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*Hamburg University of Technology*

# Construction of Urine Diverting Dry Toilets

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*Institute of Wastewater Management  
and Water Protection*

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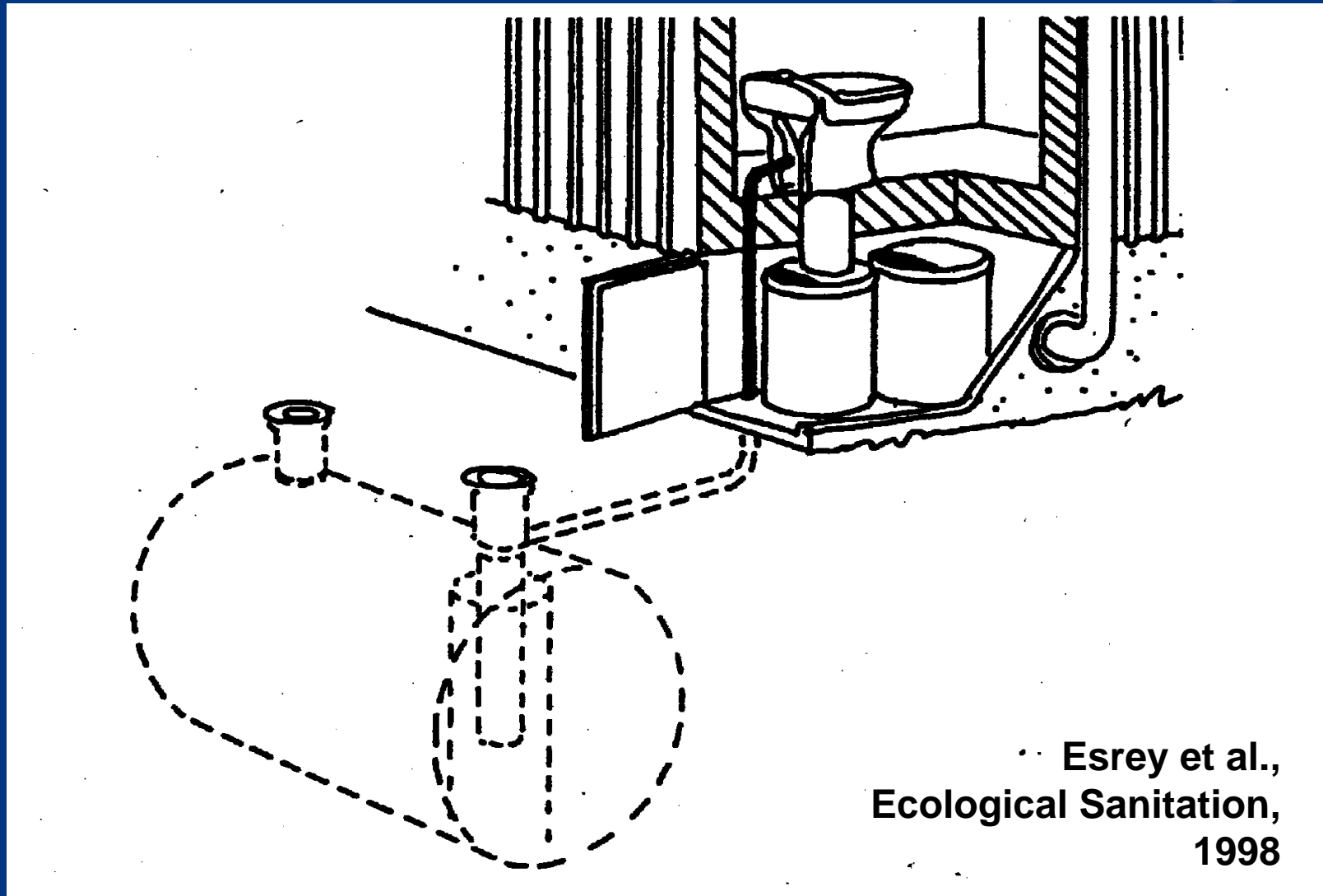
# Topics:

- **Introduction and Basic Informations**
- **Urine-Diverting Dry Toilets**
- **Examples of UD Dry Toilets**
- **How to use UD Dry Toilets**
- **How to build UD Dry Toilets**
- **Summary**

# Double Vault Urine Diverting Dry Toilet



# Scheme of Urine Diverting Toilets



# Household UDDT inside the house in Armenia (under construction)



# Separation of urine and faeces



Faeces

Urine



# Dry Toilets with Urine Diversion



# UD-Toilet with children seat





# UD- Dry Toilets from Philippines





Meilong  
Ceramics,  
China

# Urine Diverting Toilet from Concrete



# Китайский сухой туалет



# Urine Diverting Toilet from Concrete



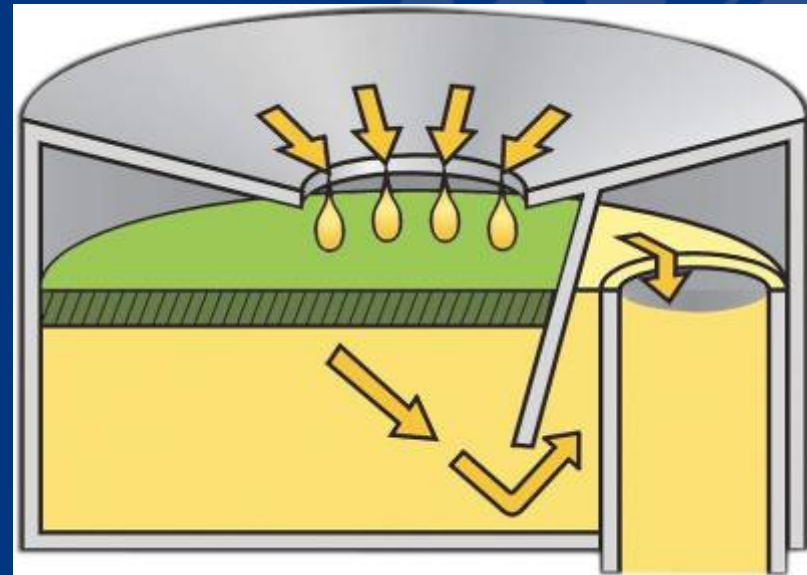
# Waterless Urinals - before



# Waterless Urinals - after



# Odour trap Urinal





# Odour trap Urinal



# Two chamber Urine-tank



# Urine Storage





(Høglund 2001)

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# Winter Times



# Single Vault vs. Double Vault

## Single Vault:

- Container needed for faeces
- Cheaper (smaller)
- Post-composting required
- Seat don't have to be replaced
- Handling with fresh faeces

# Single Vault-UDDT in Ukraine



# Single Vault vs. Double Vault

## Double Vault:

- Drying of the faeces in the toilet
- expensive (bigger area)
- possibly post-composting needed
- Seat has to be replaced



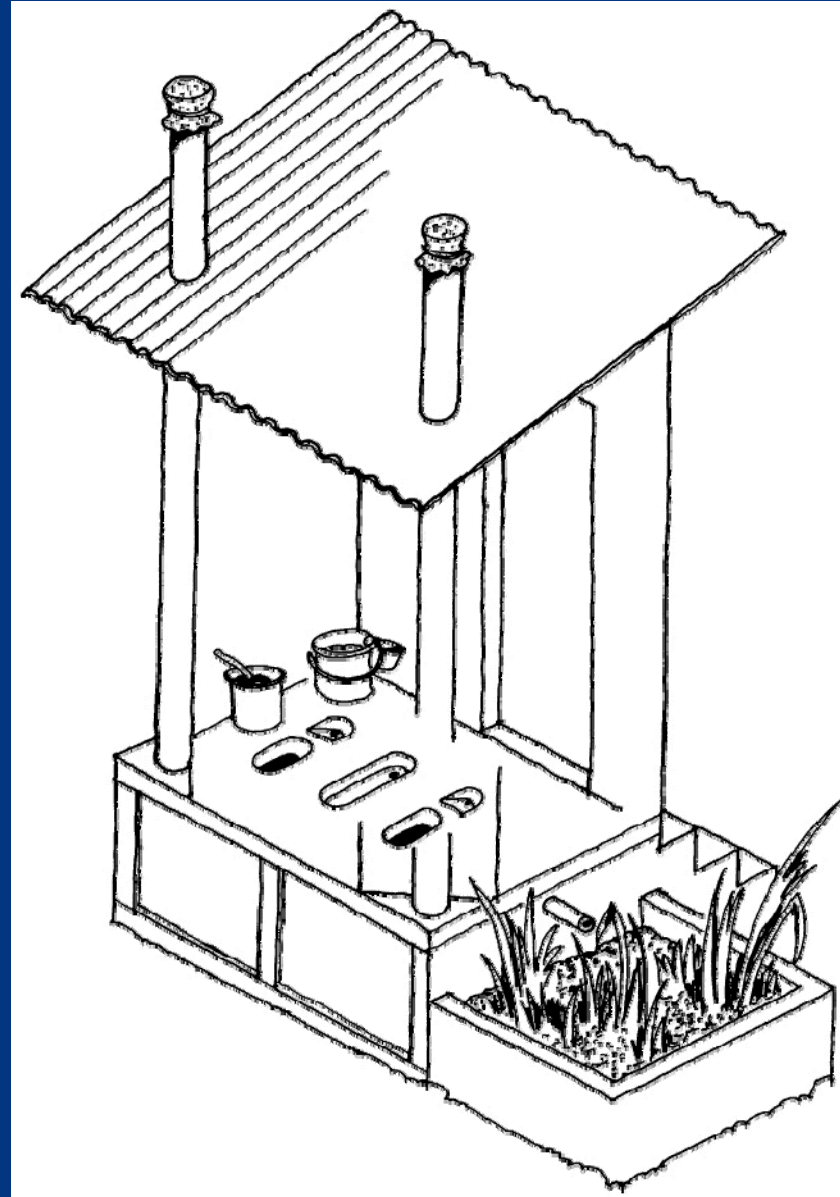
# Double Vault in Ukrainian School



# UDDT for Romanian Townhall (2006)



# Double-vault latrine



# Finished Toilethouse in Romanian school



# Finished Toilethouse



# Inside Toilets



# Waterless Urinals in school



# Household Toilet in Ukraine





# Dry Toilets in Germany



# Toilet in Hamburg



# Toilet in Hamburg





Espacio de Salud  
Cuernavaca, Morelos  
MEXICO

# Schooltoilet in Poltava (Oct 2004)

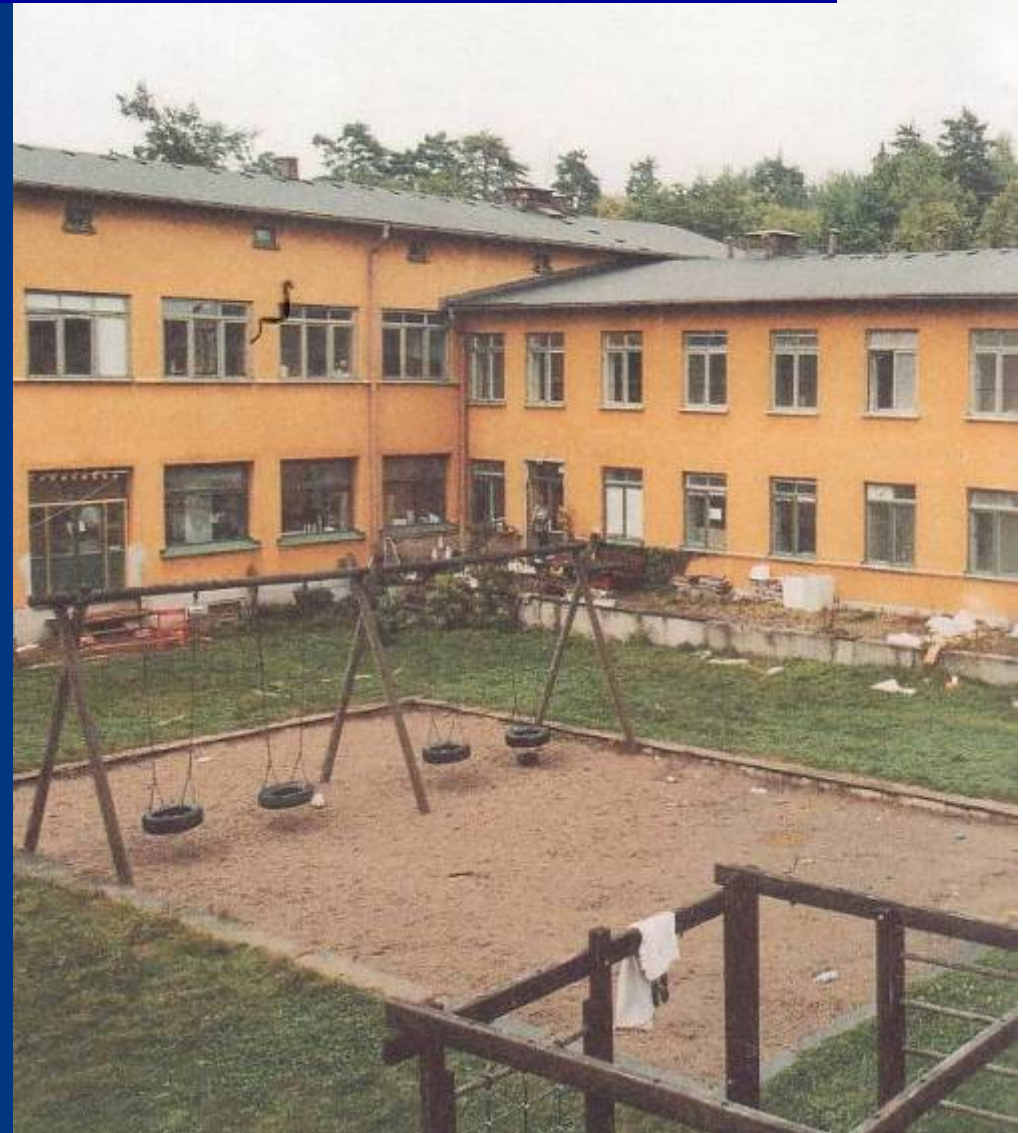


# Lismore, Australia (near Brisbane)



# Gebers, Stockholm, Sweden

Housing project  
80 inhabitants



## Separation toilet

Only urine is  
flushed with 0.1 l  
of water





## Containers for collection of faecal matter



# 140 I – bins below toilets collect undiluted faeces with toilet paper



Secondary composting  
outside the dwelling together  
with biowaste



# Composting of Faeces

Composting of the brownwater outside together with domestic organic waste



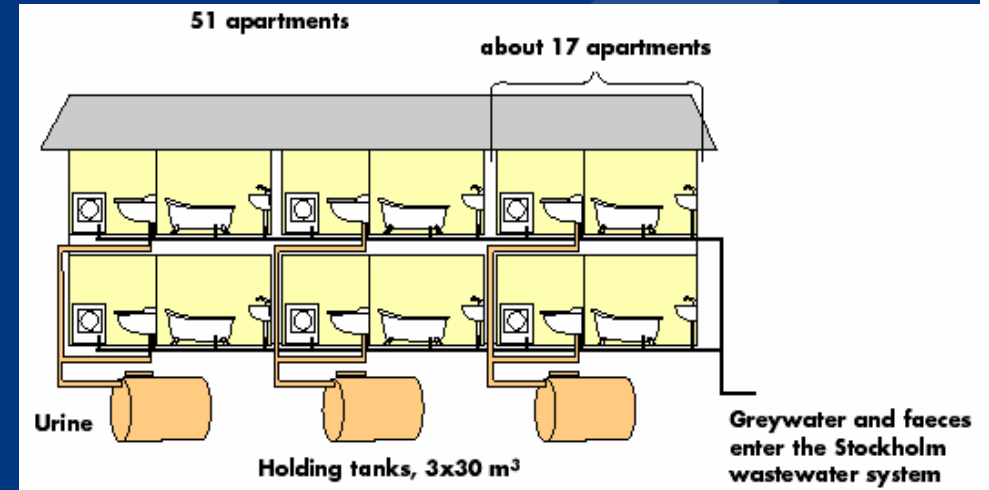
# Composted Faeces



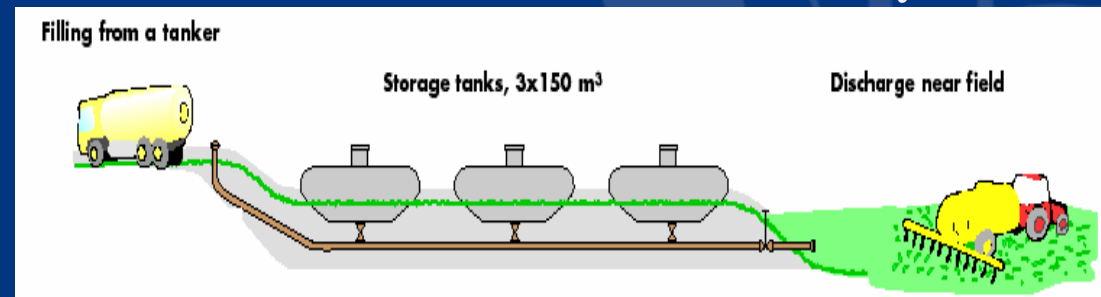
# Palsternackan Project - Sweden

## Palsternackan Project

- 51 appartements, 160 residents
- Urine separating tanks.
- Polyethylene pipe systems.
- Three urine holding tanks
- Three urine storage tanks.
- Remaining wastewater enters Stockholm wastewater system.

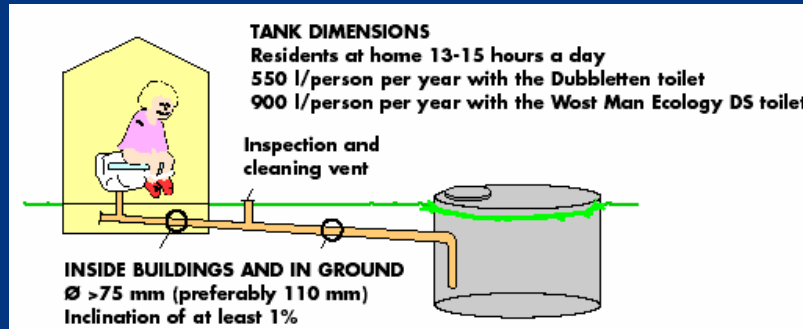


## Plasternackan wastewater treatment system



## Storage facility for human urine

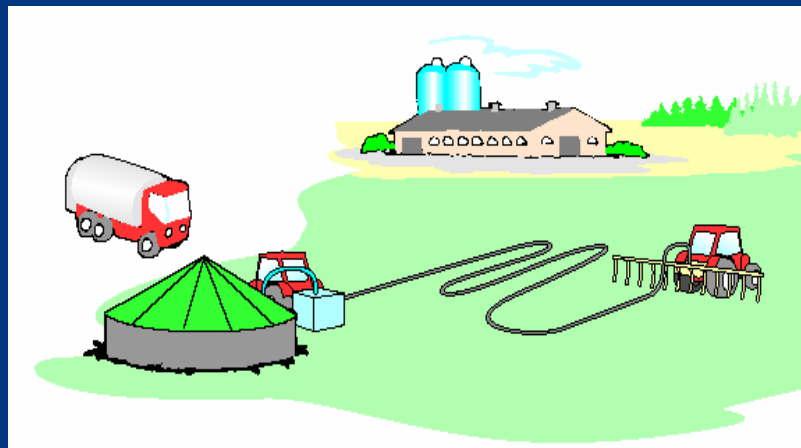
# Palsternackan Project - Sweden



Dimensions, inclination of pipes and capacity of holding tanks



Tank trucks transporting urine



# Settlement ‚Allermöhe‘, Hamburg, Germany



123 ha

34 housing units

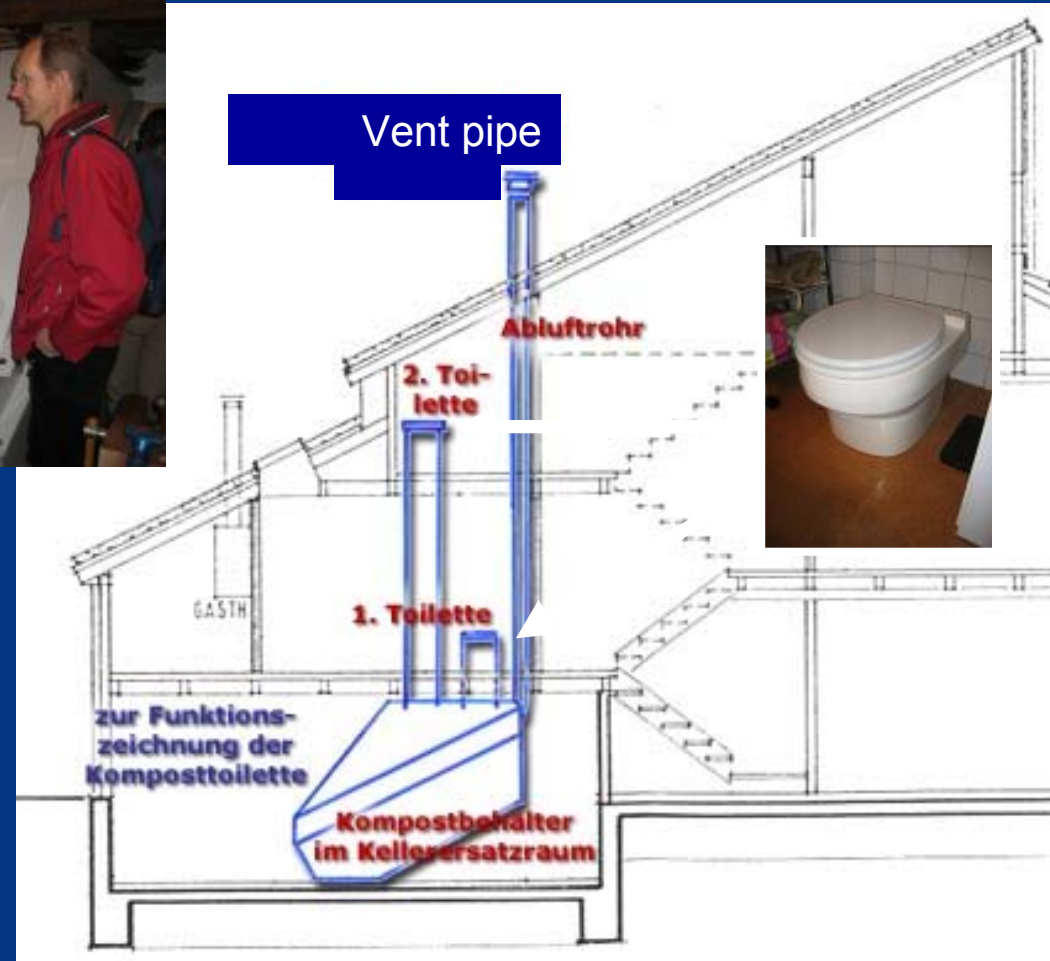
Constructed Wetland for greywater:



<http://www.oeko-siedlung-allermoehe.de/>

- Dry toilets: blackwater and organic waste treated in composter
- Greywater treated in planted soil filter

# Settlement ‚Allermöhe‘, Hamburg



Composting chambers in basement



# Settlement ‚Allermöhe‘, Hamburg, Germany

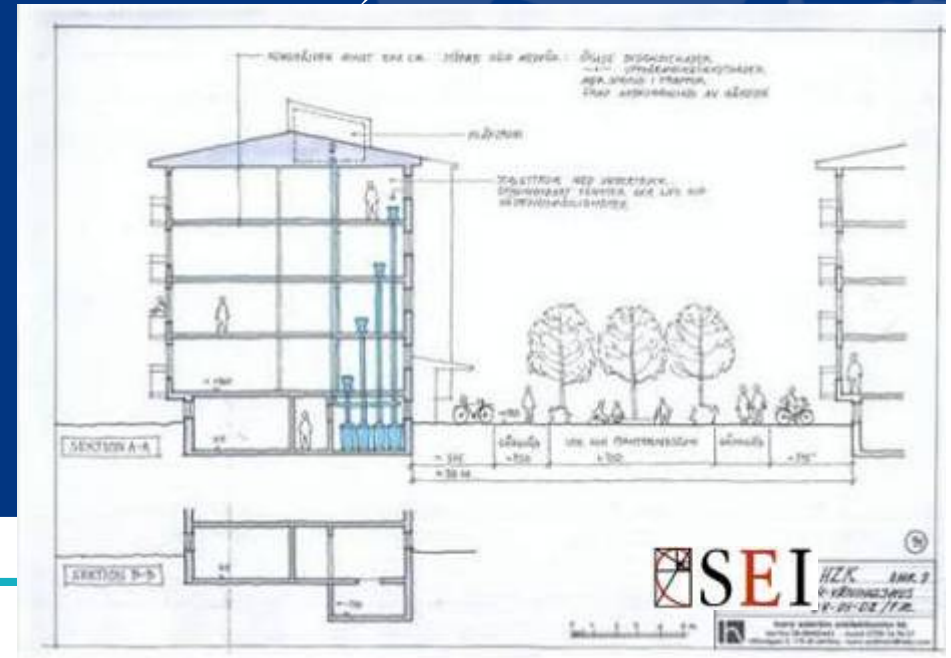
## Retrofitting Urine-Diversion:



# UDDT in multi-story apartments in Dong Sheng, China (SEI)



(EcoSan Res/  
A. Rosemarin 2005)



# Settlement ‚Braamwisch‘, Hamburg, Germany

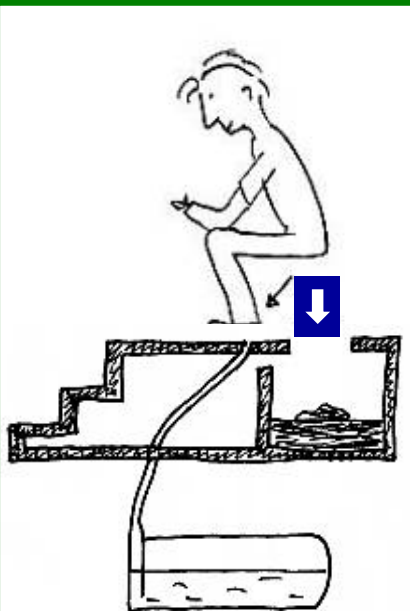


- 40 housing units
- Blackwater separate, treatment in composter
- Greywater in planted soil filter
- Solar energy usage

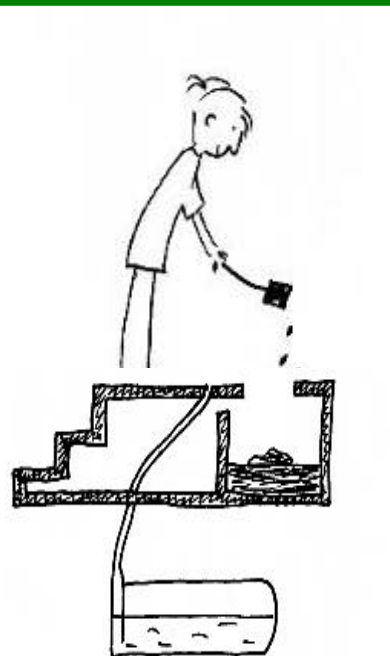
## Як правильно користуватися еко-туалетом

Toaleta Ecosan este realizată după un concept inițial al lui Cesar Anorve, Centre of Innovation in Alternative Technology, Mexico

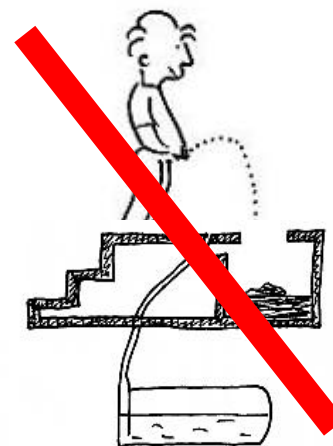
Material educațional realizat de Claudia Wendland, Universitatea Tehnică Hamburg, Germania



**Малий отвір  
призначено  
для сечі,  
великий – для  
калу.**

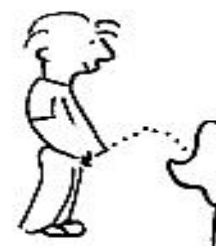


**Після завершення  
туалету кал  
необхідно  
присипати  
землею / попелом**  
**Тільки не кидайте  
землю у отвір для  
сечі!!!**



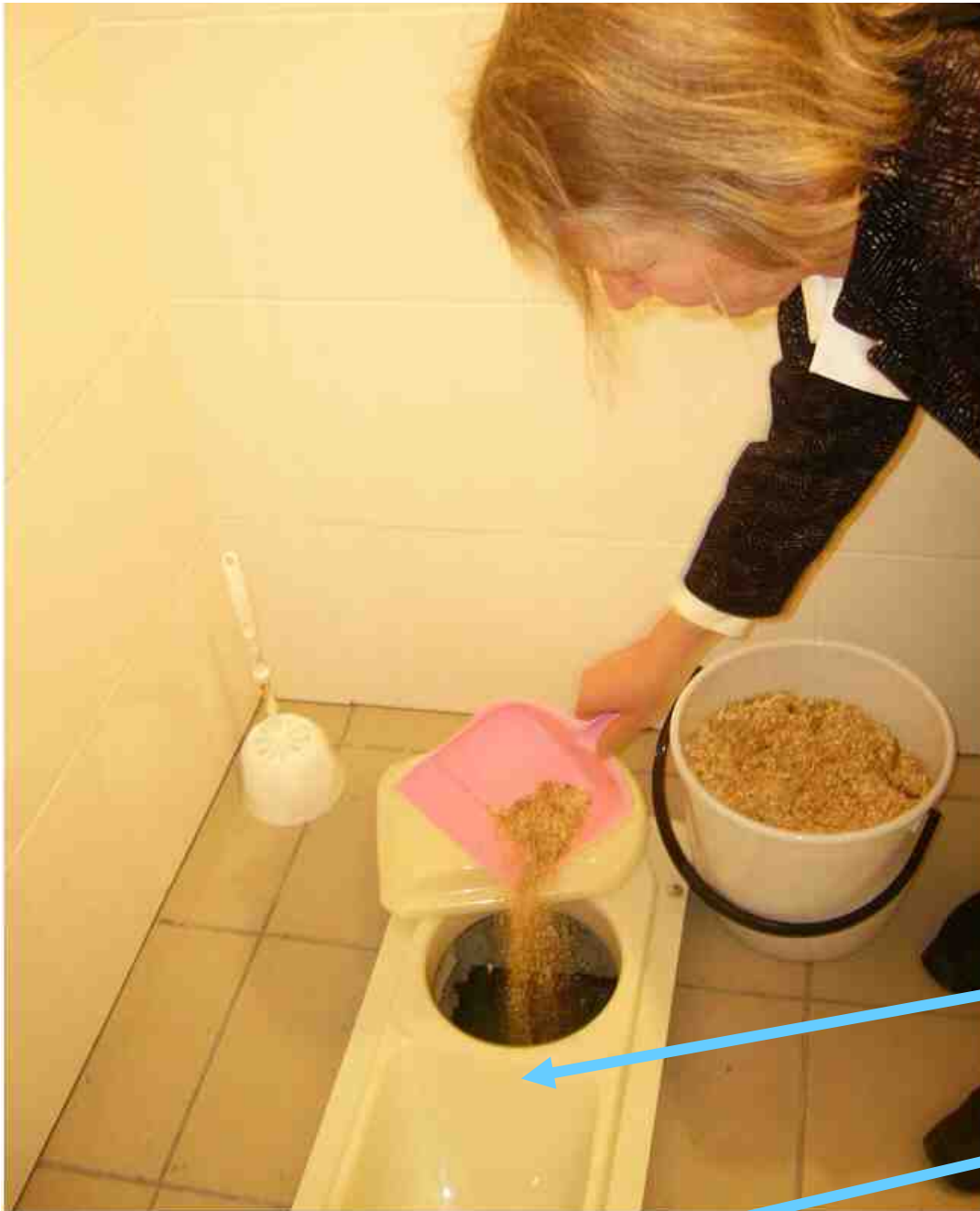
**Сеча не повинна  
потрапляти до  
відсіку з калом!**

**Користуйтеся  
пісуаром!**



**Після  
відвідування  
туалету добре  
мийте руки з  
милом!!!**





Sawdust, ashes or  
soil  
after defaecation

Urine collection

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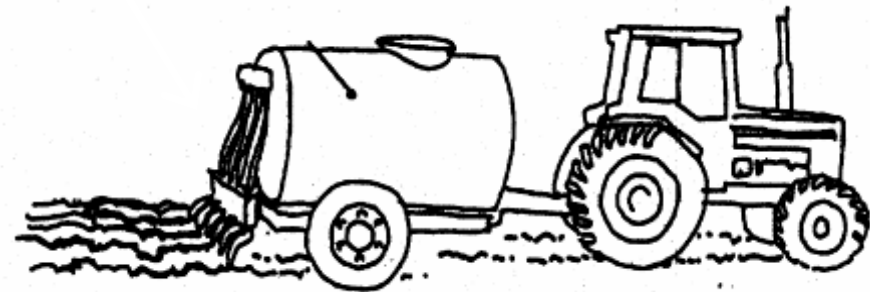
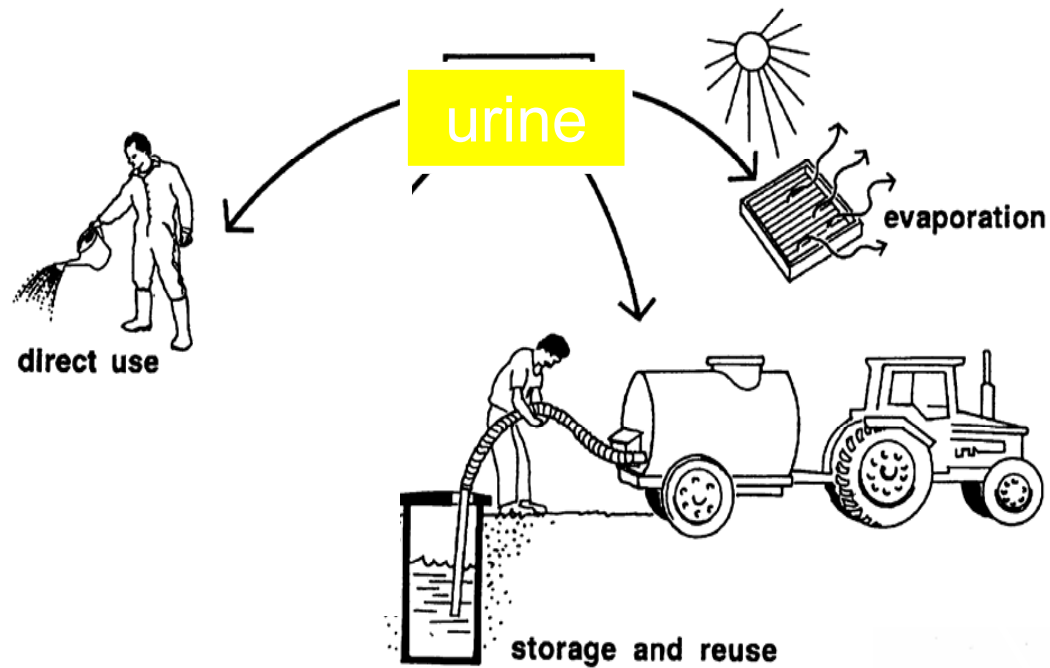
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# Urine and Faeces mixed



# Recycling of Nutrients



# Closing the Nutrient-Cycle





# Closing the Nutrient-Cycle



# Application of urine in agriculture in Sweden



Source: Urine separation-closing the nutrient cycle, final report on the R&D project source separated human urine-a future source of fertilizer for agriculture in the Stockholm region

# Enhanced vegetable growth using “pit toilet compost”.



Photos: Peter Morgan

# URINE



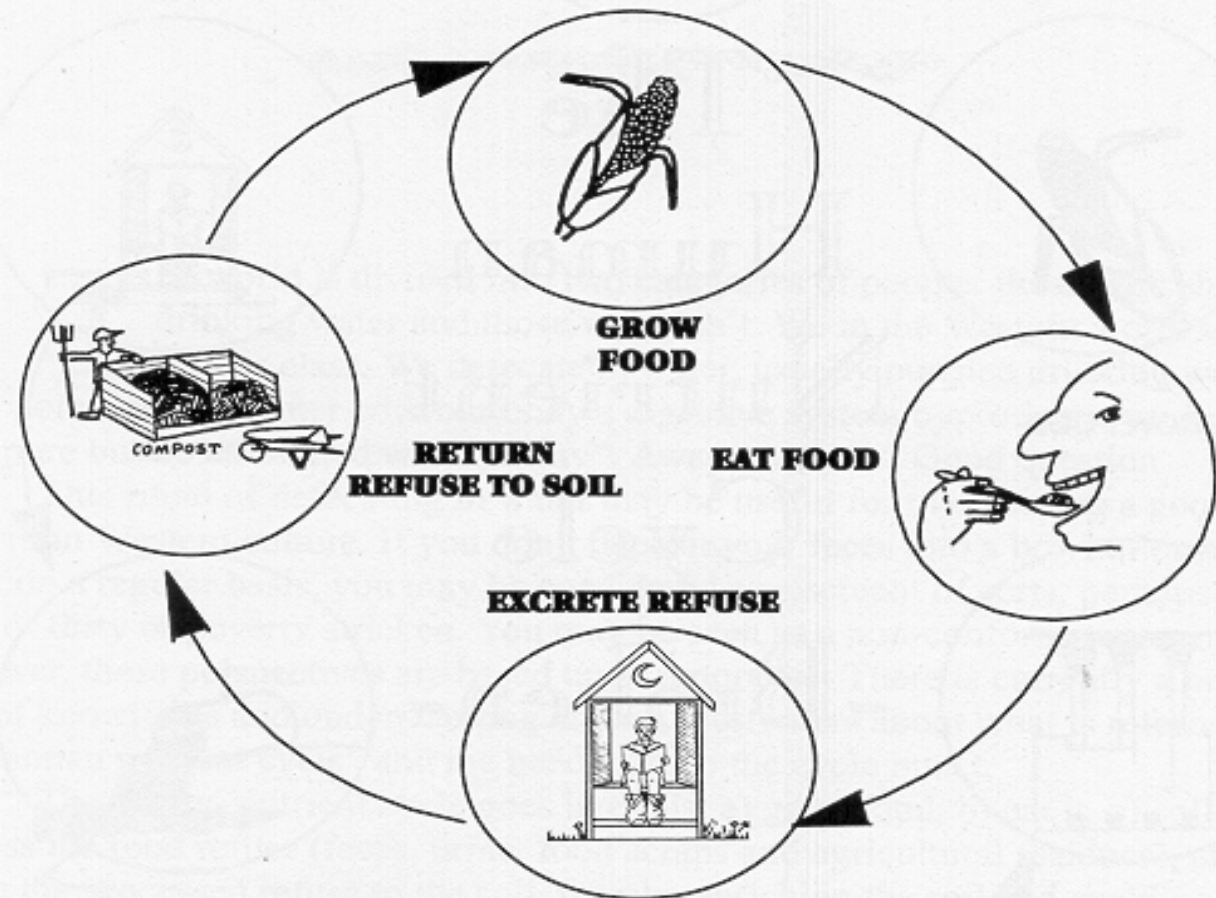
Photos: Peter Morgan

# trials with urine on maize



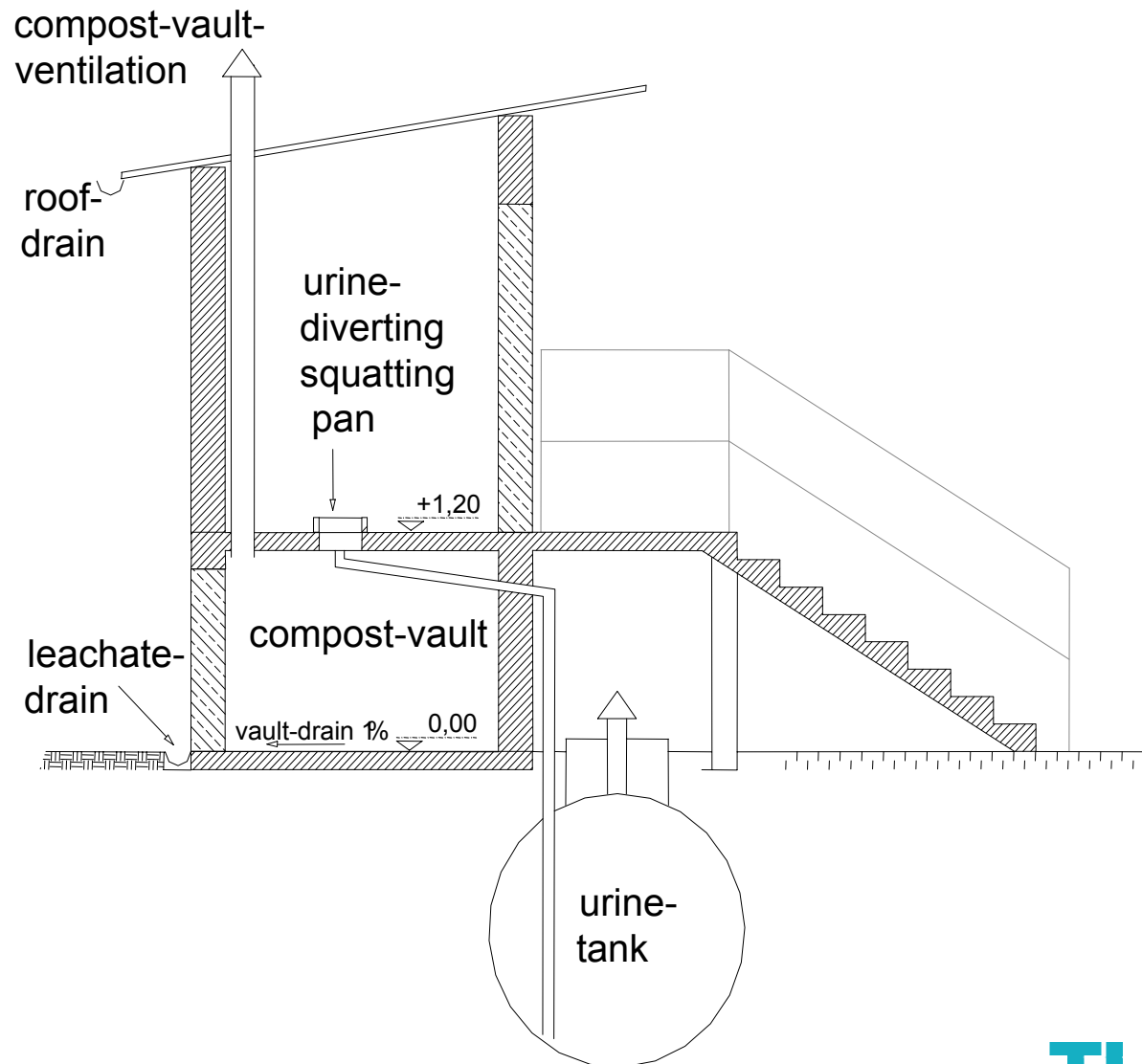
A major advantage of Ecological Sanitation is the closed food cycle:

# THE HUMAN NUTRIENT CYCLE - INTACT -



THE HUMAN NUTRIENT CYCLE IS AN ENDLESS NATURAL CYCLE.

# Cross-section toilet-house



# Earthworks for Foundation





# Floor of Faeces-Chambers



# Faeces Chambers Walls



Hole for urine-pipes

# Frame for superstructure



# Building frame and walls



# Construction of the Roof

Ventilation of  
Faeces  
chamber



# Urine-piping



# Outside View of finished Toilet



# Inside View of finished Toilet





# Benifits of Urine Diverting Dry Toilets

- ✓ Offer a high level of comfort and hygiene
- ✓ No water pollution
- ✓ No smell
- ✓ Does not attract flies
- ✓ No waste of water and nutrients
- ✓ Produce excellent fertiliser and soil conditioner
- ✓ No water connection needed
- ✓ Can be built inside
- ✓ Save Money

# Thank you for your attention!

**For further information please  
contact:**

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**[www.tuhh.de/aww](http://www.tuhh.de/aww)**

**[www.ecosan.org](http://www.ecosan.org)**

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