

# Sanitation Concepts for Separate Treatment of **Urine**, **Faeces** and **Greywater**, Demonstration Project in Berlin, Germany

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**Kooperation mit OtterWasser GmbH, TUHH, TUB und HUB**

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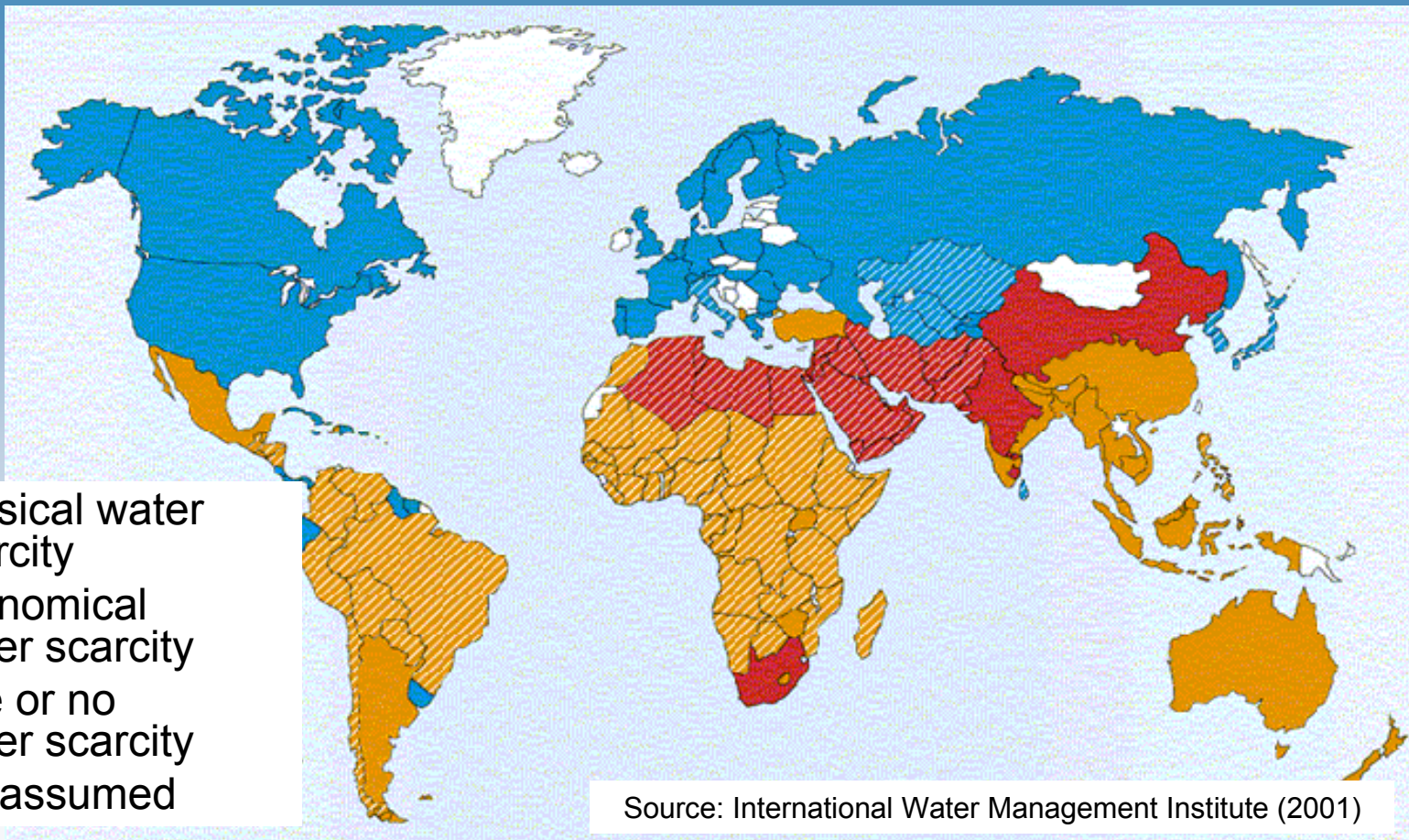
# Objectives

The *new sanitation concepts* should be relevant solutions for:

- remote areas, where the connection to a central system wouldn't be technically or economically interesting
- rapidly growing conurbation's in developing countries
- countries with scarce water resources
- a sustainable development with the recycling of nutrients and water

# Motivation

## World-wide water scarcity



physical water scarcity



economical water scarcity



little or no water scarcity



not assumed

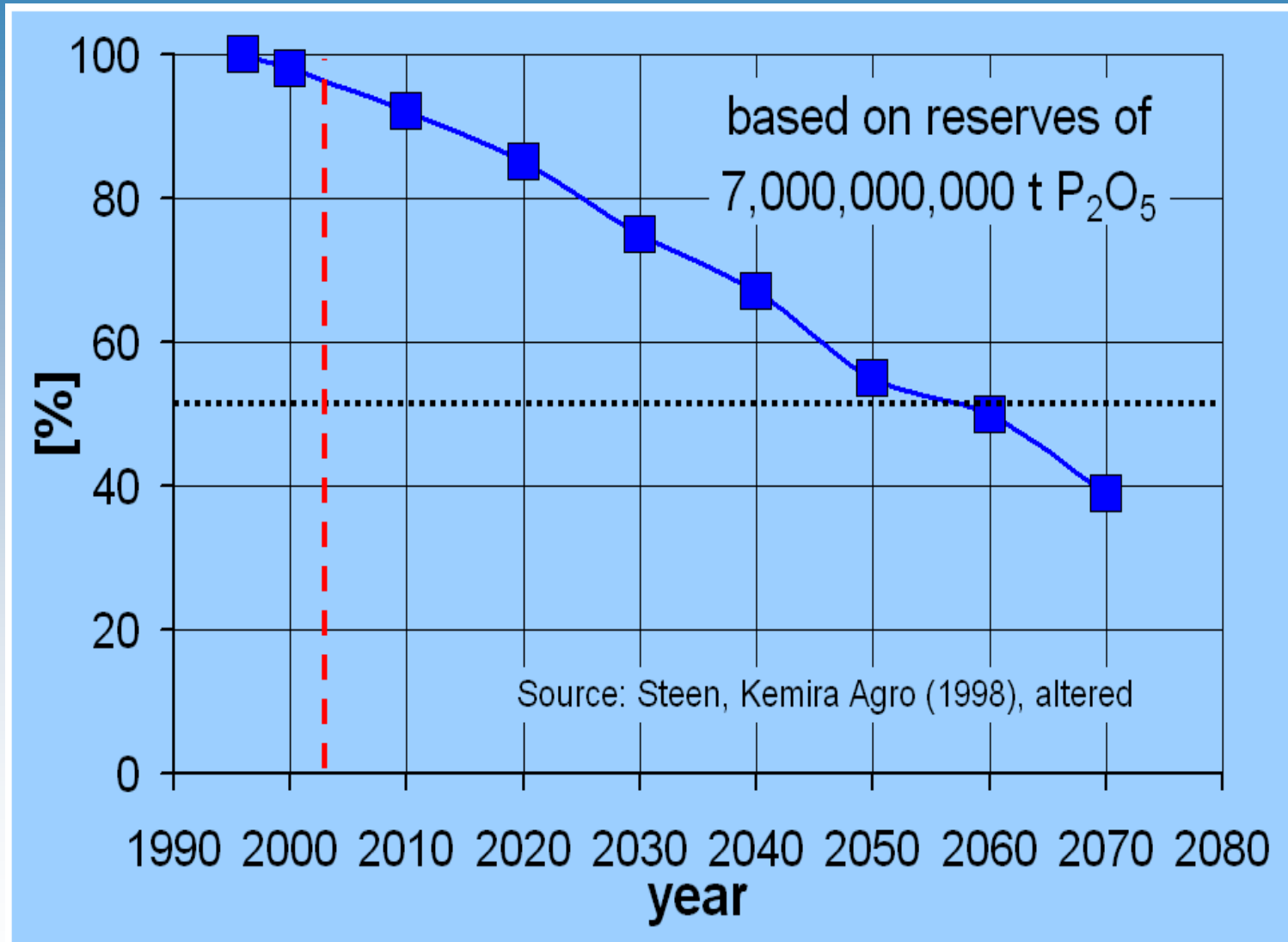


in 2025 more than 10 % of corn will be imported

Source: International Water Management Institute (2001)

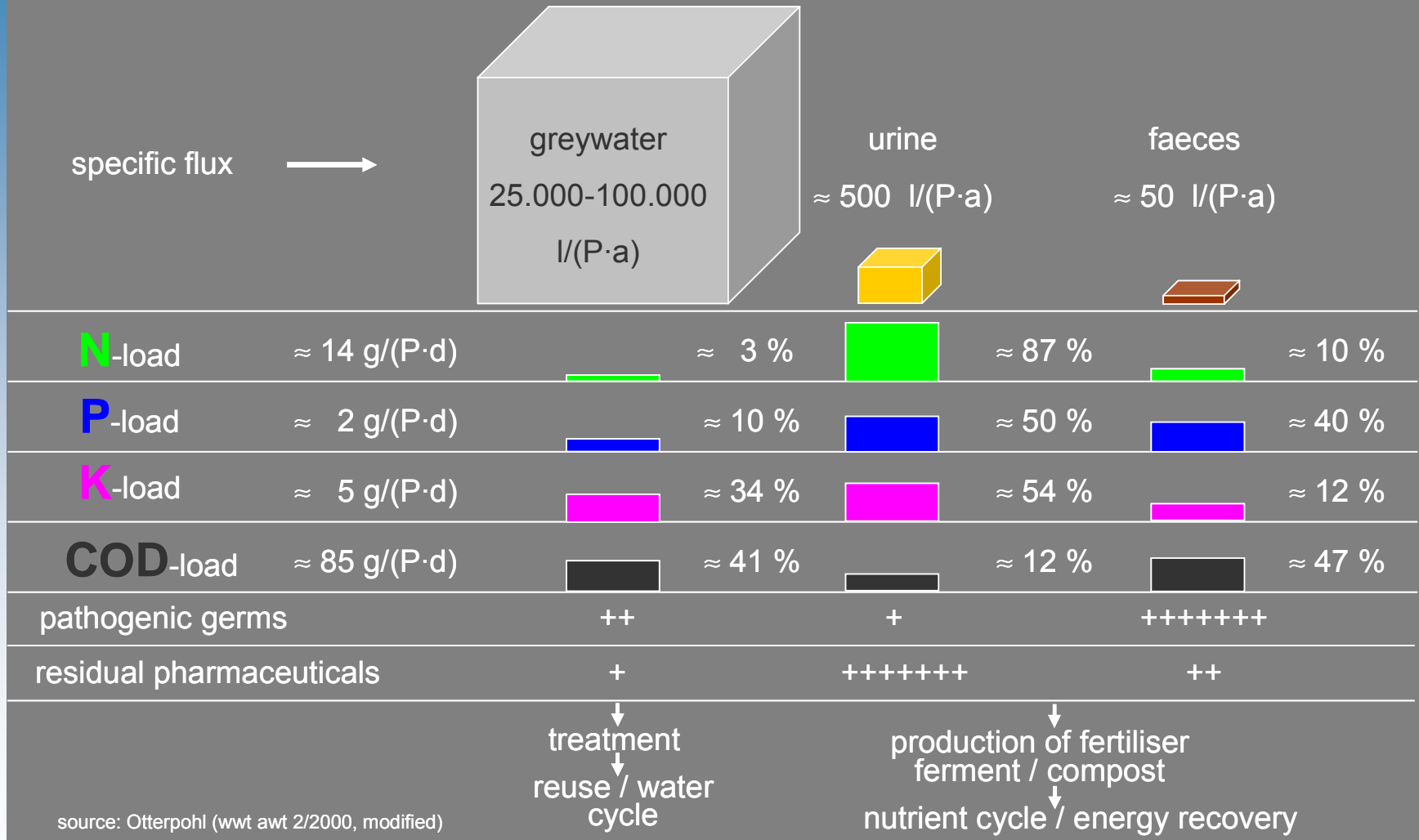
# Motivation

## Degrease of Phosphor Reserves

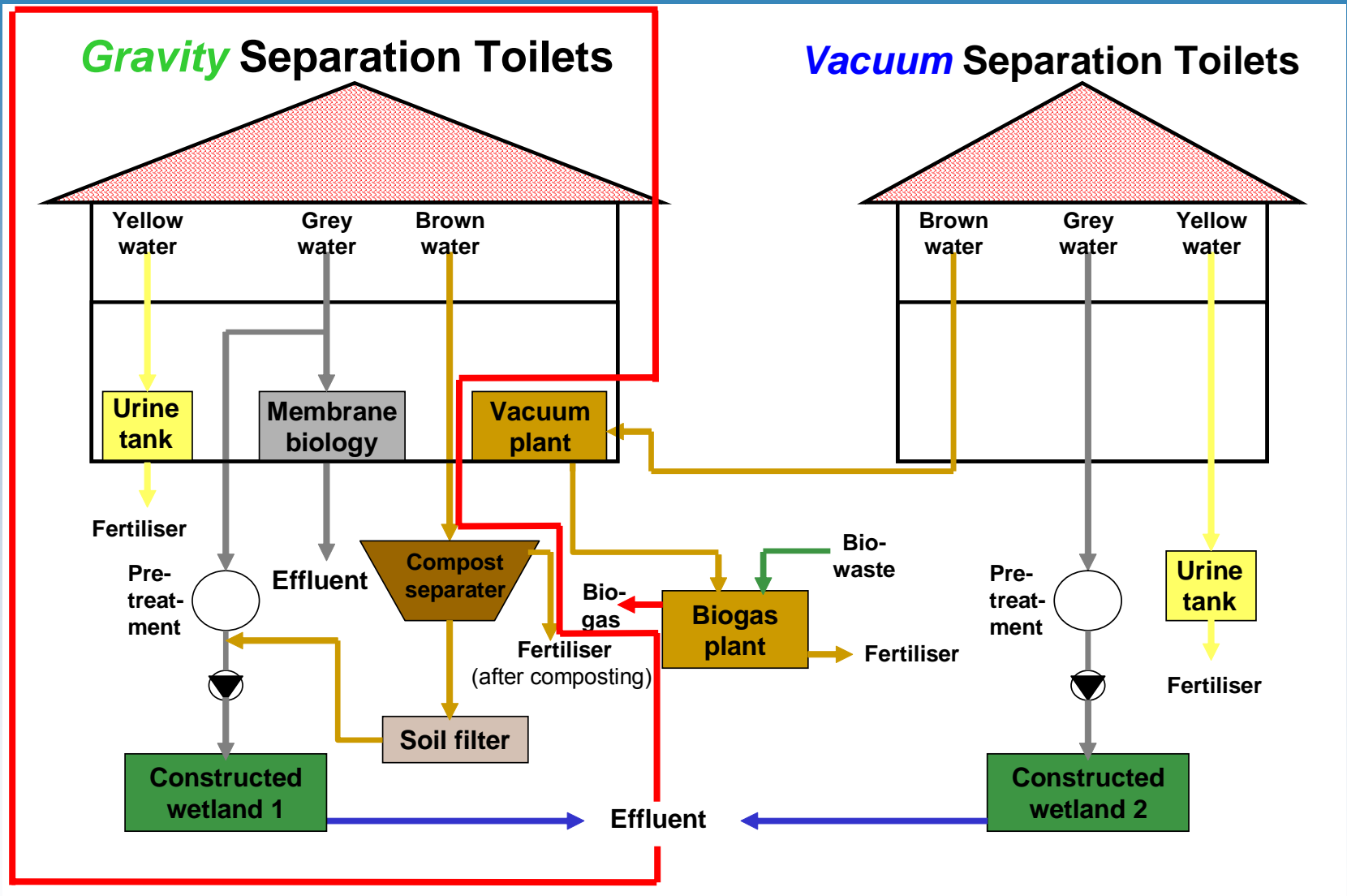


# Motivation

## Quality of different wastewater streams



# Demonstration-project



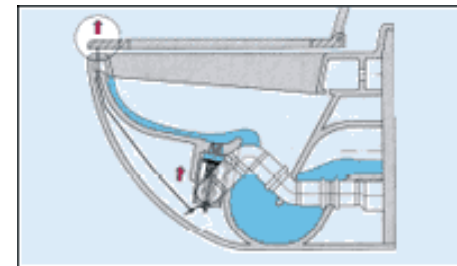
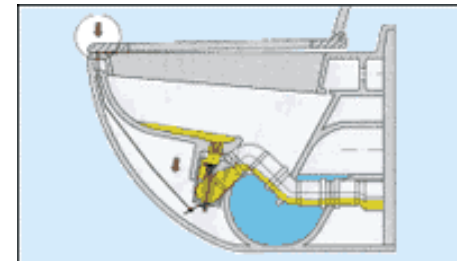
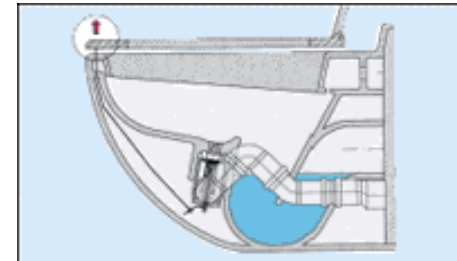


# Demonstration-project

## Roediger *Gravity Separation Toilet*



waterless  
yellow-water (urine)  
collection



# Demonstration- project



*vacuum*  
for faeces

*gravity*  
for urine

Roediger  
*Vacuum Separation Toilet*  
at WWTP Stahnsdorf

# Demonstration-project



**Office building WWTP Stahnsdorf**

# Demonstration-project



**Apartment house WWTP Stahnsdorf**

# External assistance

## Life-Cycle-Assessment

*Technical University Berlin*

## Industrial style urine treatment for utilisation

*Technical University Hamburg-Harburg*

## Fertiliser usage

*Humboldt University Berlin*

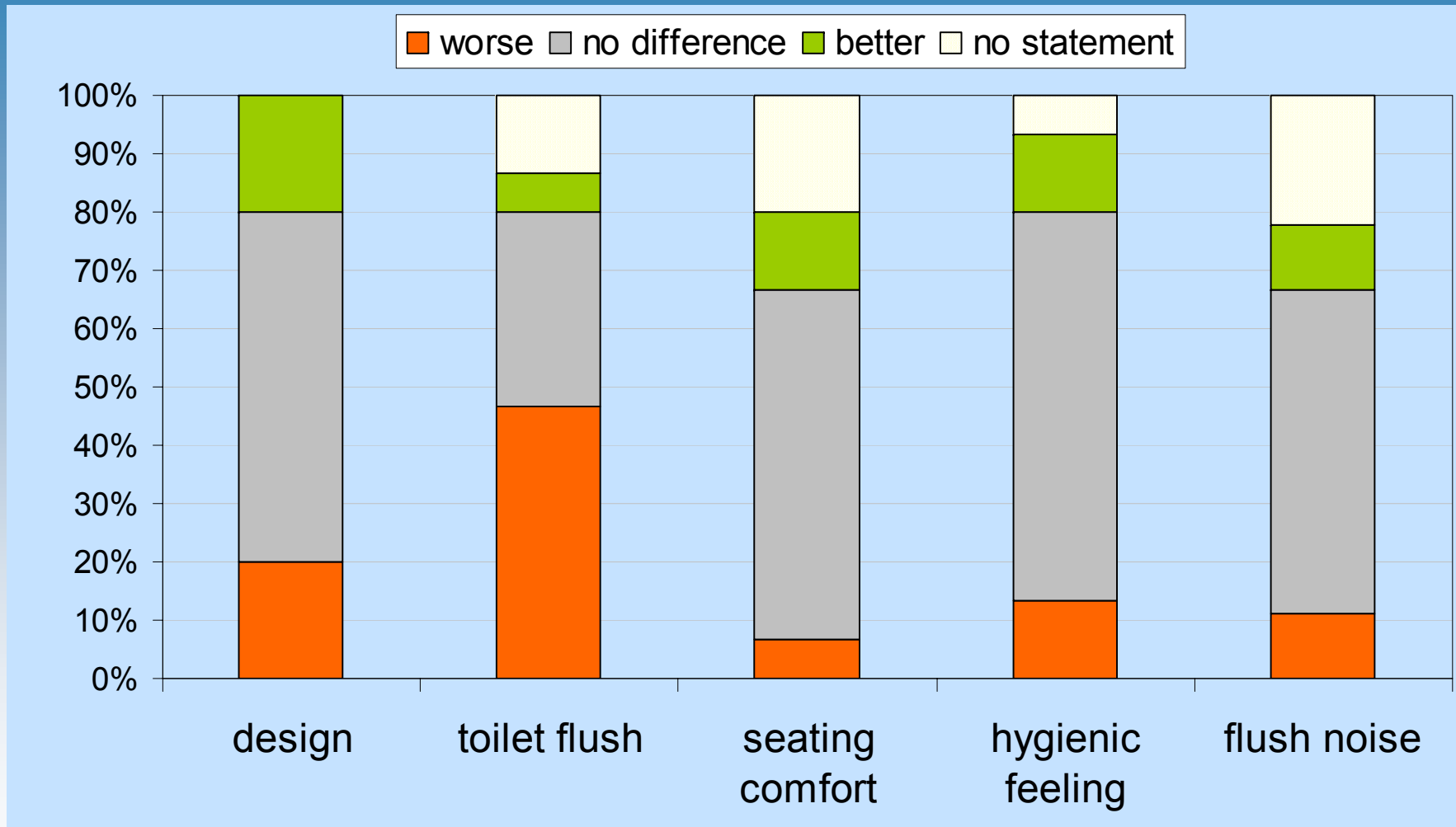
# First Results

## Infl.- and effluent Values Constructed Wetland (29.3. - 26.7.2004)

Parameter	Unit	Influent	Effluent
Flow (disigned)	l/d	4,580	
Flow (actual)	l/d	1,321	620
<b>SS</b>	mg/l	17.8	<b>3.4</b>
COD	mg/l	85	28
<b>NH<sub>4</sub>-N</b>	mg/l	7.1	<b>0.08</b>
NO <sub>2</sub> -N	mg/l	0.06	0.06
NO <sub>3</sub> -N	mg/l	0.30	7.2
<b>P-Total</b>	mg/l	2.9	<b>0.23</b>
Total coliforms	CPU/100 ml	10 <sup>6</sup>	< 10
Salmonella (100 ml)		detection of Salmonella Gr. B and Gr. C	negative
Clostridium perfringens	CPU/100 ml	≤ 180	negative

# First Result

## Gravity Separation Toilets vs. Conventional Toilets



# Conclusion

- Demand for ***New sanitation concepts*** is high world-wide
- Activities increasing world-wide
- Operation of ***gravity separation toilets*** started October 2003
- Operation of ***vacuum separation toilets*** started April 2005
- Increasing knowledge (designing, installation etc.)
- Operation experience with new sanitation concepts



