Governance of Decentralized Sanitation

Objectives, classification and selection of sanitation

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At the end of this course, participants will be able to:

- Explain different terminologies used in sanitation
- Explain the objectives of sanitation
- Categorise different sanitation systems and technologies
- Identify and select criteria for the selection of sanitation technology in a given context

Note: (1), (2), (3) etc. represents reference
Course outline

This presentation is divided into four sections:

1. General Overview
2. Objectives of sanitation
3. Classification of sanitation systems and technologies
4. Selection of sanitation systems
Sanitation refers to:

- the safe management of human excreta and greywater (2).
- the principles and practices relating to the collection, removal, or disposal of human excreta, refuse and waste water (6)
- the provision of facilities and services for the safe disposal of human excreta, maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal (7).

- It includes hardware (facilities) and software (rules, regulations, hygiene).

Sanitation facility

- refers to infrastructure dedicated for the disposal, conveyance or treatment or human excreta, greywater or solid waste

Sanitation technology

- refers to specific infrastructural configurations, methods or services designed specifically to contain, transform or transport waste to another process, point of use or disposal (3)

Sanitation system

- refers to the combination of technologies for safe collection, transport, treatment or disposal of human waste. It represents a configuration of different technologies
Sanitation

Rules and regulations:

- Policies
- Legal framework
- Norms
- Hygiene practices
Example

- Sanitation facility
- Sanitation technology
**Sanitation system** (2)

- **User interface or toilet**
  Refer to toilet, pedestal, pan or urinal the user comes in contact with

- **Collection and storage**
  Refers to the way products generated at user interface are collected or stored

- **Conveyance**
  Describes the way in which products generated from user interface are moved from one process (or functional element) to another

- **Treatment**
  refers to the process used to treat waste products generated from the interface

- **Reuse or disposal**
  refers to the ways in which waste products generated at user interface are returned to the soil. It can be treated or raw
Sanitation system and technology

Each component or functional element of a sanitation system has specific technology

- **User Interface**
  - Dry Toilet
  - Urine Diverting Dry Toilet
  - Urinal
  - Pour-Flush Toilet
  - Flush Toilet
  - Urine Diverting Flush Toilet

- **Collection and Storage/Treatment**
  - Single Pit
  - Single VIP
  - Dehydration Vaults
  - Septic Tank
  - Composting Chamber
  - Anaerobic Baffled Reactor
  - Anaerobic Filter etc.

- **Conveyance**
  - Human-Powered Emptying and Transport
  - Motorized Emptying and Transport
  - Simplified Sewers
  - Small-Bore Sewer
  - Conventional Gravity Sewer
  - Jerry Can/Tank etc.

- **(Semi-) Centralised Treatment**
  - Anaerobic Baffled Reactor
  - Anaerobic Filter
  - Trickling Filter
  - Waste Stabilisation Ponds
  - Activated Sludge
  - Constructed Wetland
  - Co-composting etc.

- **Use and/or Disposal**
  - Application of Urine
  - Application of Dehydr. Faeces
  - Compost
  - Irrigation
  - Aquaculture
  - Soak Pit
  - Leach Field
  - Land Application
  - Surface Disposal etc.
Part 1 Knowledge questions

- Can you define sanitation in your own terms?
- What is the difference between sanitation system and sanitation services?
- What is the difference between sanitation technology and sanitation system?
- How can we better define these terms
  - sanitation,
  - sanitation system,
  - sanitation technology
  - sanitation system
Sanitation is needed to:

- **Protect and promote health**
  - Keeping disease carrying waste and insects away from people, toilets and homes
  - Break the spread of diseases
  - Prevent spreading of waterborne diseases
  - Improve the health and quality of life

- **Protect the environment against pollution**
  - Keeping disease carrying waste and insects away from the environment
  - Prevent environmental pollution (air, soil and emission)
  - Prevent contamination of water resources (surface and ground water)

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**Why Sanitation matters?**

<table>
<thead>
<tr>
<th>Eating Drinking</th>
<th>Showering or bathing</th>
<th>Cleaning house</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eating Drinking</td>
<td>Drinking</td>
</tr>
<tr>
<td>Human excreta</td>
<td>Showering or bathing</td>
<td></td>
</tr>
<tr>
<td>Greywater</td>
<td>Cleaning house</td>
<td></td>
</tr>
<tr>
<td>Solid waste</td>
<td>Discarding old stuffs</td>
<td></td>
</tr>
<tr>
<td>Discarding food left over</td>
<td></td>
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</tr>
</tbody>
</table>

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**Sanitation**

2. Objectives of sanitation
Does sanitation matters?

How do you feel about this?
Part 2 Knowledge questions

- What do you think about sanitation?
- Why does sanitation matters to you?
- What are the objectives of sanitation? (reflect on our own environment)
- Looking at the pictures above, how can you better address or stress the importance of sanitation in a given context (such as slum)?
3. Classification of Sanitation

Sanitation systems can be classified in many ways:

a) **Earth and water based (1,3)**

<table>
<thead>
<tr>
<th>Waterborne or wet -</th>
<th>Non waterborne or dry -</th>
</tr>
</thead>
<tbody>
<tr>
<td>requires water for its functioning</td>
<td>no need water for its functioning</td>
</tr>
<tr>
<td>✓ Full flush or cistern flush (water comes from the cistern)</td>
<td>✓ Urine diverting dry toilet (UDDT)</td>
</tr>
<tr>
<td>✓ Pour flush (use of bucket to throw water for flushing purpose)</td>
<td>✓ Dry toilet (sit or squat pan)</td>
</tr>
<tr>
<td>✓ Low flush toilet (flushing mechanism release small quantity of water)</td>
<td>✓ VIP toilet</td>
</tr>
<tr>
<td>✓ Aqua privy</td>
<td>✓ Vault toilet</td>
</tr>
</tbody>
</table>
b) Placement of the treatment unit (1,3)

- **Onsite treatment before disposal** - the treatment of human excreta occur where or close to the source of generation
- **Off-site** - human excreta is removed from the site where it was generated and treated elsewhere.

  - In either case, the waste may be mixed with water or it may not (1). On this basis the following four groups may be distinguished:

<table>
<thead>
<tr>
<th>Required conveyance (off-site treatment)</th>
<th>No conveyance required (treatment or partial treatment on-site)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No water added</strong></td>
<td></td>
</tr>
<tr>
<td>✓Chemical toilet</td>
<td>✓VIP (single or twin pits)</td>
</tr>
<tr>
<td>✓Container toilet</td>
<td>✓Ventilated vault toilet</td>
</tr>
<tr>
<td></td>
<td>✓UDDT</td>
</tr>
<tr>
<td><strong>Water added</strong></td>
<td></td>
</tr>
<tr>
<td>✓Full waterbrone</td>
<td>✓Flushing toilet with septic tank and subsurface soil absorption field</td>
</tr>
<tr>
<td>✓Flush toilet with conservancy tank</td>
<td>✓Low-flow on-site sanitation systems (LOFLOs): Aqua-privy</td>
</tr>
<tr>
<td>✓Shallow sewer</td>
<td></td>
</tr>
</tbody>
</table>
c) Context of use (4,5)

- **Individual facility**
  dedicated for individual household

- **Shared facility**
  - used by a defined number of people (family for example)
  - can be:
    - **Local**
      Single toilet shared at local level by a number of households
    - **Communal**
      Consist of number of toilet dedicated for a pre-defined community or neighbourhood. Comprise shower, laundry points, handwash etc.

- **Public**
  Consist of toilet facilities provided in public areas, dedicated for everyone - member of the public (not confined to a pre-determined user group or settlement)
d) Types and stability of the structure (4,5)

**Mobile facility**
that can be moved from place to another without damaging the infrastructure
✓ MobiSan
✓ CAB (Community ablution block)

**Permanent structure**
facility that is fixed - cannot be moved
✓ Ablution block
✓ Communal toilets
What differentiate a communal facility to a public facility?

What are the key features of a communal sanitation facility?

Shared facility can be local, communal or public. What criteria and features can be used to distinguish these 3 types of sanitation facilities?

In what context a communal facility becomes a public facility? Explain

How can sanitation system be classified?
4. Selection of sanitation systems

- The selection of sanitation system can be done by considering the following factors:
  a) Social, cultural and gender
  b) Institutional and political
  c) Economic and financial
  d) Technical and operational
  e) Health and environmental
a) Social, cultural and gender

- Refers to:
  - Sanitation habits (e.g. handwash)
  - Local customs (religion, beliefs etc.)
  - People practices (washing after use, wiping, handwash)
  - Orientation (basic attitudes, beliefs, feelings)
  - Community roles, involvement
  - Social acceptability (comfort, privacy, dignity)
  - Understanding of the technology/familiarity
  - Gender /Equity and equality (separation male/female or mixed)
  - Safety
  - Ownership (landlord, tenants, pay-as you use)
b) Institutional and political

- Refers to:
  - Urban planning (regulations and enforcement)
  - Institutional arrangements (responsibilities, coordination)
  - Political will
  - Institutional structure (responsibilities, oversight)
  - Policies (laws, regulations, institutional framework)
  - Priority (given to sanitation by decision makers)
  - Willingness and ability by the service provider to operate and maintain the system
c) Economic and financial

- Refers to
  - Availability of fund
  - Willingness and Ability to pay for the service
  - Affordability
  - Cost of construction and O&M
  - Availability of construction materials, parts etc.
d) Technical and operational

- Refers to:
  - Availability of technologies (knowledge, replication)
  - Types of technologies
    - cost, operational requirements and context of use
  - Understanding of the technology
  - Adaptability and upgradability
  - Appropriateness to local conditions
  - Reliability
  - Sustainability
  - Robustness
  - Long term maintenance
  - Technical skills (to operate and maintain, manage)
e) Health and environmental

- Refers to:
  - Contamination
    - Human (waterborne disease...)
    - Environment (air, soil, waterbody)
  - Surface (proximity to water sources, potential pollution/contamination)
  - Ground water (water table level, flooding, potential pollution/contamination)
  - Ground composition (rocky, sandy)
  - Emission (gas, smell/odour)
Other issues to consider

- Depending on the context, the choice of a sanitation system can be influenced by the type or identity of the service provider.

- Service provider for instance can be
  - User – individual needing sanitation referred as self-supply
  - Institutions – municipalities, NGO, CBO, CSO, local and international donors, etc.

- In this case, two scenarios emerge:
  - User or individual choice
  - Institution’s choice
User provides own service provider – (Self-supply)

- **User**
  - ✓ Cost (construction, O&M)
  - ✓ Availability of materials

- **Institutions**
  - ✓ Rules and regulations (health and environmental protection)
  - ✓ Policies
  - ✓ Compliance with building and planning regulations
  - ✓ Settlement conditions (legal status of the land, topography etc.)
Institution provides service

- **User**
  - Feelings of entitlement
  - Type of sanitation facility and size
  - Position of the facility (in house or outside; toilet door facing the house or not, walking distance etc.)
  - Privacy and dignity
  - Appearance of the facility (pedestal colour, form)
  - Pedestal (squatting or seat plates)
  - Context of use (individual, shared, communal etc.) and number of user (ratio)
  - Permanency of the superstructure
  - Comfort and convenience
  - Responsibility for O&M (cleaning, fixing breakages and blockages)

- **Institutions**
  - Cost (construction, O&M, M&E)
  - Conditions of the settlements (e.g. topography, geology etc.)
  - Availability of other infrastructure
  - Climatic conditions (e.g. recurrent flooding, temperature, wind etc.)
  - Institutional arrangements (who is doing what? how and when?)
  - Political will
  - Faecal sludge and greywater handling
  - Position of the site in relation to other human settlements and surroundings
  - Building and planning regulations
Part 4 Knowledge questions

- What criteria would you consider to select a sanitation technology for a given context? Explain
- As a service provider, how will you convince the public about a given sanitation technology? Explain
- What advice would you give to the public regarding the choice of their own sanitation system? Explain
References

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