

Lesson Plan 15: Excreta Storage



75 minutes total

Lesson Description



This lesson introduces different excreta storage technologies that are commonly used in developing countries, including latrine pits, tanks and chambers. Participants learn about the basic design and operation of each technology. There is an optional activity to discuss excreta storage in challenging environments.

Learning Outcomes



At the end of this session participants will be able to:

1. Identify different latrine pit, tank and chamber technologies.
2. Explain the basic operation of each excreta storage technology.

Materials



- Flipchart paper
- Tape
- Markers
- Scissors
- Piece of cotton cloth
- Glass of water
- Bucket
- Excreta Storage Table
- Latrine Fact Sheets or Latrine Posters (see Appendix 3: Latrine Posters)
- Cards for Activity: What Latrine Am I?
- Sanitation System Design Workbook

Preparation



- Review topic in Technical Brief: Sanitation System – Excreta Storage and the Latrine Fact Sheets
- Write the definition of infiltration on paper to be added to the Word Wall
- Write the heading “*Challenging Environments*” on flipchart paper
- Optional: Write the learning outcomes on flipchart paper
- Print Excreta Storage Table (1 for each participant)
- Print and cut out the cards from the Review Activity: What Latrine Am I? (1 card per participant)

- Option A: Print the Latrine Posters. Set up 4 stations around the room with the following titles and the corresponding posters:
 1. Pits: Pit latrine, VIP latrine, Arborloo latrine
 2. Chambers: Composting latrine, Dehydrating latrine
 3. Tanks: Septic tank, Aqua privy, Biogas reactor
 4. Other: Removable container, Holding tank

Introduction

5 minutes



1. Ask two volunteers to hold the corners of the cloth tight and make it flat in the air. Ask another volunteer to pour water over the cloth. Watch the water pass through the cloth and drip underneath. Place a bucket below to catch the water dripping from the cloth.
2. Tell the participants to imagine that the cloth is a wall of a latrine pit. Ask them “What does the water represent?”
 - *The water represents the liquid that passes out of the pit into the surrounding soil.*



3. Ask the participants “What does infiltration mean?” Share some responses as a large group. Post the definition to the Word Wall and discuss.
 - *To pass into or through something. Infiltration is the process by which liquid from a latrine enters the surrounding soil.*
4. Explain that understanding infiltration is important for understanding how some excreta storage technologies work.
5. Present the lesson description or learning outcomes.

Excreta Storage Technologies

55 minutes



1. Explain to participants that we will be looking at different excreta storage technologies. These technologies fall under 4 categories: pit, chamber, tank and other.



2. Hand out one Excreta Storage Table to each participant. Explain that for each technology participants will have to fill out the answers in the table. They can place a checkmark in each box that applies, or write “yes” or “no”. Let them know they will have 30 minutes to complete the activity.
3. Option A: Appropriate for participants who need longer time to read through information. In pairs, participants move through 4 stations set up around the room. They can learn about each technology by reading the Latrine Posters and discussing with their partner. They will fill out the Excreta Storage Table. Ensure that some participants start at each station.

- Option B: Appropriate for participants who have high literacy and can quickly read through information. Do not set up stations around the room. Pairs work together in one spot. They review the Latrine Fact Sheets from their package of participant materials and discuss with their partner. They will fill out the Excreta Storage Table.
4. After 30 minutes, ask the participants to return to the large group. Ask if there are any questions about how the technologies work.
 5. As a large group, review the answers on the Excreta Storage Table. Briefly explain the basic operation of each excreta storage technology.
 6. Explain how some latrines can also be built as twin (or double) pits. When the first pit fills up, it is closed and the second pit is used. When the second pit is full, the first pit is emptied. Ask the participants “What are the reasons for having a twin pit design?”
 - *Because the sludge has sat in the pit for some time (2 years or more), it has reduced pathogen levels and is safer to handle.*
 7. Ask the participants “Which excreta storage options would do not use a twin design?”
 - *Arborloo, septic tank, aqua privy, biogas reactor, holding tank, removable containers*
 8. Ask the participants “Which excreta storage technologies can use a urine diversion toilet?”
 - *Urine diversion can be used with any of the technologies. Composting toilets may work better with urine in them (i.e., kill more pathogens and produce better fertilizer).*
 - *The only technology that MUST use a urine diversion toilet is the dehydrating latrine.*
 9. Ask the participants “What is the benefit of using a urine diversion toilet?”
 - *Reduces the amount of liquid in the pit/tank/chamber. This may mean less infiltration (good if soil or groundwater contamination is a concern).*
 - *It also reduces the volume in the storage pit/tank/chamber (i.e., it doesn't fill up as fast).*
 - *Less liquid also reduces the weight of removable containers.*
 - *Reduces the smell in the latrine – excreta smells most when urine and feces are mixed.*
 10. Tape one “What Latrine Am I?” card to the back of every participant. Explain that the objective is to figure out what latrine they have on their back by asking others only yes/no questions. Provide an example of a yes/no question. Explain that participants can only ask one question to each person. When the participants have guessed their latrine, take the card off of their back and give them another card. Continue the activity for 5 minutes.
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Optional: Excreta Storage in Challenging Environments**30 minutes**

This activity is optional depending on time and the needs of the participants.



1. Ask the participants “What challenges can the local environment pose for the excreta storage technologies discussed?” Record responses on the “*Challenging Environments*” flipchart.
2. Divide the participants into as many groups as challenging environments they mentioned. Assign each group a challenging environment. Ask the groups to identify which excreta storage options may be appropriate for their environment. They may look at the Technical Brief: Latrines in Challenging Environments for more information. Tell them they will present their solutions to the entire group.

Note: You may add other challenging environments to the list that they are not mentioned by the participants.

- High water table
 - Flooding
 - Cold climates
 - Fragile ecosystems
 - Living on or over water
 - Difficult soil types (rock, sand, impermeable soils)
 - Minimal access to water
 - High density area
 - Remote and isolated communities
3. Ask the groups to present their solutions and discuss as a large group.

Review**15 minutes**

1. Explain to participants that they will now design their excreta storage technology. Ask the participants to turn to the Excreta Storage section in their Sanitation System Design Workbook. Tell them they will have 15 minutes to complete the worksheet.
2. Remind the participants to make sure that their choice matches the toilet they have previously selected. Tell them that they can change the toilet based on the excreta storage option they select. Ensuring that the entire system works together as you gather new information is part of good design. Their design might go through many iterations.
3. Encourage participants to discuss any questions or challenges with each other or with you.

Reflections on Lesson

Activity: Excreta Storage Table. Fill in the table by reading the Latrine Fact Sheets or Posters.

| Excreta Storage Technology | What can it be connected to? | | What can go in? | | | | | | | Does liquid infiltrate into soil? |
|----------------------------|------------------------------|------------|-----------------|-------|----------------------|-------------------------------|-------------------------------|-------------|----------------|-----------------------------------|
| | Wet toilet | Dry toilet | Urine | Feces | Anal cleansing water | Soft anal cleansing materials | Hard anal cleansing materials | Flush water | Cover material | (yes / no) |
| Pit Latrine | | | | | | | | | | |
| VIP Latrine | | | | | | | | | | |
| Arborloo | | | | | | | | | | |
| Septic Tank | | | | | | | | | | |
| Aqua Privy | | | | | | | | | | |
| Biogas Reactor | | | | | | | | | | |
| Composting Latrine | | | | | | | | | | |
| Dehydrating Latrine | | | | | | | | | | |
| Holding Tank | | | | | | | | | | |
| Removable Containers | | | | | | | | | | |


SOLUTIONS

| Excreta Storage Technology | What can it be connected to? | | What can go in? | | | | | | | Does liquid infiltrate into soil? |
|----------------------------|------------------------------|------------|-----------------|-------|----------------------|-------------------------------|-------------------------------|-------------|----------------|-----------------------------------|
| | Wet toilet | Dry toilet | Urine | Feces | Anal cleansing water | Soft anal cleansing materials | Hard anal cleansing materials | Flush water | Cover material | (yes / no) |
| Pit Latrine | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | YES |
| VIP Latrine | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | YES |
| Arborloo | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | YES |
| Septic Tank | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | | YES |
| Aqua Privy | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | | YES |
| Biogas Reactor | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | | NO |
| Composting Latrine | | ✓ | ✓ | ✓ | ✓ | ✓ | ? | | ✓ | NO |
| Dehydrating Latrine | | ✓ | separate | ✓ | | ✓ | ? | | ✓ | NO |
| Holding Tank | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ? | ✓ | ? | NO |
| Removable Containers | | ✓ | ✓ | ✓ | ✓ | ✓ | ? | | ✓ | NO |

? = Depends on the emptying method and end use of the sludge



Review Activity: What Latrine Am I?



| | |
|---|---------------------------------------|
| <p>Aqua Privy</p> | <p>Septic Tank</p> |
| <p>Pit Latrine</p> | <p>Biogas Reactor</p> |
| <p>Removable Containers</p> | <p>Arborloo</p> |
| <p>Ventilated Improved Pit Latrine</p> | <p>Composting Latrine</p> |
| <p>Holding Tank</p> | <p>Dehydrating Latrine</p> |