

# Institutional and Collective Sanitation: Bottlenecks and Ways Forward

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# Introduction

**A. School sanitation**

**B. Sanitation for housing blocks**





# A. SCHOOL SANITATION



**Distance**

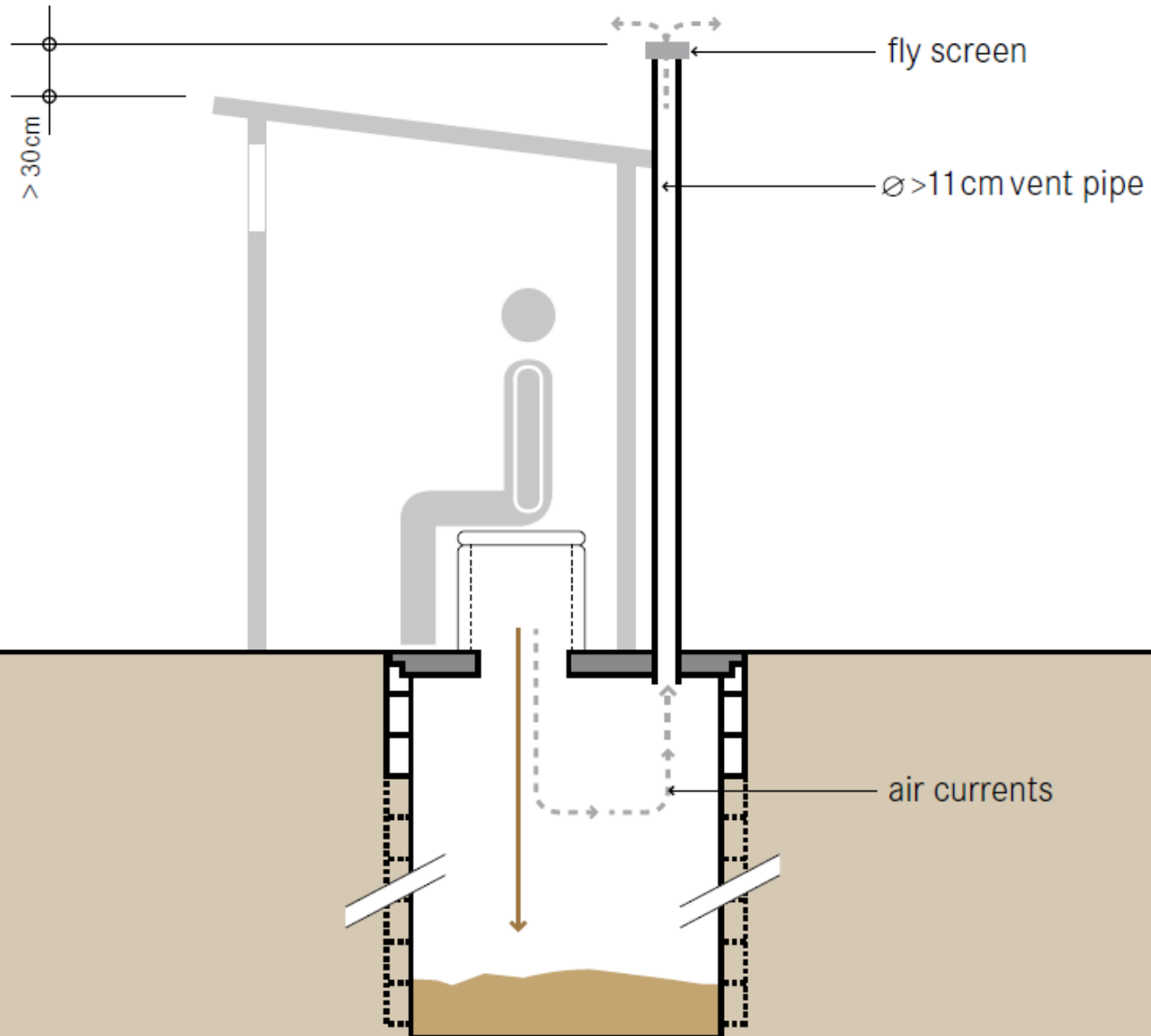
# Ventilation



*Pipe ?*

# Potential for improvement

## Ventilated Improved Pit (VIP latrine)



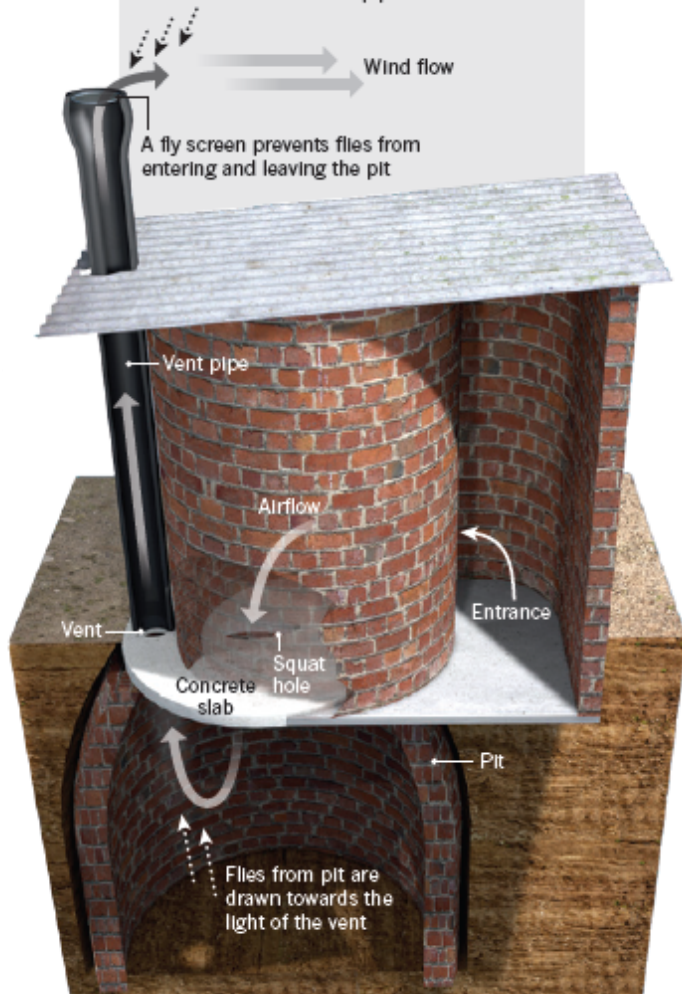
# Potential for improvement

## Ventilation of dry toilets

### AIR TRAFFIC CONTROL

The Blair toilet uses a vent to trap flies, preventing them from spreading disease. The vent also draws out odours from the pit, making the toilet interior almost odour free.

Flies outside are attracted to the odour from the vent pipe



*Blair latrine, Zimbabwe* [2]



**Smoke test**





**Ventilation**

**Number of toilets**

***Here 2 toilets for 434  
students + teachers !!!***

A large, rectangular block of light-colored, fibrous material, likely used for anal cleansing, resting on a dark, textured surface. The material has a rough, layered appearance. To the left of the block, there is a small, dark, circular hole in the surface. The background is a dark, textured surface, possibly soil or a similar material.

**Anal cleansing material**





**Shaky  
structure**

# Toilet surface



# Toilet surface





# Water for hand washing



***Tap broken***

# Water for hand washing







**Toilet paper**

**Bucket if no water**

**Tap**

**Tiles**



A photograph of a toilet stall interior. The stall is constructed from reddish-brown wood. In the center is a white toilet. To the left of the toilet is a small white cylindrical container holding a blue-handled toilet brush. Below the brush container is a black plastic bin filled with crumpled white toilet paper. The floor is dark, and the walls are light-colored. Two red circles highlight the brush container and the bin. Two white text boxes with black text are overlaid on the image: one at the top right pointing to the brush, and one at the bottom center pointing to the bin.

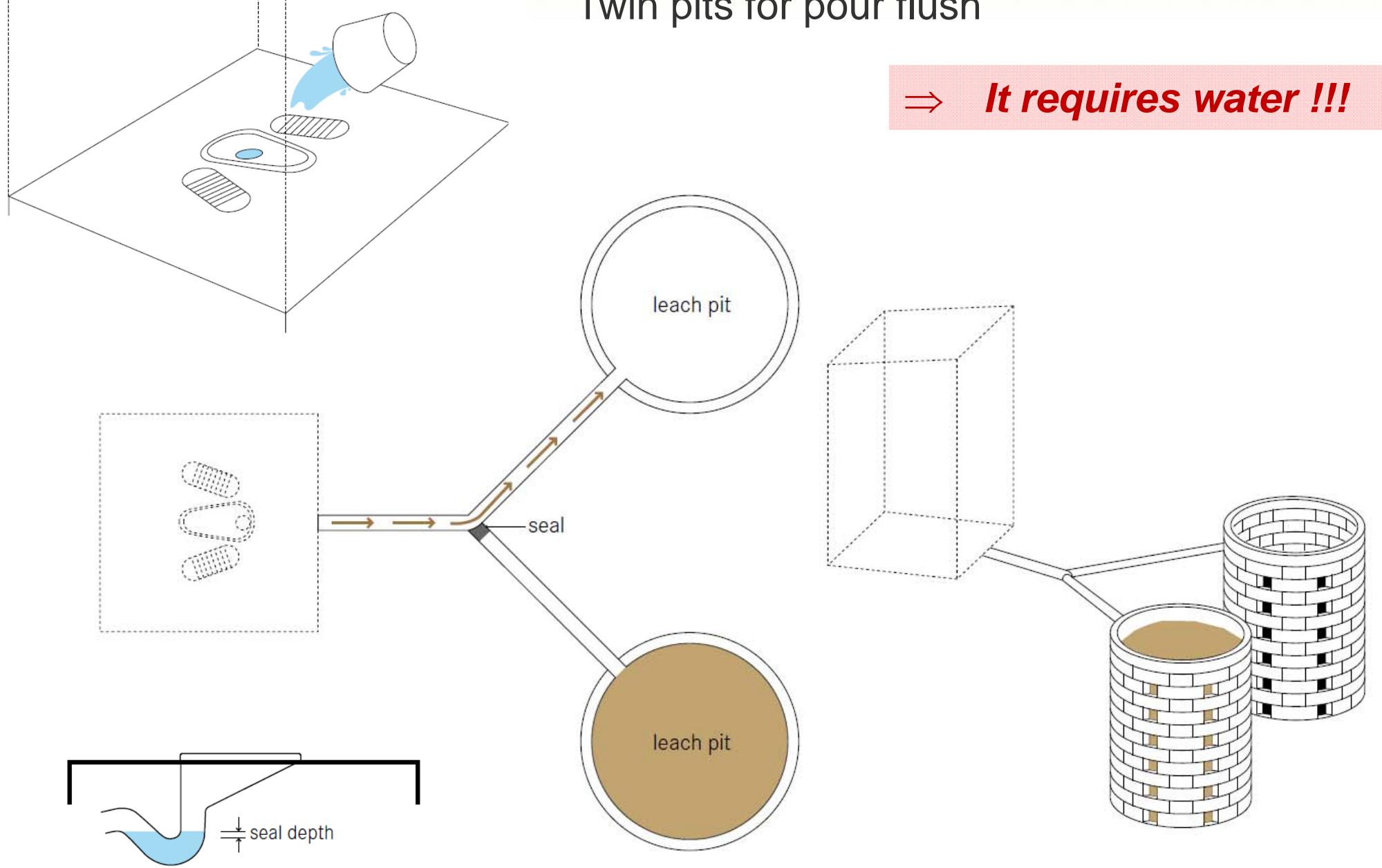
**Brush to clean the toilet after use**

**Bin for toilet paper**

# The UNICEF model

## Twin pits for pour flush

⇒ ***It requires water !!!***



**What does explain this miracle ?**

**Water stream**

**Motivation and awareness of  
Director and teachers**





Dig hole for manual emptying

Pit

*School toilet in the Fan mountains*

## Often discuss, but to be taken with care:

### The Urine-Diverting Dry Toilet (UDDT or *Ecosan*)

#### Advantages:

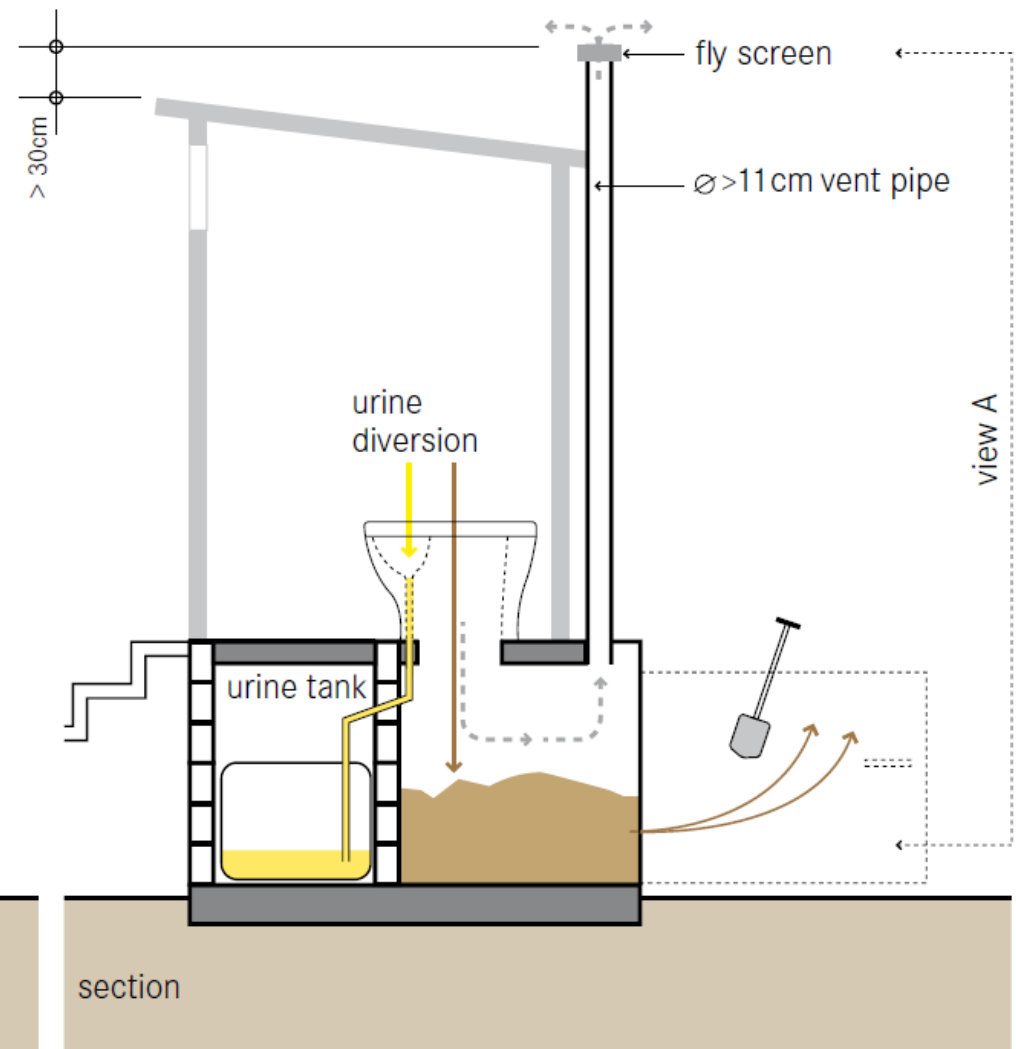
- Much less smell if properly used
- Earth-like compost to be removed.

#### But:

- Are people ready to use the sludge ?
- Ready to add material to increase composting (or availability)?
- Interested / willing to use the urine ?

**In many countries, works only on a large-scale with collection service**

view A



# School toilets

## Constraints

- Lack of water

⇒ *Pour-flush toilets are **not** an option in most cases*

- Lack of funds to remove the sludge
- Absence of vacuum trucks
- Absence of sewer system and treatment plants

## Opportunities

- Lot of space available

⇒ **Dry pit toilets seem to be the most appropriate option for most places, but can be improved !**



# Institutional sanitation

## Synthesis of recommendations

- 1. Water supply projects:** include connection to the right points in schools and health centres.
- 2. Hand washing point next to the toilet block + functioning taps**
- 3. Running water against freeze vs. water meters in winter ?**
- 4. Mechanism to ensure presence of toilet paper and soap**
- 5. Toilet improvement:** focus on **toilet floor** and **ventilation**, not on superstructure
- 6. Increase the number of toilets** and ensure toilets for teachers
- 7. Add waterless urinals**
- 8. Design for children with handicap**

# Where to act ?

## Regulations / enforcement:

- Codes of Practice ?
- Ministry of Education ?
- Ministry of Construction ?

## Management:

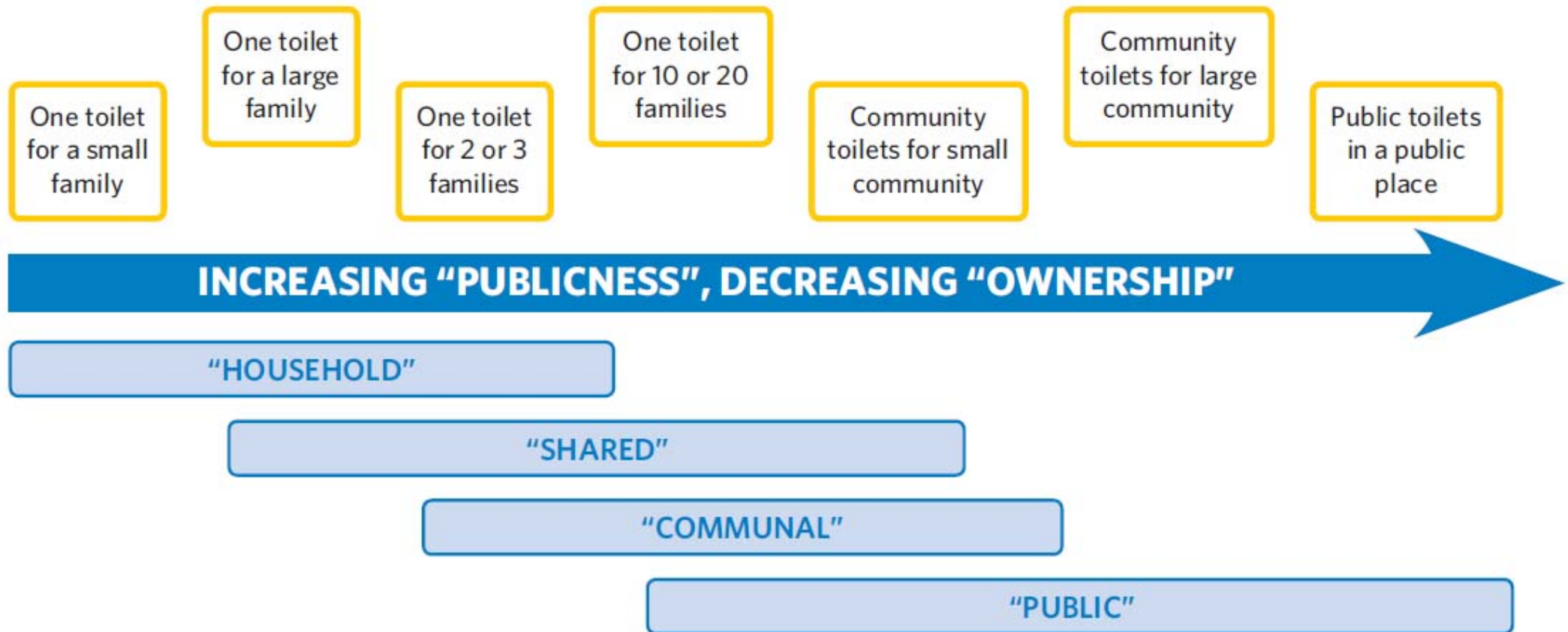
- School Directors and teachers
- Toilet paper and soap:
  - ⇒ *Request children to bring a roll/soap every month/year ?*
  - ⇒ *Ask parents to pay 1-2 TJS/month for this appliances (and sometimes water)?*

## B. SANITATION FOR HOUSING BLOCKS





## Toilets for housing blocks : different setups



**Research question:** What is the best configuration in each case ?

# Housing blocks

## Case study Farkhor



# Toilets for housing blocks

## Case study Farkhor





# Wastewater treatment system for housing blocks

## Case study Farkhor





# Decentralised sanitation for housing blocks

## Case study of Farkhor

### Current situation:

- Water taken from street taps

### Rationale of the project:

- Water supply to each apartment :
  - ⇒ *Wastewater consumption increase significantly*
  - ⇒ **Problem:** *there is no sewer system*
  - ⇒ *Need for infiltration*

⇒ **Will the infiltration capacity be enough ?**

⇒ **Cost for removing sludge ?**

⇒ **Cost per capita of this infrastructure ?**



# Decentralised sanitation for housing blocks

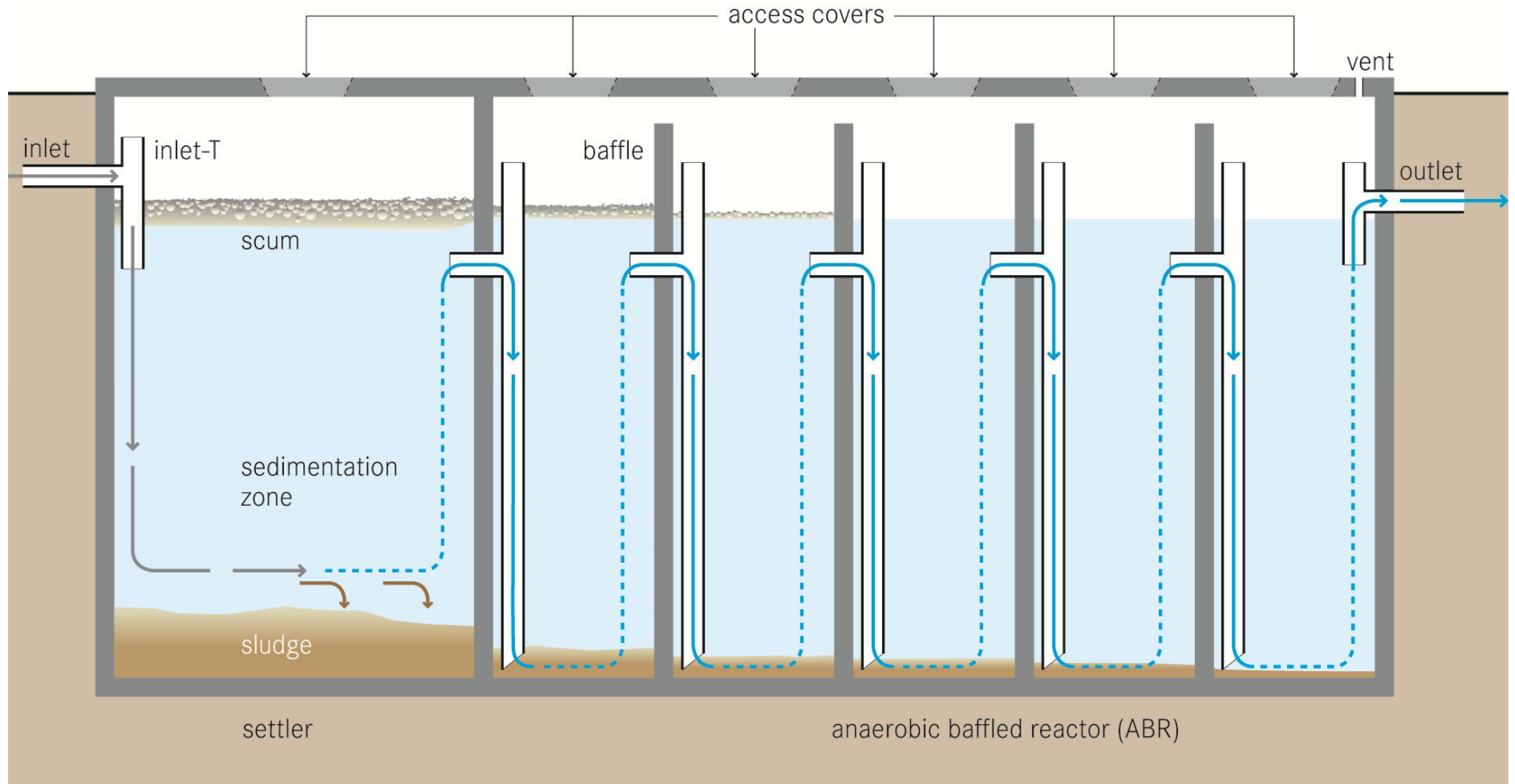
## The wastewater dilemma

- What to do with the wastewater if there is **no sewer network** ?
- What if the **groundwater table is very high** (e.g. Muminabad) ?
- If not treated properly, risk to **contaminate the rivers**.
- Keep on **separating excreta from greywater** until a sewer system is built?
- Is a **vacuum truck** available ?
- Who will **manage** such small treatment units ? KJKP ?
- Need to investigate **actual water consumption**

⇒ **Need for planning beyond the housing block**

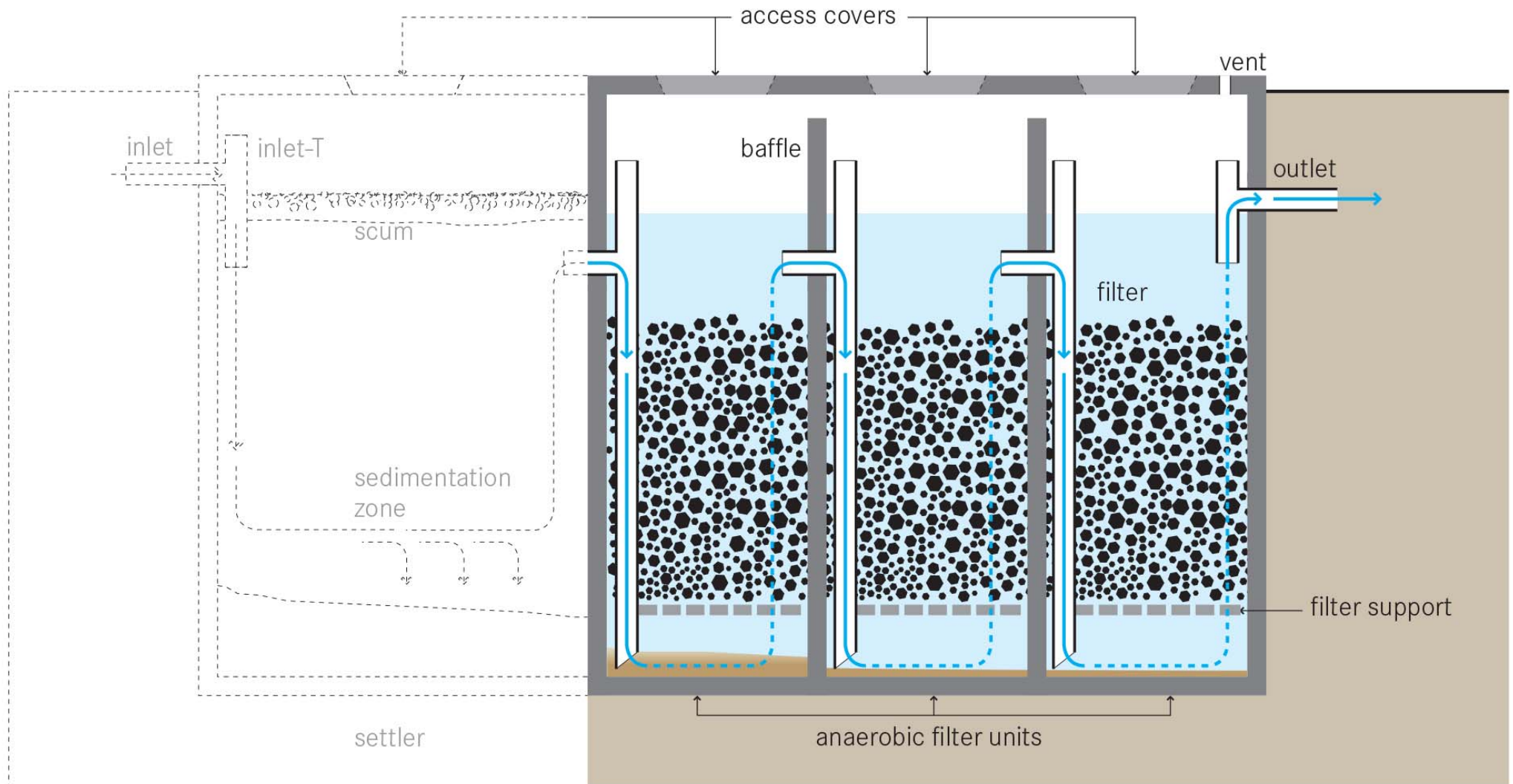
# Potential improvements

## Anaerobic Baffled Reactor (ABR)



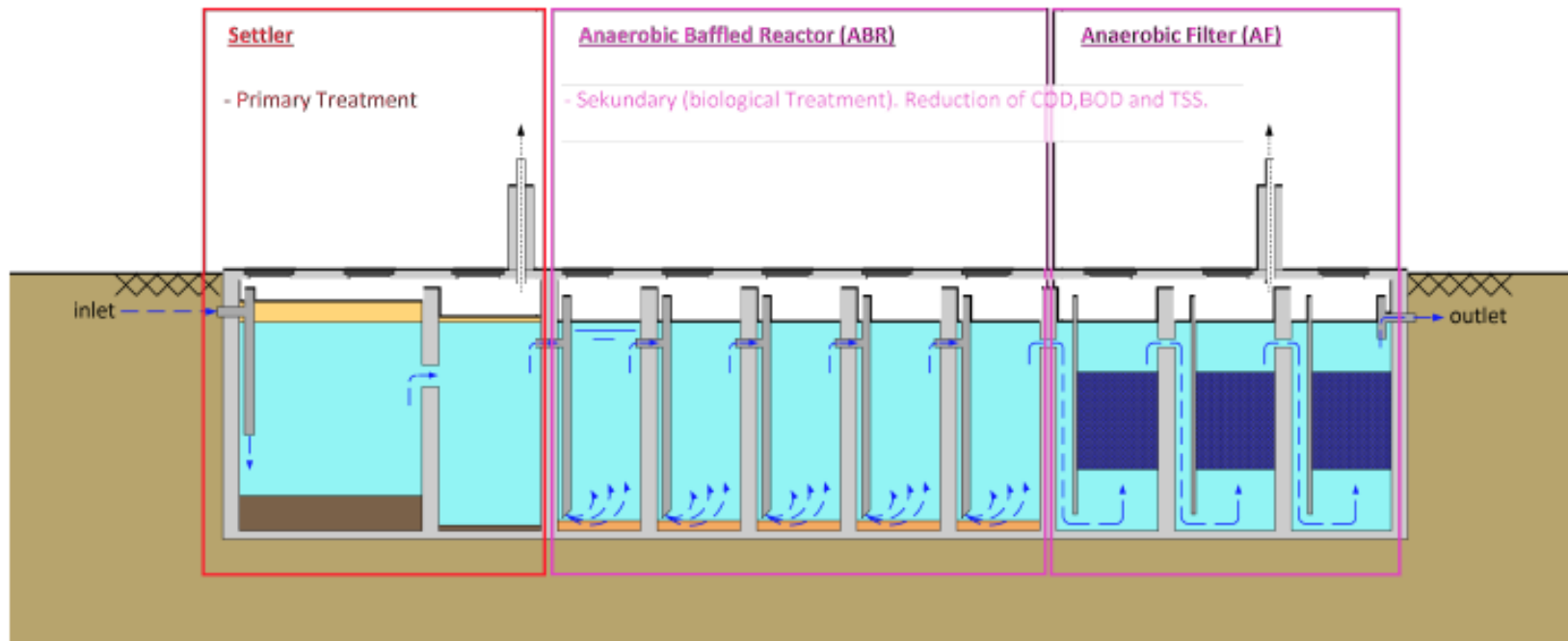
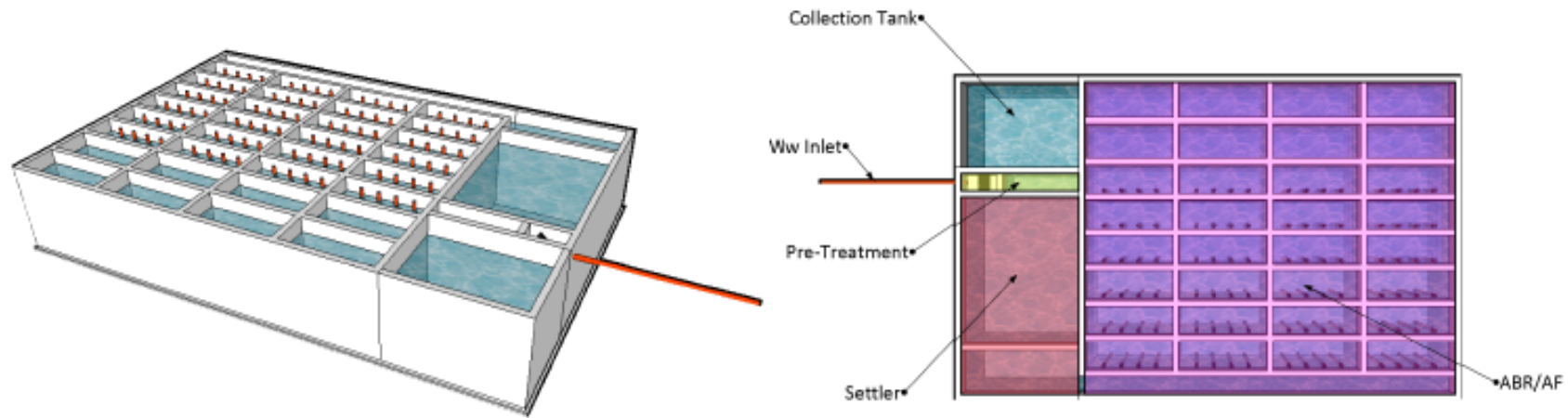
# Potential improvements

## Anaerobic filter





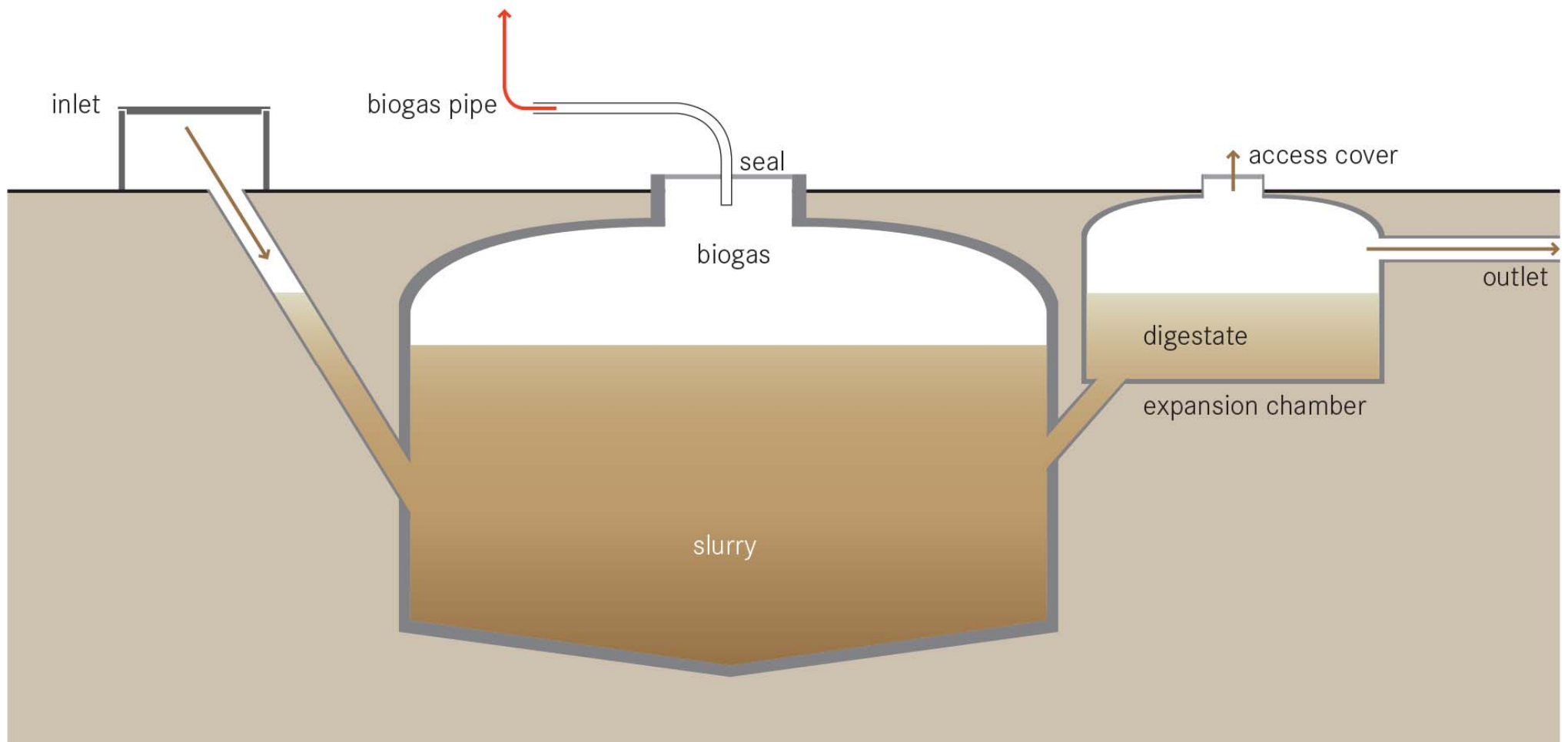
# Example of an effective anaerobic system



# Potential ways forward

## Biogas digester

⇒ *Interest for the use of biogas ?*



# Prefab- DEWATS

The new pre-fabricated modular solution for decentralized wastewater treatment



**BORDA**



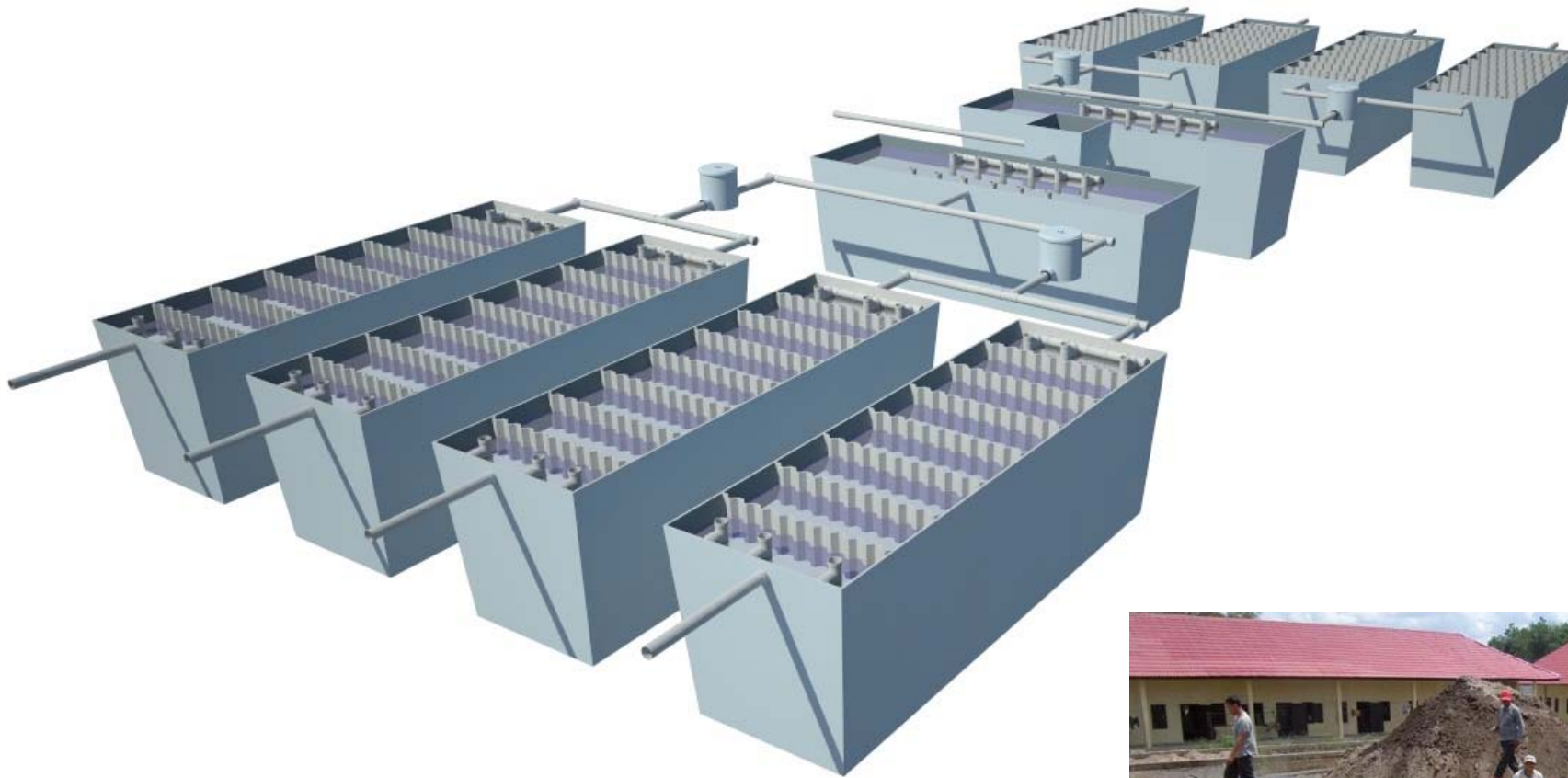
- Prefab-DEWATS components and modules are manufactured by local companies in demand regions.





# Potential improvements

## Modular prefabricated units

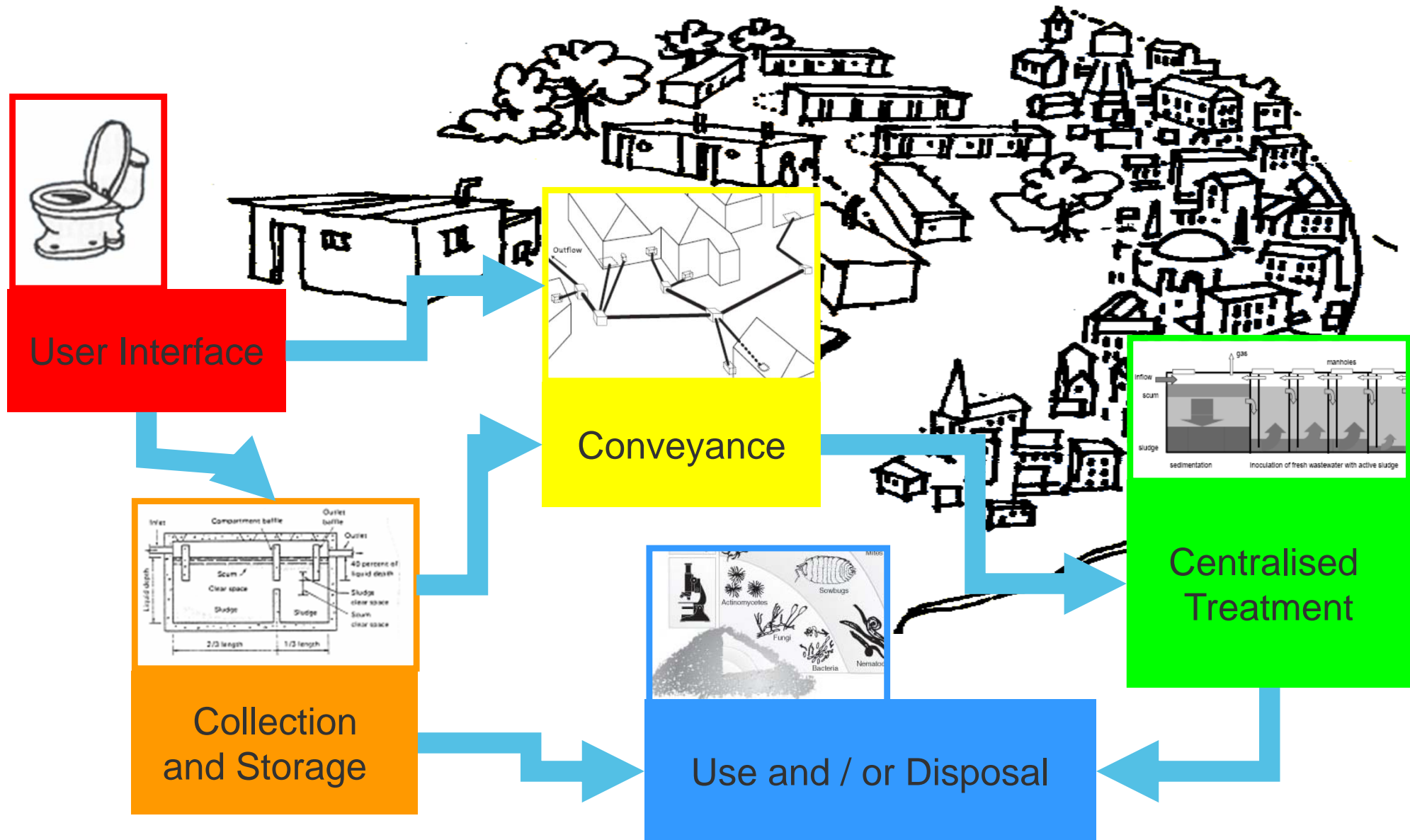


*Modular prefabricated treatment plant, with 2 settlers and 8 ABRs, treating about 80 m<sup>3</sup>/day (source: BORDA, 2012)*



# The Systems Approach

Planning shall integrate the five different functional groups !!!



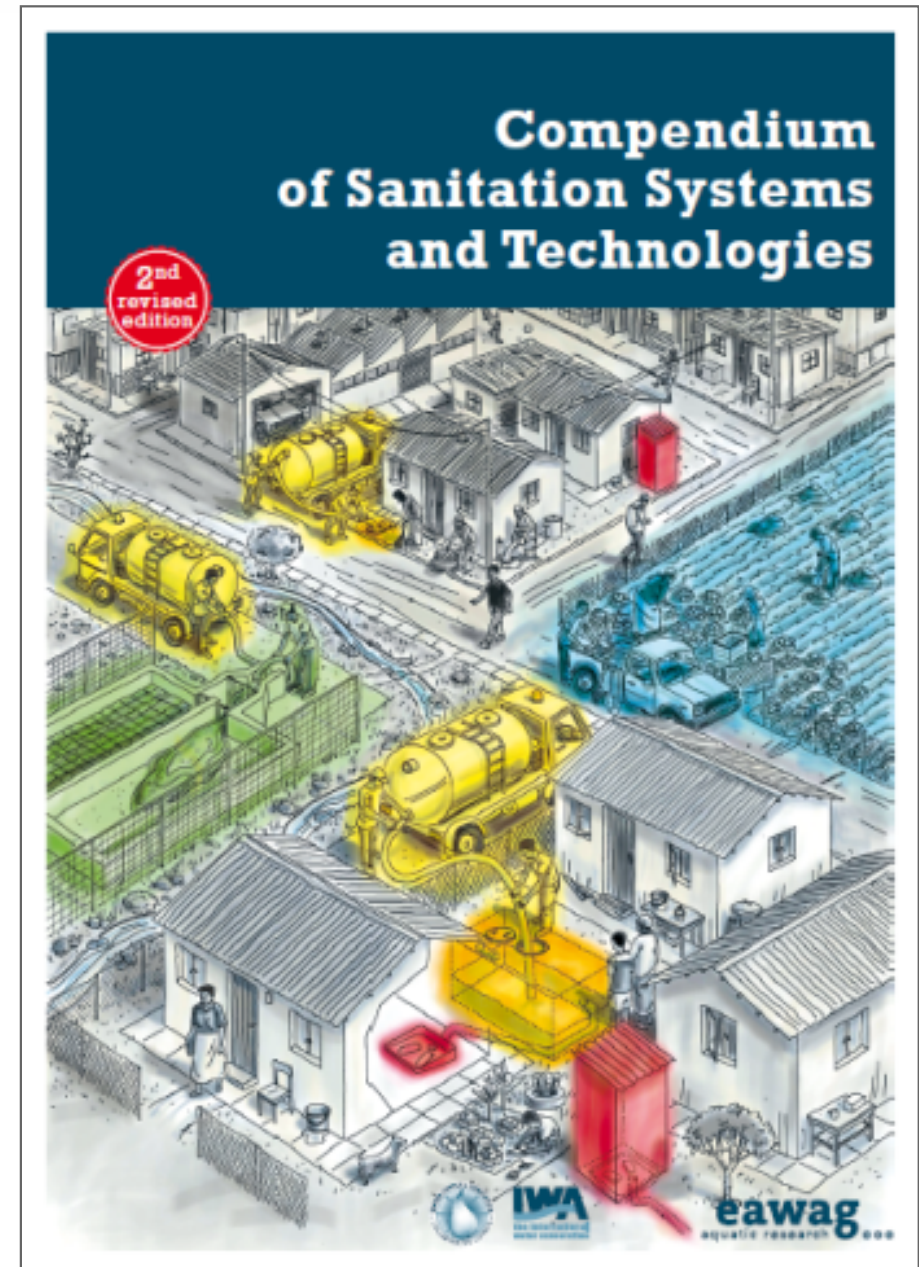


# The Compendium of Sanitation Systems and Technologies

***Currently translated into Russian !***

*Download:*

**[www.sandec.ch/compendium](http://www.sandec.ch/compendium)**



# Thank You!

Questions?

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