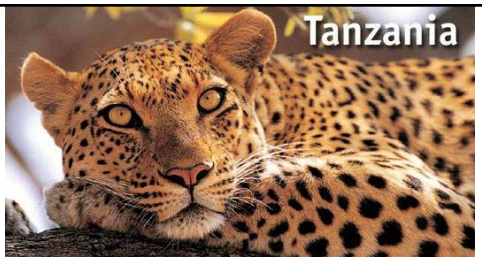
Tanzania

East Africa:

- **Indian ocean, Mozambique, Malawi, Kenya, Uganda and Zambia**

- **945,000 km^2**
  - **30 times Netherlands**
- **36 million people**
- **Developing country:**
  - **500 Euro income per capita**
- **Economy: Agriculture**
- **A stable, safe country!**



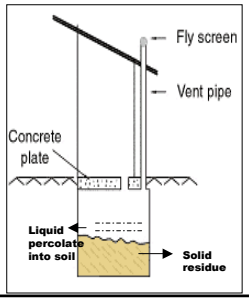
Human waste situation in Tanzania

	Urban	Rural
Drinking water available		
Septic Tanks	3.	0.5
Sewerage	1.4	0.3

Already many pit-latrines in Tanzania!

Tanzania-National Coverage of Excreta Disposal Facilities (1998)

Pit latrines



Practice:

- Many are Leaking
- Ground water pollution

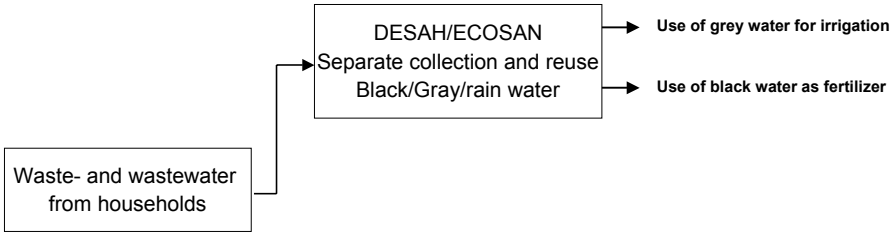
But Is already Ecological sanitation when:

- Kept dry (no water with faeces and urine)
- No leakage to groundwater
- Good infra-structure aimed on re-use of nutrients

Ecological sanitation is a great option but:
Combined with Source seperation

Water21, April 2005

Source separation



Based on Mels, 2004 and Kampf, 2005

Double Vault separation toilet

Safe fertilizer

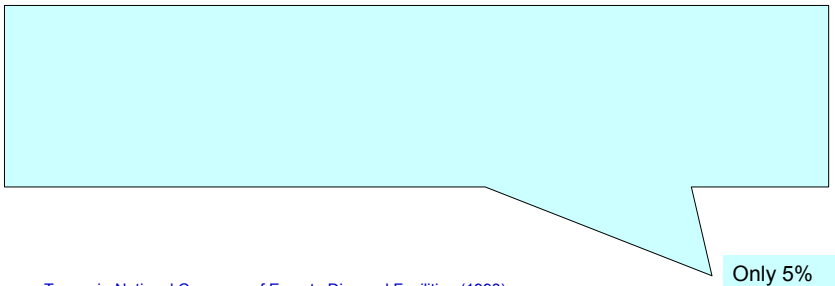
Short term solution for 80 – 90 % of the population

Enough fertiliser for the country

A Dutch latrine

Human wastes situation in Tanzania

	Urban	Rural
No or hardly drinking water		
Pit latrines	93	82



Tanzania-National Coverage of Excreta Disposal Facilities (1998)

Only 5%
Sustainable ?

Waste water in Tanzania

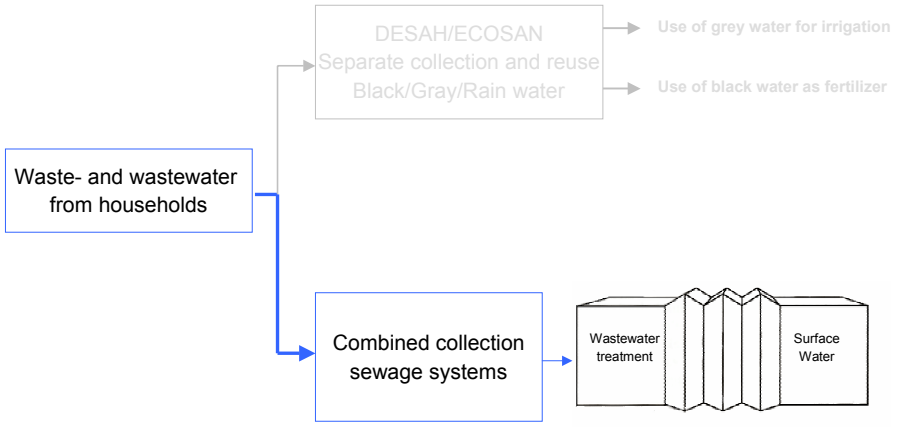
Not sustainable and proof failure due to:

- Population explosion
- Influx of people in urban areas
- Industrialisation in unplanned areas
- Human wastes not regarded as potential resources

“ like in most developing countries.....

and situation likely to worse”

But, also sustainable:

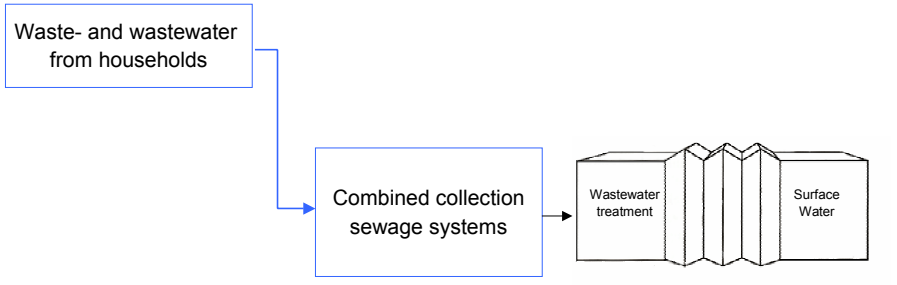


Based on Mels, 2004 and Kampf, 2005

Applicable:

Tanzania:

- **wastewater only produced by 5 % of population,**
  - **but this 5 % is the wealthiest part**
    - **offices,**
    - **hotels, hospitals**



Based on Mels, 2004 and Kampf, 2005

Polluter pays?

The New Arusha Hotel
160 USD for double room
140 USD for single room
Dik Dik Hotel
120 USD for double room
100 USD for single room

Polluter pays

Example Masai Mara National reserve :

- **"Mara Simba** is the only lodge in Kenya which has installed a Waste Water Treatment Plant. The plant was imported from U.S.A. This plant treats all the sewage and produces crystal clear water which is then used for irrigation. We are truly the only environmentally friendly lodge in Kenya"

Why not in Tanzania?

http://www.marasimba.com/introduction.html

Use of treated waste water in Tanzania

Some possible treatment methods:

- *Constructed wetlands: "natural treatment"*
- *Oxidation ponds: ponds, mainly used in India*
- *Oxidation ditches: very simple aerobic treatment*
- *UASB reactors: anaerobic reactor*

(Upflow Anaerobic Sludge Blanket)

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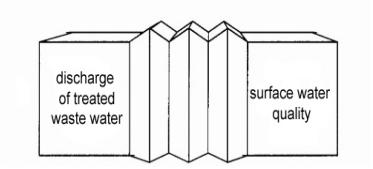
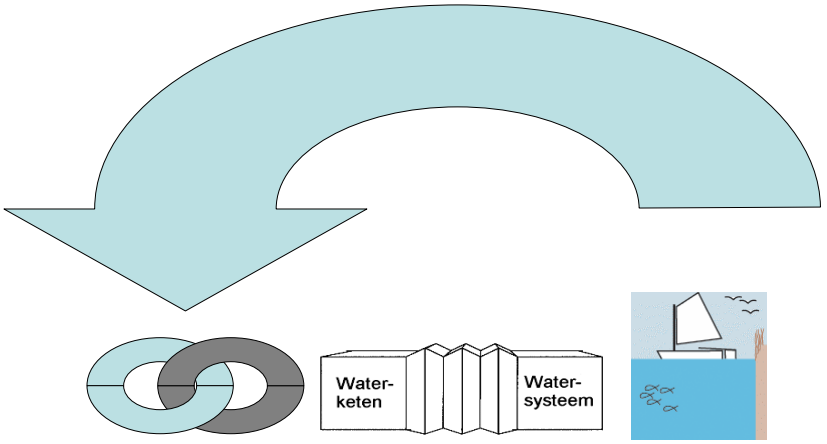
Waterharmonica

What is the potential of this Dutch initiative for Tanzania?



"The bridge between treated wastewater and surface water to fill the gap"

The missing link in Water management

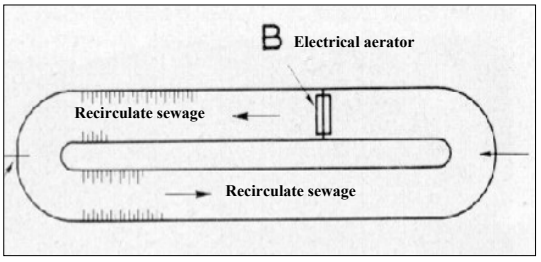


How?

- Ecological engineering
- Polishing and reuse of wastewater
- Link between treatment plant and surface water:

Aerated Oxidation Ditch

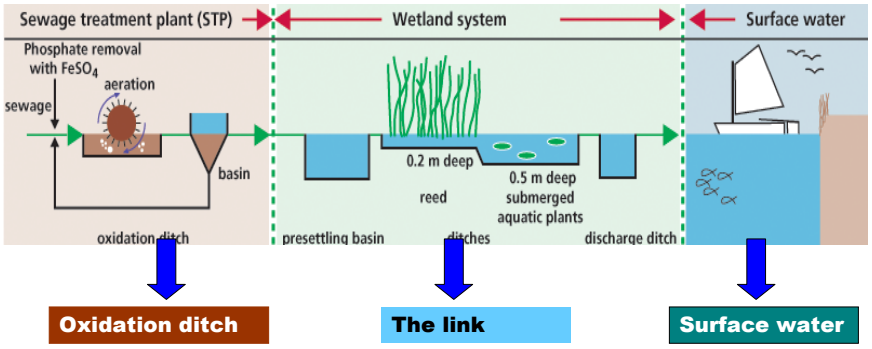
A.Pasveer (1909 – 2001).



- Developed in Netherlands
- Normal ditch with ring or oval shape.
- Installed with aerator in one side to provide enough mixing to entrain oxygen.
- Installed with bar screen to trap bigger particles (stones etc)
- Sludge removal: 0.05kg per population per day with volume of influent of 250 – 300 litre p.e

The Waterharmonica on Texel:

from wastewater to surface water



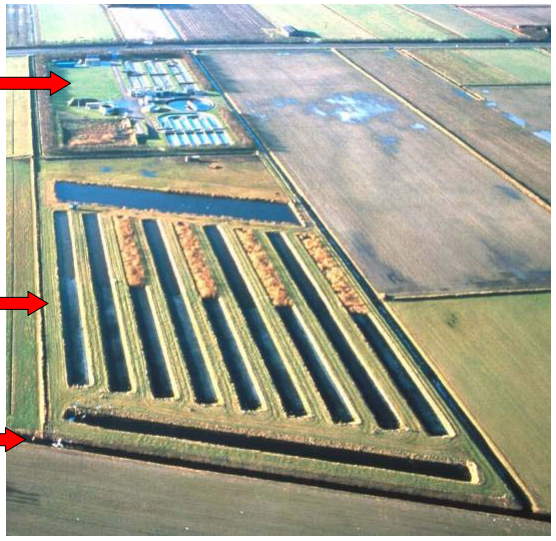
www.waterharmonica.nl

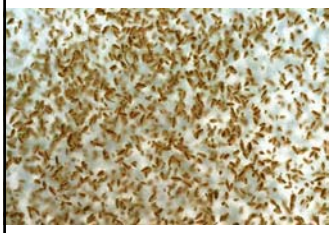
Texel

sewage treatment plant

constructed wetland

surface water





Waste water for nature

www.waterharmonica.nl

Texel

well treated wastewater
can be a good source of life!

More sustainable, natural water systems

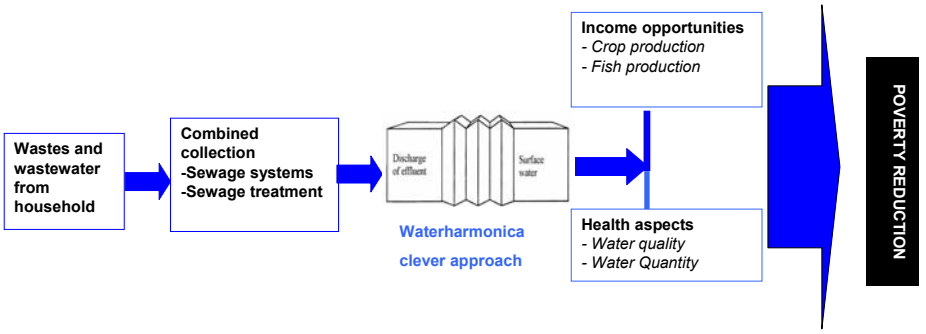
Wastewater fed fish ponds
Calcutta

Wastewater fed fish ponds
Kenya

Crops irrigated with wastewater - India

Minimise risks

- Treatment of wastewater
  - Good quality of treated waste water
    - Degree of pathogen and chemical removal
- Crops restriction
  - Crow crops with less risks to worker and consumers
- Proper use of crops and fish
  - Boil, not eat fresh crops (vegetable or fruits)



Reuse of wastewater

- Increase crops yield
- Increase fish yield
- Conserve nutrients, reducing the need of artificial fertilizer
- Energy saving approach

Reuse of wastewater

- Conserve water and provide reliable water supply
- Reduces pollution of water sources

Ensure sustainable development

of the Waterharmonica concept

1. Education

- Affordable approach for wastewater treatment
- Reuse of nutrients from wastewater (irrigation, fish ponds)
- Benefit to local community

2. Participatory involvement

- Management processes (decision making, planning)
- Self confident
- Creativity

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Conclusions

Waterharmonica concept is a promising approach that could promote the livelihood of local people in Tanzania

-Waterharmonica makes waste water safe

-reduce water pollution

-Safe fertilizer of nutrients from safe wastewater

-Agriculture, aquaculture

-Polluter pays make waste water a resource

-Water conservation

-Wastewater for irrigation; fresh water for domestic uses

Follow up in Tanzania

- *Make list of possible places where Waterharmonica could be used*
- *Promote demonstration projects*

For instance:

- Dar es Salaam: hospitals, schools, military barracks
- Regional towns: Iringa, Mbeya, Kilimanjaro, Mwanza, Tanga

But especially:

- luxury hotels or lodges in the nature parks

Reuse of material from Texel ?

- 4 oxidation ditches on Texel will be put out of order (‘t Horntje, Oosterend, Oude Schild and the Cocksdorp)
- The main plant at Everstekoog will be renewed totally
- Many materials could be reused:
  - Aerators, pumps, screens, etc
  - It will not be easy:
    - Transport cost, installing in Tanzania, etc
    - Main problem: energy and maintenance !
  - But!????:
    - we need a good project!

“My success is the result of my failures”