

# Compendium of Sanitation Systems and Technologies: Concepts and First Experiences of its Diffusion

M. Saladin, C. Lüthi, E. Tilley

matthias.saladin@eawag.ch

Eawag: Swiss Federal Institute of Aquatic Science and Technology

# Introduction

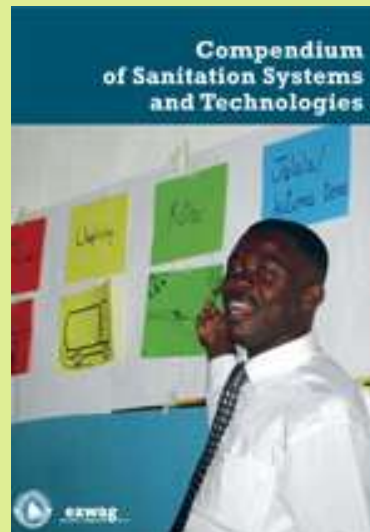
- 2.5 billion people worldwide lack access to improved sanitation systems
- Massive and targeted efforts for constructing new and improving existing systems are required
- One of the key factors for facilitating the construction of improved sanitation solutions is the capacity of planners and engineers to take informed decisions.

## Rationale

- Informed decision-making is only possible if information is well-ordered and structured
- Abundant information exists about sanitation technologies, but it is not easily accessible and understandable by relevant stakeholders.
- There is a need for a tool which pulls together all relevant information on different sanitation systems and technologies and presents them in a readily understandable manner: The Compendium.

# What is a Compendium?

- *Concise, yet comprehensive compilation of a body of knowledge (sanitation).*
- Not a construction manual, not a do-it-yourself guide, not a methodological guidebook.
- Tool to support informed decision making



# Target users of the Compendium

## Engineers, planners and other professionals ...

- who are familiar with sanitation technologies and processes;
- with well-developed awareness of the context and priorities of the community and other stakeholders;
- With interest in learning more about alternative or novel technologies which may not be yet applied in the local context.
- **“Non-experts“** interested in sanitation systems and technologies, their advantages and disadvantages

Meant to be used as part of a **Participatory Planning Approach**



# Products

- Products include: Human wastes, products for transport, additional products (toilet paper, green organic waste), output products (fecal sludge, biogas)
- 19 different Products defined
- System choice will depend on the Products that are generated/ required /desired

# Functional Groups

- Functional Groups are groupings of technologies which perform the same function
- 5 different Functional Groups defined: User interface, Collection/Storage, Conveyance, Treatment, Disposal
- Every technology belongs to a Functional Group (colour-coded)

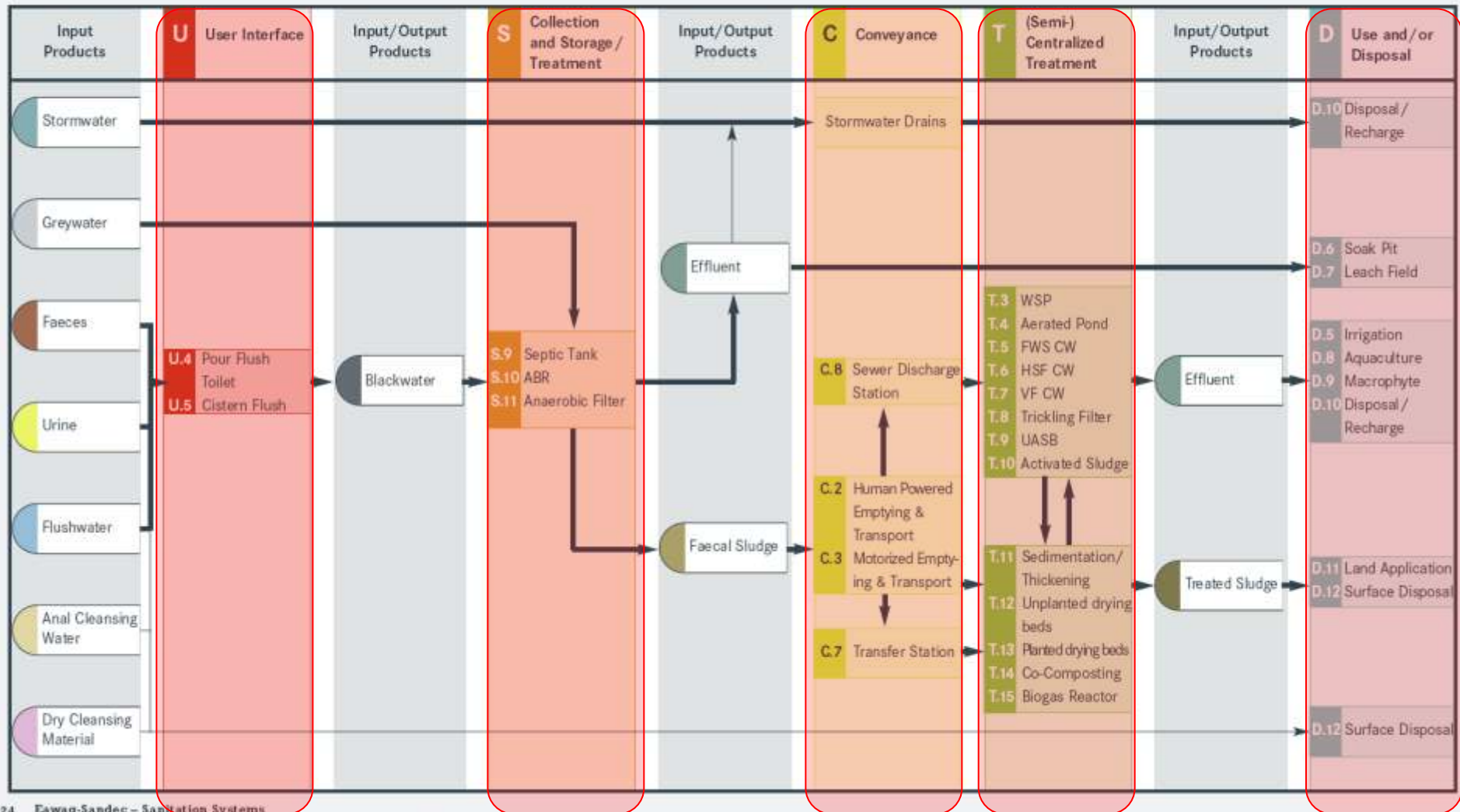
# System Templates

- System Templates show logical combinations of Technologies which can be linked to form a system
- 8 different System Templates defined: from which 100s of Systems can be built
- Templates are built using Products and Technologies from Functional Groups

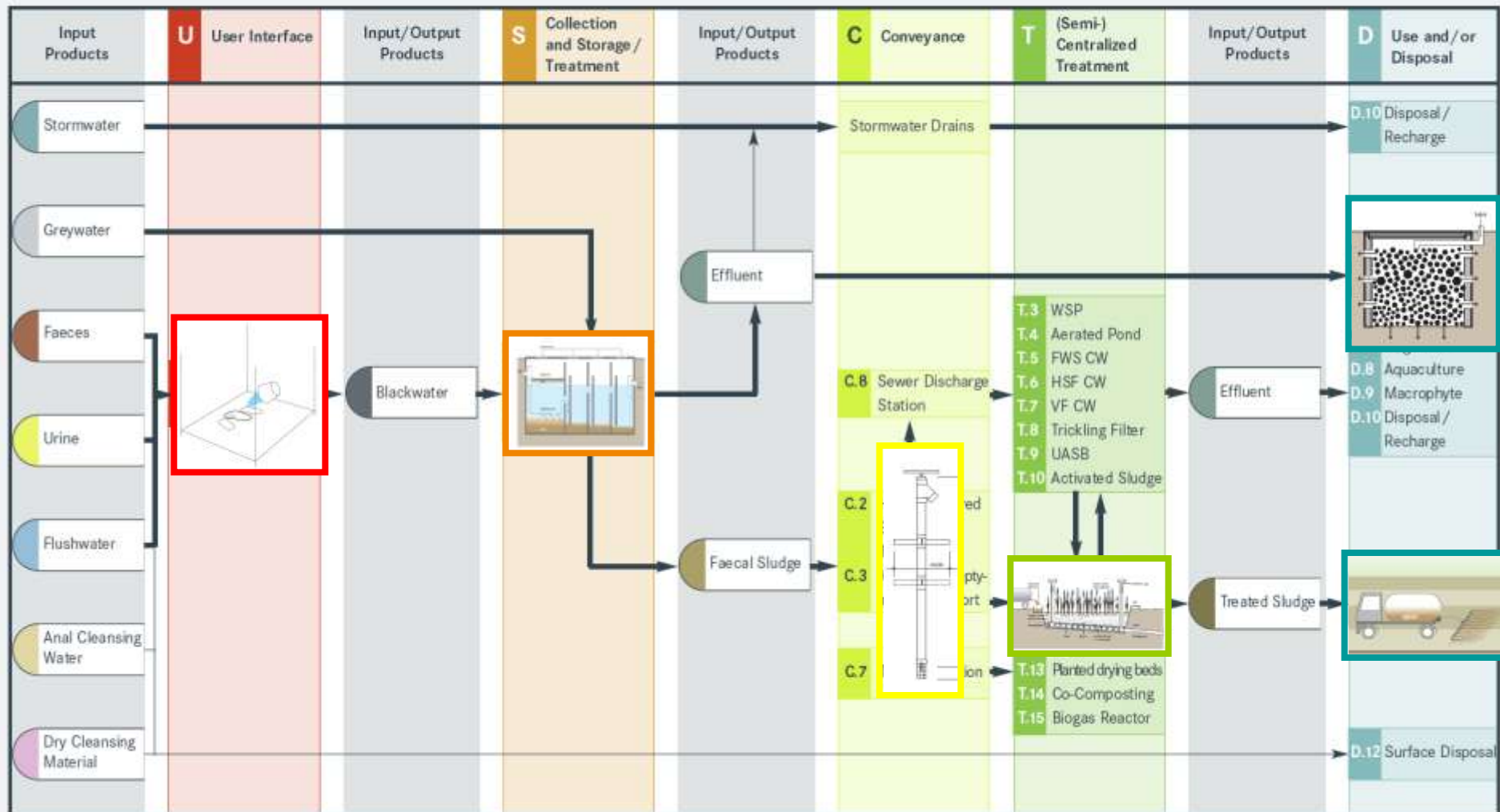


# Functional Groups

## Sanitation System 5: Blackwater Treatment System with Infiltration



# Sanitation System 5: Blackwater Treatment System with Infiltration



**This section describes the technologies with which the user interacts.  
The User Interface is the way in which the sanitation system is accessed.**



**Technology Label**

**U.4 Pour Flush Toilet**

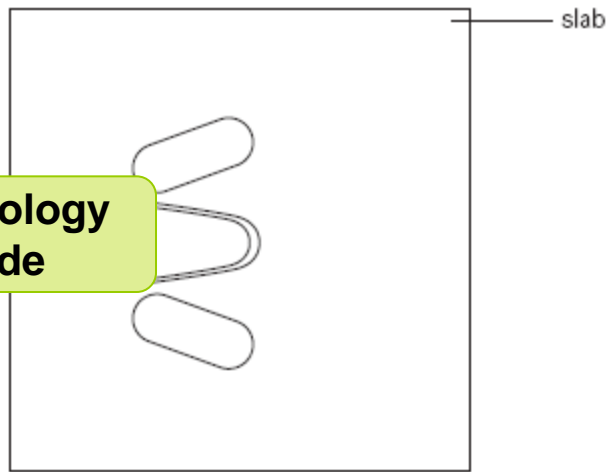
Applicable to:  
**System 1, 3, 5, 6, 7**

**U.4**

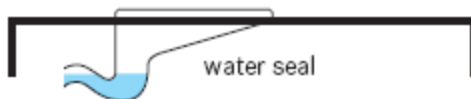
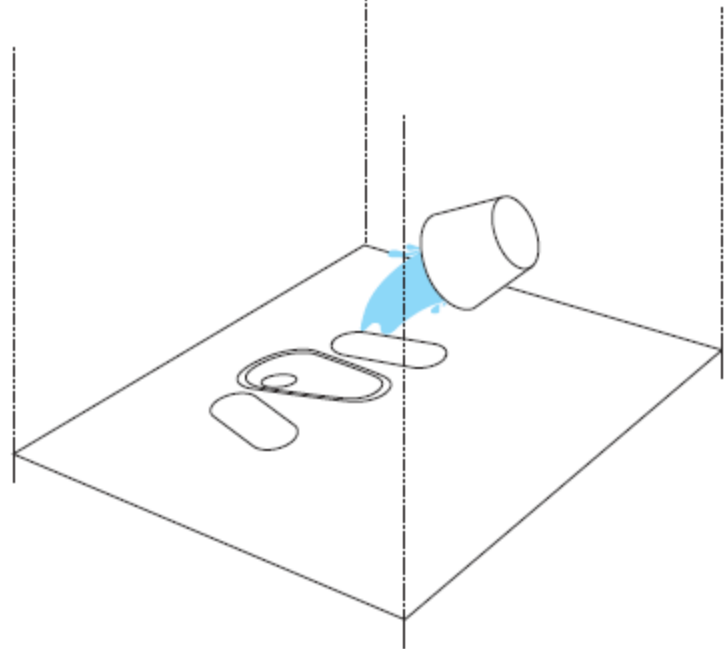
**Inputs:**  Urine  Faeces  
 Flushwater  Anal Cleaning Water

**Outputs:**  Blackwater

**Technology Code**



**Link to Systems**



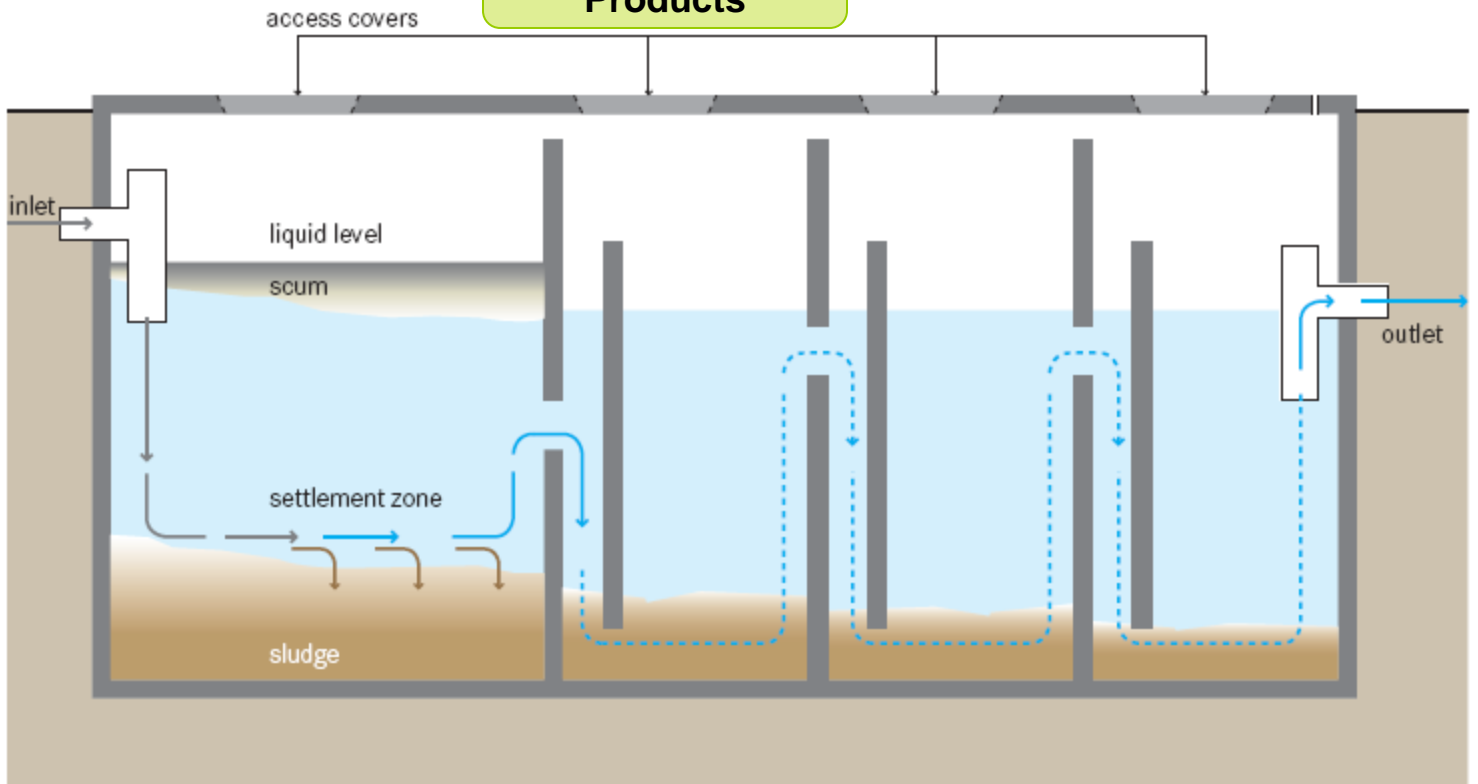
# Management Level

<b>S.10</b>	<b>Anaerobic Baffled Reactor (ABR)</b>	Applicable to: <b>System 5, 6</b>	<b>S.10</b>
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<b>Application Level</b> ★★ Household ★★ Neighbourhood □ City	<b>Management Level</b> ★★ Household ★★ Shared ★★ Public	<b>Inputs:</b> <input checked="" type="checkbox"/> Blackwater <input type="checkbox"/> Greywater <b>Outputs:</b> <input type="checkbox"/> Faecal Sludge <input checked="" type="checkbox"/> Effluent
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# Application Level

# Input/ Output Products



## Conveyance

C

The technologies in this section are responsible for moving or transporting Products from an onsite Collection and Storage/Treatment technology to a subsequent offsite treatment, use or disposal technology.



## C.2 Human-Powered Emptying and Transport

Applicable to:  
System 1, 2, 3, 4, 5

C.2

### Application Level

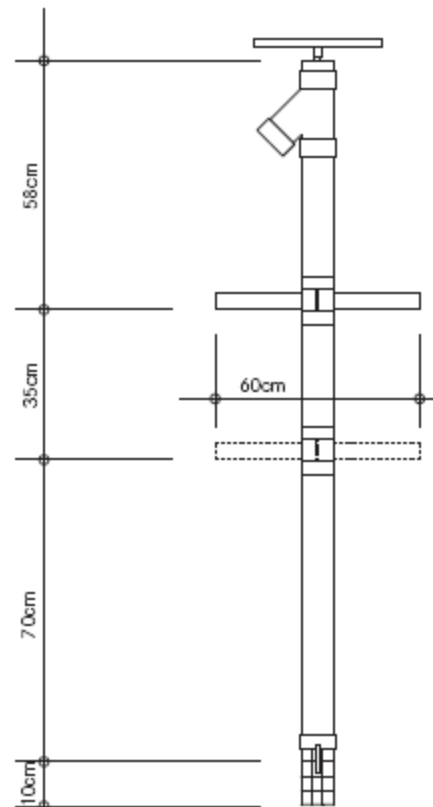
- ★★ Household
- ★★ Neighbourhood
- City

### Management Level

- ★★ Household
- ★★ Shared
- ★★ Public

### Inputs/Outputs:

- Faecal Sludge
- Dried Faeces
- Compost/EcoHumus
- Blackwater



## (Semi-) Centralized Treatment

T

This section describes the technologies that can be used for the treatment of faecal sludge and blackwater. These treatment technologies are designed to accommodate increased volumes of flow and provide, in most cases, improved removal of nutrients, organics and pathogens than household-centered storage technologies.



# T.13 Planted Drying Beds

Applicable to:  
System 1, 5, 6, 7, 8

T.13




## Application Level

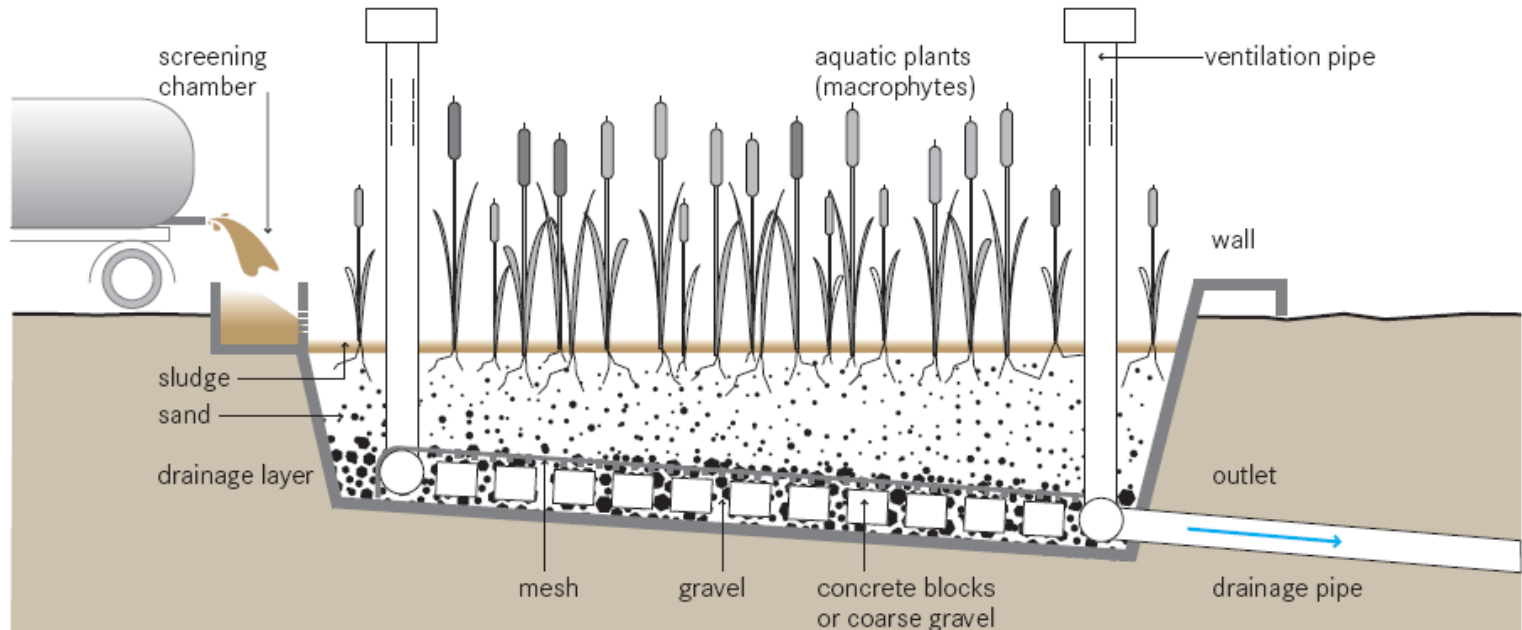
- Household
- Neighbourhood
- City

## Management Level

- Household
- Shared
- Public

**Inputs:**  Faecal Sludge

**Outputs:**  Treated Sludge  Effluent  
 Forage



This section presents different technologies and methods that use or dispose of the output products in ways that are the least harmful to the user and the environment.



**Aerobic:** means 'requiring oxygen'. Aerobic processes can only function in the presence of molecular oxygen ( $O_2$ ), and aerobic organisms are those that use oxygen to drive cellular respiration and store energy.

**Anaerobic:** means 'in the absence of oxygen'. Anaerobic processes are either hindered, or halted by the presence of oxygen. Anaerobic processes are often more foul-smelling than aerobic processes.

**Anal cleansing water:** is water that is collected after having been used to clean oneself after defecating (and/or urinating). It is generated by those who use water, rather than dry material for anal cleansing.

**Anoxic:** means 'deficient in oxygen'. Organisms that can live in an anoxic environment can use oxygen that is bound in other molecules (e.g. nitrate, sulphate). Anoxic conditions are often found at the interface between aerobic and anaerobic environments (e.g. in trickling filters or in facultative ponds).

**Bacteria:** bacteria are simple, single cell organisms. Bacteria obtain nutrients from their environments by excreting enzymes which dissolve complex molecules into more simple ones that can then pass through the cell membrane. Bacteria live everywhere on earth and are essential for maintaining life and performing essential 'services' such as composting, aerobic degradation of waste, and digesting food in our stomachs; some types however can be

**Biomass:** refers to the quantity of living organisms. It is often used to describe the 'active' part of the sludge that is responsible for degrading the organic matter.

**Biogas:** the common name for the mixture of gases released from anaerobic digestion. Typically biogas is comprised of methane (50–75%), carbon dioxide (25–50%) and varying quantities of nitrogen, hydrogen sulphide, water and other components.

**Biosolids:** faecal sludge that has been digested/stabilized. Biosolids can be used and applied with reduced risk compared to raw faecal sludge.

**Blackwater:** the mixture of urine, faeces and flushing water along with anal cleansing water (if anal cleansing is practiced) or dry cleansing material (e.g. toilet paper). It is high in organics and pathogens.

**Brownwater:** the mixture of faeces and flushing water, but with NO urine.

**CBO:** Community Based Organization (CBO) is a small organization that does not have the registered status of an NGO (Non-Governmental Organization) but is a structured group of volunteers who work together to achieve a common goal. Anyone can start their own CBO.

**Cesspit:** a covered hole or pit to receive drainage or sewage.

# Diffusion of the Compendium



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Agua and SDC

- Included in curricula at Universities, NGOs
- Training of Trainer workshops in Africa, Asia, Latin America (29.06-02.07: Lima, 04.07-07.07: Managua):
- [www.alianzaporelagua.org](http://www.alianzaporelagua.org), [www.fundacionsodis.org](http://www.fundacionsodis.org)

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