



# ecological sanitation – new developments in recycling oriented sanitation systems

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recycling oriented  
wastewater management  
and sanitation systems

commissioned by



**Federal Ministry  
for Economic Cooperation  
and Development**





Sawdust, rice husk or even better ash is used and put into the excreta hole after defecation to dry the faecal matter.

© text & photo: ecosan service foundation, pune



Apart from drying the faecal matter, smells and flies are stopped and a composting like process is started or prepared.

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## Introduction into ecosan – the example of the Navsarjan Raika Primary School, Gujarat, India

An improved ecosan three hole Indian squatting platform made out of ceramic can now be purchased at Shital Ceramics, Ahmedabad (Gujarat).

Anal washing water

Faeces

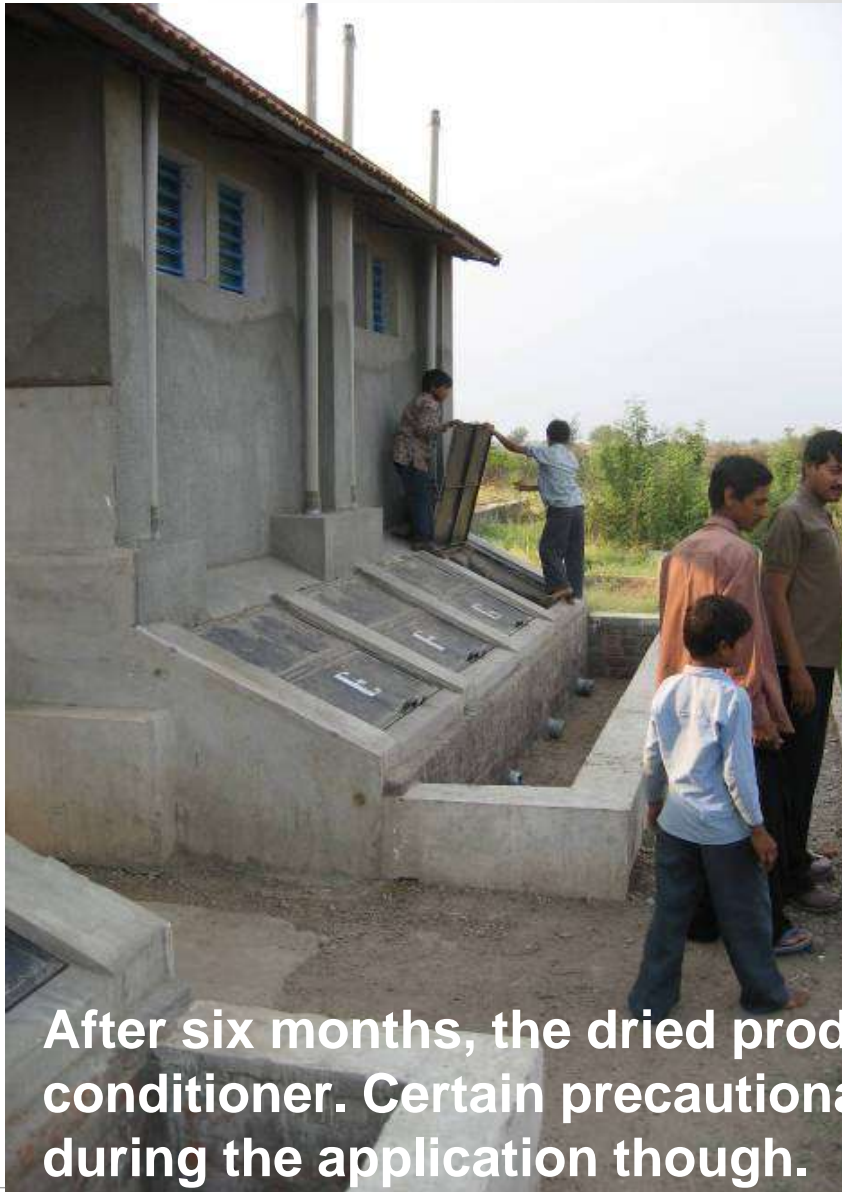


Urine



Like that, the faecal matter has time to dry completely. During this process, most pathogens die. The faecal matter should rest for at least 6 months.

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**After six months, the dried product can be used as a soil conditioner. Certain precautionary measures have to be taken during the application though.**



The urine from the toilets (urine hole) and from the men's urinals is collected and stored for hygienisation.

© text & photo: ecosan service foundation, pune





There are no water taps to reduce water consumption as the school does not have piped water. All water has to be brought by tanker, which is very costly.



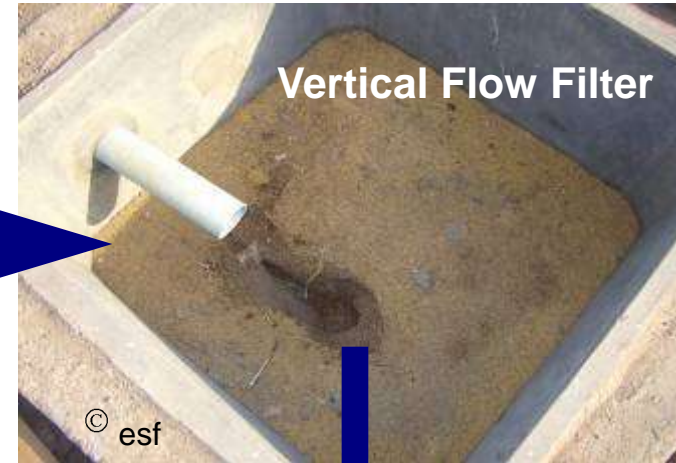
# Introduction into ecosan – the example of the Navsarjan Raika Primary School, Gujarat, India



Greywater from the bathrooms, washbasins and laundry place are collected, filtered through a vertical flow filter and collected in a tank.



© esf



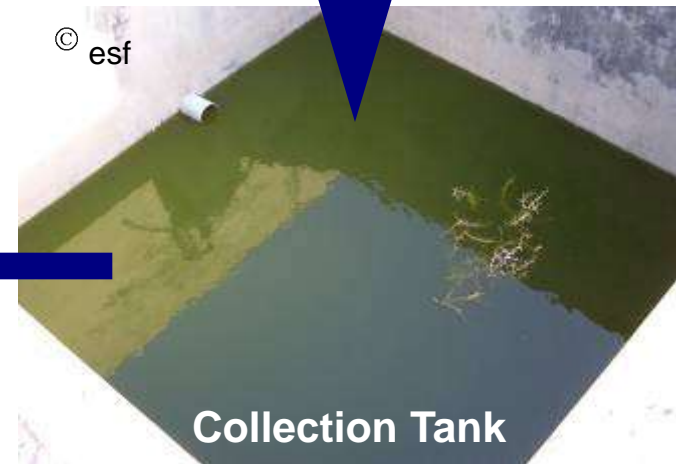
Vertical Flow Filter

© esf



School Garden

© esf

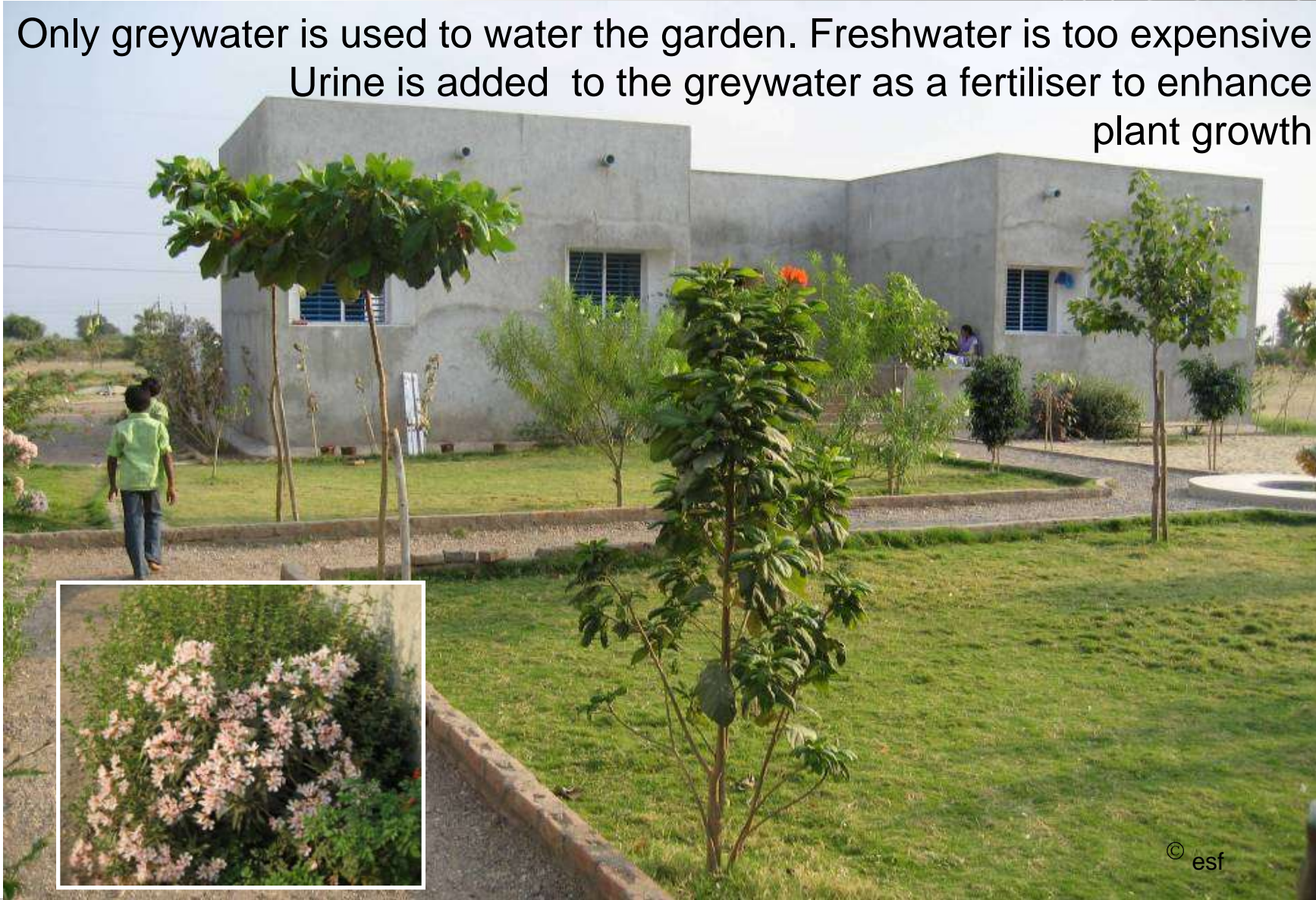


Collection Tank

© esf



Only greywater is used to water the garden. Freshwater is too expensive  
Urine is added to the greywater as a fertiliser to enhance  
plant growth





© esf

Through proper training, the students have become ecosan experts and constructed a model of their toilet.



## ecological sanitation...

- is **not a specific technology**, but a new philosophy of dealing with what is presently regarded as waste and wastewater for disposal
- considers **human excreta and wastewater not as wastes** but as natural resources
- applies the basic **natural principal of closing the loop** by using modern and safe sanitation and reuse technologies
- opens up **a wider range of sanitation options** than those currently considered

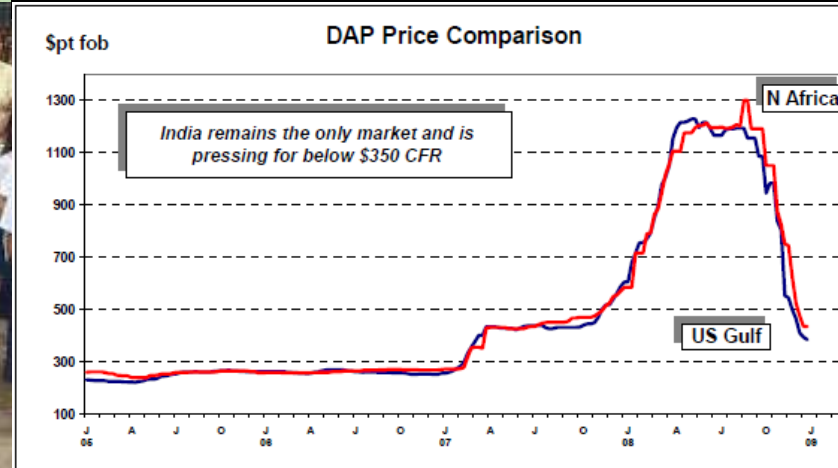
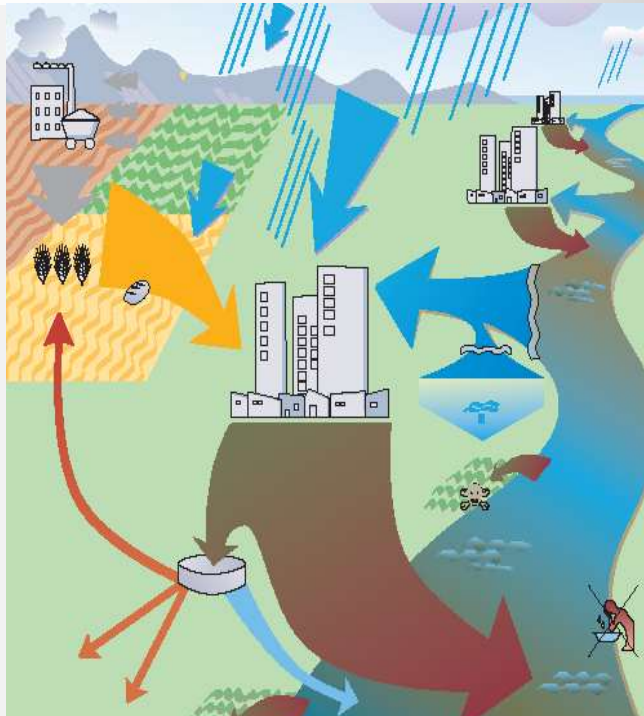


1. Global frame conditions & priorities
2. The task
3. Re-evaluation
4. Sustainability
5. Future scenarios
6. Communication Strategy  
„no toilet – no bride!“



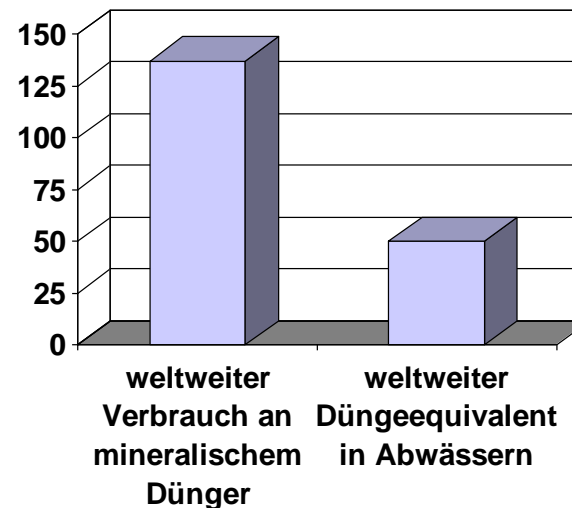


1. Set priorities
2. The Task
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5. The Future





- Human right to food, water, sanitation [What does it mean on the ground?!]
- Resource protection & efficient use [Peak Phosphor – world food crisis]
- Eco-cities [Organic waste and -water management in the eco-city of tomorrow]



1. Set priorities

2. The Task

3. Re-evaluation

4. Sustainability

5. The Future

6. „no toilet, no bride!“

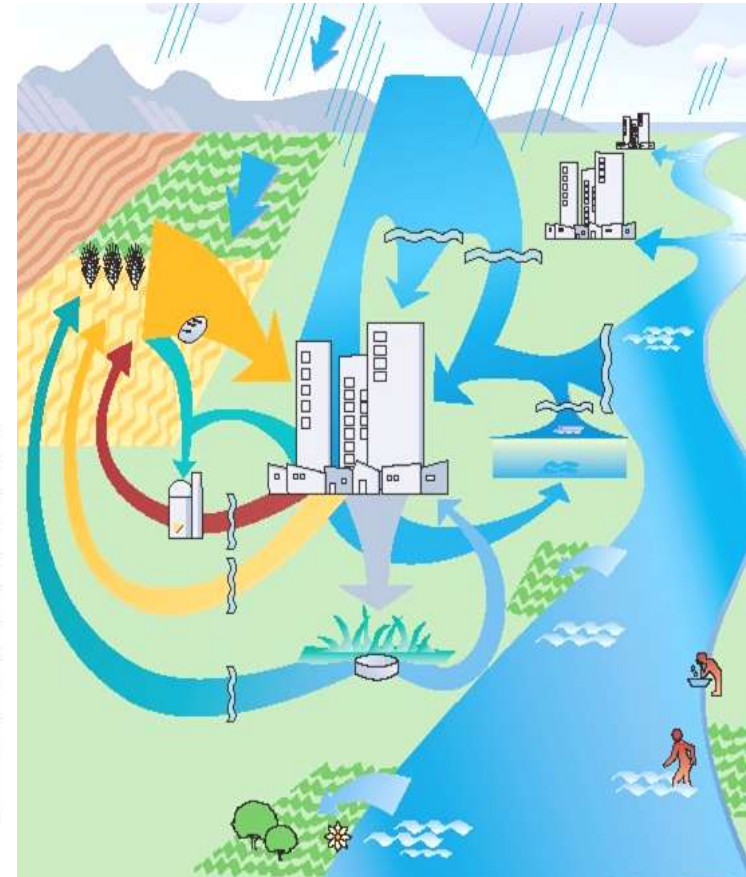
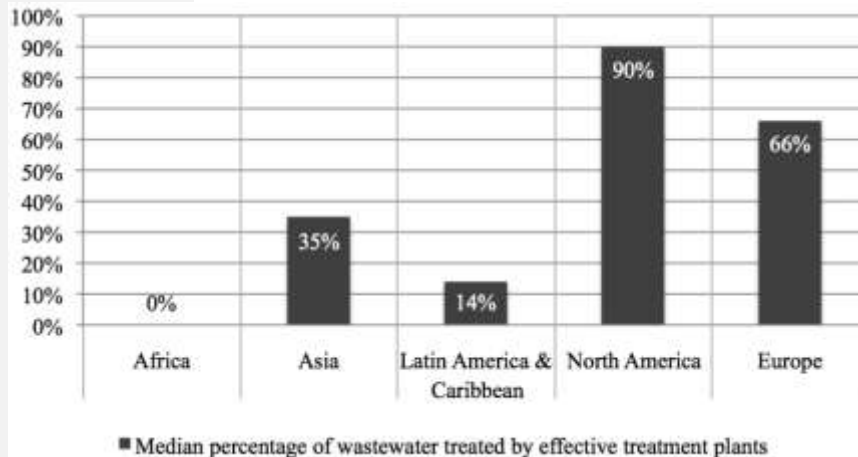


# The Task



1. Set priorities
2. The Task
3. Re-evaluation
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6. „no toilet, no bride!“

- **Systems change** from large centralised inefficient systems, towards a mix of (often small) highly efficient reuse oriented Systems
- **Rational:**
  - Bellagio Principles
  - HCES





1. Set priorities
2. The Task
3. **Re-evaluation**
4. Sustainability
5. The Future
6. „no toilet, no bride!“

- **Productive Sanitation systems**  
(Fertiliser, Soil conditioner, Biogas, Irrigation)
- **Value added chains** to be developed along sanitation systems – from cradle to cradle
- **Water stewardship**  
(Water footprint / virtual water / ... )





- Productive sanitation systems as elements of the **2000-Watt Society** <http://www.2000watt-gesellschaft.org>  
(Resource efficient use – climate protection)
- Organic solid-waste and wastewater related mater fluxes as part of a holistic sustainable closed loop system  
(Resource protection)



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6. „no toilet, no bride!“

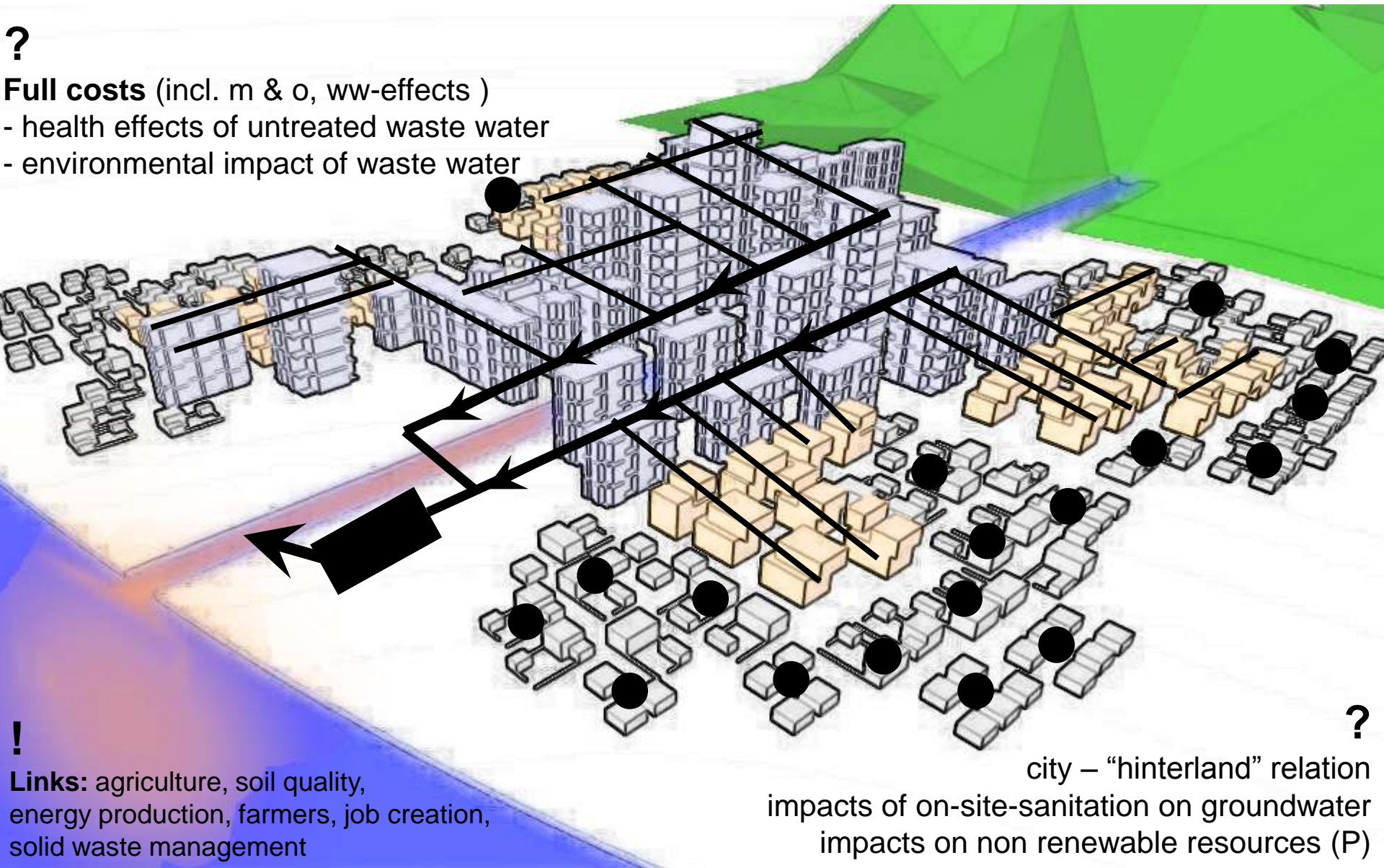


- **Multiple use of urban space:** recreation / green lung of the city / food production / treatment-reuse of wastewater and organic waste / production of biogas-energy
- Develop the city of the future with trans sectoral closed loop systems (Membrane technology, grey water recycling, urine diversion, urban agriculture, „vertical gardens“)



?

**Full costs** (incl. m & o, ww-effects )  
- health effects of untreated waste water  
- environmental impact of waste water



!

**Links:** agriculture, soil quality, energy production, farmers, job creation, solid waste management

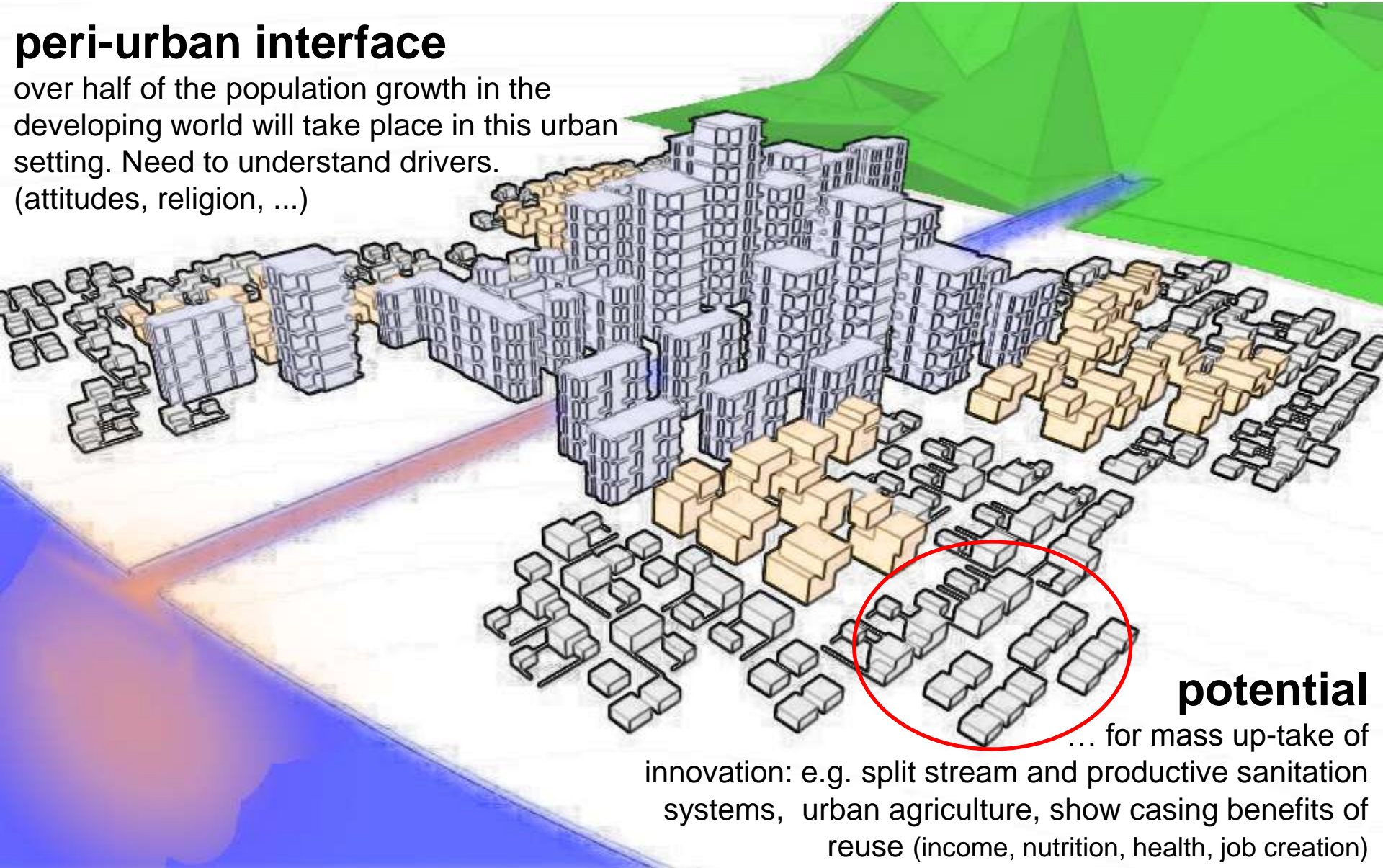
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city – “hinterland” relation  
impacts of on-site-sanitation on groundwater  
impacts on non renewable resources (P)



## peri-urban interface

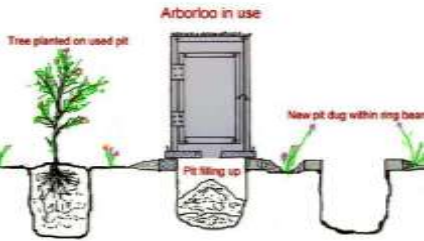
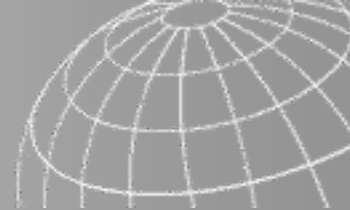
over half of the population growth in the developing world will take place in this urban setting. Need to understand drivers. (attitudes, religion, ...)



**potential**

... for mass up-take of innovation: e.g. split stream and productive sanitation systems, urban agriculture, show casing benefits of reuse (income, nutrition, health, job creation)

# From disposal-oriented to reuse-oriented urban sanitation



**Allotment gardens cum ecosan system for schools and poor families in Cagayan de Oro, Philippines**



## Peri-urban interface

**Construction and inauguration of an UDD-Toilet**

Source: Robert Holmer, Robert Gensch, Xavier University, Ph.





## Planned urban dev. areas:

Interest of investors and local regulations may play a significant role in sanitation systems choice  
may not meet environmental concerns  
and user priorities.

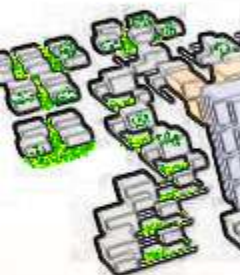
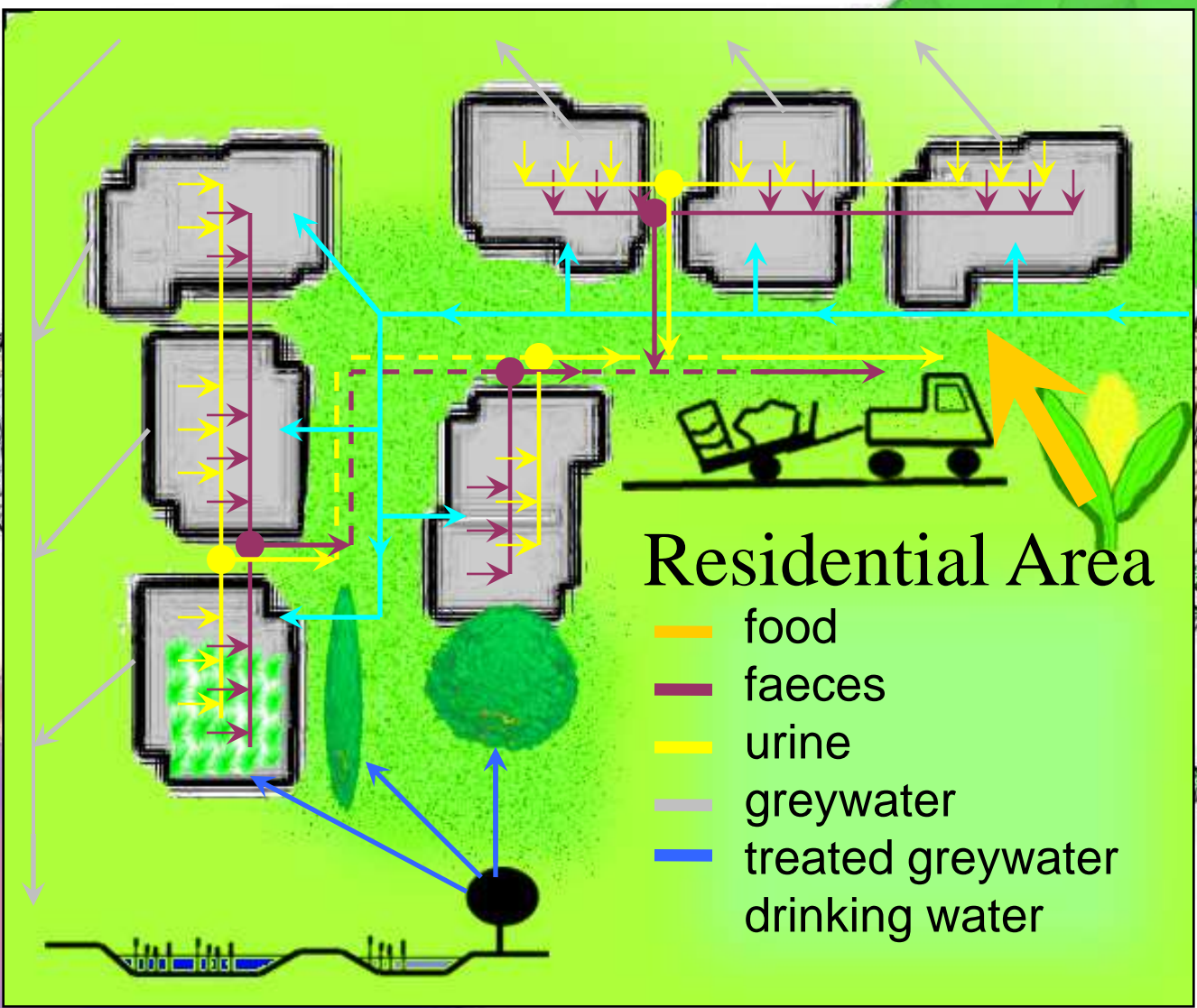


## Potential

... to build innovation  
e.g. develop solid waste management service-providers and their capacity (transport of ecosan products, management of ecosan systems, production of ecosan equipment)



# From disposal-oriented to reuse-oriented urban sanitation



# From disposal-oriented to reuse-oriented urban sanitation



*Assainir  
et  
produire plus !*



PROJET  
D'ASSAINISSEMENT  
ECOLOGIQUE DE LA VILLE DE OUAGADOUGOU

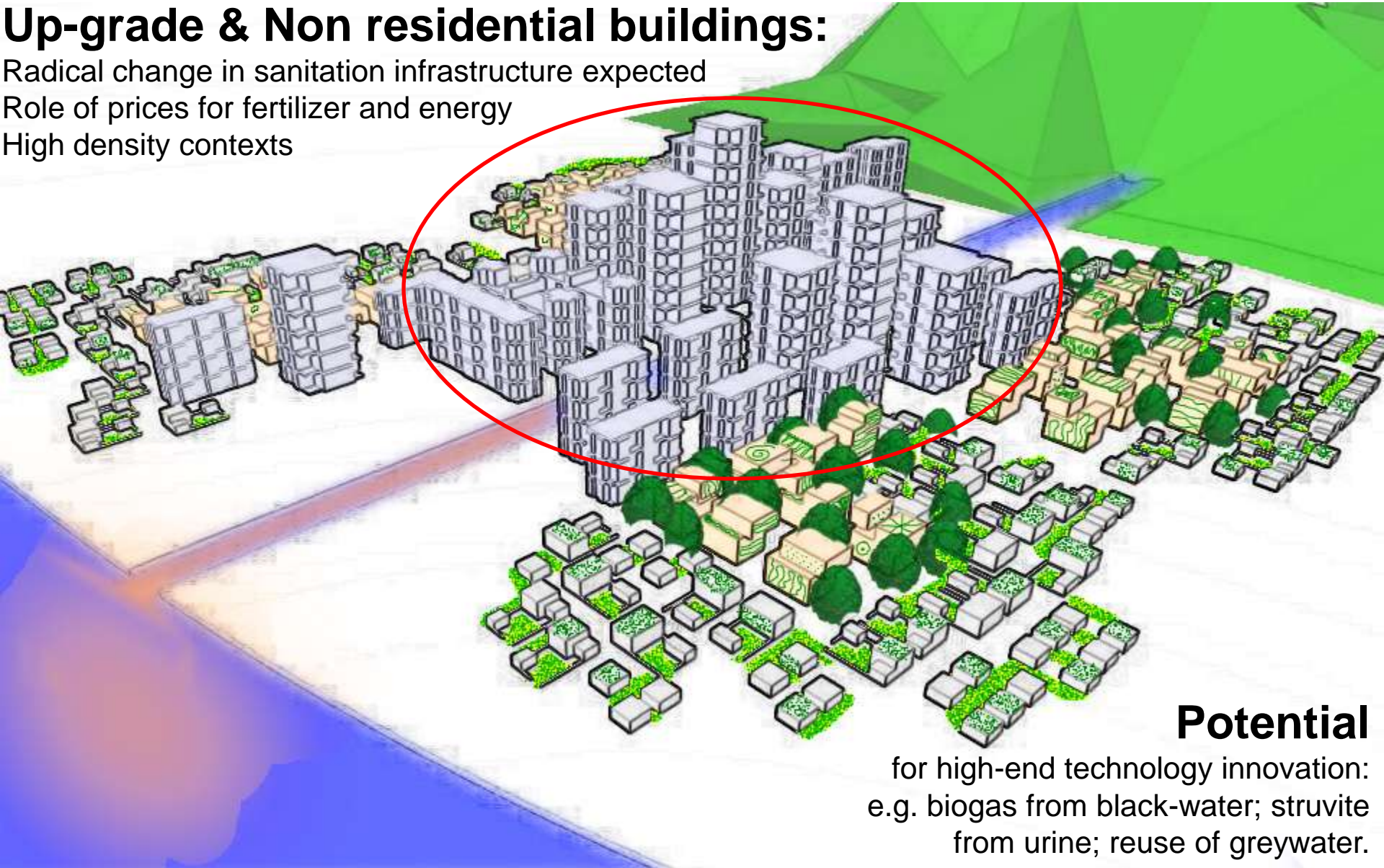


## Up-grade & Non residential buildings:

Radical change in sanitation infrastructure expected

Role of prices for fertilizer and energy

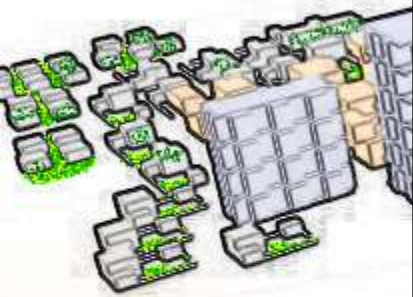
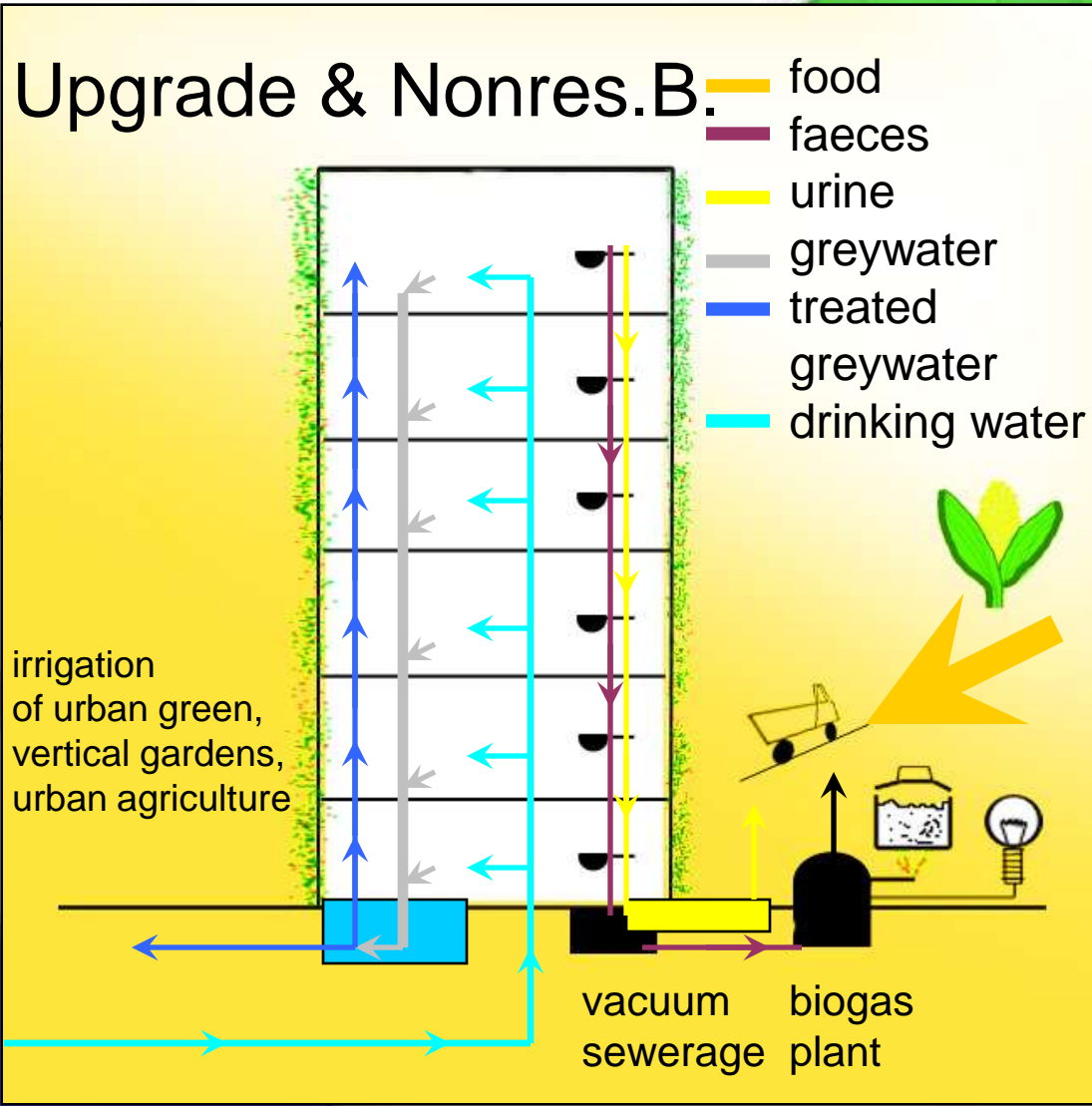
High density contexts



## Potential

for high-end technology innovation:  
e.g. biogas from black-water; struvite  
from urine; reuse of greywater.

# From disposal-oriented to reuse-oriented urban sanitation



# From disposal-oriented to reuse-oriented urban sanitation



Eawag (near Zürich, CH)

Kibera, (Nairobi, Kenia)

GTZ-HQ (near Ffm, Germany)



Bank (Ffm, Germany)

ecotact, downtown (Nairobi, Kenia)

eco-building, (Freiburg, D)

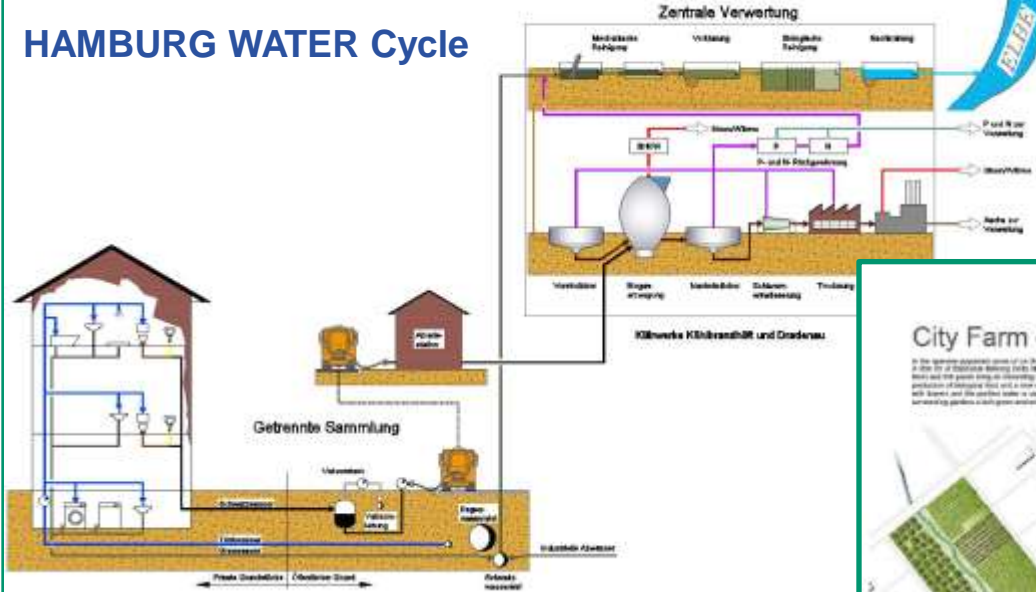


# From disposal-oriented to reuse-oriented urban sanitation



Zukunftsorientierte Abwasserentsorgung in Hamburg

## HAMBURG WATER Cycle



- Possible solution for Hamburg:**
- Separate, decentralized collection
  - Centralized treatment / recovery
- © Hamburg Wasser

## Vision for Le Binh, Vietnam



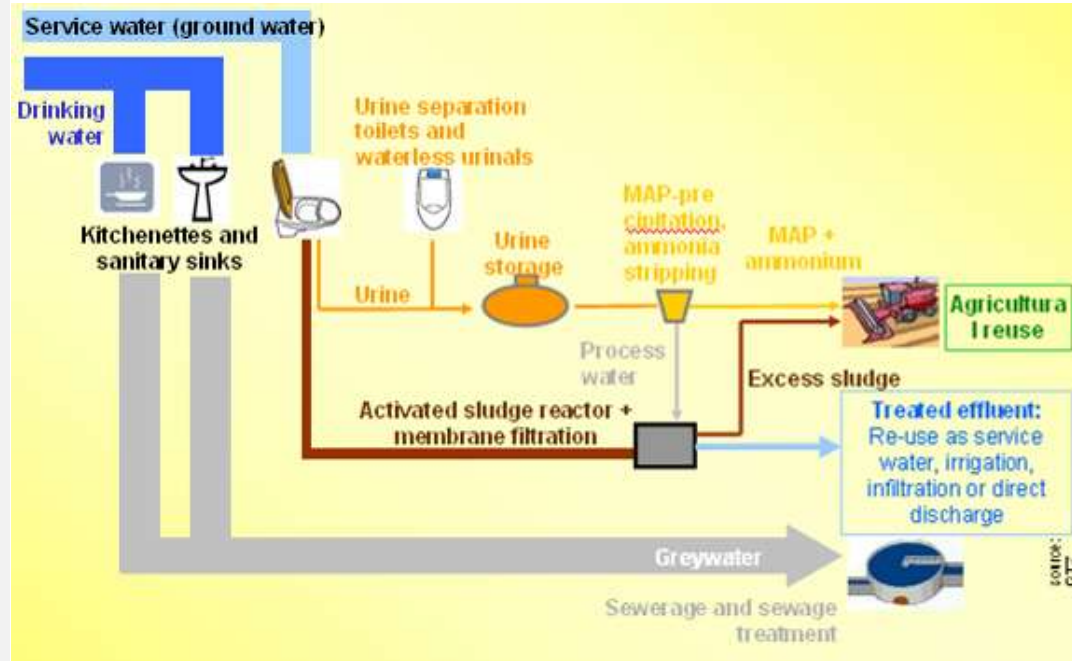
# From disposal-oriented to reuse-oriented urban sanitation





1. Set priorities
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6. **Communication strategy - „no toilet, no bride!“**

- **Demo- & research projects in North and South ( → medium sized ... scalable)**
- Slogans „no toilet - no bride!“
- Sanitation World Cup
- WASH campagne (comp. AIDS-Campaigns)
- Schools as entry points







**Thank you for your attention!**

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