

# Managing wastewater in the city of the future

## Decentralized wastewater and rainwater reclamation and use in Urban Agriculture



# Decentralized wastewater and rainwater reclamation and use in Urban Agriculture

## Session 8. Future considerations and the way forward

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# New sanitation systems are conceptually more sustainable

- Closing material cycles
- Reduction of environmental emissions
- Reduction in energy use
- Reuse of water and nutrients
- Better control in transport and treatment

# But what about the challenges?

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- Key issues for project success

# Key issues for project success

- Involvement of users
  - Also in the selection of the system vs. participation through education (trying to convince)
  - Case by case approach
- Institutional arrangements
  - Long-term commitment (office created)
  - Coordination of efforts
- Systems adjusted to context (technology)
  - Geographically
  - User-interface

# Key issues for project success

- Savings other than infrastructure are incorporated into the financial calculations
  - Long-term cost recovery
  - Water, energy, pollution treatment, health savings
- The technology should be promoted and implemented both in rich neighborhoods
  - Should not be the imposed technology on the poor

# What about the costs of new sanitation systems?

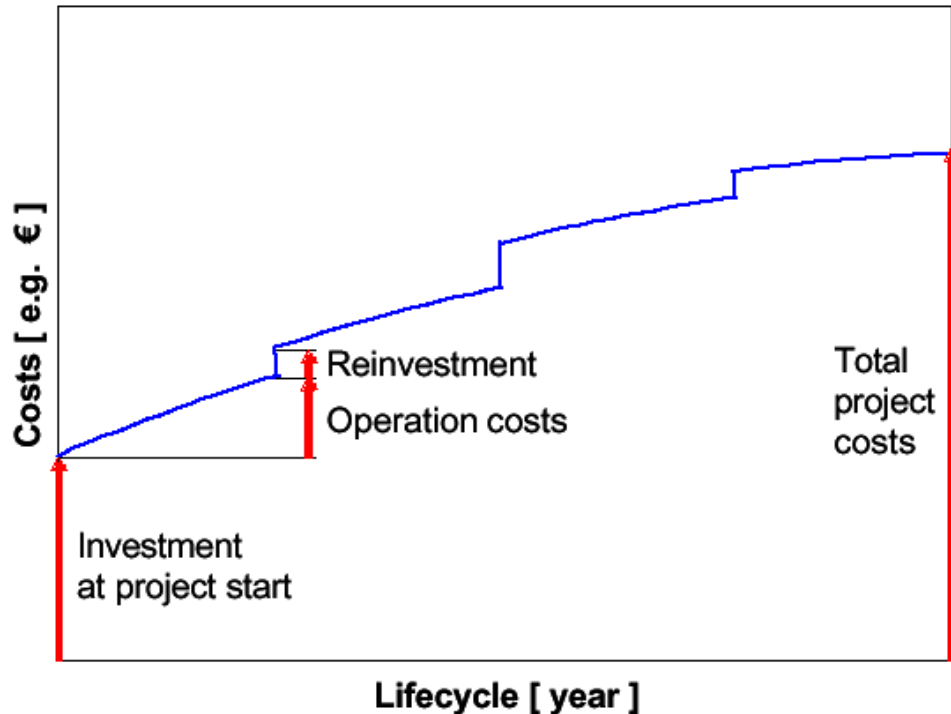


Figure 1. Demonstration of the total project costs (Projektkostenbarwert)

Costs over total life time (net present value method)

# Costs for two scenarios for No Mix technology

- Scenario 1.
  - Urine : agriculture
  - Brown water : gravity transport and composting
  - Grey water : constructed wetland
- Scenario 2.
  - Urine : agriculture
  - Brown water : vacuum collection and digestion
  - Grey water : constructed wetland

# Costs for two scenarios for No Mix technology

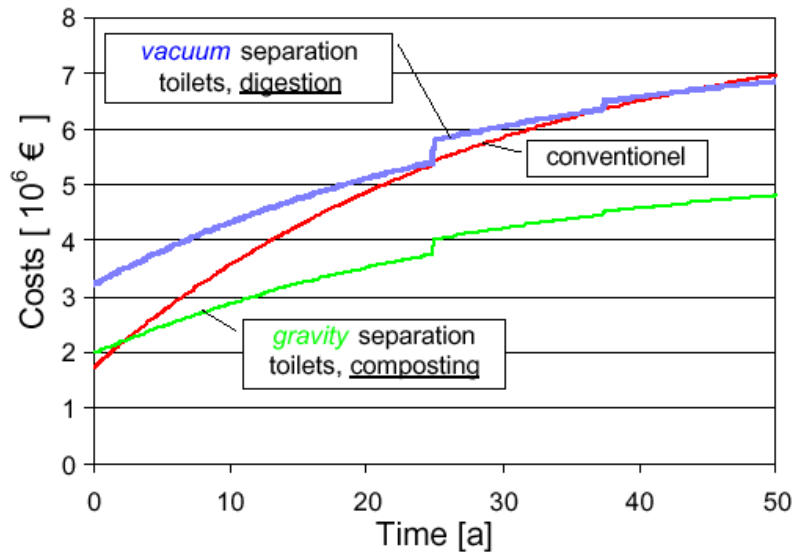


Figure 2. Total project costs for the conventional and the new sanitation concepts (672 inhabitants); cost basis: *local company*

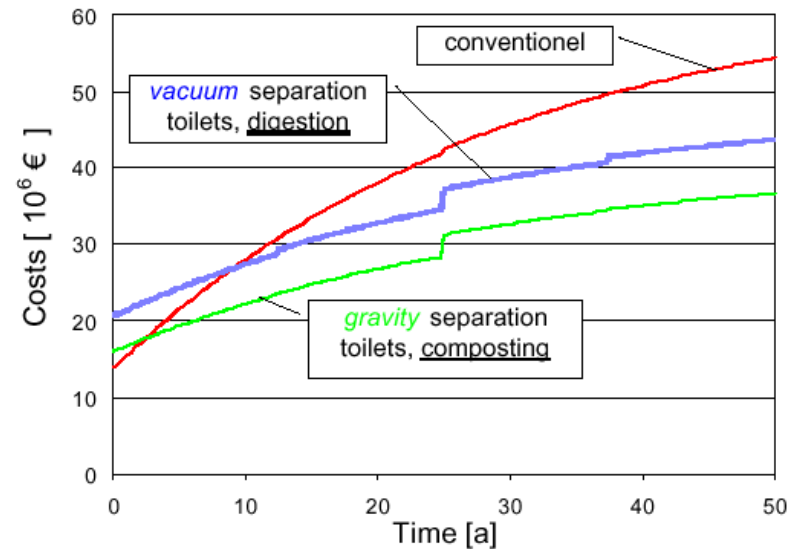


Figure 3. Total project costs for the conventional and the new sanitation concepts (5,000 inhabitants); cost basis: *local company*

Calculation for situation in Berlin by *Berliner Wasserbetriebe, Vivendi Water and Otterwasser (Peter-Frohlich et al. 2003)*

# Philippines

- Sanitation
  - Improved toilet facilities:
    - 1990: 55%
    - 2000: 67%
  - Open defecation is common
    - “flying toilets”
  - Only 1% of industrial and domestic wastewater in 1500 Philippine cities is treated

De Lange, 2010

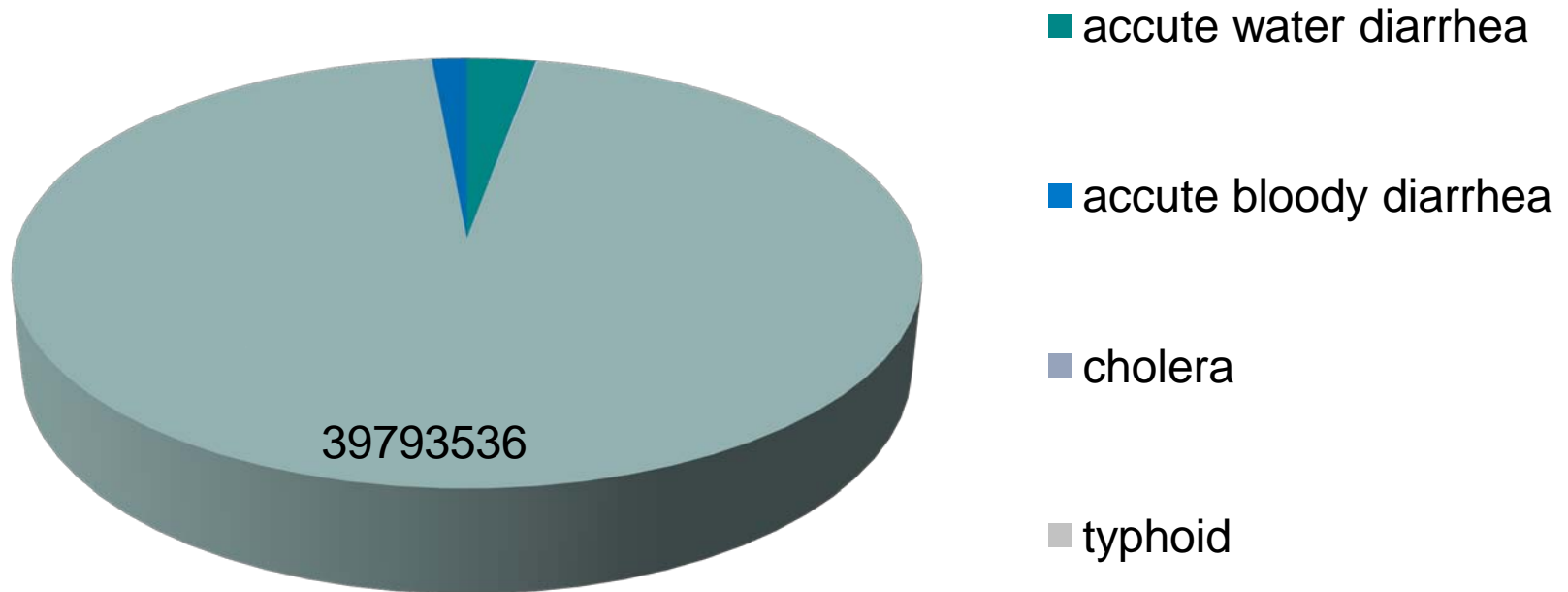
# Philippines

- Pollution
  - Groundwater pollution, main source for showering, washing and cooking
  - Half of the pollution coming to the Philippine waters comes from untreated domestic waste-water
- Health
  - 67% of school children suffer from intestinal worm infection
  - Acute water diarrhea main cause of morbidity and mortality related to poor sanitation ~13.000 deaths

De Lange, 2010

# Philippines

## Cases



De Lange, 2010

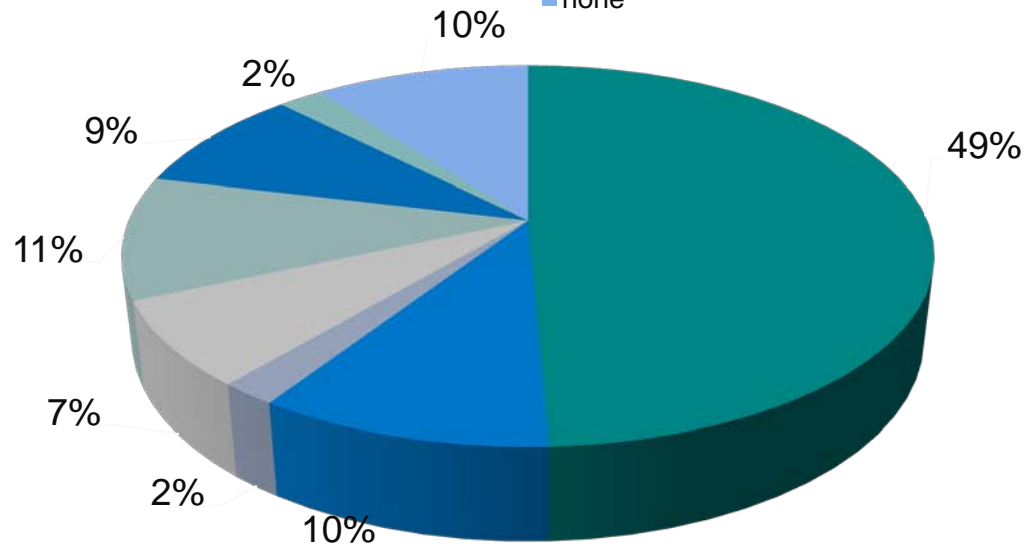
# Philippines

- 92 million people nowadays
- Duplication of the population in only 35 years!!
  - Water scarcity
  - Food scarcity
  - Pollution, most of it related to lack of sanitation

# Philippines

## Kind of toilet facilities

- Water-sealed sewer+ septic tank-individual
- Water-sealed sewer+ septic tank-shared
- water sealed other depository-individual
- water sealed other depository-shared
- closed pit
- open pit
- others
- none



De Lange, 2010

# Philippines

- Pour flush most common user interface
- Septic tank most common disposal
- Open bottom
  - Saves emptying
  - Risk of groundwater pollution

# Philippines

- Stakeholders active in Sustainable Sanitation
  - a) CAPS: Center for Advanced Philippines Studies
  - b) DED: Deutsche Entwicklungs Dienst
  - c) GTZ
  - d) SCOTIA: Sustainable Coastal Tourism in Asia
  - e) Streams of knowledge
  - f) USAID

# Philippines



- In 1993 partnership CAPS (Center for Advanced Philippines Studies) and San Fernando City, La Union
- Coast and rural upland community
- 500 ecosan toilets in San Fernando city and 500 more elsewhere
- Urine-diverting and dehydration of faeces

# Philippines

## Progress

- PEN: Philippine Ecological Sanitation Network
- Small provision inserted in the Clean Water Act allowing ecological sanitation as accepted sanitation option
- Research and publications in safe reuse of urine and compost -CAPS

# Philippines

## Obstacles

- Cultural: “flush and forget”
- Ecological sanitation not mentioned in the PL sanitation code
- Clean Water Act of 2004 oriented towards sewerage
- Dispersed efforts and unclear responsibilities at local level: environmental, health, infrastructure solid waste management departments
- Heavy subsidies not sustainable

# Philippines

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Which direction to go for the Science  
City of Munoz ?