Sanitation with a different perspective

History of sanitation in the Netherlands

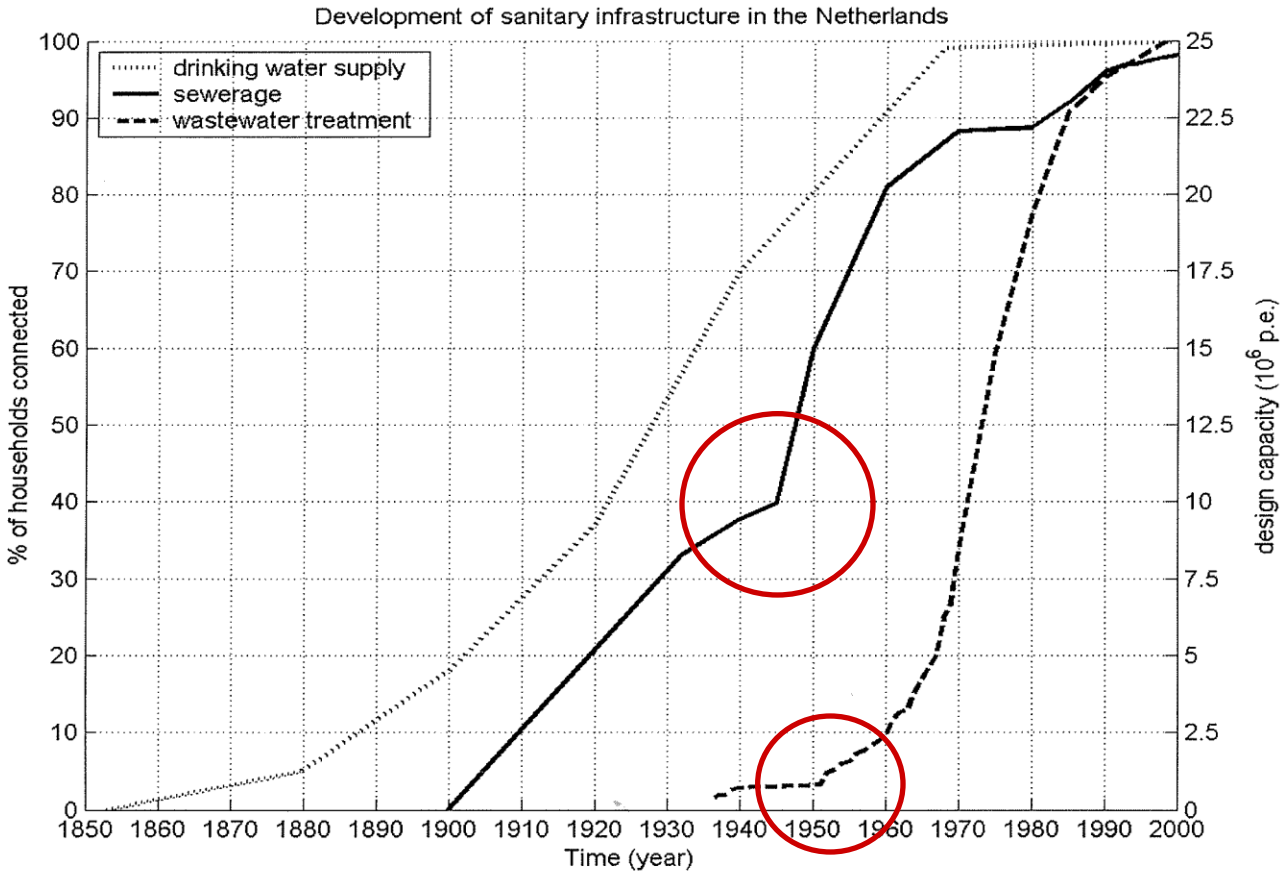
De Goudsbloemgracht, canal in Amsterdam, 19th century

In 1866-1867 maakte een cholera epidemie in Nederland 21.000 slachtoffers. In de stad Amsterdam waren, ondanks de 10 jaar eerder begonnen distributie van duinwater, 1151 doden te betreuren. In een deel van de toen arme Jordaan stierf 9,6 % van de bevolking hieraan

History of sanitation in the Netherlands

Collecting nightsoil in Amsterdam, 19th century

Development of water and sanitation in the Netherlands

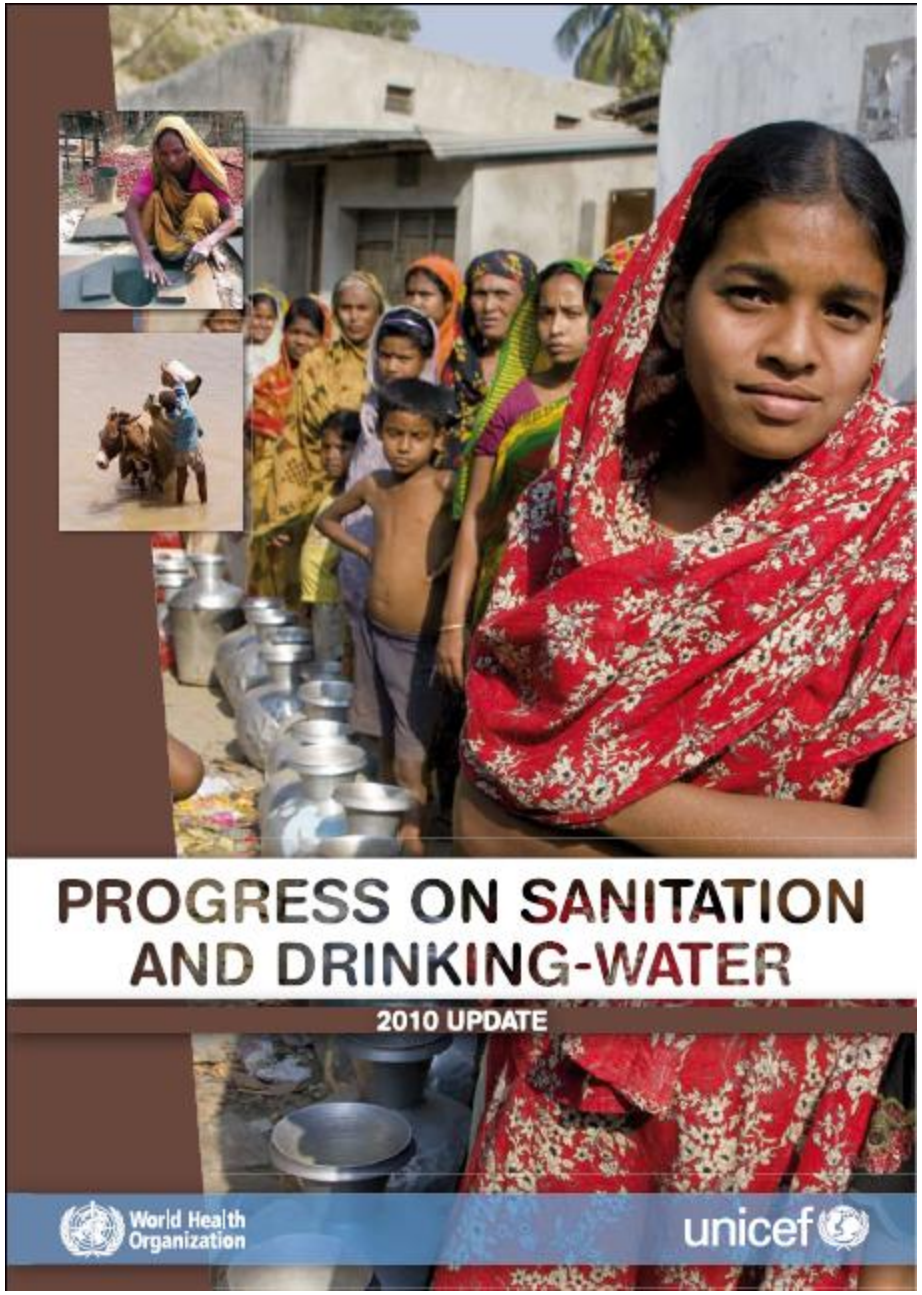


Source: TU Delft

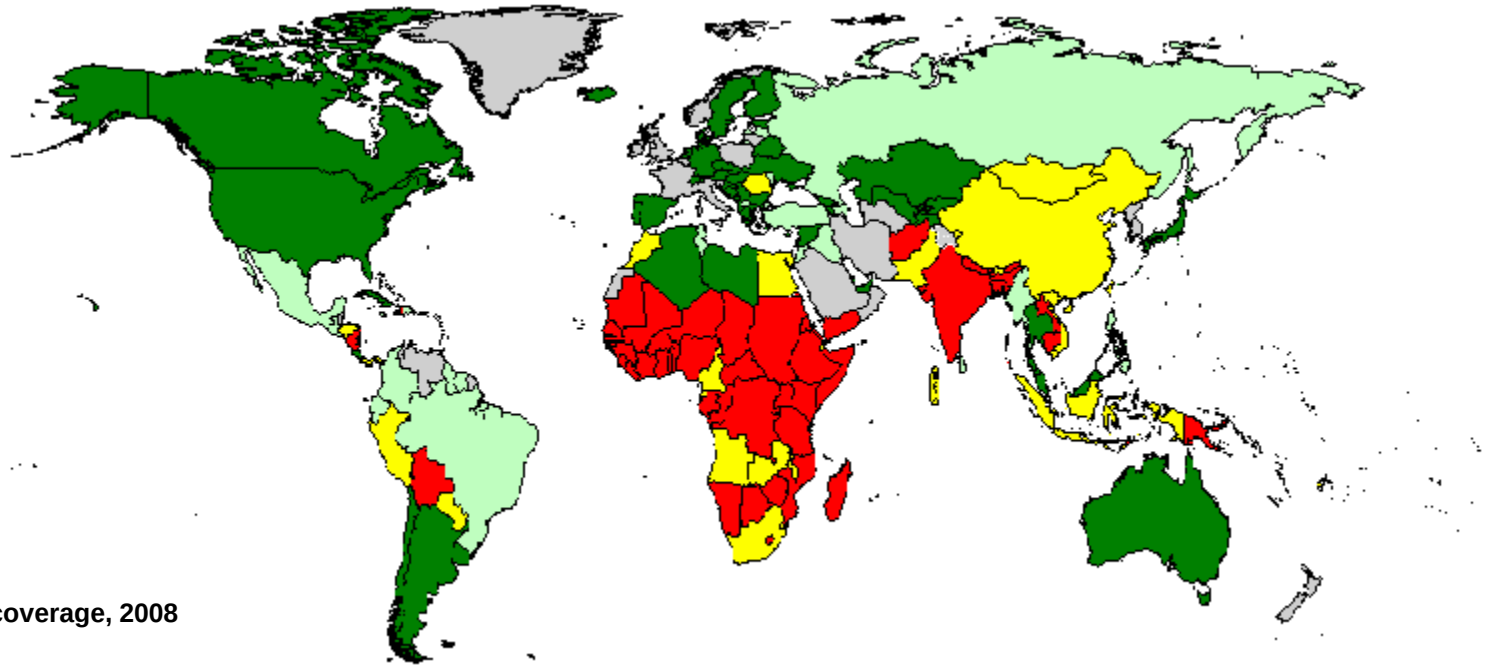
Millennium Development Goals

MDG 7 – Target 10

"Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation (baseline year 1990)"


PROGRESS ON SANITATION
AND DRINKING-WATER
2010 UPDATE
World Health Organization
unicef

World is ‘off-track’ for the Sanitation MDG target



Sanitation coverage, 2008

- Less than 50%
- 50 – 75%
- 76 - 90%
- 91 - 100%
- No or Insufficient data

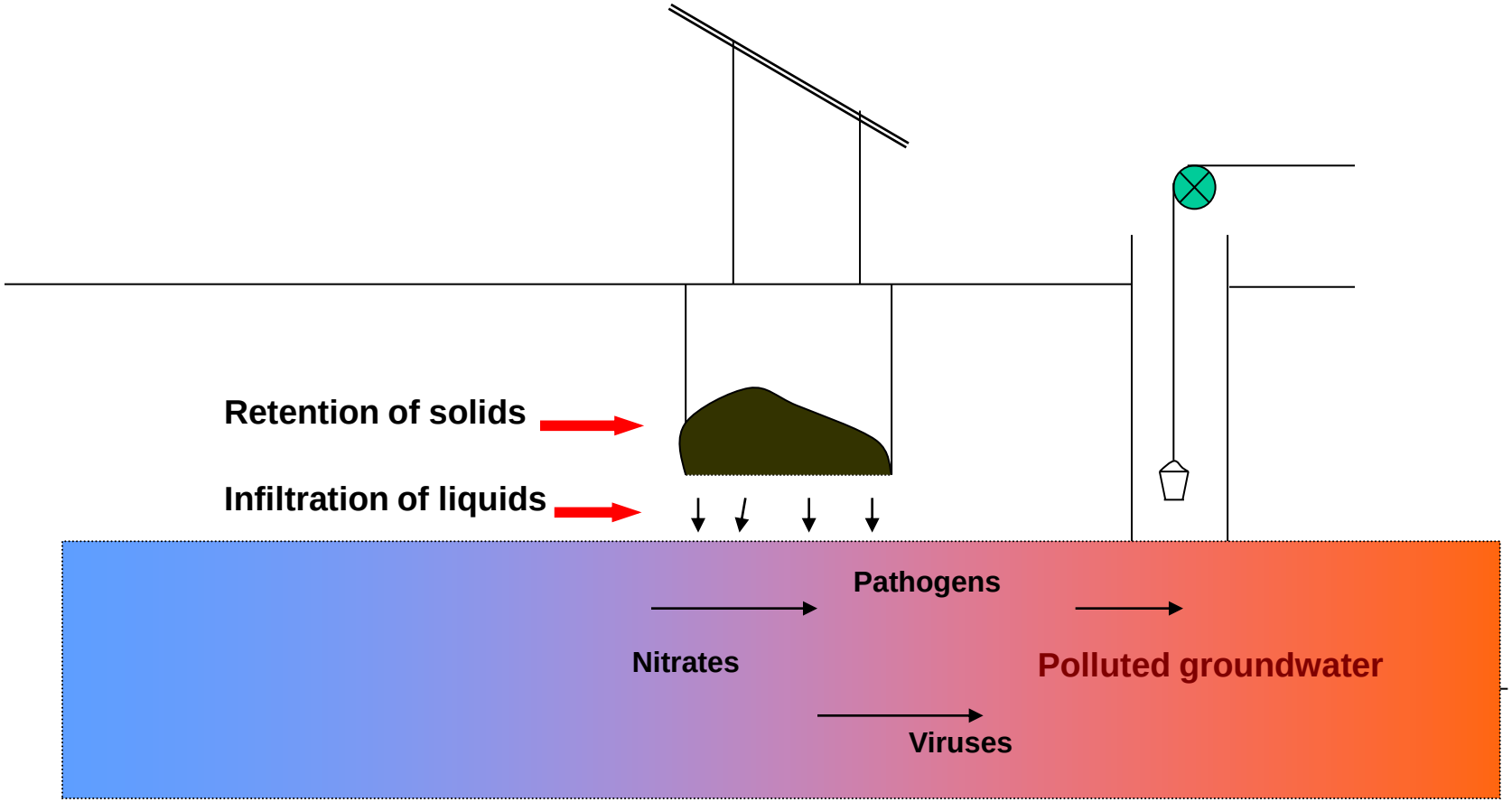
- 2.5 billion people (1.8 billion in Southern Asia) are still without improved sanitation – 48% of the population in Southern Asia is still defecating in the open.
- At the current rate – the target will be missed by 700 million people.
- Therefore: the 5 year Drive

BUT (now also the good news!)

- 87% of world population uses water from improved sources. 884 million people are still using unimproved sources.
- The progress for water is on track

The idea, that human excreta is waste with no useful purpose is a modern misconception. It has led to the development of so-called “drop and store” or “flush and forget” sanitation solutions.

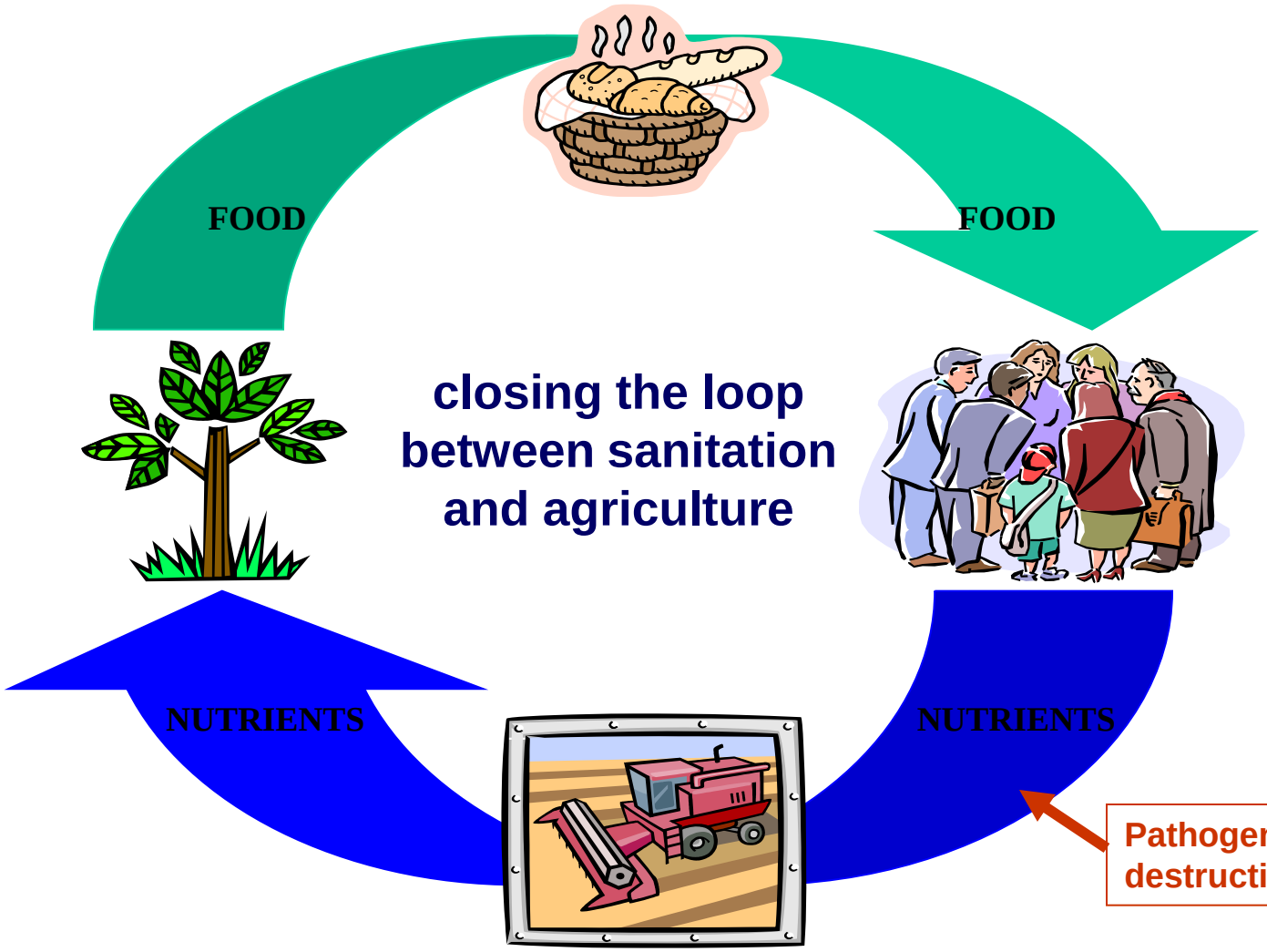
shortcomings of conventional „drop and store“ sanitation



excreta are a valuable resource

farmers around the world yearly require 135 Million tons of mineral fertiliser for their crops, while at the same time conventional sanitation dumps 50 Mio tons of fertiliser equivalents from so called wastewater flows into our water bodies - nutrients with a market value of around 15 Billion US dollars.

principles of ecosan



Human excreta and domestic used water are not waste but are important natural resources!

phosphate

	Mine production		Reserves	Reserve base
	2001	2002[e]		
United States	31,900	35,800	1,000,000	4,000,000
Australia	1,890	1,800	77,000	1,200,000
Brazil	4,700	4,700	330,000	370,000
Canada	800	1,000	25,000	200,000
China	21,000	21,000	6,600,000	13,000,000
Israel	3,510	3,500	180,000	800,000
Jordan	5,840	7,000	900,000	1,700,000
Morocco and Western Sahara	21,800	24,000	5,700,000	21,000,000
Russia	10,500	10,500	200,000	1,000,000
Senegal	1,700	1,500	50,000	160,000
South Africa	2,550	2,800	1,500,000	2,500,000
Syria	2,040	2,400	100,000	800,000
Togo	1,060	1,100	30,000	60,000
Tunisia	8,000	7,500	100,000	600,000
Other countries	8,710	8,000	1,000,000	2,000,000
World total (rounded)	126,000	133,000	17,000,000	50,000,000

source: US Geological survey, 2003

- **World demand for phosphate fertilizers continues to expand in relation to increased world population and food requirements.**
- **Within about 60 years, all reserved phosphate are expected to be mined.**
- **Future conflicts on the access to phosphate are likely, due to the limited reserves and the concentration of significant minable resources in a very small number of countries.**

agricultural utilisation of nutrients

One person can provide enough nutrients for:
200 m^2 to 400 m^2 agricultural production area,
depending on soil and plant type.

agricultural use

direct injection of liquid fertiliser

irrigation

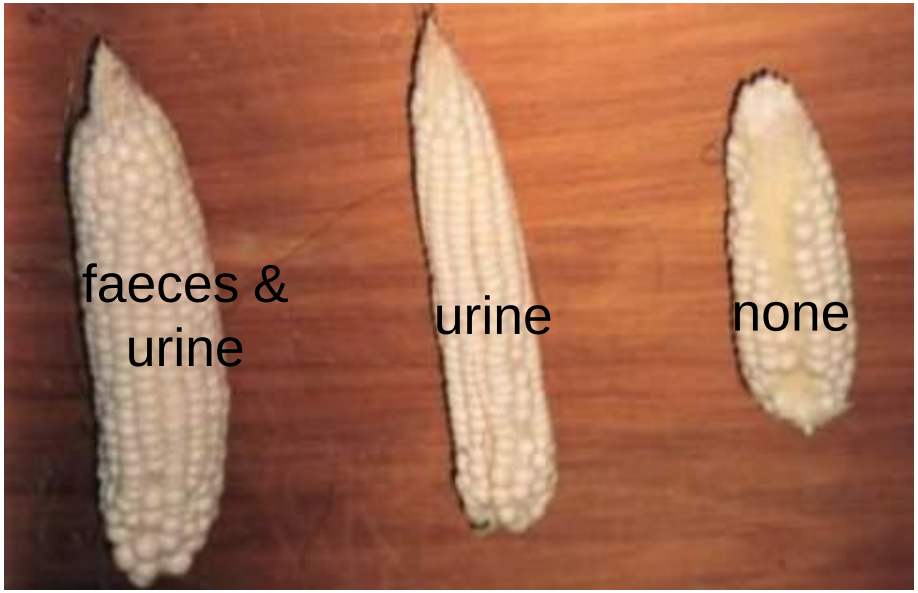
urban agriculture

dried faeces - „soil amelioration“)

composting with organic waste

urban agriculture

- restored soil fertility through nutrient reuse



source: Vinnerås, 2003

- improved soil quality through reuse of organics

source: Petter Jenssen

after one week without water

ecosan pilot projects

ecosan-study and reuse experiments in Havana, Cuba (supported by GTZ)

- Study of options for reuse of urine and faeces in existing urban agriculture in Havana

improved soil quality through reuse of organics

aqua culture

- wastewater treatment by aquatic plants and fish with nutrient recyling by human consumption
- offers high quality protein at low cost
- predominantly in Asian countries
- fish production of 1-6 tons/ha·year) achieved


tilapia

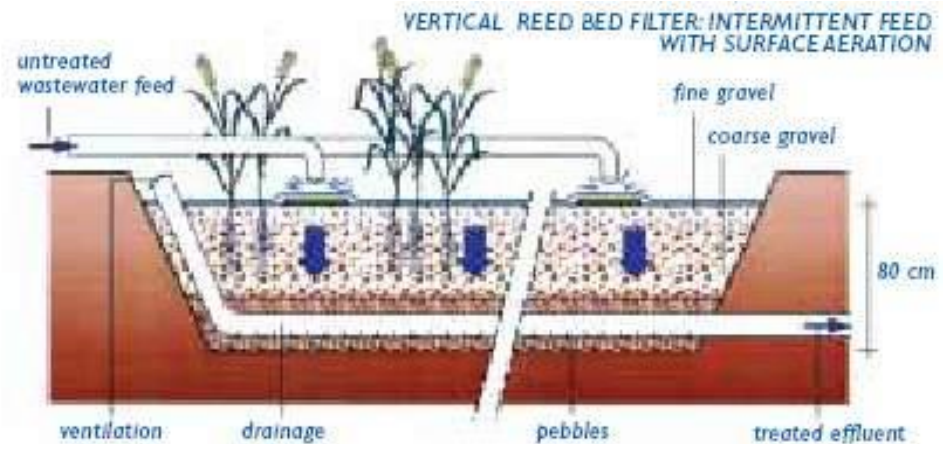

carp


duckweed

fishfarming with wastewater from ducks, poultry or pigs husbandry (Asia)

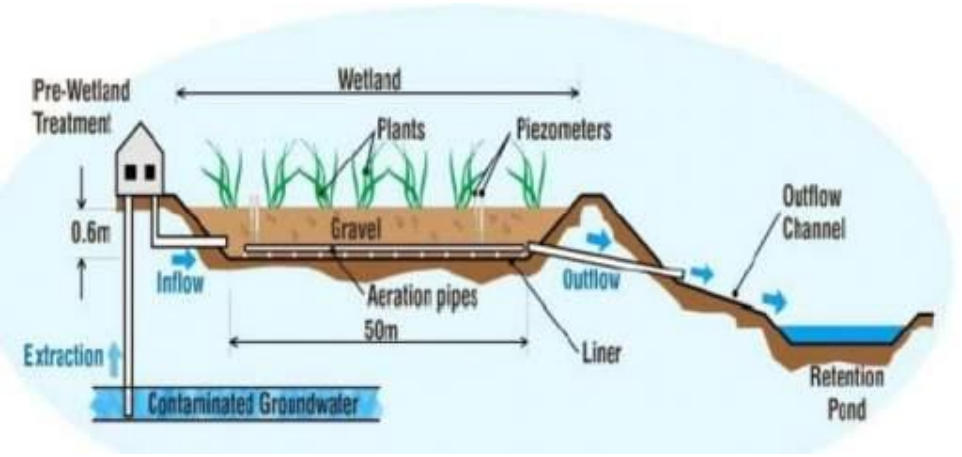
source: Nils de Pauw

constructed wetlands



vertical flow

source: Cemagref



horizontal flow

source: Comax International Ltd.

- treatment of wastewater or greywater
- effective in the removal of BOD, TSS, pathogen and nitrogen
- effluent can be reused
- aesthetically appealing

Niels De Pauw

Constructed wetland with biomass production

source: EU Fair, 2003

- Combined wastewater treatment and bio-fuel production from willow plantations (example in Sweden)
- Cost and energy effective

examples of urine diverting toilets


China


GTZ, Mali

waterless:
faeces and urine without flush


Wost-Man, Sweden

dry/wet:
faeces without, urine with flush


Roediger, Germany

dry/wet:
faeces with, urine without flush


Dubletten, Sweden

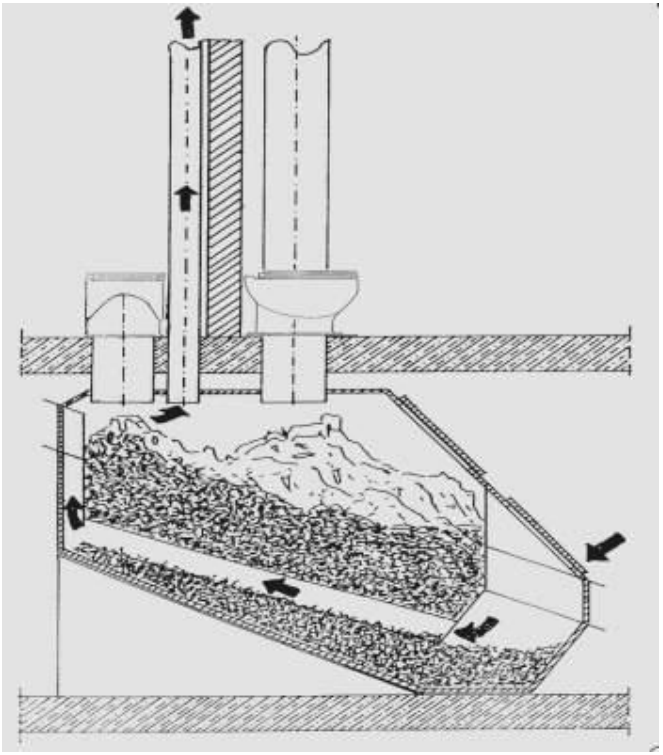
wet:
faeces & urine with flush

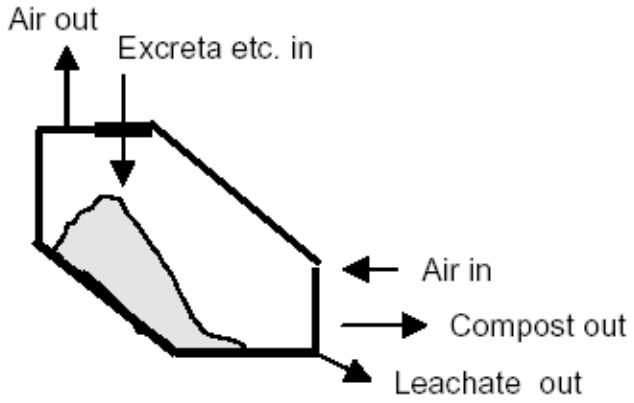
urine storage

Various containers for urine storage:
Gebers, Sweden
Lambertsmühle, Germany

examples of composting toilets

composting toilet, Germany (Berger Biotechnik)





Sweden

examples of dehydrating toilets

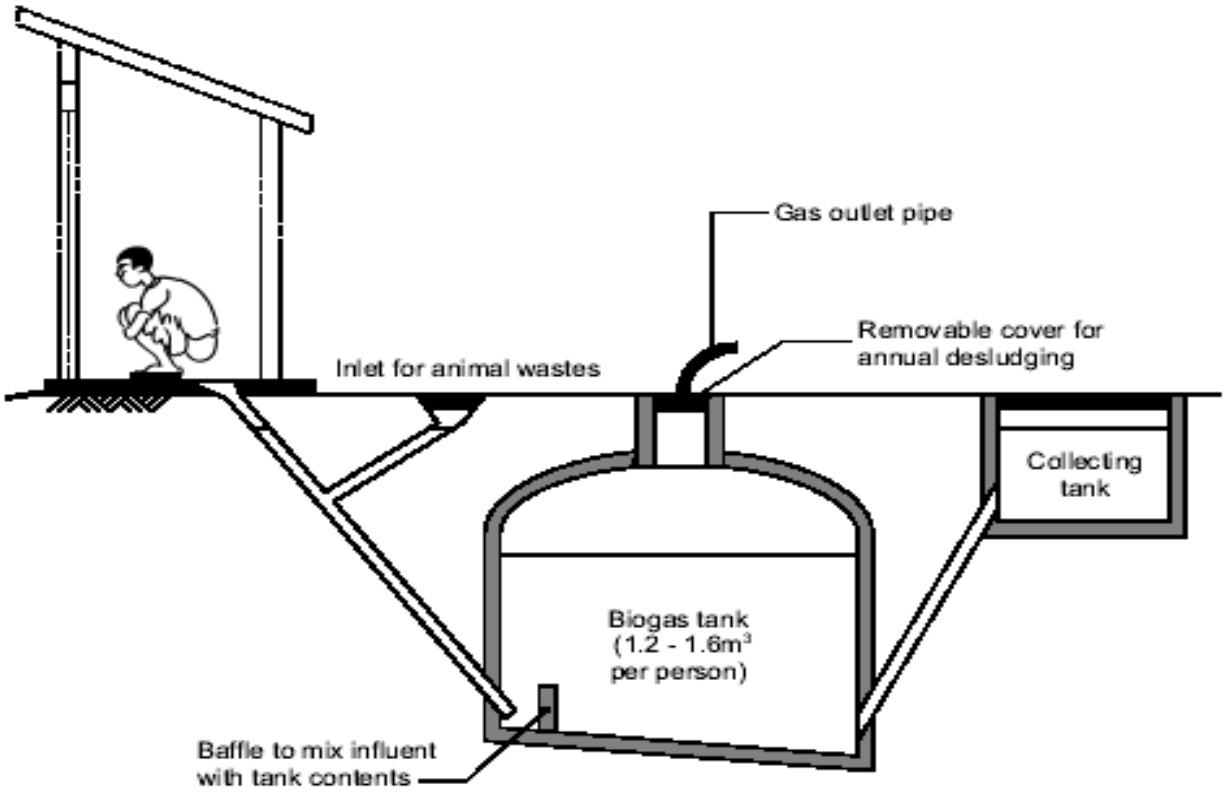
various dehydration systems (with and without urine separation)

"SolaSan"-prefabricated system, South Africa

"Enviroloo"-prefabricated system, South Africa

anaerobic treatment with biogas production

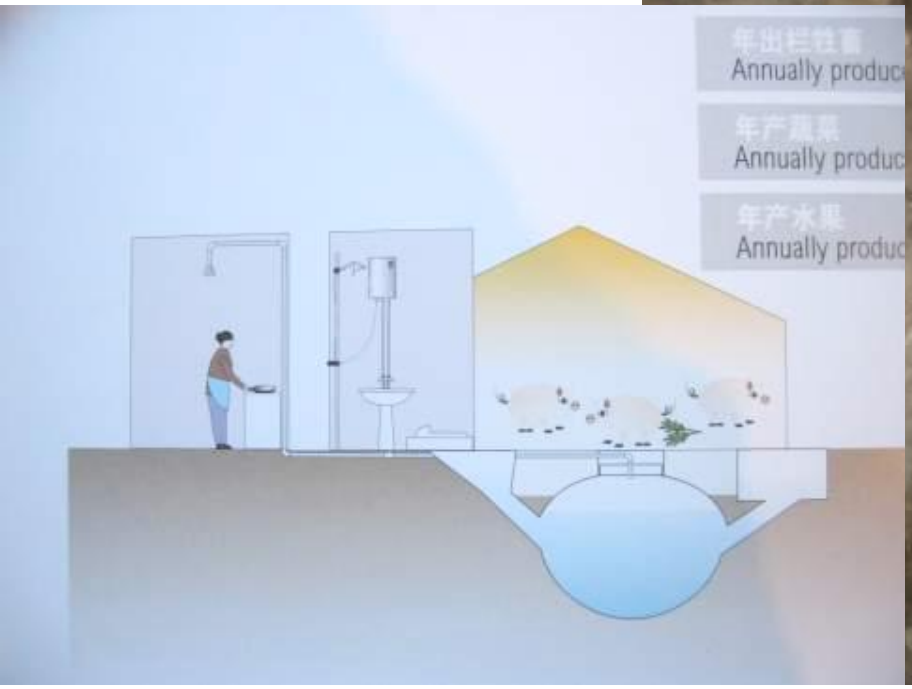
small-scale biogas plants:
decentralized treatment of household wastewater with or without agricultural waste



household biogas latrines

By 2002: 11 million households

Data: Ministry of Agriculture



biogas-program Dhapasi, Nepal

toilet wastewater and manure is used in a household biogas plant

biogas is used for cooking, organic sludge is used to fertilise the garden

biogas septic tanks Lesotho (supported by GTZ and DED)

- 1st step (2002): small bore sewer grid for 8 houses, a biogas-septic tank unit, upflow filter based on recycled plastic bottles, wetland, 800m² vegetable and fruit garden, two household connections for the biogas as full cooking energy source
- 2nd step (2003): field tests of black-, greywater and urine separation

public toilet centre Bangalore, India (supported by ACTS, SDC, Uni Oslo and GTZ)

Current collection-, transport-, treatment- and reuse-system

Succesfull approach:
Community-Led Total Sanitation

Short term, intensive approach with
1-2 goals and community approach:

Community-Led Total Sanitation

- Community Transect Walk to visit local open defecation areas
- Calculation of excreta load – ‘do we want this dirt & shame?’
- Decision that all households will build toilets and make community open defecation free
- Social pressure to ensure all comply

Other promising new developments:

- WASH UNITED

- PEEPOO

II. Sanitation Components: Climbing the Toilet Ladder

On-site toilet improvements over time: a selection

Ceramic pan, no door

Cemented floor & lower walls

Door from beaten tins

Cemented outer walls

Metal sheet door, tiled floor, cemented lower walls

experimental on-site sanitation in Koulikoro, Mali
(supported by GTZ)

experimental on-site sanitation module consisting of a urine diverting dehydrating latrine, shower and greywater garden

Urine diverting concrete slab

Greywater garden

integrated natural resources management in Botswana (supported by IUCN, DED, GTZ)

Introduction of ecosan systems in three communities: dehydration toilets, urine separation and fertilization of gardens with urine

urine diversion toilet made out of plastic

Awareness workshop on a village level

ecosan pilot projects

participatory development of ecosan solutions in Gibeon and Marienthal, Namibia (supported by GTZ)

- Information, awareness building, situation and stakeholder analysis
- Participatory development of ecosan concepts
- Pilot and demonstration units (fixed and movable dehydration toilets with urine diversion)

ecosan dry toilet promotion in Guangxi-Province, China (supported by SIDA and Unicef)

Photos: Sandec, Text: Mi Hua

- Large ecosan project in the phase of up-scaling
  - 1997, pilot project funded by SIDA/Unicef, 70 ecosan (urine diverting dehydration toilets) built in pilot village, Dalu Village
  - 1998, 10.000 urine-diverting toilets were built in 200 ecosan villages in Guangxi
  - 2002, 100.000 ecosan toilets in Guangxi
  - 2003, 685.000 ecosan toilets in 17 provinces (Ministry of Public Health)
- Factors of success: cultural acceptance, political commitment, technical flexibility, low cost, income generation, pressure from water pollution and water scarcity, promotion and marketing

Capacity development: Local Toilet Production and Sales

Examples from India

Trained women toilet masons/block makers

Establishing local production and sales centres

Village Sanitation Shop

Finance

Access to finance is essential for users and producers:

- Soft loans for local producers of sanitation components
- Soft loans for the poor through micro-finance – does micro-finance really reach the poor
- Subsidies for the very poor – debated as targeting of subsidies is difficult
- Rewards for reaching open-defecation free status

DGIS : PPP Facility operational end 2011

Thank you!