



SSWM

*sustainable sanitation
and water management*

Urine-Diversion Dehydration Toilets

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Depending on the initial situations and respective local circumstances, there is no guarantee that single measures described in the toolbox will make the local water and sanitation system more sustainable. The main aim of the SSWM Toolbox is to be a reference tool to provide ideas for improving the local water and sanitation situation in a sustainable manner. Results depend largely on the respective situation and the implementation and combination of the measures described. An in-depth analysis of respective advantages and disadvantages and the suitability of the measure is necessary in every single case. We do not assume any responsibility for and make no warranty with respect to the results that may be obtained from the use of the information provided.



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1. *Composting vs. dehydration*

Composting

- breaking down organic materials by microorganisms
- final product = humus

Dehydration (desiccation)

- removal of moisture or water content

Dehydration material

Any material with low moisture content:

- sawdust
- leafy waste
- rice husk
- ash (domestic, industrial)

2. Double-Vault Urine-Diversion Dehydration Toilets

Concept

- designed to operate in batches
- collection and storage of faeces in twin pit compartments (used alternately)
- sprinkle cover material (wood ash, saw dust, soil, etc.) over faeces after each use
- when "full", respective compartment is sealed off while other compartment is put in use
- storage time is counted from date of last contribution and should be at least one year
- urine & anal cleansing water diversion is important



Interior view of Double-Vault UDDTs

Source: M. Wafler

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior and interior view of Double-Vault UDDT by Rural Dev. Dep. Karnataka State, India

Source: M. Wafler

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior view of Double-Vault UDDTs by ENPHO, Nepal

Source: M. Wafler

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior and interior view of Double-Vault UDDT by Practical Action, Sri Lanka

Source: M. Wafler

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior and interior view of Double-Vault UDDT by SCOPE, India

Source: SCOPE

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior and interior view of Double-Vault UDDT by Ecosan Services Foundation, India

Source: N. Zimmermann

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior and interior view of Double-Vault UDDT by Ministry of Health, Bhutan

Source: M. Wafler

2. Double-Vault Urine-Diversion Dehydration Toilets

Examples



Exterior views of Double-Vault UDDTs, Philippines

Source: GTZ-Philippines

2. Double-Vault Urine-Diversion Dehydration Toilets

Common chamber sizes

Implementing organisation	Size of processing chambers		
	Length [m]	Width [m]	Height [m]
PEO/PPDO/GTZ (Philippines)	ca. 1.65 to 2.30 (sloping cover)	ca. 0.60	ca. 0.80
Practical Action (Sri Lanka)	ca. 0.90	ca. 0.60	0.60 to 0.75
Ecosan Services Foundation (India)	ca. 1.20	ca. 1.00	ca. 0.65
SCOPE (India)	ca. 1.30	ca. 0.75	ca. 0.60

3. Single-Vault Urine-Diversion Dehydration Toilets

Concept

- only one compartment for collection and/or containment of faeces
- building costs is less than of double-vault UDDT
- secondary storage or other types of treatment (e.g. co-composting, etc.) must be planned for
- urine and anal cleansing water diversion



Drums for collection and storage of faeces and interior view of Single-Vault UDDTs

Source: GTZ-Philippines (top), UNESCO-IHE (bottom)

3. Single-Vault Urine-Diversion Dehydration Toilets

Examples

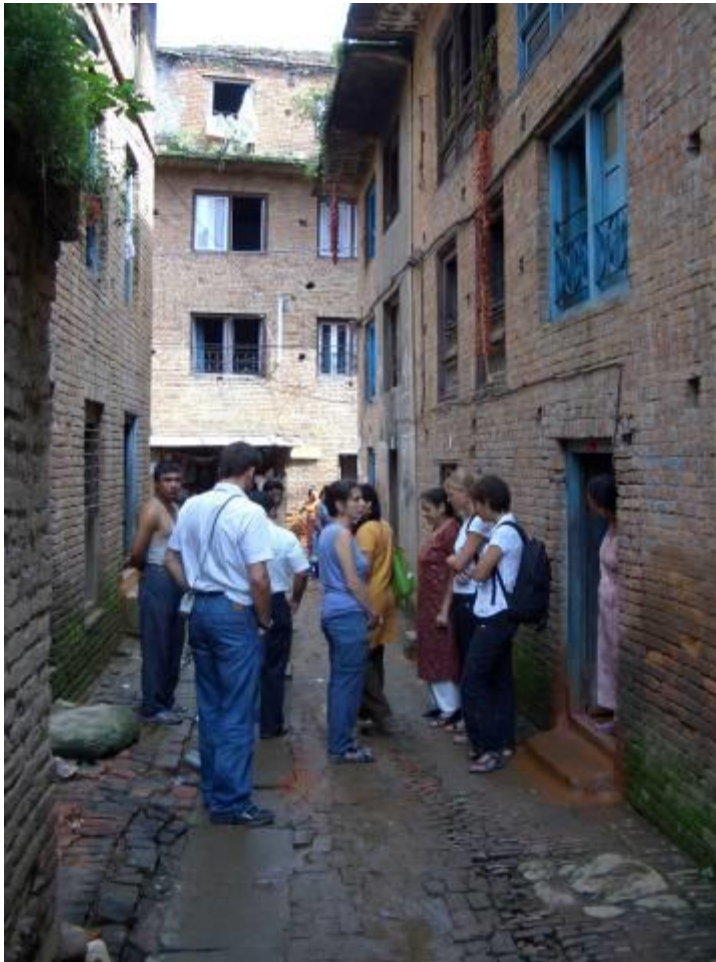


Drums for collection and storage of faeces, Philippines

Source: GTZ-Philippines

3. Single-Vault Urine-Diversion Dehydration Toilets

Examples



Single-Vault UDDT at ground floor level of multi-storey building, Kathmandu, Nepal

Source: M. Wafler

3. Single-Vault Urine-Diversion Dehydration Toilets

Examples



Low-cost UDDTs at coastal area in Libertad Municipality, Philippines

Source: M. Wafler

3. Single-Vault Urine-Diversion Dehydration Toilets

Examples



“Hanging UDDTs” at coastal area in Libertad Municipality, Philippines

Source: M. Wafler

4. *How it can optimize SSWM*

- do not require water for flushing
- allow for reuse of nutrients in separated urine (after hygienisation)
- allow for reuse of desiccated excreta in agriculture
- not contaminating groundwater sources due to contained processing of human feces

5. Important information

Construction details

- seal processing compartments (removable slabs or lockable covers) to prevent rainwater and insects from entering
- raise bottom slab of processing chamber about 10 cm above the surrounding ground level to prevent flood water from entering
- apply plaster to inner walls and bottom slab for smooth surface
- raise squatting pans above finished floor level of toilet or use pedestal to prevent water from entering processing compartments or urine collection system
- provide squatting pans/pedestals with tight fitting covers to seal from insects

5. Important information

Construction details (contd.)

- provide straight ventilation pipes ($\text{Ø} \geq 100 \text{ mm}$) that run above roof (at least 50 cm), are screened against flies and capped for rain
- attach vent pipes to outside walls to avoid penetrating the roofing and associated leakiness in rainy season
- drain urine to sealed receptacles (jerry can, plastic tank, etc)
- use corrosion resistant material (plastic) for urine pipes, provide for proper diameter ($\text{Ø} \geq 50 \text{ mm}$) and slope ($\geq 4\%$) to avoid stagnation, extend urine pipe to ca. 3" above bottom of receptacle
- divert anal cleansing water

6. Applicability

- mainly rural and per-urban areas, but also urban context
- households, schools, universities, hospitals, public toilets, etc.
- especially suitable for regions with high average temperatures, long dry and short rainy seasons or arid climatic conditions. Works also in humid climate and/or regions with cold climate conditions (right design)
- placed outside house, attached or even inside house
- suitable for various cultural settings (sitting/squatting cultures and to cope with the use of water for wet anal cleaning cultures as well.

Source: adapted from GTZ 2009

7. *Advantages and disadvantages*

Double-Vault Urine-Diversion Dehydration Toilets

Advantages:

- suitable for hard rock soil areas, high ground water levels and areas prone to flooding
- no contamination of groundwater sources (contained processing of human faeces)

Disadvantages:

- increased surface area for construction of toilet (compared to Single-Vault UDDTs)
- possibility of smell if too much liquid (urine, anal cleansing water, etc.) enters processing compartment

7. *Advantages and disadvantages*

Single-Vault Urine-Diversion Dehydration Toilets

Advantages:

- suitable for hard rock soil areas, high ground water levels and areas prone to flooding
- no contamination of groundwater sources (contained processing of human faeces)
- reduced construction costs (compared to Double-Vault UDDT)

Disadvantages:

- regular shifting of drums
- transport of unsanitised human excreta to secondary storage and/or processing site
- possibility of smell if too much liquid (urine, anal cleansing water, etc.) enters processing compartment

8. References

Muench, E. (2009): Basic description of urine-diversion dehydration toilets (UDDTs). Draft Version. (= Technology review). Eschborn: German Agency for Technical Cooperation GmbH (GTZ) and Sustainable Sanitation Alliance (SuSanA) Available at: <http://www.gtz.de/en/themen/umwelt-infrastruktur/wasser/9397.htm> [Accessed 18.05.2010]

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