



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management

# CWIS Approach for Municipalitywide Inclusive Sanitation in Nepal

## Training of Trainers

Power Point Presentation Slide Note for Participant



Part II

August, 2023

### **Material and Learning Application:**

This material is prepared by Environment and Public Health Organization (ENPHO) with the support from “CWISAN Thematic group” for Training Material Development and is to be used for training purposes only. Materials used in the package are for the reference to understand the concept and or to show the practices around the globe and at national level. The package development team do not claim for the materials used in the package as of their own but is the sole property of the respective organization.

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This is the continuation (second part) of the “CWIS TOT slidenotes”. For the earlier session slidenote refer to “CWIS TOT slidenote” part 1.

# Introduction

This document, power point presentation with slide notes, is a supporting document for the trainers/presenter to conduct the "Citywide Inclusive Sanitation Training for Trainers" training. This is a compilation of all the slides to be presented in the training along with the notes for the trainer as of what to describe while presenting the particular slide.

## Objective

The main objective of the document is to guide the content that a presenter would be discussing on each slide. To this, it also provides a preview of all the slides contained in the training along with the slide notes.

## How to Use?

The document consist of slides from all session. Slide notes for each slide is presented just below the slide itself. The trainers or presenter can go through the notes and describe the slides as per the information provide in the slide notes.

For the effective use of the documents, trainer or presenter is recommended to use simultaneously with the "Trainer Manual" with instructions.



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# SESSION 9

## Enabling Environment

Slide 1



"Citywide Inclusive Sanitation – Training of Trainer's"  
**Enabling Environment**  
Resource Person




Government of Karnataka  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management

Slide 2

**Before Starting...**

How do flower get transformed?



**Enabling Environment**  
Factors or environment supporting flower to grow into big tree

1. Sun
2. Rain
3. Wind
4. Butterfly

## Learning from Nepal's Hydropower Sector



[https://www.youtube.com/watch?v=3UlyA\\_qVcKc](https://www.youtube.com/watch?v=3UlyA_qVcKc) (3:43 minutes)

- Hydropower – National Priority Sector (Positive Provisions)
- Priorities in uplifting hydropower sector in Nepal converted Nepal from **Electricity deficient country to electricity surplus country**

Remind the participants of the load shedding phase in Nepal, hours and hours of no electricity, every day life revolved around electricity. And now we have surplus electricity. Nepal declared hydropower as the National Priority Sector, and with this several provisions were made that supported the Upliftment of the sector. Today, Nepal has surplus hydropower...

After watching the given video; also discuss on the provisions that were made for the hydropower sector.

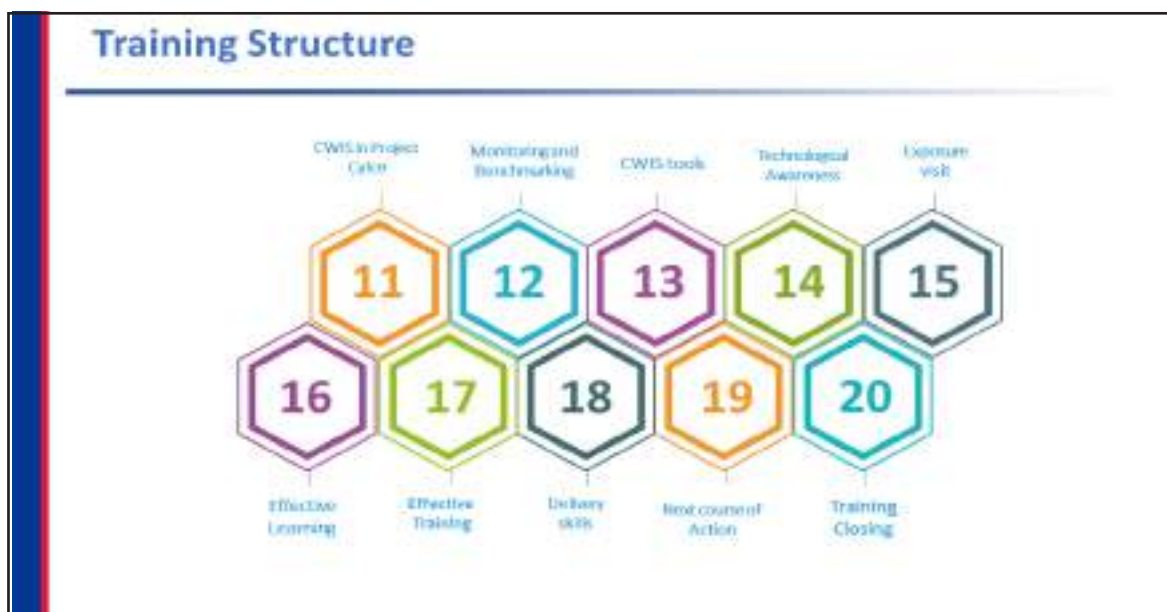
Discuss with participants what are the learnings from hydropower sector that we can apply to sanitation sector ??



This training includes 20 main technical sessions, and are currently on session 9: Enabling Environment



## Slide 5



This training includes 20 main technical sessions, and are currently on session 9: Enabling Environment


## Slide 6

### Learning Outcomes

- Define enabling environment for Sanitation
- Identify factors that create enabling environment for safe sanitation


## Presentation Outline

- Enabling Environment
  1. Legal Instruments
  2. Institutional Arrangement
  3. Sector Financing
  4. Service Provider Capacity
  5. Regulatory Effectiveness
  6. Infrastructure and Technology
  7. Social Acceptance & Affordability
  8. Private Sector Enablement





An illustration of a person with an orange head and green body standing next to a whiteboard on a tripod stand. The whiteboard has several horizontal lines representing text. The person has their right hand on their hip and their left hand pointing towards the whiteboard.


## Enabling Environment




A diagram illustrating the concept of an enabling environment. On the left, a pink flower is shown with a blue arrow pointing to a seedling, which in turn has a blue arrow pointing to a large, mature green tree. To the right of the tree is a list of four numbered items, each with a corresponding icon: 1. Sun, 2. Cloud with rain, 3. Wind, 4. Butterfly.

1. 

2. 

3. 

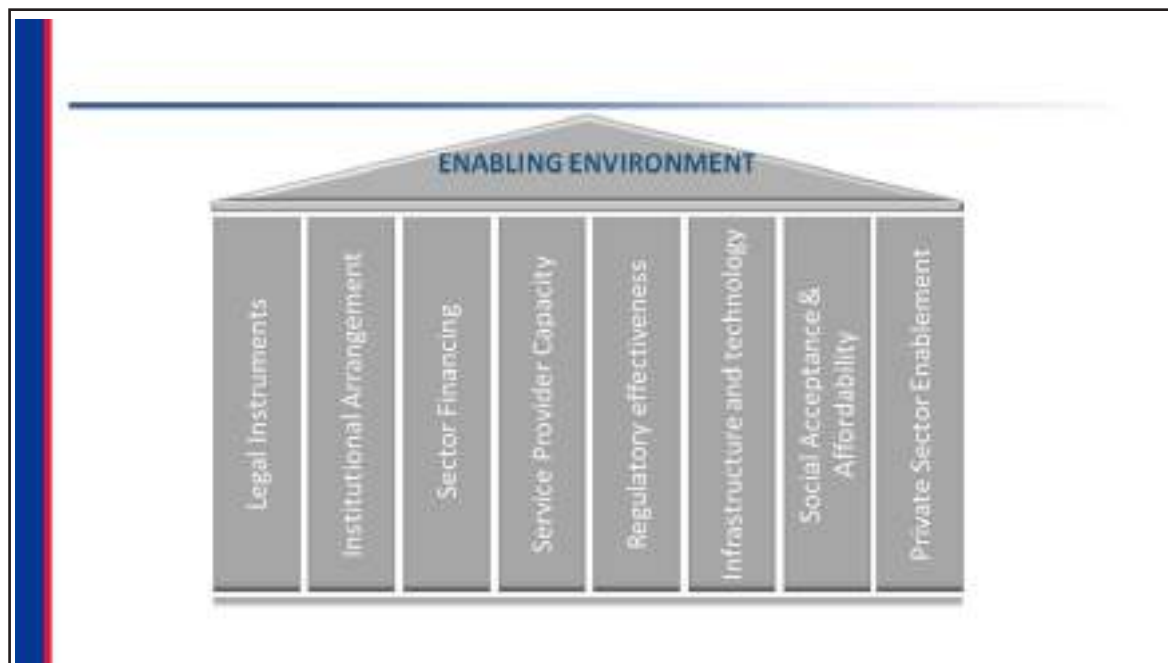
4. 

An **Enabling Environment** is a set of interrelated sector functions that impact the capacity of governments and public and private partners to engage in the WASH service delivery development processes in a sustained and effective manner

Slide 9




Slide 10



Link to the learning from hydropower sector. Inform the participants that as we go ahead on discuss we will analyse the aspects from hydropower case.

## 1. Legal Instruments

- National priority through clear provisions in policy framework
- Provide clear guidance for service delivery including investment
- Incentives and Penalties



## 1. Legal Instruments

### I. Constitution of Nepal



**Fundamental Rights (Section 3)**

- Article 30 (1) – Every citizen has the **right to survive in a clean & healthy environment**.
- Article 35 (4) – Every citizen has the **right to access safe drinking water and sanitation**.
- Article 44 (1) – Every consumer shall have the **right to obtain quality goods and services**.
- Article 44 (2) – A person who has suffered injury from any substandard goods or services shall have the **right to obtain compensation** in accordance with law.

## Slide 13

## 1. Legal Instruments

### ii. Water Supply and Sanitation Act, 2079

#### Water Supply and Sanitation Rights

- Clause 3(2)(क) – Right to quality sanitation service easily and at affordable cost.

#### Water Supply and Sanitation Operation and Management

- Clause 7(1) – Safe and quality water supply and sanitation service operation and management need to be provided by Federal government, Provincial government & Local government.
- Clause 7(2) – The Federal government, Provincial government & Local government can do the water supply and sanitation service operation and management by their self or through organized organization.

## Slide 14

## 1. Legal Instruments

### ii. Water Supply and Sanitation Act, 2079

#### Water Supply and Sanitation Operation and Management

- Clause 7(3) - Through mutual coordination the Federal government, Provincial government & Local government needs to provide basic water supply and sanitation service operation and management by their self or by self owned or controlled organized organization.

#### Licensing

- Clause 9(1) – Need to take license to provide water supply and sanitation service, project or service network survey, construction, operation and management ....
- Provisions regarding the application for license, duration of license, cancellation of license, etc...

## 1. Legal Instruments

### ii. Water Supply and Sanitation Act, 2079

**Service to be provided**

- Clause 18(1) – Licensed organization need to provide or arrange to provide water supply and sanitation service in justifiable way within their service area.

**Tariff fixation commission**

- Clause 28(1) – Provision for Tariff fixation commission for Water Supply and Sanitation service.

**Set Quality Standard**


- Clause 36(1) – The government can set Water Supply Quality Standard and Sanitation Service Standard.

## 1. Legal Instruments

### ii. Water Supply and Sanitation Act, 2079


**Mixing of Wastewater**

- Clause 37(1) – Prohibition to mix or discharge Fecal Sludge mixed or not mixed wastewater in sewer network or discharge Fecal Sludge in river, pond, lake, dam, or society or public land that do not meet Effluent Quality Standard.



**Service Monitoring and Inspection**

- Clause 39 – Ministry of Water Supply to appoint an inspector for Quality Standard implementation, Monitoring and Inspecting.
- Clause 40 – Inspector to regularly monitor wastewater effluent standard based on the collected samples test and analysis.



## Slide 17

## 1. Legal Instruments

---


**ii. Water Supply and Sanitation Act, 2079**

**Service Monitoring and Inspection....**

- **Clause 41** – Inspector to regularly monitor service level of the licensed operator's sanitation service

**Crime and Punishment**

- **Clause 42(1)** – Activities considered as crime:
  - (क) Without permission construction and operation, project or service system regarding Water Supply Service and Sanitation Service;
  - (ख) Water Supply and Sanitation Service use or its misuse without permission



## Slide 18

## 1. Legal Instruments

---

**ii. Water Supply and Sanitation Act, 2079**

**Crime and Punishment**

- **Clause 42(1)** – Activities considered as crime:
  - (क) Damaging or destroying of any structure or installed pipelines or goods or installed meter or purification system or any other equipments regarding Water Supply Service, Sanitation Service, Project or Service system;
  - (ख) Discharging of Wastewater with or without Faecal Sludge below Effluent Quality Standard in sewerage system, or discharging Faecal Sludge directly in river, stream, lakes, ponds, reservoir or public land.
  - (ग) If permitted organization takes tariff against the act provisioned tariff or approved basis or standard.

## 1. Legal Instruments

### ii. Water Supply and Sanitation Act, 2079

#### Crime and Punishment

- **Clause 42(2) – Punishment:**
  - (क) Fine of NRs. 1 Lakh or 1 year imprisonment or both for crime as per Clause 42(1)(क);
  - (ख) Fine of NRs. 1 Lakh for crime as per Clause 42(1)(ख, ग, घ र ट);
  - (ग) 3 month to 1 year imprisonment or Fine of NRs. 5 Lakh or both for crime as per Clause 42(1)(ड to ज).




## 1. Legal Instruments

### ii. Water Supply and Sanitation Act, 2079

#### Crime and Punishment

- **Clause 43 – Compensation:**
  - (2) Appropriate compensation for damaging Water Supply or Sanitation project or service system and their structures.



Slide 21

## 1. Legal Instruments

---

### ii. Water Supply and Sanitation Act, 2079

#### Coordination Committee

- **Clause 55** – Formation of Intra government level coordination committee to suggest government of Nepal for policy & project planning and implementation on subjects related to Water supply and Sanitation;
  - **Minister, Ministry of Water Supply – Chairman**
  - State minister, Ministry of Water Supply; all 7 provinces Provincial Minister, Water Supply related Ministry; Secretary, Ministry of Water Supply; total 7 number including 3 women from Chairman or Vice-chairperson of Local Level representing from each province and appointed by Government of Nepal – **Member**
  - Joint Secretary of MoWS – **Member Secretary**

Slide 22

### WASH Policy draft – Key features on sanitation

Strategy	Working Policies
Gradual improvement, strengthening and integration of water and sanitation service providers	<ul style="list-style-type: none"> <li>Enhancing province and local capacity in project planning, selection and implementation</li> <li>Implementing <b>capacity building programmes</b> to strengthen service delivery capability of service providers and WUSCs</li> <li>Refining policy, act, by-laws, standards and directives on water and sanitation</li> </ul>

## Slide 23

WASH Policy draft – key features on sanitation	
Strategy	Working Policies
Reducing proportion of untreated wastewater and disposal with effective wastewater management	<ul style="list-style-type: none"> <li>• Preparing and application of standards on disposal of domestic, industrial and agricultural wastewater</li> <li>• Expanding sewer network with treatment in dense urban areas. Unregulated disposal of untreated wastewater will be discouraged. On-site sanitation will be promoted in low dense areas</li> <li>• Implementing effective treatment systems in small and emerging towns, not connected to sewer network, to treat human waste</li> <li>• Operation and maintenance cost of sewer network will be done based on cost sharing with local levels and benefited population;</li> <li>• Facilitating in the construction of (public) toilets in each wards</li> </ul>
Planning and implementing Faecal Sludge Management with treatment while ensuring clean and ambient river and lake quality and environment protection	<ul style="list-style-type: none"> <li>• Prioritizing decentralized treatment systems while ensuring ambient quality in the river and streams</li> <li>• During the establishment of wastewater system and construction of treatment plant, federal and provincial government will provide loan or grant depending on need and co-financing arrangements with local levels and communities</li> <li>• Incentivizing engagement of private sector in wastewater management considering financing security and establishment of paripauk fund</li> </ul>
Gradual improvement, strengthening and integration of water and sanitation service providers	<ul style="list-style-type: none"> <li>• Enhancing province and local capacity in project planning, selection and implementation</li> <li>• Implementing capacity building programmes to strengthen service delivery capability of service providers and WUSCs</li> <li>• Refining policy, act, by-laws, standards and directives on water and sanitation</li> </ul>

## Slide 24

1. Legal Instruments		
iii. FSM in other Policy and Legal Documents		
SN	Policy documents	Areas covered
1.	National Policy on Solid Waste Management 2053 (1996)	<ul style="list-style-type: none"> <li>• Enhance public participation through increased public awareness of sanitation, focused on urban and peri-urban areas.</li> <li>• Responsible bodies: Local bodies and SWMC.</li> </ul>
2.	Urban Water Supply and Sanitation Sector Policy 2009	<ul style="list-style-type: none"> <li>• Encourage community participation and <b>public-private partnerships</b> in service delivery.</li> <li>• Innovative on-site sanitation, like ECOSAN to be promoted.</li> <li>• Responsible bodies: Municipalities, local bodies and NGOs, with line agencies to take a facilitation role.</li> </ul>
3.	National Water Resources Strategy, 2077	<ul style="list-style-type: none"> <li>• Compensation from those who pollute water bodies.</li> </ul>
4.	National Urban Policy 2007	<ul style="list-style-type: none"> <li>• No clear provisions</li> </ul>

## Slide 25

1. Legal Instruments		
iii. FSM in other Policy and Legal Documents		
SN	Policy documents	Areas covered
5.	Fifteenth Plan: 2076/77-2080/81	<ul style="list-style-type: none"> <li>Clarity on WWM, FSM, need of effluent discharge standard</li> <li>Envisioned financing WWM/FSM and private sector engagement in the sector</li> </ul>
6.	Sanitation and Hygiene Master Plan (2011)	<ul style="list-style-type: none"> <li>Decentralized sanitation options preferred.</li> <li><b>Community and private sector participation</b> in waste management.</li> <li>Responsible bodies: Local bodies, government and sector stakeholders.</li> </ul>
7.	Vision Paper, Ministry of Urban Development 2069 (2012)	<ul style="list-style-type: none"> <li>Increase public participation and awareness and adopt <b>PPP approach</b>.</li> <li>Responsible bodies: MoUD, municipalities.</li> </ul>
8.	Water Supply Management Board Act, 2063	<ul style="list-style-type: none"> <li>Provisions for Municipality level Water supply and sanitation service operation and management through formation Water supply management board.</li> </ul>

## Slide 26

1. Legal Instruments		
iii. FSM in other Policy and Legal Documents		
SN	Policy documents	Areas covered
9.	Local Government Operation Act - 2074	<p>Local government responsible for</p> <ul style="list-style-type: none"> <li>operation and management of local level projects,</li> <li>Policy, law, standard, project planning, implementation and regulation of basic health, sanitation and water supply.</li> <li>Pollution control and Awareness raising regarding sanitation</li> <li>Collection, reuse, treatment, disposal and setting tariff regarding Solidwaste</li> <li>Operation and management of water supply and sanitation</li> </ul>
10.	Institutional and Regulatory Framework for FSM in Nepal	<ul style="list-style-type: none"> <li>Clear roles and responsibilities of different stakeholders on FSM.</li> </ul>
11.	Total Sanitation Guideline	<ul style="list-style-type: none"> <li>A water-sealed toilet should be connected with properly designed septic tank at both household and institutional level for FSM</li> </ul>

## 1. Legal Instrument – Municipal Level

FSM by-laws Mahalaxmi Municipality




FSM Policy Dhulikhel Municipality



## 2. Institutional Arrangements

- The term “**institutional framework**” refers to a **set of formal organizational structures, rules and informal norms for service provision**
- An **institutional framework for sanitation and water management** consists of a range of different organizations that are in place (or need to be in place) to develop and manage water resources and the delivery of water and sanitation services at different levels of society



*Source: Sustainable Sanitation and Water Management(SSWM) tool box*

How sanitation sector is positioned within the institutional structure at the National level and City level is important and determine its faith further on

## Slide 29

## 2. Institutional Arrangement ...

### i. National Level

SN	Organization	Responsibility
1.	Ministry of Water Supply	<ul style="list-style-type: none"> <li>Development of Policy, law, standard, regulation and project planning/ M&amp;E of National level (or Large) water supply and sanitation projects.</li> </ul>
2.	Department of Water Supply and Sewerage Management	<ul style="list-style-type: none"> <li>Project planning, implementation, M&amp;E of National level (or Large) water supply and sanitation projects.</li> <li>Prepare design, planning and O&amp;M guidelines regarding water supply and sanitation projects</li> </ul>
3.	Federal Water Supply and Sanitation Project Offices	<ul style="list-style-type: none"> <li>Project planning, implementation, M&amp;E of National level (or Large) water supply and sanitation projects.</li> </ul>
4.	Kathmandu valley Water Supply Management Board	<ul style="list-style-type: none"> <li>Asset owner of Water supply and sanitation system</li> <li>Can hire operator for providing Water supply and sanitation services</li> </ul>

## Slide 30

## 2. Institutional Arrangement ...

### i. National Level

SN	Organization	Responsibility
5.	Water Supply Management Board at Bharatpur, Hetauda, Dharan & Kavre	<ul style="list-style-type: none"> <li>Asset owner and operator of Water supply and sanitation services</li> </ul>
6.	Kathmandu Upatyaka Khanepani Limited	<ul style="list-style-type: none"> <li>Development of Policy, law, standard, regulation and project planning/ M&amp;E of National level (or Large) water supply and sanitation projects.</li> </ul>
7.	Nepal Water Supply Corporation	<ul style="list-style-type: none"> <li>Provide water supply service at 22 municipalities.</li> </ul>

## 2. Institutional Arrangement ...

**ii. Provincial Level**

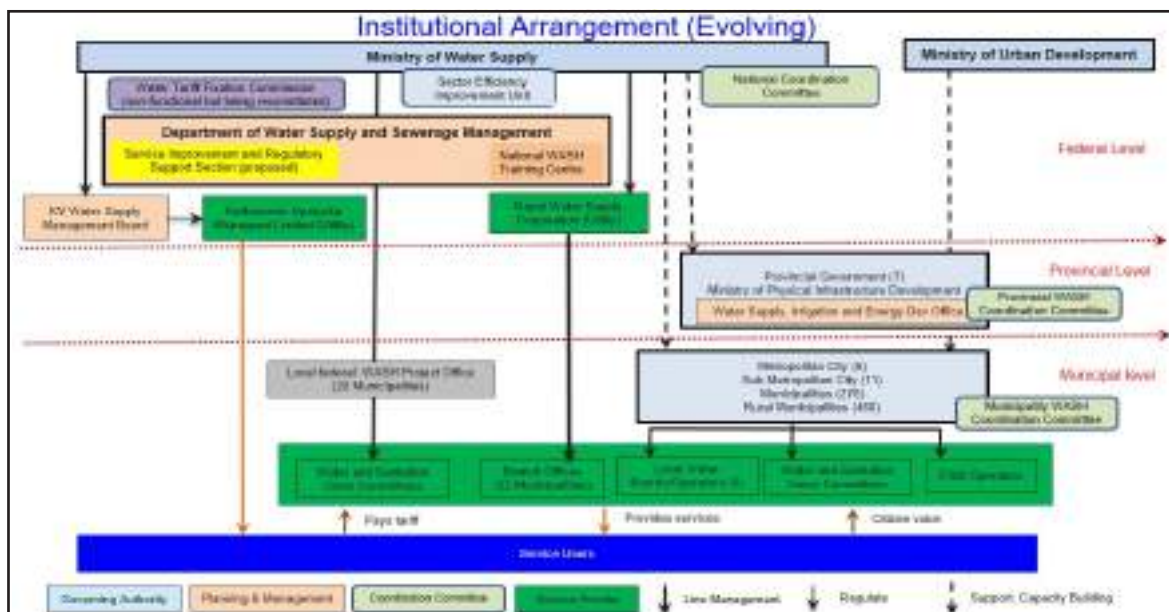
SN	Organization	Responsibility
1.	Provincial Ministry working related to Water Supply and Sanitation	<ul style="list-style-type: none"> <li>Development of Policy, law, standard, regulation and project planning/ M&amp;E of Provincial level water supply and sanitation projects.</li> </ul>
2.	Provincial Water Supply and Sanitation Offices	<ul style="list-style-type: none"> <li>Project planning, implementation, M&amp;E of Provincial level water supply and sanitation projects.</li> </ul>

## 2. Institutional Arrangement ...

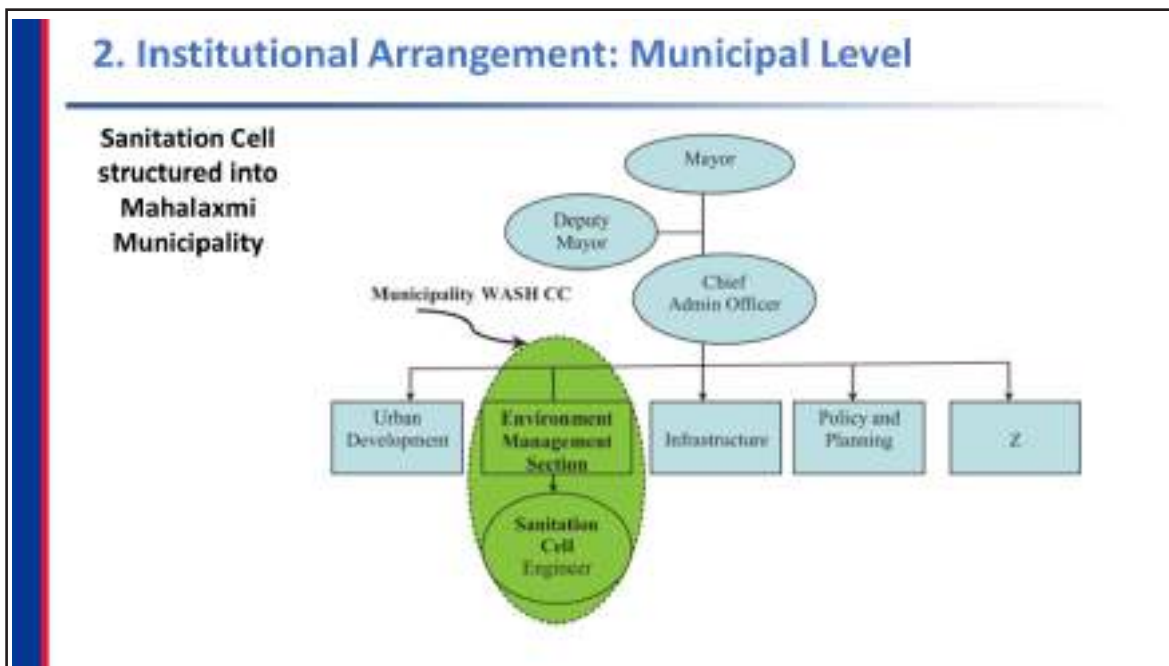
**iii. Local Level**

SN	Organization	Responsibility
1.	Municipality/ Rural municipality	<ul style="list-style-type: none"> <li>Development of Policy, law, standard, regulation, project planning/ M&amp;E including operation and maintenance of Local level water supply and sanitation projects.</li> </ul>
2.	Water Supply and Sanitation User's Committee	<ul style="list-style-type: none"> <li>Operation and maintenance of water supply and sanitation projects.</li> </ul>

Slide 33



Slide 34



### 3. Sector Financing

Investment is required across the sanitation chain: from the equipment used by sanitation entrepreneurs for collection; to the provision of decentralized transfer stations, essential for incentivizing FSM businesses to serve low-income areas; to faecal sludge treatment facilities, which ultimately secure positive citywide impacts on health, environment and wellbeing.

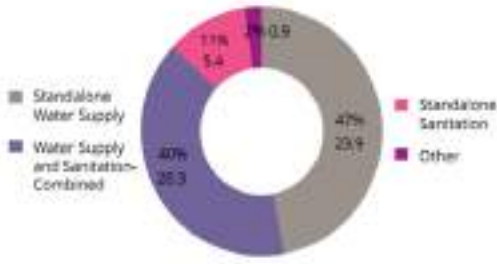



### 3. Sector Financing


#### I. Government Sector (all 3 Tiers)

- NPR 50.5 billion is 1.4 percent of the GDP and 2.8 percent of the federal and provincial combined overall budget
- Major financing source on WASH Sector
- Priority increasing to finance on FSM

WASH BUDGET ALLOCATION BY SANITATION AND WATER SUPPLY - 2021/22  
in billion NPR



BUDGET ALLOCATION TREND IN STANDALONE SANITATION 2016/17 TO 2021/22  
in billion NPR



Category	Percentage	Value (billion NPR)
Standalone Water Supply	47%	23.9
Water Supply and Sanitation-Combined	40%	20.3
Standalone Sanitation	11%	5.4
Other	2%	0.9

Year	Value (billion NPR)
2016/17	3.7
2017/18	3.8
2018/19	4.6
2019/20	6.8
2020/21	4.1
2021/22	5.4

Source???



## Slide 37

### 3. Sector Financing

#### ii. Development Partners

- Different development partners contribute for the development of WASH sector. DPs provide technical and financial support for the developmental works
- Financing may be either on Loan or Grant

#### iii. Private Sector

- Private organizations are needed to provide ease service and for sustainable solutions
- To meet the National as well international commitments (like SDG), Private financing is essential. WASH sector needs to explore much for Private financing

## Slide 38

### 4. Service Provider Capacity

- **FSM service provider** mainly work on **construction of toilets, its cleaning and transportation** of Faecal Sludge in Nepal.
- **Improving the operational efficiency of FSM service providers** will be essential in the short to medium term, positioning them to provide safe sanitation products and services in the long term without prolonged external support.



## 5. Regulatory Effectiveness

Safe and equitable FSM service provision depends on well-designed regulations to formalize the sector and provide clear guidelines for those working within it. Regulations cover every aspect of sanitation service provision, from safe emptying practices to treatment and proper disposal/reuse including setting tariffs to support for businesses.



## 5. Regulatory Effectiveness

**Regulatory Works for FSM includes**

- **Licensing requirements for FSM service provider,**
- **Set minimum standards for on-site sanitation facilities** in homes, for transportation of FSM, for treatment, effluent quality and disposal/reuse,
- **Development of guidelines & SOP for minimal standards for FSM** (including toilet design, toilet emptying procedures, and storage and treatment facilities)

The **Water Supply and Sanitation Act, 2079 (2022)** has envisioned

- Water Supply and Sanitation Tariff Commission, and
- Provision for appointing a Regulator by MoWS for inspection and regulation of water supply and sanitation services.

Slide 41

## 6. Infrastructure and Technology

Infrastructure and appropriate technology is required across the sanitation chain:

- from the construction of toilets and storage system;
- equipment used by sanitation workers to empty pits and septic tanks;
- to transfer the faecal sludge to the faecal sludge treatment facilities;
- installing appropriate FSTP and its proper O & M,

It helps for sustainable sanitation solutions which ultimately have citywide impacts on health, environment and wellbeing.

Accessibility, Affordability, Appropriateness and Easiness to use are the key things to be considered for selecting any Infrastructures or Technology.

Slide 42

## 7. Social Acceptance & Affordability

Social acceptance and affordability is one of the key factor essential for promotion and continuous use of the FSM infrastructure and products

Construction of toilet, its utilization, timely emptying the containments, construction of FSTP, utilization of FSTP etc. all depends on the social behaviour and the affordability of the public.




## 7. Social Acceptance & Affordability

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**Golbazar Municipality in Siraha struggling to keep poop in the loop**

Aawaaj News; March 26, 2021



**Kirtipur Municipality struggling in Fecal Sludge Management for want of treatment plant**

Aawaaj News; February 26, 2021

## 8. Private Sector Enablement

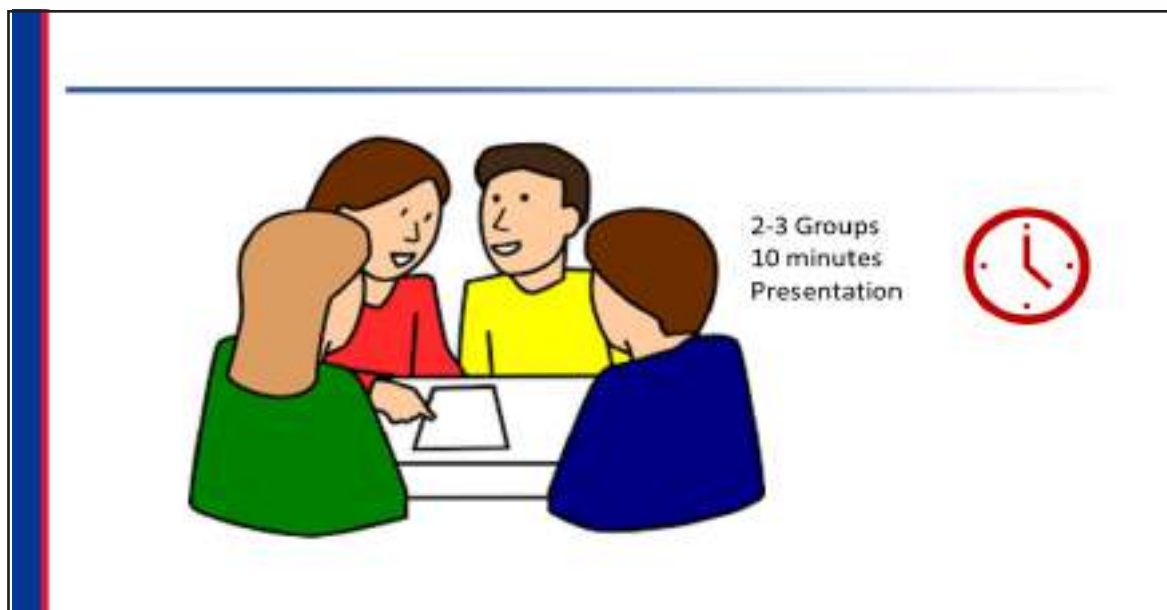
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- Public Utility operators and local governments struggle to deliver safely managed sanitation to residents at the scale required to serve everyone in many municipalities.
- Private sectors in Sanitation have a critical role to play in helping to bridge the service gap, offering efficiency, innovation and flexibility to address complex issues.
- FSTP designing, Construction works, Cleaning of Septic tank, Transportation of Faeces, FSTP O & M are some of the examples of private sector involvement in the FSM. But their **involvement in the sector is very limited** which needs to be evolved for achieving the national and international targets as well as better environment.





## Slide 45



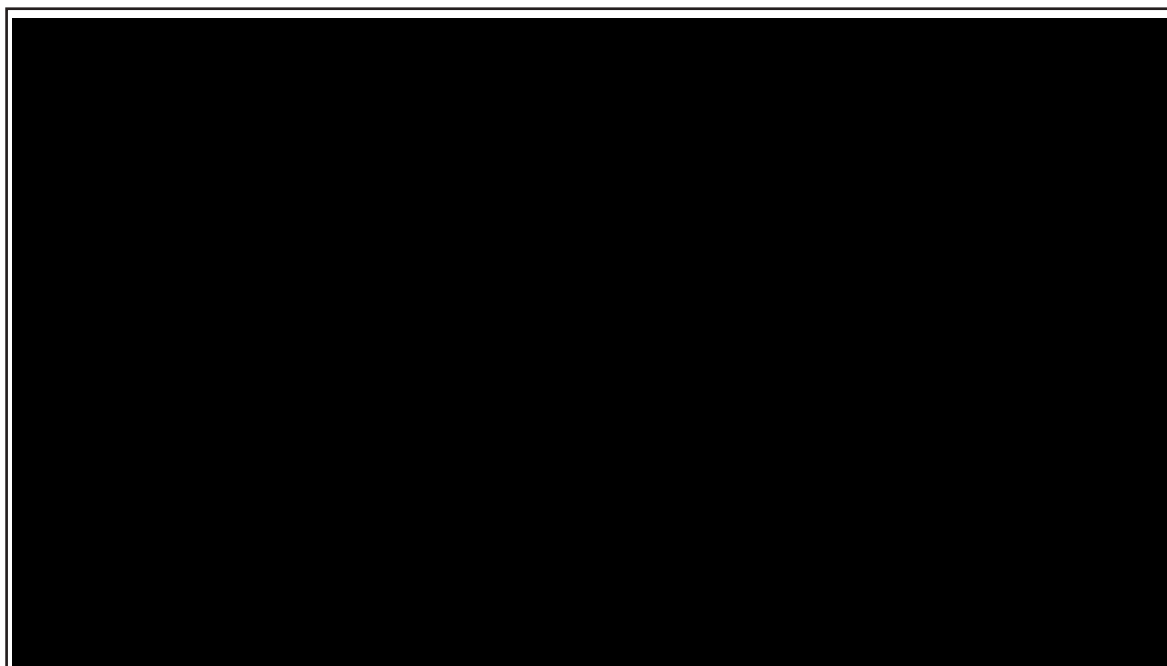
Sanitation Workers Case ☑ Watch youtube video (<https://www.youtube.com/watch?v=8Dx9PW-JSEyo&list=PLMI6wivbm5ZkXGnadUg23GTzmePw3M-HU>)

Group work (10 minutes)

Group presentation (2 to 3 minutes each group)

For this group activity, divide the participants into two to three groups (not many to limit the time for the group presentation). After watching the video, ask the participants to identify the appropriate enabling environment to address this grim issue in our country. Consider all the enabling environment pillars discussed in the session. Refer to the youtube video on hydropower case shown during the introduction to this session.

## Slide 46



<https://www.youtube.com/watch?v=8Dx9PWJSEyo&list=PLMI6wivbm5ZkXGnadUg23GTzme-Pw3M-HU> (3:55 minutes)

Yet another revolutionary initiative by  
**Shri Naveen Patnaik**  
Hon'ble Chief Minister of Odisha

**Garima**  
Scheme for Safety & Dignity of Core Sanitation Workers  
Dealing with faecal matter in toilets / septic tank / sewer and treatment facilities

State level Launching on 11th March 2024  
5.00 pm on various Platforms

To benefit 1 lakh Core Sanitation Workers & their families

Special category of employees  
Training  
Provision of PPE  
Special Risk & Incentive  
Social Security  
Free transport facilities  
Other allowances to compensate the higher responsibility  
Free availability of medicines for the core sanitation workers  
20% extra of normal Overtime Pay  
Waiver of all financial penalties, suspensions & detentions  
Setting up of Emergency Response Team

Ministry of Urban Development, Government of Odisha

Linking to India's experience to address such issue, inform the participants India's Garima project (Video showed during the safety case) addresses the needs and issues of sanitation workers in India. The icons included in the slides show some of the arrangements done by the Odisha government.

Government of Odisha has prioritize the issues of Sanitation workers, inform them that further information can be found in internet, it is good to understand how our neighbouring country is addressing such crucial issue on sanitation.

## Key Messages

- Most of the legal and policy documents have no clear provisions for FSM;
- As of now, FSM institutional and regulatory framework clearly indicates roles and responsibilities;
- Based on the local context and requirements, local governments (Municipalities and Rural Municipalities) have authority to formulate their own local FSM policies, guidelines and frameworks;
- We need to work together to build local capacity, exchange of knowledge and expertise to ensure proper and sustainable FSM at the local level.

## Slide 49

## References

- <https://www.youtube.com/watch?v=M8CuHRBzFHw>

## Slide 50

Thank you!  
धन्यवाद !

  
Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
DWSM Building, Changuinara, Maheshpur, Kathmandu, Nepal  
Phone: 977 011 5548 4118151  
Website: www.dwsrpn.gov.np

Technical Support  
  
Environment & Public Health Organization (EPHO)  
Kathmandu, Nepal  
Phone: 977 011 5548 4118151

# SESSION 10

## Private Sector Engagement



## Slide 1



**"Citywide Inclusive Sanitation – Training of Trainer's"**  
**CWIS and Private Sector Engagement**  
 Resource Person




Government of Karnataka  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

## Slide 2

**Before we start...**

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How can one relate private sector engagement with CWIS outcome?



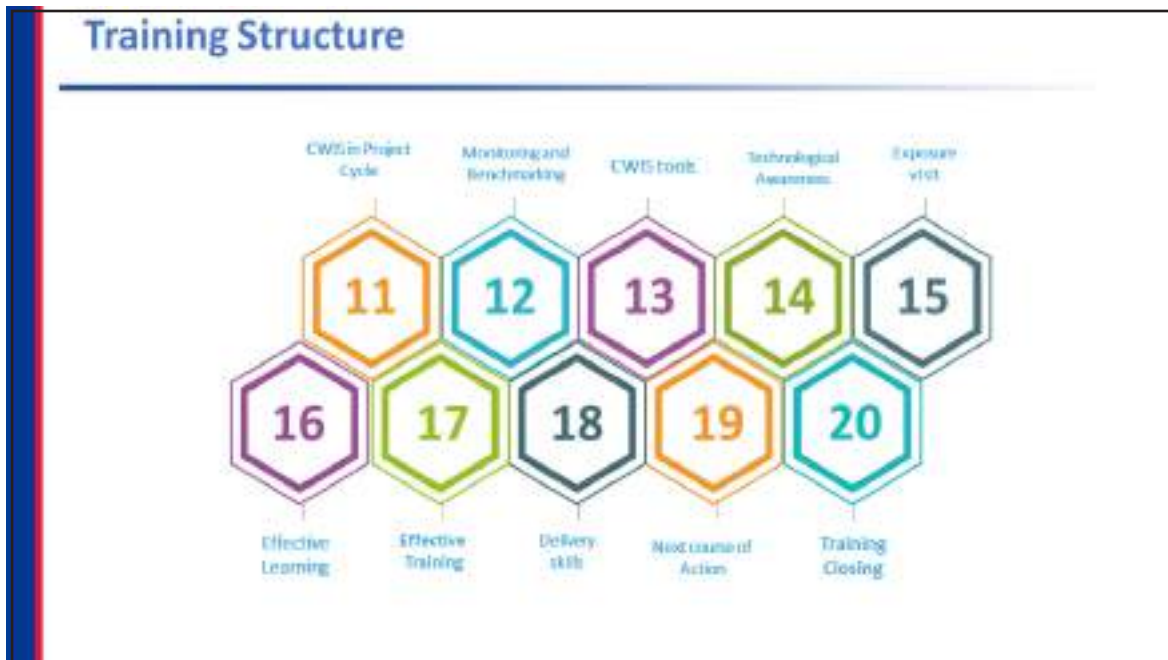
2 to 3 responses

As discussed on earlier session, 'Enabling Environment' one of the important stakeholder for equitable, safe and sustainable outcomes is the engagement of private sector.

Ask participants how they can relate it- private sector engagement with CWIS outcome.  
 Collect 2 to 3 responses from participants



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools- SFD




This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools- SFD

## Slide 5

## Learning Outcomes


1. Define the role of private sector as a key stakeholder in CWIS implementation.
2. Analyze the engagement of private sector in sanitation service delivery based on experience sharing.



## Slide 6

## Presentation Outline

- Experiences Sharing
  - Initiatives in sanitation service provision
  - Opportunities and challenges while delivering the services
  - Scope of replication of the initiatives



Slide 7

**Initiatives in Sanitation Service Provision**

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Slide 8

**Opportunities and Challenges**

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Slide 9

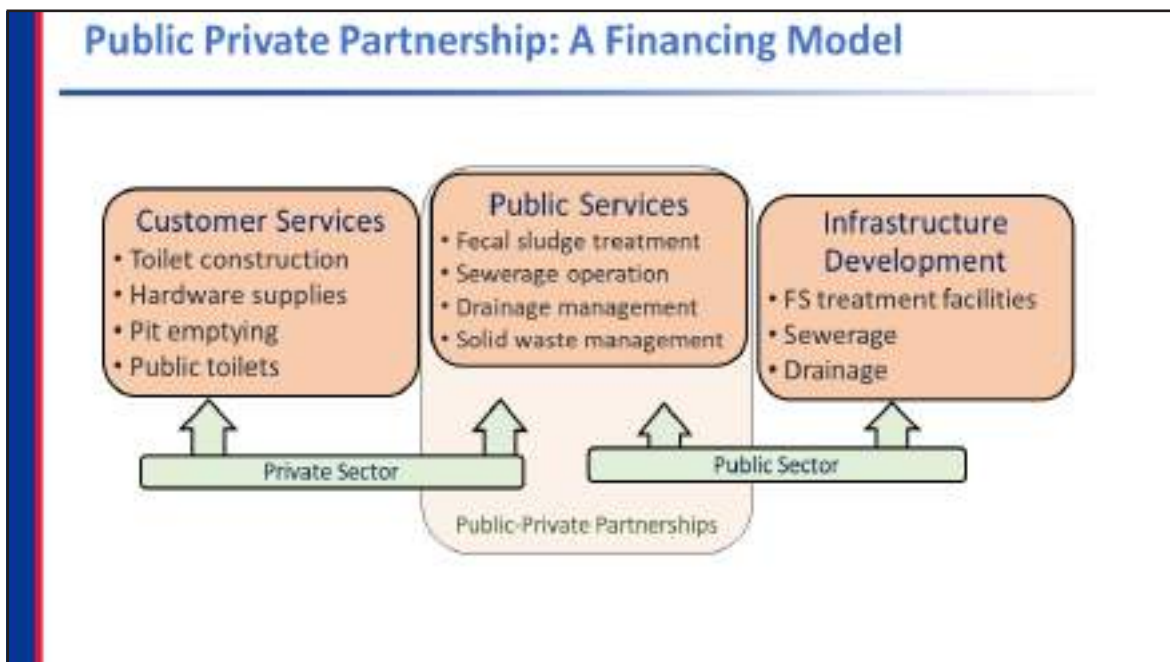
## Scope of Replication of the Initiatives

Slide 10





Ask the participants, where could be the positioning of free market, restricted market and PPP in the sanitation chain. (Free and Restricted market in the individual services, or the purchase of equipments (eps. In yellow areas) and PPP in green areas.



Many factors need to come together to achieve a positive sanitation outcome. These are some of the key ones. Both the public and private sectors will typically be involved. At the upstream end of the service chain, people are usually willing to pay to free themselves of fecal waste, but they may be less willing or able to pay for the public benefits provided by the downstream parts of the chain, so public funds are usually required as well. Whoever provides the services, effective local governance is needed to provide an enabling environment, which itself depends on the national policy, legal, institutional, regulatory and financial environment.

## Slide 13

## Framework for Presentation

- Introduction of the organization- 2 slides
  - Goal
  - Mission/ vision
- Scope of private sector in sanitation- 1-2 slides
- Initiatives – 2-3 slides
- Success and Challenges of private sector in sanitation- 4-5 slides
- Scope for replication- 1-2 slides

## Slide 14

Thank you!  
धन्यवाद !



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
DWSM Building, Thapathali, Kathmandu, Nepal  
Phone : 977-01-4415745, 4418054  
Website : [www.dwsms.gov.np](http://www.dwsms.gov.np)

Technical Support



Environment & Public Health Organization (EPHO)  
Apoorva Marg, 1, Thapathali, Kathmandu, Nepal  
Phone : 977-01-4418041 | Website : [www.ephonp.org](http://www.ephonp.org)

# SESSION 11

## Integrating CWIS in Project Cycle



Slide 1



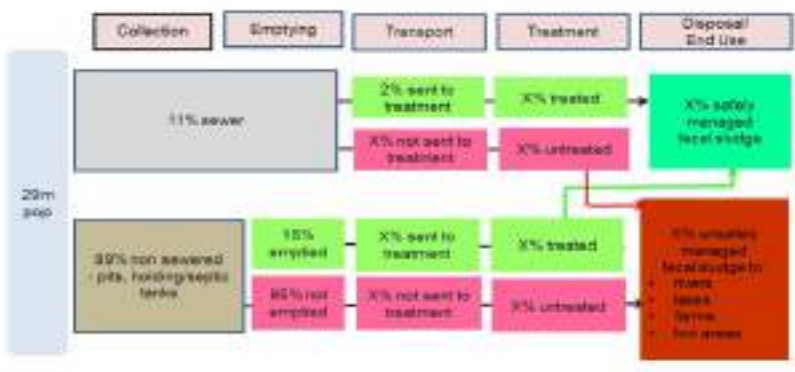
"Citywide Inclusive Sanitation – Training of Trainer's"  
**Integrating CWIS in Project Cycle**  
 Resource Person

Government of Nepal  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

Slide 2

### Urban Context in Nepal

- Within 1 decade of period urban population has increased by more than 3 folds
- Sanitation management is one of the emerging challenge for urban cities



Collection	Emptying	Transport	Treatment	Disposal End Use
11% sewer	2% sent to treatment 8% not sent to treatment	X% sent to treatment X% not sent to treatment	X% treated X% untreated	X% safely managed local sludge X% untreated managed local sludge to rivers, lakes, ponds, low areas
89% non sewer (pits, holding/septic tanks)	18% emptied 71% not emptied	X% sent to treatment X% not sent to treatment	X% treated X% untreated	X% safely managed local sludge X% untreated managed local sludge to rivers, lakes, ponds, low areas

20m pop

Source: UN-Habitat Nepal

### CWIS Approach

- CWIS is an approach to urban sanitation to achieve safely managed sanitation for all urban dwellers
- Holistic and comprehensive approach to manage human waste throughout the sanitation service chain

The diagram illustrates the CWIS sanitation service chain through six sequential stages, each represented by an icon and a label in a blue arrow-shaped box at the bottom:

- CAPTURE:** An icon of a person sitting on a toilet inside a house.
- CONTAINMENT:** An icon of a person standing next to a large blue container.
- EMPTYING:** An icon of a person operating a vacuum truck.
- TRANSPORT:** An icon of a truck carrying a large container.
- TREATMENT:** An icon of a wastewater treatment plant.
- SAFE REUSE OR DISPOSAL:** An icon of a tractor pulling a trailer, representing the final stage of the waste management process.

### CWIS Approach

- Inclusive and integrated sanitation services for all urban residents including both off and onsite sanitation system
- Integrated urban sanitation solutions including drainage and solid waste management

The slide features two images that illustrate the concept of integrated urban sanitation:

- Left Image:** A photograph showing a person in a white shirt and dark shorts emptying a large blue container into a trash bin. The ground is covered with various pieces of trash, representing solid waste management.
- Right Image:** A circular inset showing a close-up of two large, dark pipes. Turbid, brownish water is flowing through the pipes, representing the drainage and wastewater management component of the system.

Slide 5

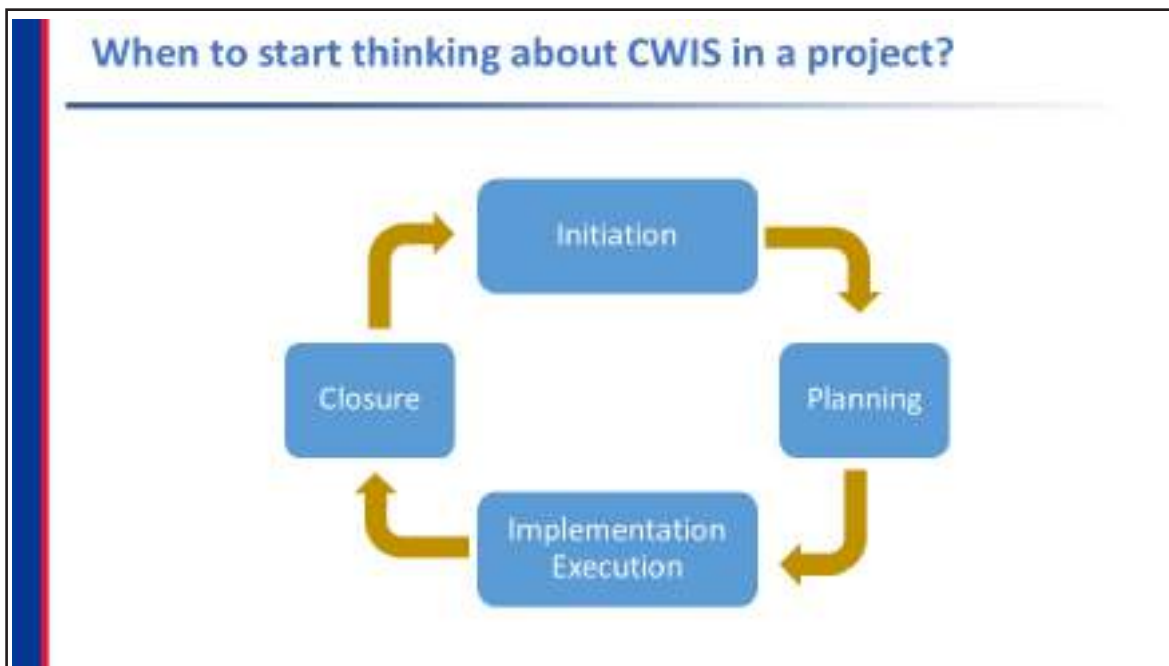
### CWIS Approach

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#### CITYWIDE INCLUSIVE SANITATION SERVICE FRAMEWORK

CORE CWIS OUTCOMES	<b>EQUITY</b>  <p>Services reflect fairness in distribution and prioritization of service quality, prices, deployment of public finance/ subsidies</p>	<b>SAFETY</b>  <p>Services safeguard customers, workers and communities from safety and health risks by reaching everyone with safe sanitation</p>	<b>SUSTAINABILITY</b>  <p>Services are reliably and continually delivered based on effective management of human, financial and natural resources</p>
	<b>RESPONSIBILITY</b> <p>Authority(s) execute a clear public mandate to ensure safe, equitable and sustainable, sanitation services for all</p>	<b>ACCOUNTABILITY</b> <p>Authority's(ies)' performance against its mandate is monitored and managed with data, transparency, and incentives</p>	<b>RESOURCE PLANNING AND MANAGEMENT</b> <p>Resources—human, financial, natural, assets—are effectively managed to support execution of mandate across time/space</p>

Slide 6



In most of the project cycle , project phases are similar , but, depending upon the nature of the project and its objectives, different steps and activities may be carried out



This training includes 20 main technical sessions, and are currently on session 10: Integrating CWIS in Project Cycle




This training includes 20 main technical sessions, and are currently on session 10: Integrating CWIS in Project Cycle

## Slide 9

## Learning Outcomes

- Relate all components of CWIS framework into a project cycle
- Apply CWIS approach in project planning, implementation and monitoring and evaluation of the project




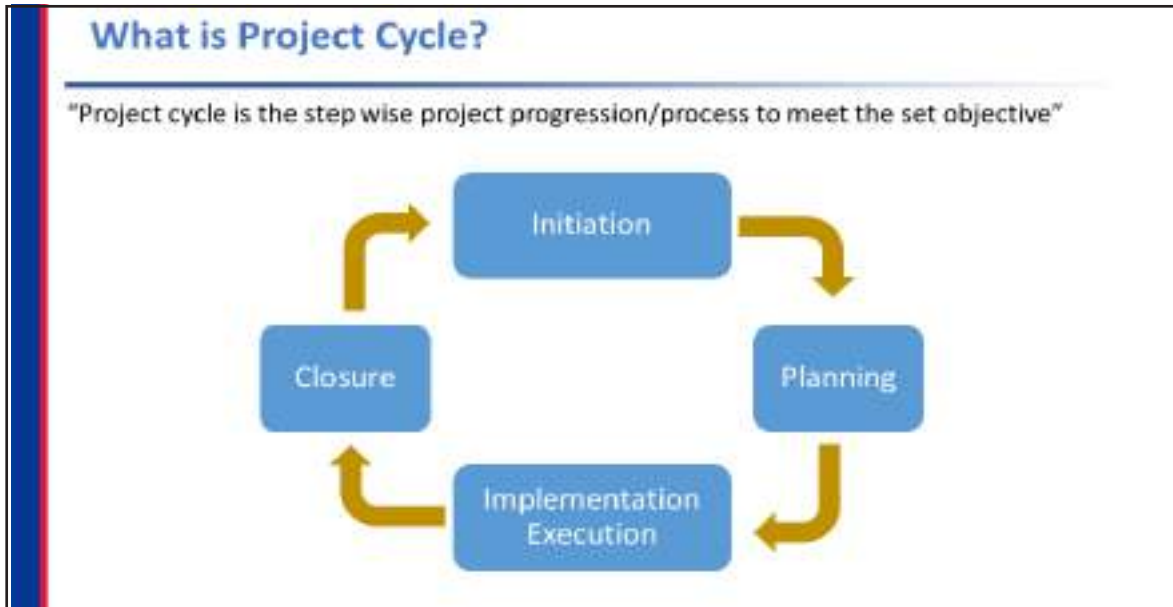
At the end of the session, participants will be able to ...

## Slide 10

## Presentation Outline

- What is Project cycle?
- Project cycle in CWIS
- Step 1: Initiation of CWIS
- Step 2: Planning and Organizing
- Step 3: Project implementation and monitoring
- Monitoring and Evaluation
- Case study
- Key Messages





They are going for a group work. For this, participants will be provided a case and will be divided into 4 groups

## Slide 13

## Case I

"A" municipality designed centralized sanitation treatment system to treat 17MLD of sewage with the support of ABC project. The project had developed centralized treatment system with following assumptions :

- Required sewage will be generated by sewer connection to the municipal HHs,
- The treatment system will be fully functional as designed.

The project had designed sanitation system without assessing the sustainable run of the system such as –sanitation need assessment, appropriate technology selection, capacity building etc. After completion of project, the system received significantly less amount of sewage. Surprisingly, system is more catering the FS of the municipal HHs.

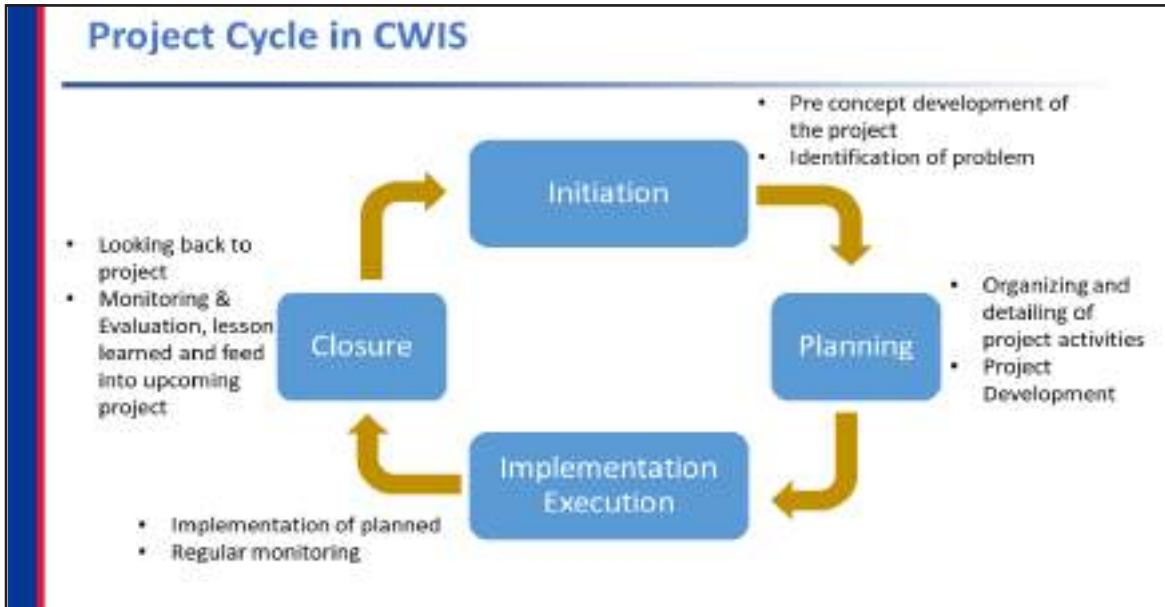
## Slide 14

## Case II

"B" municipality has prioritized safely managed sanitation in their municipal planning. The municipality is also practicing institutional set up by appointing dedicated sanitation focal person, formulating policy guideline, building the capacity of staffs and allocating good amount of sanitation budget. In addition, municipality has conducted sanitation assessment and found municipality has acute problem of FSM, however, the municipality is still not in the position to construct FSTP and this resulted unsafe disposal of FS.

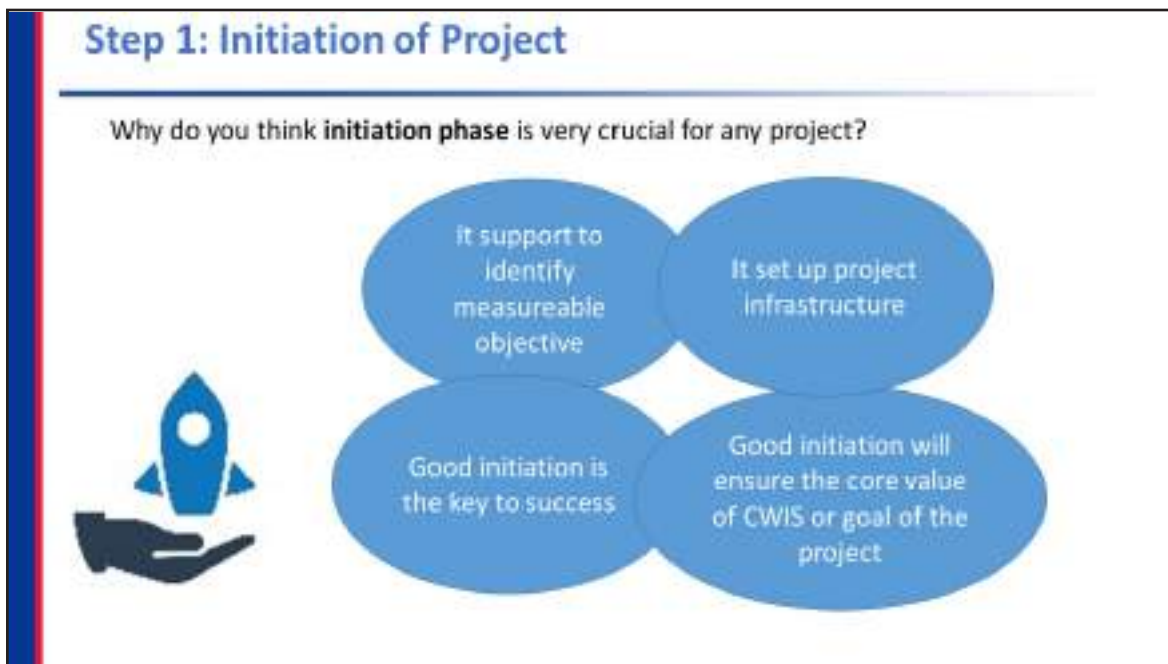
**What are the problems in Case I and II ?**

Five minutes will be provided to participants to read and understand problems of both cases. These case studies will facilitate participants to identify the problem during various stage of sanitation project. After discussion on both cases, upcoming slides will bridge the gaps in sanitation project by integrating CWIS approach in project cycle.



Implementation- regular update of the activities

Baseline survey- indicators must identified in planning phase ( if resources are available), closure – impact assessment



Brain storming at the beginning . Aims to know the understanding of the participants.




Slide 17

### Step 1: Initiation of the project

- **Identification of problems** is the first and important step of the project cycle;
- Clear identification of the problems and needs contributes to designing a solid and pragmatic project;

**What are the problems?**



Stakeholder dialogue

• Pre advocacy

• Discussion and consultation

• Identifying commitment


Pre advocacy on the project and FGD with municipal/city decision maker to identify the major problem and collect their vies.  
 Identify the municipality/city’s commitment and willingness towards the project  
 This step need series of discussion and pre advocacy  
 Pre advocacy will be made through Sensitization on need of urban sanitation/ challenges ( for decision makers) which will trigger them to provide commitment towards the project

Slide 18

### Step 1: Initiation of the project

- Outline the **objective of the project**
- Outline the scope of work
- **Data collection**
- Secondary data collection
  - Comprehensive literature review
  - Consolidation of existing data/information
  - Conduct initial level sanitation assessment (eg- SFD Lite)

**Project Initiation**



Advocacy is powerful when it is based on data and evidence!

Consolidation of existing data- demographic information, sanitation situation  
 Data collection exists in the all phases project cycle.  
 Use lite SFD for initial sanitation assessment

### Step 1: Initiation of the project

Godawari Municipality, Province No. 3, Nepal  
 Sanitation Feasibility Study Level: SFD Line  
 Date prepared: 29 Nov 2019  
 Prepared by: UNICEF/WHO, South Asia/WHO/UNICEF

- Present sanitation management problem in the city
- Provide important information to decision maker and service provider
- Powerful tool for advocacy

### Step 1: Initiation of the project

- Initial assessment focusing on both **enabling environment** (policy, institutional setup, regulatory framework etc.) and **infrastructure & services**
- Developing a **concept note for the pre-feasibility/assessment study**
  - Set objectives and approach
  - Estimate tentative budget
- May require **technical support from consultants/experts** for project development

Source: ConCad training materials

Initial assessment will be more focus on meeting interaction, observation on their services, priority however the initial assessment must address both sanitation infrastructure and service and enabling environment for safely and sustainable sanitation

Slide 21

### Step 1: Initiation of the project

- Defining clear TOR to ensure CWIS components are included

**Components of TOR**

- Enabling Environment
- Market and Business Assessment
- Private Sector Engagement
- Financial Assessment
- Innovative Technologies
- Integrated Municipal Information Management System
- ESIA
- CRVM
- Health Impact Assessment


Source: IsDB

The idea here is to show that the design of TOR already addresses one or more than one of the CWIS outcomes and functions. While they might be particularly addressing one or more CWIS framework but integrally all of the components of 2\*3 matrix are covered. And how they are and will be covered is dependent on the approach that we take. The ToR components are dependent upon the project of the nature. This example is from IsDB project output is delivered from consultancy services

Other components may require as per requirement  
 ESIA- Environmental and social impact assessment  
 CRVM

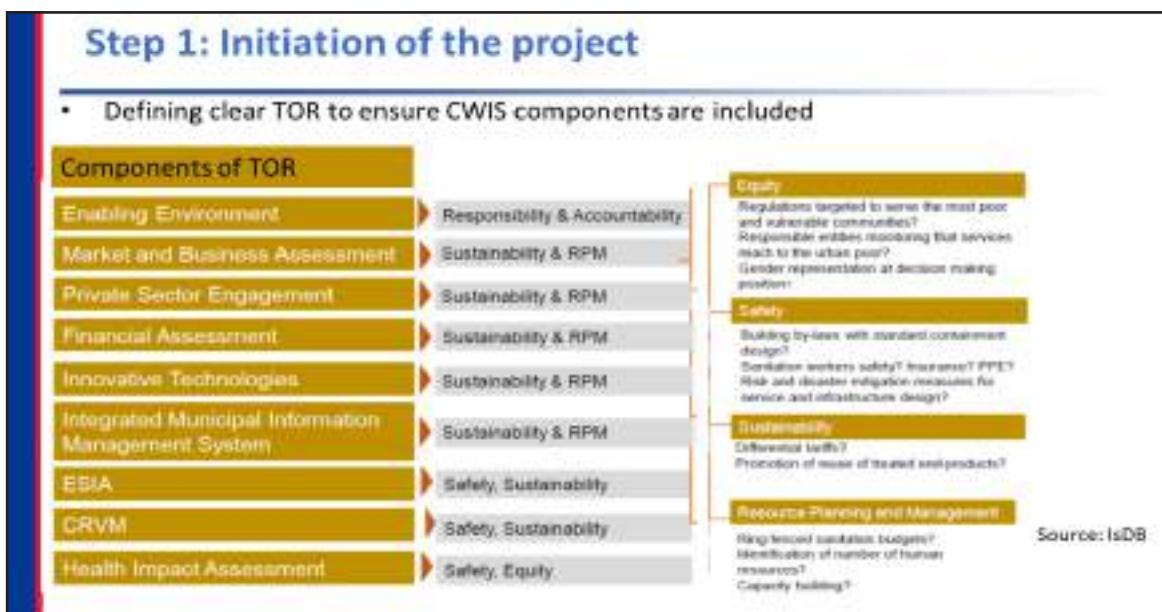
Slide 22

### Group Activity



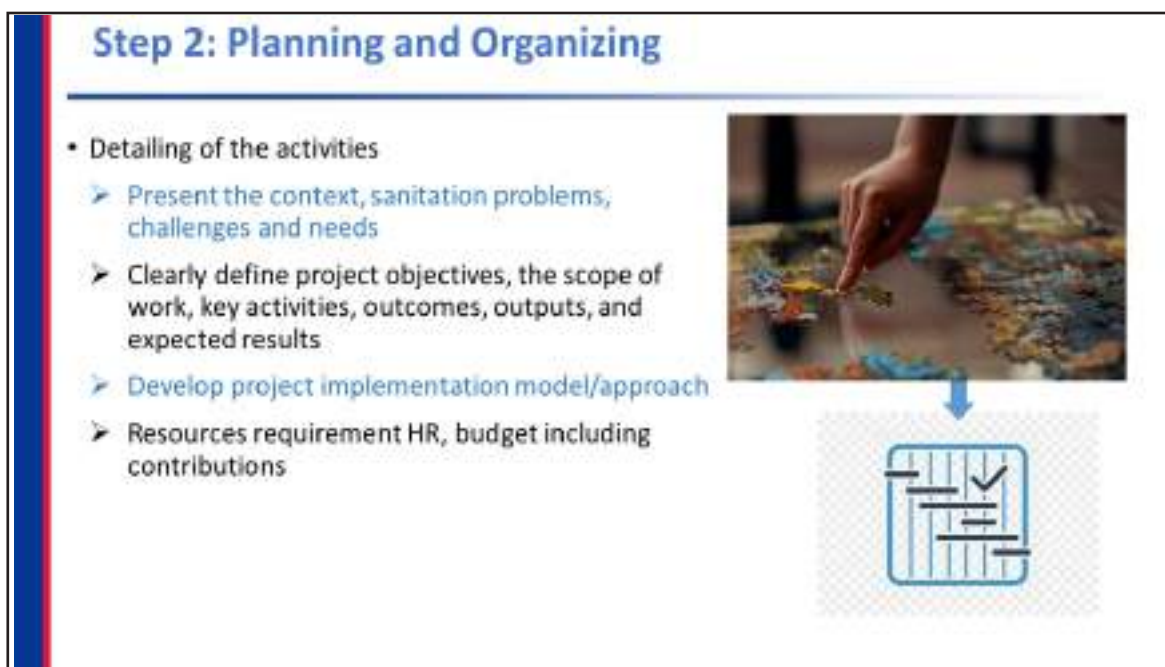
4 Groups  
5 minutes

They are going for a group work. Provide a handout to 4 groups from earlier activities and ask to discuss and write down/ note down which of the component of CWIS framework is addressed through each point of the components of ToR.



The idea here is to show that the design of TOR already addresses one or more than one of the CWIS outcomes and functions. While they might be particularly addressing one or more CWIS framework but integrally all of the components of 2\*3 matrix are covered. And how they are and will be covered is dependent on the approach that we take. The ToR components are dependent upon the project of the nature. This example is from IsDB project output is delivered from consultancy services

Other components may require as per requirement  
 ESIA- Environmental and social impact assessment  
 CRVM



Objectives are may not static, for more clarity, objective may change during different phases of project

Slide 25

## Step 2: Planning and Organizing

Most important | Identify stakeholders and their roles & responsibilities

Source: WSP 2009

Identifying roles and responsibilities of stakeholders are very important because it will minimize the risk of confusion during project implementation and also reduce the risk of duplication which ultimately support to manage time and resource.  
 Note: This slide can be redesigned as per Nepalese context

Slide 26

## Step 2: Planning and Organizing

	AGENCY	CITY	REGULATORY
REGIONS/LEVELS	<ul style="list-style-type: none"> <li>Identify project objectives in line with the national and provincial urban planning, policies, and development of public services</li> <li>Identify stakeholders</li> <li>Identify roles and responsibilities of stakeholders in line with the national and provincial urban planning, policies, and development</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> </ul>	<ul style="list-style-type: none"> <li>Identify project objectives in line with the national and provincial urban planning, policies, and development of public services</li> <li>Identify stakeholders</li> <li>Identify roles and responsibilities of stakeholders in line with the national and provincial urban planning, policies, and development</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> </ul>	<ul style="list-style-type: none"> <li>Identify project objectives in line with the national and provincial urban planning, policies, and development of public services</li> <li>Identify stakeholders</li> <li>Identify roles and responsibilities of stakeholders in line with the national and provincial urban planning, policies, and development</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> <li>Identify roles of public service providers and contractors</li> <li>Identify roles of private service providers and contractors</li> </ul>
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- Present a clear project logical framework
- Developing clear M&E indicators to ensure the CWIS approach
- Regular monitoring against CWIS indicators

Source: CWIS MLE of 8 cities

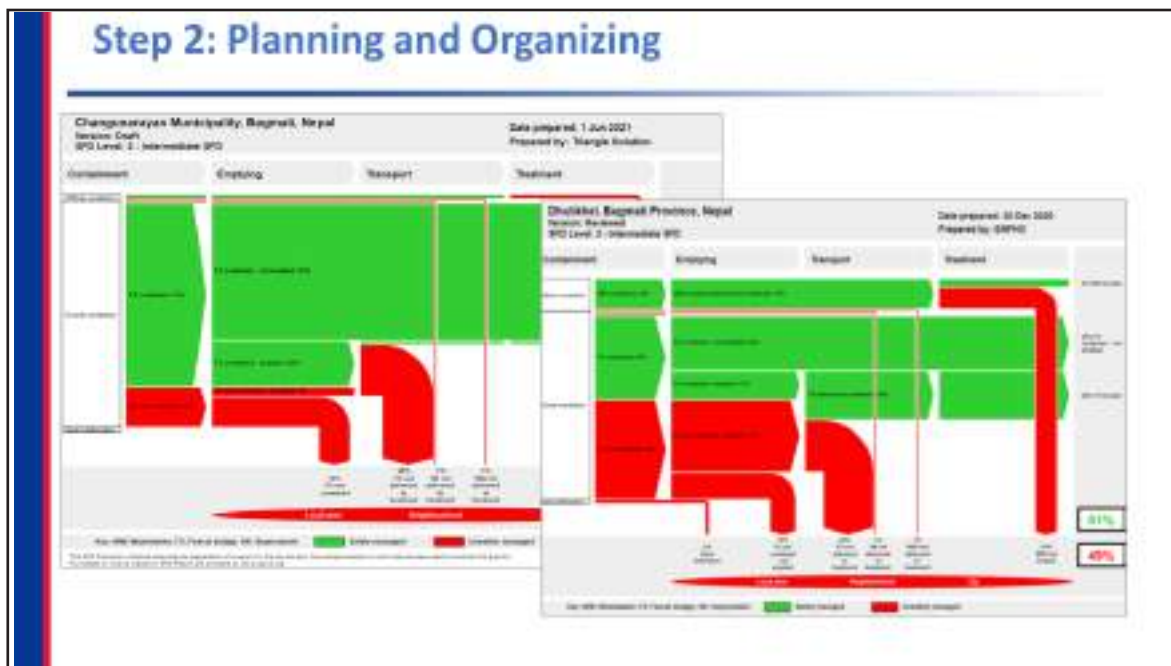
CWIS indicators map the six areas of CWIS framework. The indicators within the CWIS framework will support to measure the project progress, it will support to observe either project is in the right track or not to achieve the project objective. It is a project monitoring tool.

## Step 2: Planning and Organizing

- Data collection using sanitation assessment/diagnostic tools:
  - HH survey, FGDs, stakeholders' consultations
  - Shit Flow Diagram (SFD)
  - CSDA (City Service Delivery Assessment)
  - FSM toolbox
  - CWIS SAP Tool
  - IMIS
  - N-WASH, etc.....

**Note:**  
 The comprehensiveness of the assessment study depends on the available resources and time. Some of the detailed assessments can be done during the project preparation & implementation

Normally detail level assessments are carried out to generate primary level data. These data support design need based activities during planning phase.



## Slide 29

## Step 2: Planning and Organizing

- Support municipality for strategic planning to invest and decision making
- Digitization of business process mainstreaming sanitation value chain
- Provides real time data for monitoring and evaluation of CWIS system

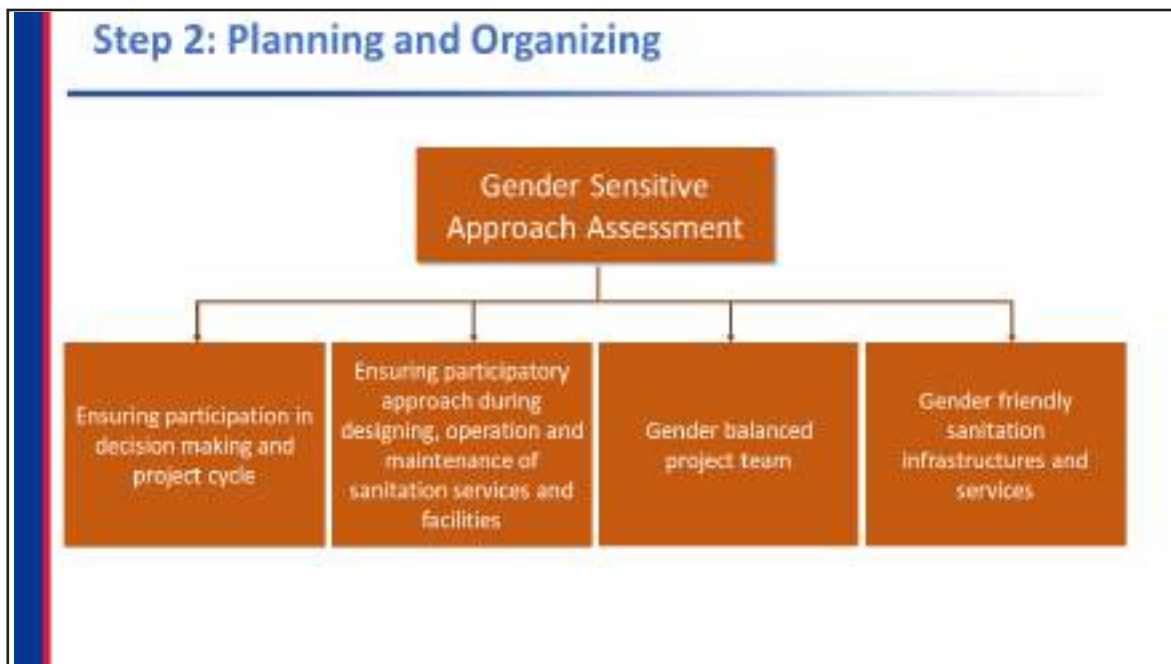
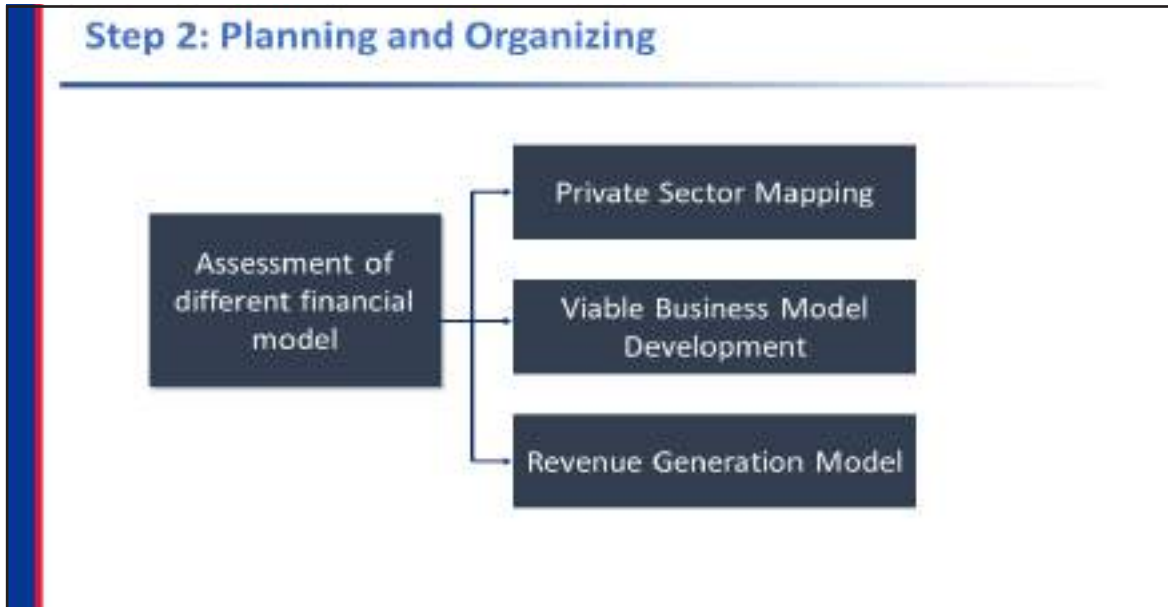
IMIS DRIVING EFFICIENCY, RESPONSIVENESS AND ACCOUNTABILITY OF MUNICIPALITIES

IMIS is a powerful tool which support the municipality for effective implementation, management and monitoring to CWIS project and its components

## Slide 30

## Step 2: Planning and Organizing

- Planning for necessary capacity building, training, awareness, advocacy etc.
- Set technology selection matrix to select appropriate sanitation solution
- Conduct DPR for selected technologies
- Coordination among various section of sanitation (solid waste, drainage, urban planning etc.)
- Assessment of necessary enabling environment
  - ✓ Policy, By laws, Act, FSM licensing system etc.
  - ✓ Institutional and regulatory framework assessment





## Slide 33

## Step 2: Planning and Organizing

- Assessment of different financial model
  - ✓ Private sector mapping
  - ✓ Viable business model development
  - ✓ Revenue generation model
  
- Gender sensitive approach assessment
  - ✓ Ensuring participation in decision making and project cycle
  - ✓ Ensuring participatory approach during designing , operation and maintenance of sanitation services and facilities
  - ✓ Gender balanced project team
  - ✓ Gender friendly sanitation infrastructures and services


## Slide 34

## Step 3: Project Implementation and Monitoring

- Formulate or adopt project implementation guidelines, and procedures (procurement guidelines, recruitment policy)
- Staff recruitment and orientation & capacity development
- Establish project progress tracking and monitoring systems
- Regular coordination and communication with stakeholders
- Monitor project progress against the CWIS indicators & logical framework
- Revise project plan as needed to achieve project objectives and results
- Document key learnings and disseminate them regularly

### Step 3: Project Implementation and Monitoring

- Execution and implementation of designed activities
- Institutionalization of CWIS
  - ✓ Formulation and enforcement of policy, By-laws and regulation
  - ✓ Regular monitoring
  - ✓ Full functioning responsible section to run CWIS program



### Step 3: Project Implementation and Monitoring

**Regulatory Mechanism**

Mechanism	Legal power	How applied	Examples
<b>Guidelines</b>	-	Advisory	- Toilet design
<b>Standards</b>	✓	Ex-post	- Re-use products; effluents; sanitary ware - Working procedures for sanitation workers - Sanitary performance of facilities and services
<b>Permit</b>	✓	Prior approval	- Building permits – sanitation facility standards - Discharge permits
<b>Legal agreement</b>	✓	Licence, Contract	- Pit and septic tank emptying - Sewage and faecal sludge treatment - Public toilet performance - Utility performance

Source: EWAG training module

The regulatory mechanism will ensure the CWIS approach

## Slide 37

### Step 3: Project Implementation and Monitoring

- Introduce **new financing system** for revenue generation
- Completion of **contracting process with private sector**
- **Construction and Implementation** of sanitation systems, facilities and services



The pictures show the different types of implementation according to objective of the sanitation project


## Slide 38

### Step 4: Monitoring and Evaluation

- Project evaluation can be done periodically – **half-yearly, yearly, and at the end of the project**
- Evaluate against the **CWIS M&E indicators**
- Indicators are designed to measure 6 aspect of CWIS
- Showcasing how the project is contributing to **SDG 6.2 target**
- If national sanitation database exists, project data/information can be integrated on it
- Document and disseminate



### Case Study



**Project name:** Pilot implementation of FSM standard in Nepal

**Project Area:** Mahalaxmi Municipality Lalitpur

### At Project Initiation level

Major Objective:

- To test the ISO 24521 guideline for the management of basic on-site domestic wastewater service and thereby help improve environment sanitation conditions in municipalities
- To draw lesson from this piloting experience and evidence to recommend implementation of the ISO 24521 guideline at the national level through policy and practice changes

↓


Integration of ISO 24521 Guidelines with CWIS Service Framework

The project has funded by BMGF therefore, in this case, major objective of the project was pre defined before it started in the municipality


Slide 41

## Project Initiation

- Identifying the problem
- ✓ Sanitation situation assessment 2/3 of the HHs have onsite sanitation system
- ✓ Advocacy and sensitization for the decision makers of municipality
- ✓ Orientation on CWIS and approach to the municipality officials



Map of the Study Area  
Municipality  
July 9, 2014



Slide 42

## Project Planning and Designing

- Conducting regular planning meeting with the project team and sharing to the municipality
- Sharing of project activities and revisit
- Developing project implementation model and revising it in next phase of the project
- Identification and defining roles and responsibilities of key stakeholder





**Project Implementation Model**

## Project Planning and Designing

<p><b>SEPARATE INSTITUTIONS</b></p> <p><b>Strategy</b></p> <ul style="list-style-type: none"> <li>• Comprehensive list of services to be provided (FSTPs and other wastewater treatment facilities)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> </ul>	<p><b>Viability</b></p> <ul style="list-style-type: none"> <li>• My 2020 - 2021 FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> </ul>	<p><b>Sustainability</b></p> <ul style="list-style-type: none"> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> </ul>
<p><b>SECTORAL PLANNING</b></p> <p><b>Responsibility</b></p> <ul style="list-style-type: none"> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> </ul>	<p><b>Accountability</b></p> <ul style="list-style-type: none"> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> </ul>	<p><b>Resource Planning and Management</b></p> <ul style="list-style-type: none"> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> <li>• FSTPs to be provided in clusters of 1000-1500 population (single FSTPs are not recommended)</li> </ul>

- **Set the indicators to achieve CWIS framework**

## Project Planning and Designing

- Formation of technical team
- Identifying Necessary Assessment
  - Technical feasibility study (3 FSTPs: Mahalaxmi, Dhobighat, Kodku)
  - Assessment for enabling enabling environment for both regulatory framework and infrastructure development , eg-Sanitation cell, by-laws, septic tank design manual
  - Development of business model for the sustainability
  - Planning for designing of IMIS tool
- Mapping of private sector engagement for desludging service

## Slide 45

## Project Implementation and Monitoring


- Orientation and capacity building program
  - ✓ Orientation on standard septic tank to municipal engineers
  - ✓ Mason training on standard septic tank
- Awareness raising program
- Exposure visit programs
- Publication IEC and advocacy materials



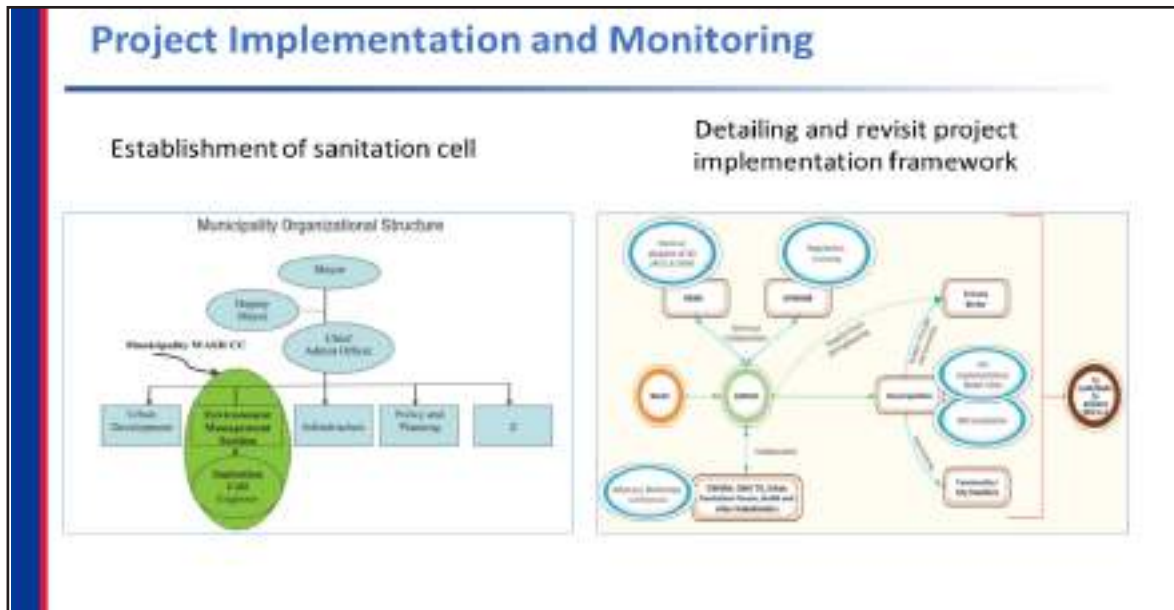

## Slide 46

## Project Implementation and Monitoring

- Developed FSTP DPR (within municipality premises)
- Rehabilitation of existing FSTP
- Development of technical manual



The image shows the cover of a technical manual titled 'Septic Tank Design Manual'. At the top, there is a yellow header. Below it is a cross-sectional diagram of a septic tank with various layers and components labeled. The title 'Septic Tank Design Manual' is prominently displayed in the center. At the bottom, there is a logo for the Environment and Public Health Organization (EPHO) and the date 'July 2007'.



### Project Implementation and Monitoring

- Formulation and implementation of **Institutional Regulatory Framework**
  - ✓ FSM By-laws
  - ✓ Demonstration of RTI septic tanks as option of safely managed sanitation
  - ✓ Institutionalize standard septic tank design and regular monitoring

CWIS approach can be institutionalized only through- creating enabling environment and developing necessary infrastructures and services



Slide 49

### Project Implementation and Monitoring

- ✓ Appointment of **dedicated HR at the municipality** for **regular monitoring of standard septic tank** in the municipality
- ✓ **Development of institutional and monitoring mechanism** for the **inspection/monitoring of standard septic tank** in the municipality
- ✓ Development of PPP model


Elements	Outsourcing and Transport	FSPP
Operation	3 Private Desludging and Transport Operators (one dedicated)	Private FSPP Operator
Operating Instrument	Licensing agreement between Municipality and operators	Construction and O&M Contract with built-in KPIs
Service Fees/Tarif	Business Model	O&M cost for 3 years provided for by ICW/SMB in contract, supported through fees earned by application of Business Model
Regulator	Municipality as per licensing agreement	ICW/SMB for three years then handover to Municipality
Beginning 3th year, whole FSM service chain planned to operated by a FSM Utility Operator		

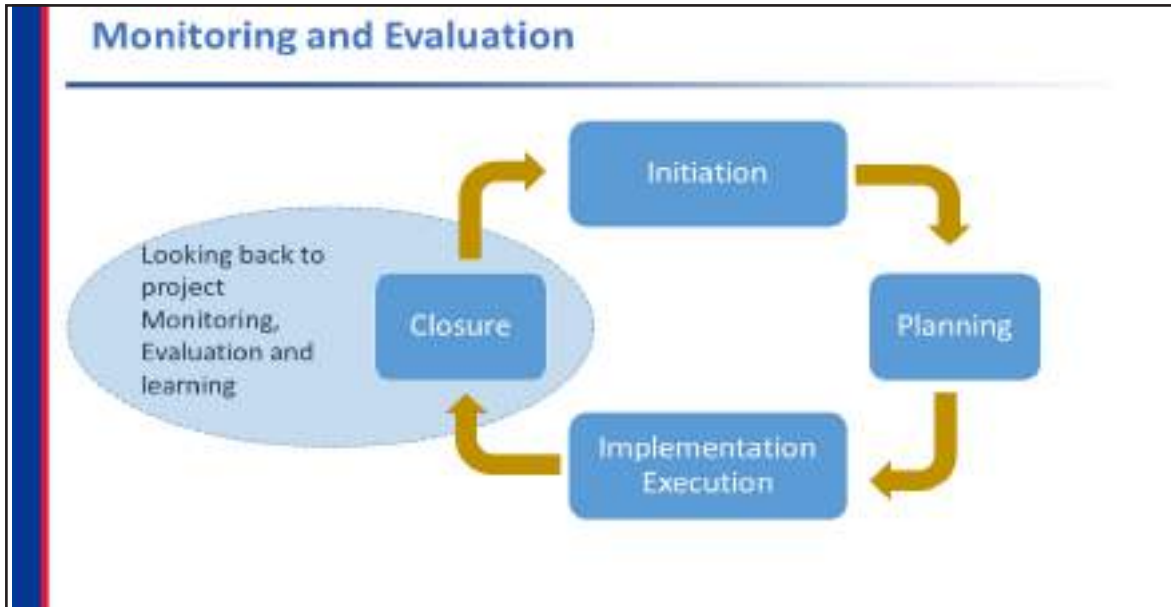
The pictures show the different types of implementation according to objective of the sanitation project

Slide 50

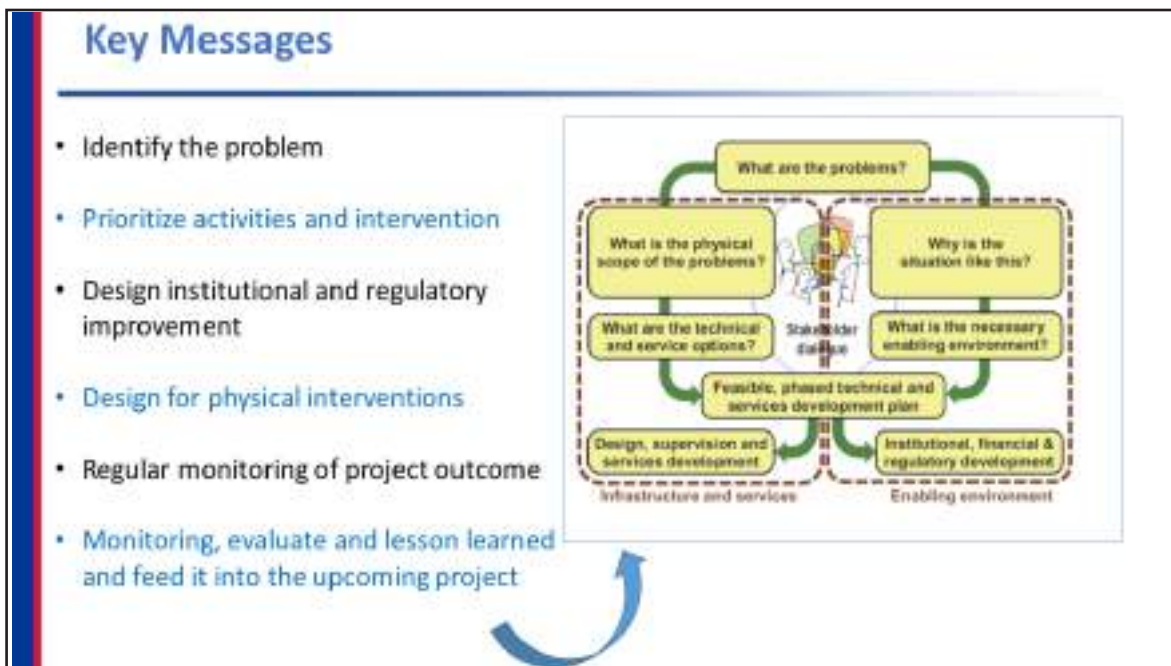
### Project Implementation and Monitoring

- Training, orientations, to the staff of municipality on IMIS
- Implementation of IMIS by municipality (eg. Tax, road, building permit section, etc.)
- Monthly planning, review, revisit, re-planning





The project has reached up to its implementation phase, however, the project is planning to measure its outcome against its set indicators



In Summary, CWIS in project cycle...

## Slide 53

## References

- chrome-extension://efaidnbmnnnibpcajpcgiclfindmkaj/https://www.susana.org/\_resources/documents/default/3-1336-7-1413893411.pdf
- <https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/1336>

## Slide 54

Thank you!  
धन्यवाद !



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Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
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Phone : 977 01 4215744, 4418252  
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**SESSION 12**

**Monitoring and  
Benchmarking**

## Slide 1



"Citywide Inclusive Sanitation – Training of Trainer's"  
**Monitoring and Benchmarking**  
 Resource Person



Government of Nepal  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

## Slide 2

**Before starting...**



What is this?

(Note: It's DEWATS at Sunga, Thimi, that treats wastewater from a small community).

Let one of the participants explain what it is. Add on if necessary.

Click it is the plant that takes in wastewater and lets out clean water so that wastewater from our houses doesn't impact the receiving water bodies and environment.

DEWATS is a natural system with low to no mechanical equipment.

Since it does not require too much people's touch, let's imagine nobody goes there, and let it do its work without any disturbance, ask questions

what do you think will happen??

Do you think it is the right strategy to forget about it? If not, what should be done??

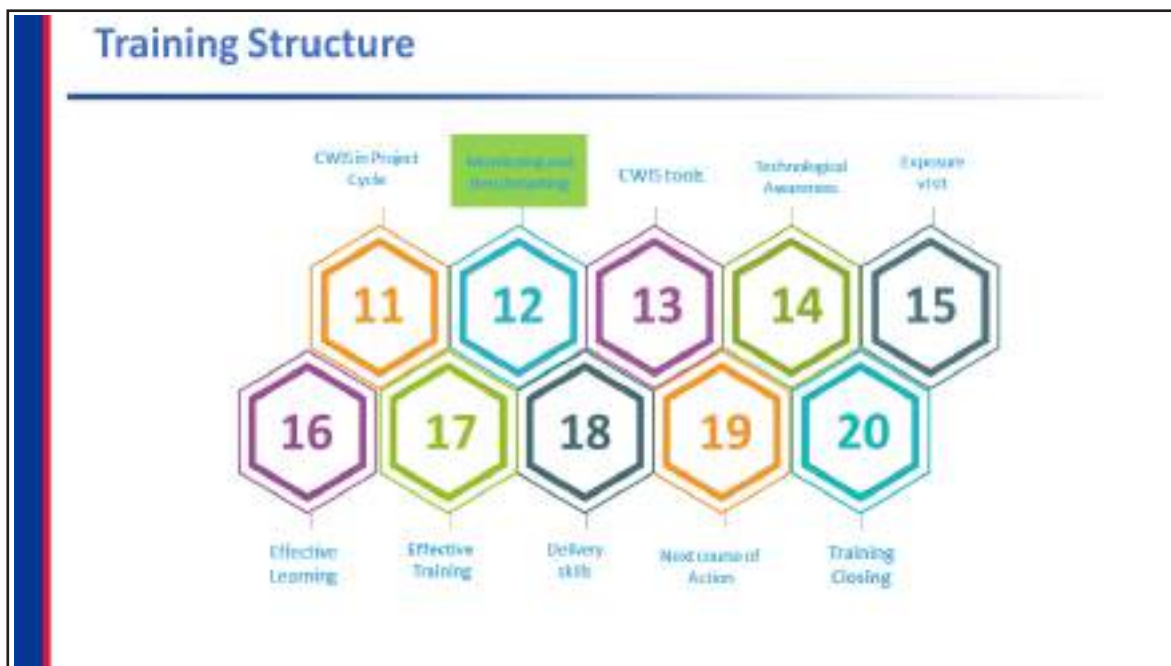
Collect the responses from participants and add that regular site visits and a few regular activities need to be scheduled in to know that DEWATS is operating properly and add on the need to analyze the quality of incoming and outgoing water helps to regulate, check the blockage in the pipes, inspection of chamber for any wrongs are some of the activities that need to be done.

These activities are part of monitoring.

Conclude with one last click by mentioning that with monitoring and evaluation we can keep the effluent water clean and that is what we are going to discuss in the session.



This training includes 20 main technical sessions, and are currently on session 12: Monitoring and Benchmarking




This training includes 20 main technical sessions, and are currently on session 12: Monitoring and Benchmarking

## Slide 5

## Learning Outcomes

- Define the protocols for monitoring, evaluating and setting benchmarks in sanitation sector through CWIS perspective
- Explain monitoring and evaluation tools for the measurement of the CWIS indicators




At the end of the session, participants will be able to ...

## Slide 6

## Presentation Outline

- Monitoring and Evaluation
  - Why monitoring?
  - Protocol for monitoring, evaluating and benchmarking
  - Sanitation Monitoring Framework-India, Nepal
  - Monitoring requirements
- Data and Information
- Monitoring methods
- CWIS Monitoring Framework
- Key Messages




## Monitoring and Evaluation

### Monitoring

**The periodic tracking** (for example, daily, weekly, monthly, quarterly, annually) **of any activity's progress** by systematically gathering and analyzing data and information is called Monitoring.

### Evaluation

**Structured interpretation** and giving of meaning to **predicted or actual impacts** of proposals or results.




Monitoring is a continuous assessment that aims at providing all stakeholders with early detailed information on the progress or delay of the ongoing assessed activities. The purpose of monitoring is to determine if the outputs, deliveries and schedules planned have been reached so that action can be taken to correct the deficiencies as quickly as possible

## Monitoring- when?

Where do you think is the place for monitoring in the given project cycle ??

M&E is a continuous process that occurs throughout the life of a program (PCM).



- Project Definition:- Project constraints and Problem statements
- Detailed Planning:- Estimation & Scheduling
- Project Team:- Acquisition, Development & Management
- Monitoring, Controlling, Closure & Review

Monitoring is an ongoing data collection process of the program outputs. Particularly in the project pilot phase, it is important to gather detailed monitoring data to help identify and correct unforeseen weaknesses in the project design and to replicate successful features during scale-up. Why is it important to monitor the implementation?

it provides a way to assess the crucial link between implementers and beneficiaries on the ground and decision-makers; it adds to the retention and development of institutional memory; it provides a more robust basis for raising funds and influencing policy.

Performance monitoring is a systematic and periodic observation of performance over time in order to develop or verify performance records, to uncover inefficient and ineffective practices, to identify needs for services, and most important, to detect underperformance timely to avoid the further deterioration of performance.


For this all, data seems to be key/ primary for all activities.



## Slide 9

## Why Monitoring?

- Giving feedback to related stakeholders (ex. local authority, donors, implementers and beneficiaries)
- For Accountability and Learning for the future
- Help to show accountability to stakeholders, aid sustainability and contribute to building an enabling environment



The illustration shows a meeting around a table with three people. In the background, there are three large screens displaying various data visualizations like bar charts, pie charts, and line graphs. One person is pointing at a screen, another is using a magnifying glass over a screen, and a third is pointing at a screen. A blue speech bubble is positioned to the left of the meeting.


M&E for accountability commonly focuses on upward accountability to government or the funding agency. M&E is often an obligation to demonstrate that contracted work has been conducted in compliance with agreed standards or to report on results vis-à-vis plans. Downward accountability involves making accounts and plans transparent to the primary stakeholders: clients.

M&E for learning requires continuous and conscious involvement of evaluators and stakeholders in collaborative learning, allowing stakeholders to share their views, perspectives and ideas, without fear of negative consequences (Kusters et al., 2011).

## Slide 10

## Why Monitoring?

- Provide evidence about the effectiveness, efficiency, strengths and limitations of programs, interventions and services
- Provide feedback for corrective actions to stakeholders
- Are essential for evidence-based approaches to research, programming and policy making
- Build sector knowledge and enable systematic learning



The icon depicts a blue clipboard with a checklist of three items, each with a checkmark. A magnifying glass is positioned over a stylized person icon, symbolizing investigation or monitoring.

Both monitoring and evaluation are essential components of effective management and together they bring the listed outcomes.

Provide evidence about the effectiveness, efficiency, strengths and limitations of programs, interventions and services;

Provide feedback to stakeholders, such as funders, community members, local authorities, regulators and other sectors;

Are essential for evidence-based approaches to programming and policy making;

Build sector knowledge and enable systematic learning;

Build an evidence base for research, policy and practice;

Enable diagnostically accurate and targeted corrective action;

Help to show accountability to stakeholders, aid sustainability and contribute to building an enabling environment.

### Monitoring helps to assess on:

1. Whether or not **resources are available to and used** by the constituent units within the limits of an authorized budget and stipulated timeframe
2. Whether or not **expected outputs are achieved in a timely and cost-effective manner**
3. What is the **level of implementation capacity?**
4. What kind of **problems and constraints** are being faced and what kind of **remedial measures** are called for?

### Sanitation & Hygiene (Ladder of services)

**Safely managed:** Private improved facilities where fecal wastes are safely disposed in site /soap and water available

**Basic:** Separate improved facilities

**Limited:** Improved facilities shared with other households

**Unimproved facility** which does not separate excreta from human contact

**No service:** Open defecation

↑

Planning of resources

Example: Gaur Municipality  
(retrieved from NWASH 1/14/2023)

Monitoring doesn't just mean measurements it also links with the resource planning to achieve the service ladders. Whether the resource is enough or not should also be monitored

## Slide 13

## Protocols for monitoring, evaluating and Benchmarking

- Planning the monitoring requirement
- How monitoring and evaluation planned across the project cycle (Monitoring framework)
- What are the data and information requirements ??
- How to collect those data and information? ? (Monitoring Methods)
- Benchmark should be in place to assess the position
- Ensure the flexibility of project/program to incorporate feedbacks from M&E i.e. to incorporate the learning's (Adjustments as per the feedbacks)

Monitoring provides data for making operational decisions, reporting findings and taking corrective action

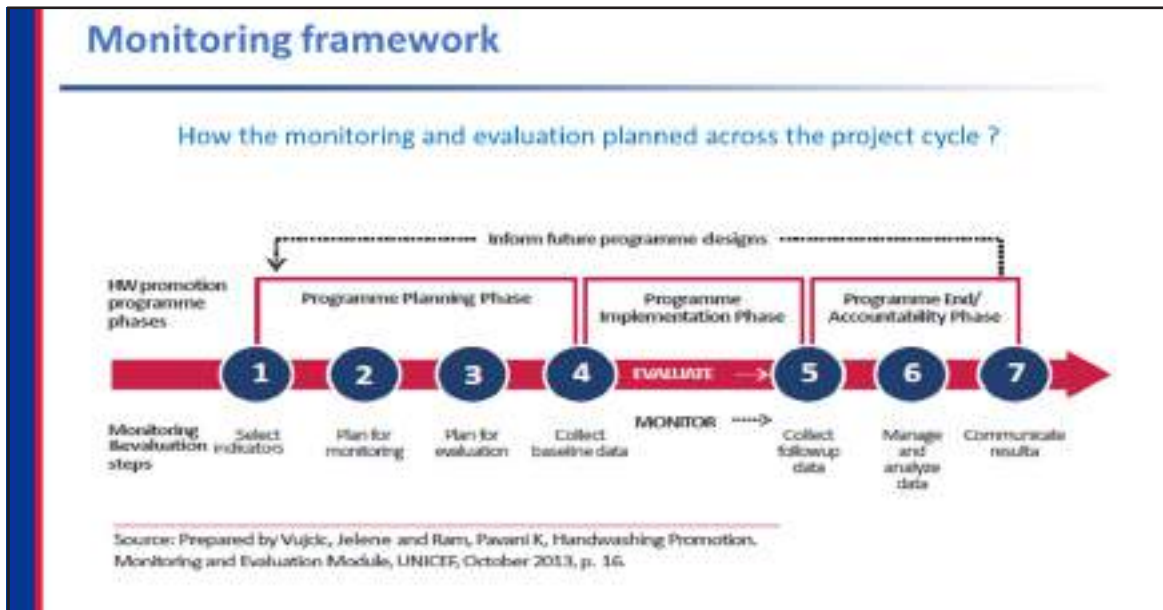
## Slide 14

## Monitoring requirement (and by whom)

### What to monitor?

- Design of septic tanks/pits/onsite wastewater treatment
- Quality of desludging service
- Checking of permits/licenses
- Recordkeeping
- Treatment performance
- Quality of treatment product





### Sanitation monitoring frameworks – India

- States/UTs will be required to send in Monthly Progress Reports (MPRs), Quarterly Progress Reports (QPRs) in prescribed format with regard to targets and achievements
- The Mission Directorate may prescribe other reports that may be considered appropriate from time to time
- The scale of mission, a comprehensive and robust IT enabled MIS will be established for tracking targets and achievements
- States/UTs will be required to submit progress reports online once this MIS is operational

Source: ASCI

Uts= Union Territories

## Slide 17

## Sanitation monitoring frameworks – India

- Monitoring activities will include, but not be limited to., third party evaluation, impact evaluation studies, etc.
- The evaluation of the mission will be undertaken during the course of its implementation to effect mid-term correction and align the mission to achieve its objectives

Source: ASCI



## Slide 18

## Sanitation monitoring frameworks – India

- A District Level Review and Monitoring Committee (DLRMC) will be constituted with a view to fulfill the objective of ensuring satisfactory monitoring of projects under the chairpersonship of a member of Parliament
- Detailed guidelines for this purpose will be issued separately by the SBM National Mission Directorate

Source: ASCI



## Sanitation monitoring frameworks – Nepal





**NWASH**  
Web based & GIS enabled MIS  
Mandatory tool for monitoring, planning resource allocation as per WASH act/draft policy

**Sanitation Monitoring Framework** through CWIS approach are under development to integrate into NWASH platform *(will be discussed in next session)*

## Data and Information

- What is the **significance of data and information** ?
- Where can we find data on sanitation?






Ask with participants what are the significance of data and information, especially in monitoring?

Also, ask participants second questions and emphasize that the sanitation data are fragmented in different sectors.

## Slide 21

## SDG 6 and database

UN Water SDG 6 Global Acceleration Framework has identified **data and information** as one of the five accelerators of SDG 6 outcomes




**SDG 6.2 Goal:** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation

**Indicator 6.2.1a:** Proportion of population using safely managed sanitation services

- UN Water SDG 6 Global Acceleration Framework has identified “DATA” as one of the five accelerators of the SDG 6 outcome.
- The SDG 6.2 Goal is one of the goals set within SDG 6 that states By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation
- To measure this,
  - The 6.2.1a indicator highlights the proportion of population using safely managed sanitation services as an indicator for achieving the 6.2 goal
- Ask the audience where the proportion related information/ data is obtained/generated/ acquired from? (SDG 6.2.1a indicator)

## Slide 22

## Monitoring methods



**Visual or sensory inputs:** Visual observations of on-site containment structures, plant conditions, such as scum on a treatment lagoon, sludge color or odors, emanating from a pump tank

**Surveys :** Questionnaire or Data collection via. simple checklist

Source: ASCI

## Monitoring methods

---

**Analysis of measurement at source:** This includes size of containment structures based on designs, performance analysis using test strips or kits that can be utilized in the field for measurement of pH, dissolved oxygen, or temperature

**Laboratory testing** of samples (either onsite or offsite)

**Review:** standard operating procedures, drawings, designs, process flows, collected data (manifest forms, performance data, licenses)

Source: ASCI

## Benchmarks and Indicators

---

How to use data such that they speak to us ?

Data collection against “?”

### Requirements

- **Benchmark:** a standard or point of reference against which things may be compared
- **Indicator:** things that indicate the state or level of something

Link with Accountability



Slide 25

### SDG Targets


	2015	2030
Basic water supply coverage	87%	100%
Piped water supply	49.5%	90%
Using safe drinking water	15%	90%
HH with E-Coli	82.2%	1%
Basic sanitation	82%	100%
Improved sanitation facility (not shared)	60%	95%
Urban toilets connected to sewer system	30%	90%

NPC - SDG Road Map

These indicators are not aligned properly with the SDG 6.2 goals and hence NPC is planning to revisit these goals .

Slide 26

### Standards/Norms



- National wastewater/sludge discharge standards
- Septic tank norms


Some examples as a benchmarks

## CWIS Indicators

- **Identify specific indicators** for all **monitoring activities** across the sanitation value chain
- This provides the **benchmark for performance**

Indicator framing guidance document  
(Developed by Athena Infonomics and Bill and Melinda Gates Foundation)

➔



Inform the participants that currently Nepal is in the process of localizing CWIS indicators based on the guidance.

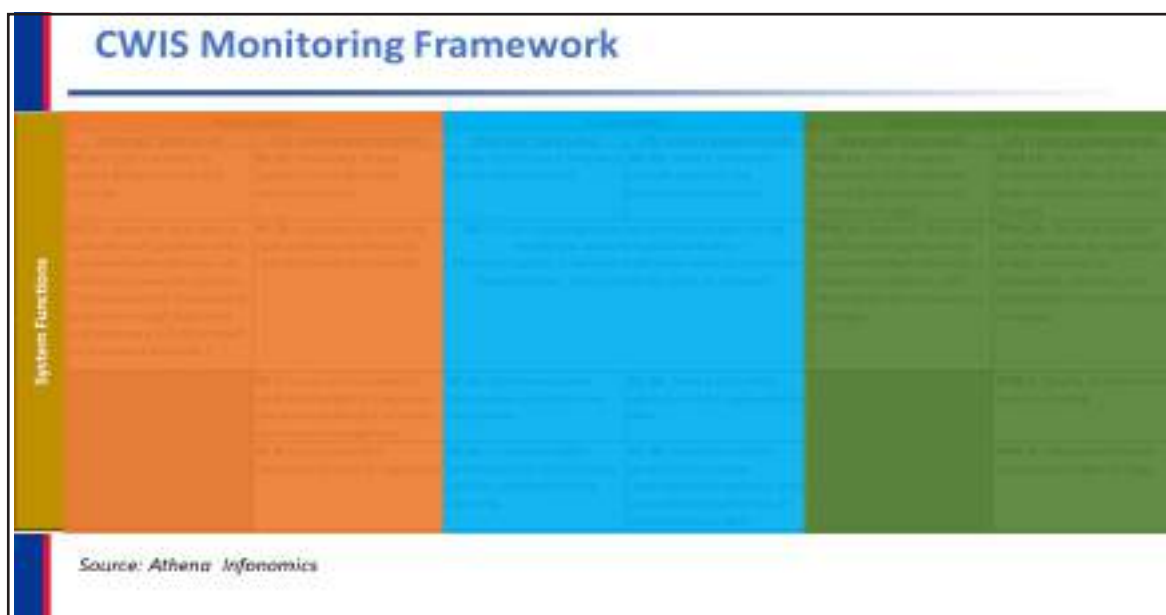
## CWIS Monitoring Framework

Performance Outcomes	<p>Performance Outcomes are the high-level results that an organization seeks to achieve through its strategic initiatives. They are the primary focus of the organization's efforts and are typically measured over a long period of time. Performance Outcomes are the primary focus of the organization's efforts and are typically measured over a long period of time.</p>	<p>Performance Outcomes are the high-level results that an organization seeks to achieve through its strategic initiatives. They are the primary focus of the organization's efforts and are typically measured over a long period of time. Performance Outcomes are the primary focus of the organization's efforts and are typically measured over a long period of time.</p>	<p>Performance Outcomes are the high-level results that an organization seeks to achieve through its strategic initiatives. They are the primary focus of the organization's efforts and are typically measured over a long period of time. Performance Outcomes are the primary focus of the organization's efforts and are typically measured over a long period of time.</p>
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Source: Athena Infonomics

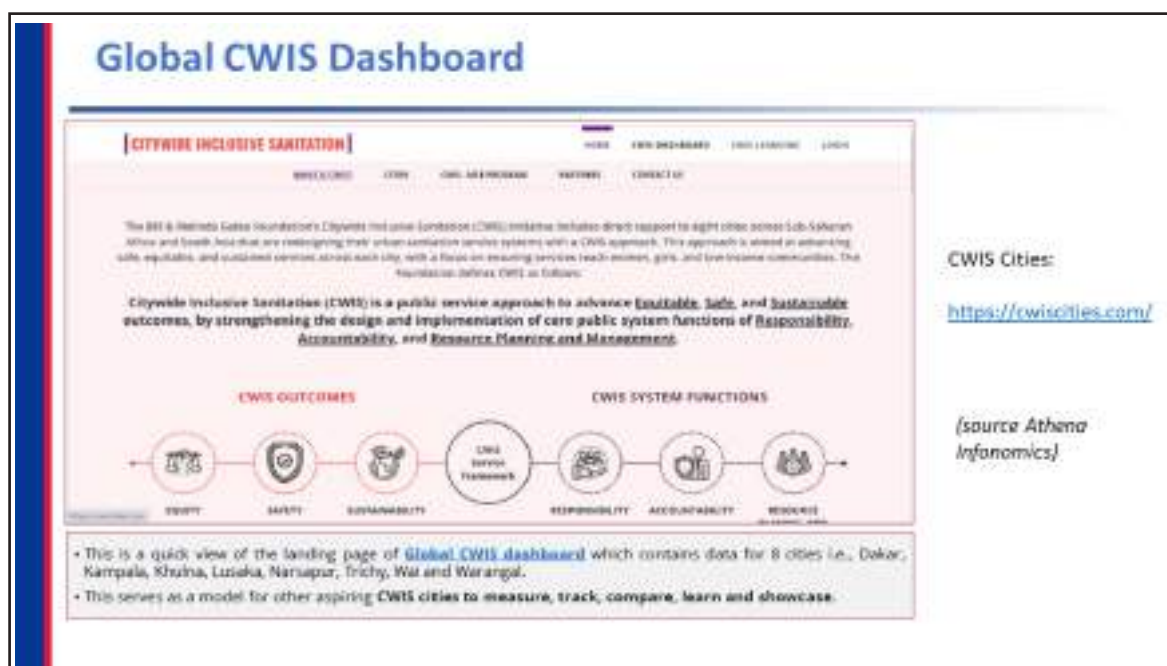
As discussed in respective topic, the indicators on CWIS framework has been discussed for the global context developed by Athena infonomics. The total indicators on CWIS outcomes are...

Slide 29



As discussed in respective topic, the indicators on CWIS framework has been discussed for the global context developed by Athena infonomics. The total indicators on CWIS functions are...

Slide 30



If possible, visit the <https://cwiscities.com/> site and present on how CWIS indicators can be measured.

## Global CWIS Dashboard

• The dashboard provides **comparative views** of all 8 CWIS cities for each year i.e., 2018, 2019 and 2020  
 • There is separate **outcomes-wise and functions-wise views** for all cities  
 • A quick view of graphical **quantitative data** representation with supporting **qualitative data** description is provided for all indicators

(source: Athens Informatics)

## Global CWIS Dashboard

• The dashboard also has a **'Learning' page** for CWIS cities to showcase their reports and documents for peer learning  
 • Viewer can filter the learning documents topic-wise, city-wise and sanitation value chain-wise

(source: Athens Informatics)

## Slide 33

## Key Messages

- Monitoring- Regular observation and recording for feedback to related stakeholders
- Data and Information is one of accelerators of SDG 6

Hence, Monitoring is a regular observation and recording for progress updates and must be carried out continuously at different phases, giving feedback to the related stakeholders to be followed by Action points.

For monitoring one needs data and such data can be compiled through a system as IMIS, a useful management system for government, utilities and service providers which can be then presented to the stakeholders for advocacy or could be used to analyze the situation for the development of appropriate interventions through different sanitation tools like SFD and CSDA

## Slide 34

## Reference

1. Paper on "Monitoring Progress in Citywide Sanitation". Online available at: <https://www.frontiersin.org/articles/10.3389/fenvs.2021.751534/full>
2. "CWIS Guidance Note". Online available at: <https://www.adb.org/sites/default/files/publication/751531/cwis-citywide-inclusive-sanitation-needed.pdf>
3. Youtube video: "Monitoring & Evaluation of Water Sanitation Projects". [https://www.youtube.com/watch?v=TpieXRRK15E&ab\\_channel=StrategiaNetherlands](https://www.youtube.com/watch?v=TpieXRRK15E&ab_channel=StrategiaNetherlands)
4. WHO information on Monitoring WASH: <https://www.who.int/activities/monitoring-water-sanitation-and-hygiene>
5. "Sanitation Monitoring Toolkit" [https://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/UNICEF\\_SanitationMonitoring\\_Toolkit.pdf](https://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/UNICEF_SanitationMonitoring_Toolkit.pdf)
6. <https://sfd.susana.org/>
7. <https://www.youtube.com/@insightintonwashmis5746>
8. <https://lncsanprac.com/tools.html>
9. <https://s3.amazonaws.com/resources.cwis.com/learning/201/CWISMeasurementNote2021ulyv3.pdf>

Thank you!  
धन्यवाद !



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Technical Support



Environment & Public Health Department (EPHD)  
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# SESSION 13

## CWIS Tools and Platform

Slide 1



**"Citywide Inclusive Sanitation – Training of Trainer's"**  
**CWIS Tools and Platform**  
 Resource Person



Government of Karnataka  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

Slide 2

**Before we start...**




If you are going for the planning of sanitation systems and services, to cover the whole city, you need to understand the city first. You want to get a common vision with all the key stakeholders and for the reason, collecting information should be used to get them engaged in the process. Several tools exist to help do such an assessment work with stakeholders and render the results in a visual way.

And in the session will be discussing on 2 such diagnostic tools along with the data compilation platform for the same.



Slide 3



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - SFD


Slide 4



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - SFD


## Learning Outcomes

- Discuss briefly on different CWIS tools and platform for data compilation

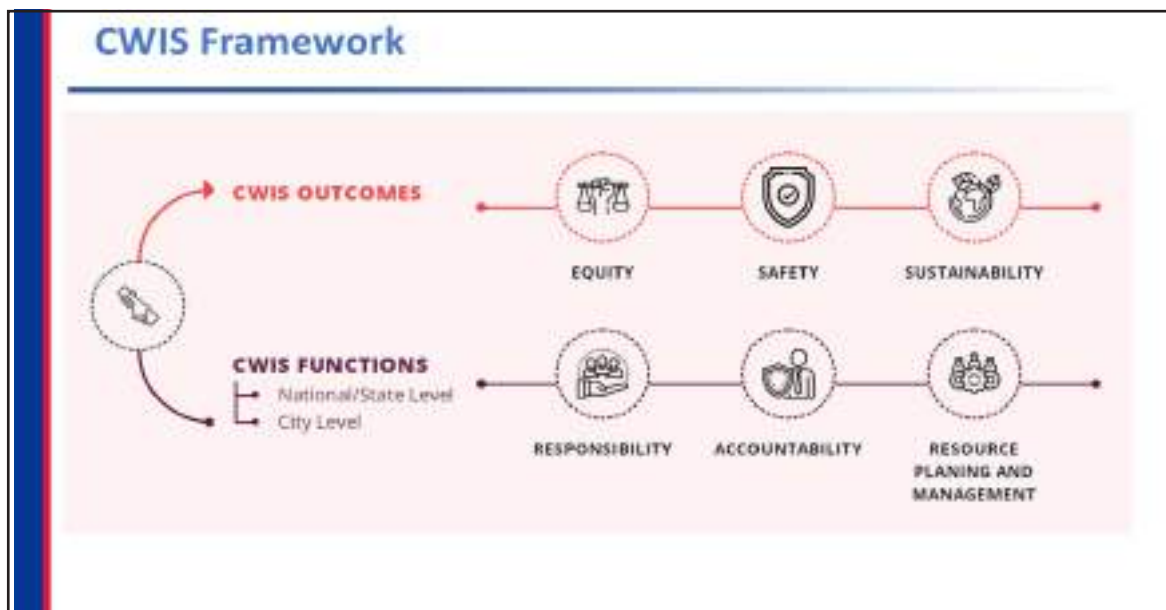


## Presentation Outline

- CWIS Tools
  - Shit Flow Diagram (SFD) and some examples
  - CWIS Service Delivery Assessment (CSDA)
- Platform
  - N-WASH
  - IMIS



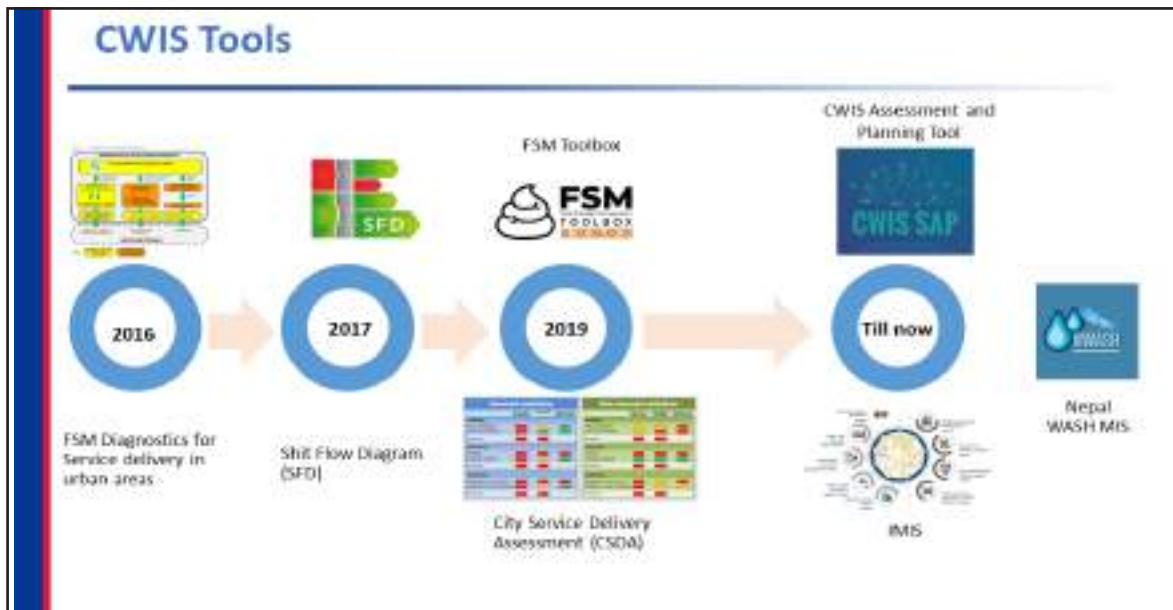
Slide 7



Slide 8

### Information, data and sources

- Policies, laws, regulations, by-laws
- Census and household surveys
- Government and City annual, medium-term plans
- Utility annual reports, operational and treatment reports
- Key informant interviews and focus group discussions
- Ministry of Finance reports, budget expenditure reviews
- Regulator and audit reports
- Development partner and NGO reports



### CWIS Tools

- 3 types of tools – to help planners and decision-makers analyze their data and plan accordingly
  - Diagnostic tools,
  - Prioritization tools and
  - Planning and decision-making tools

As discussed earlier, to serve the whole city with the right blend of sanitation systems and services, there are 3 types of tools to help planners and decision makers analyze their data and plan accordingly.

## Slide 11

## Diagnostic Tools

- Shit Flow Diagram (SFD)
  - City-wide diagnostic; useful for engaging stakeholders,
  - advocacy,
  - Useful diagram to introduce the topic
- City Service Delivery Assessment (CSDA)
  - Diagnostic of the local enabling environment,
  - distinguishes its complexities.
- Sanitation GIS Mapping
  - Improve planning and monitoring of service delivery

For the situation analysis, diagnostic tools are used.

In the session, participants will be discussing on SFD and CSDA in a brief as an intro to different tools.

## Slide 12

## Prioritization Tools

- SaniPath
  - Prioritization: given health issues
- Sanitation Safety Plan
  - Prioritization and linking with health professionals.
- Service Delivery Action Framework
  - Decision-support; prioritization ("what next").
- Citywide Inclusive Sanitation Services Assessment and Planning (CWIS SAP)
  - Support decision-making and communication about which interventions to prioritize

## Planning and Decision Making

- **SaniPlan**- Decision support, towards a practical plan.
- **FSM Toolbox**- Planning, especially going through practical steps and documents for planners
- **Septage Management Decision Support**- Planning, based on financial analysis.
- **Cost-effectiveness and Options Assessment**- Technology choice based on sound assessment and ranking; use utilities' language.
- **Intervention Options Assessment**- Technology choice
- **Integrated Design Approach for FSM**- Technology choice (for recovery)

Among these all, as an introduction to the tools, will be discussing further on SFD and CSDA. Later, will be more focusing on the platform for the data compilation, that is, N-WASH at national level and IMIS at local government level.

Thank you!  
धन्यवाद !



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# SESSION 13.1

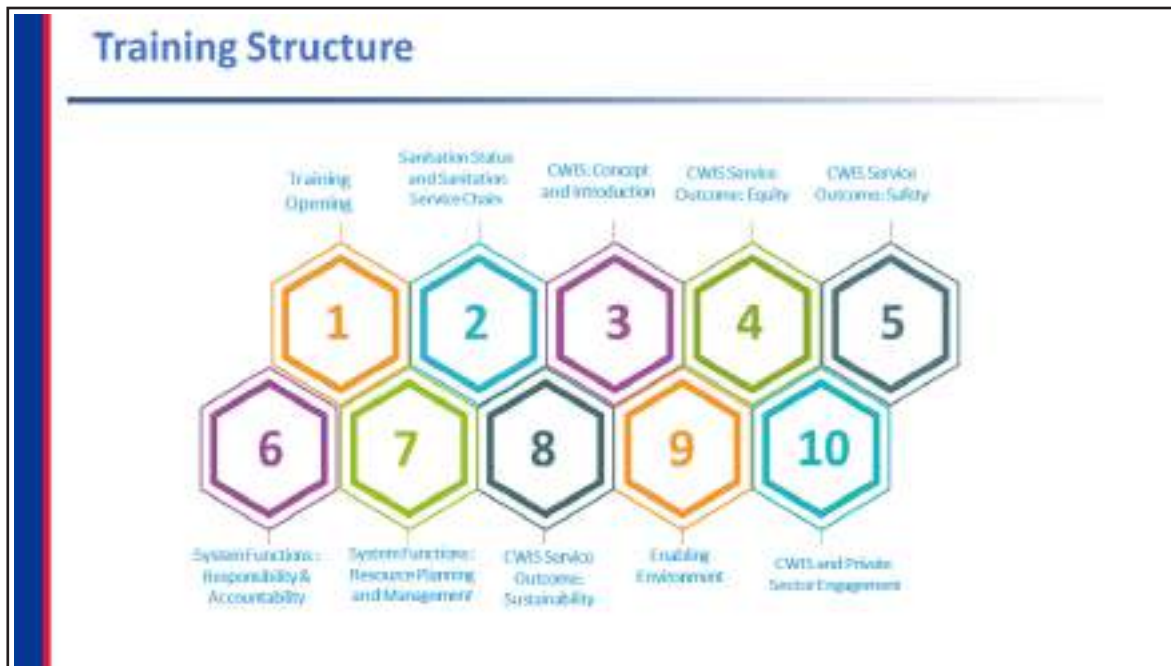
## CWIS Tools: Shit Flow Diagram

Slide 1

**"Citywide Inclusive Sanitation – Training of Trainer's"**  
**Technical Awareness 1 (User interface to Transportation)**  
Resource Person

Government of Karnataka  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management

Slide 2



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - SFD



Slide 3



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - SFD


Slide 4

### Learning Outcomes

- Define Shit Flow Diagram (SFD) as an advocacy tool
- Interpret the sanitation situation through the Shit Flow Diagram (SFD)

## Presentation Outline

- Representation of Data
- Advantage of data representation
- Shit Flow Diagram (SFD) and some examples
- Level of SFD




## Representation of Data

- Tabular Representation of Data

- Graphical Representation of Data

S.N.	Name of company	Production (NRs.)	Sales (NRs.)
1	XYZ	600,000	700,000
2	ABC	800,000	600,000
3	QRS	500,000	500,000
4	MNO	1,000,000	1,200,000

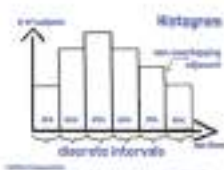


Company	Production (NRs.)	Sales (NRs.)
XYZ	600,000	700,000
ABC	800,000	600,000
QRS	500,000	500,000
MNO	1,000,000	1,200,000

Slide 7

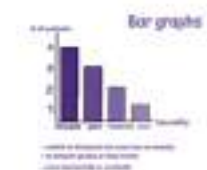
## Advantages of graphical representation of data

- **Attractive**
- Give a **bird's eye view** of the data
- **Easily understood** by common men
- Facilitate **comparison** of various characteristics
- Impressions created by them are **long-lasting**

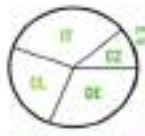


**Histogram**


discrete intervals



**Bar graphs**



**Pie chart**



**Pictographs**

Slide 8

## Advocacy/Sensitization



Boss, increase my salary



The product has increased from 500 units to 800 units per day, so I deserve for increased salary

Who do you prefer?

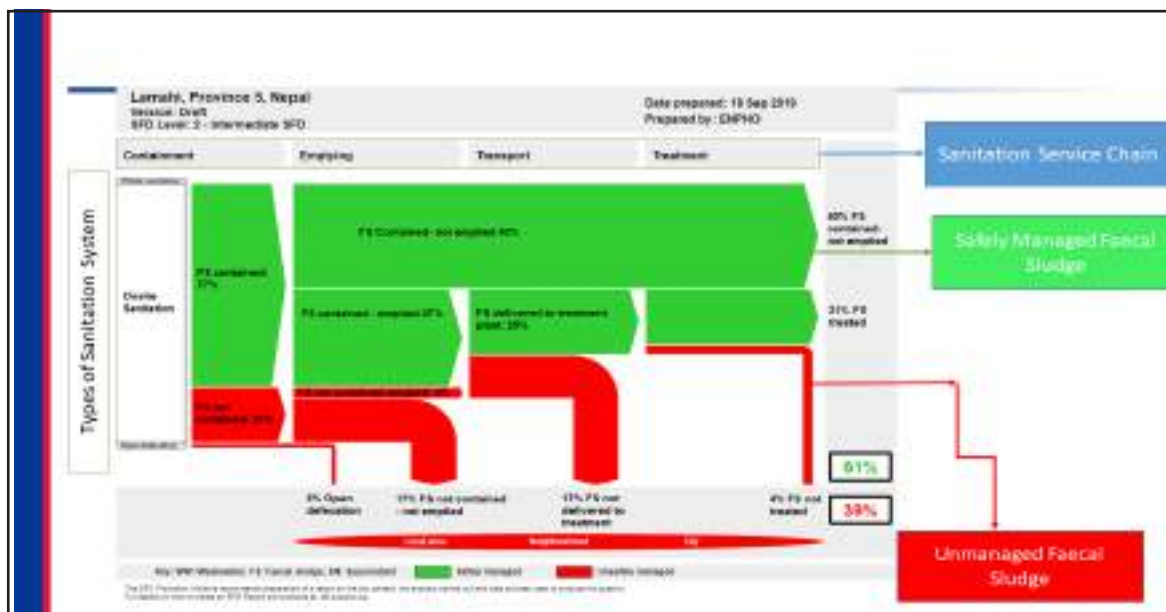


## Data Required for Preparation of SFD Graphic

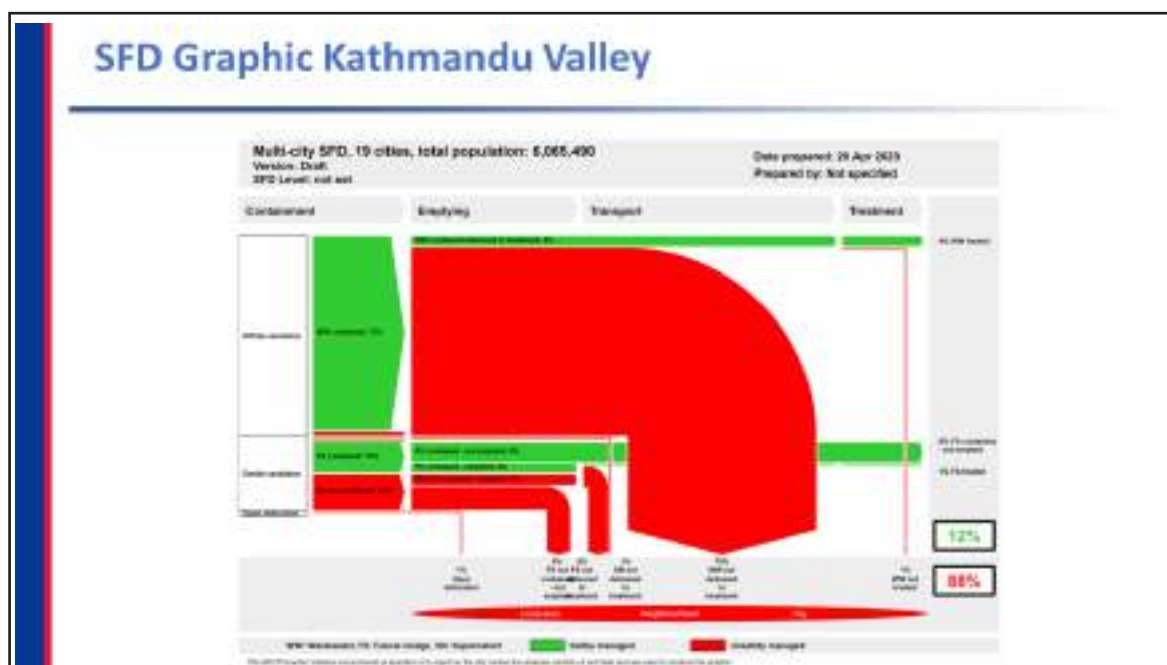
**Now select the sanitation systems in use in your city or urban area**  
Use the cursor to hover-over the selection grid and then click on the selected systems.

What is the toilet technology in use? (i.e. what type of environmental technology is used?)	List all the technologies considered for (i.e. which does the water or effluent discharge to, if anything?)										
	To combined combined toilet	To combined flush-to-pit toilet	To combined combined toilet	To combined flush-to-pit toilet	To water body	To open drain or storm sewer	To water body	To open drain	To land fill or other	To other	
No toilet technology. Toilet discharge directly to environment (open or closed)											Not applicable
Septic tank											
Pit latrine (open)											
Latrine with impermeable liner and open bottom											
Flush pit with earth partition under each toilet											
Composting	Not Applicable										
On-site system (closed) without any disinfection/sterilization and covered with soil											
On-site system (closed) without any disinfection/sterilization and not covered with soil											
Total toilet technology considered in the city											

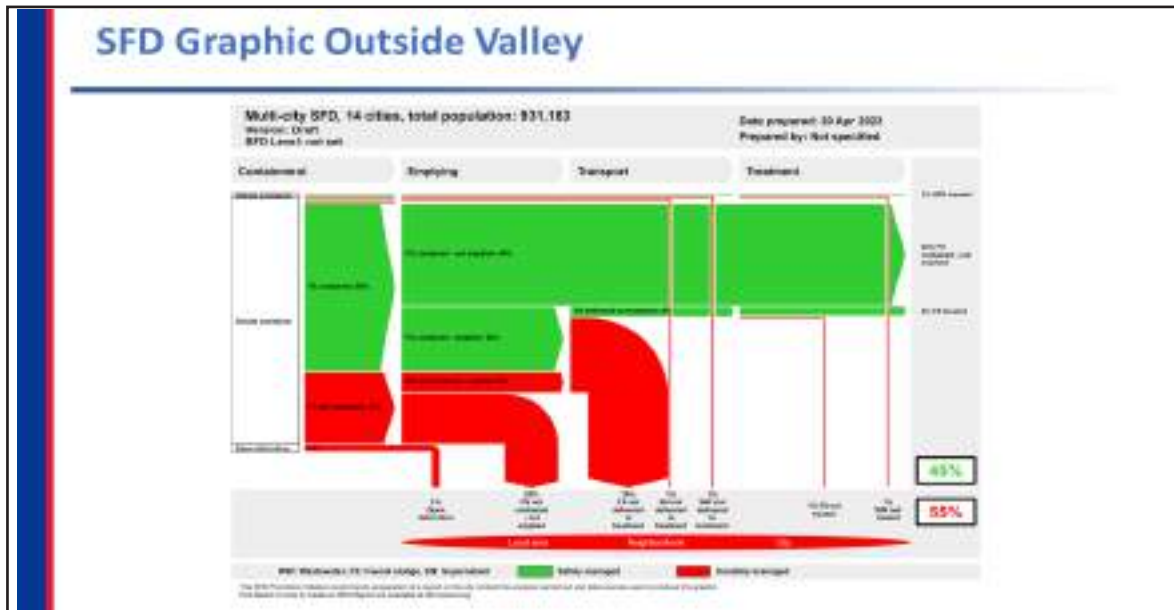
Slide 11



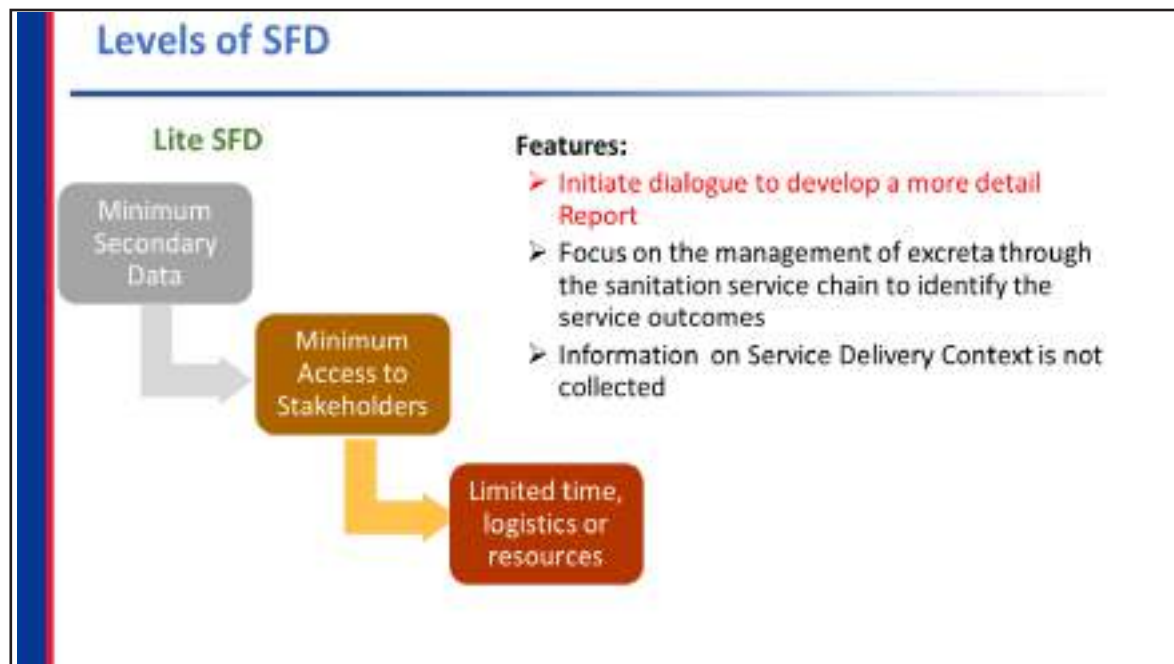
Slide 12



Slide 13



Slide 14



Slide 15

### Level 1: Initial Level

```

    graph TD
      A[Limited Secondary Data] --> B[Limited Access to Stakeholders]
      B --> C[Limited time, logistics or resources]
  
```

**Features:**

- Use as advocacy document
- Generate interest and initiate a conversation
- Support the identification of data gaps and assess the need for conducting a more detailed report

Slide 16

### Level 2: Intermediate

```

    graph TD
      A[Extensive Secondary & primary Data] --> B[Access to wide range of Stakeholders]
      B --> C[Enough time, logistics or resources]
  
```

**Features:**

- Use as advocacy document
- Uses validated triangulated primary data
- Provides broad understanding of the service delivery situation

Slide 17

### Level 3: Comprehensive

**Features:**

- Use as planning document
- Uses validated triangulated data
- Informal and formal observations and direct measurement in the field, to verify data accuracy

```
graph TD; A[Extensive Secondary & Primary Data] --> B[Access to wide range of Stakeholders]; B --> C[Enough time, logistics or resources];
```

The diagram illustrates the components of Level 3 Comprehensive. It starts with 'Extensive Secondary & Primary Data' in a grey box, which leads to 'Access to wide range of Stakeholders' in a brown box. This, in turn, leads to 'Enough time, logistics or resources' in a darker brown box. The features listed on the right are: 'Use as planning document', 'Uses validated triangulated data', and 'Informal and formal observations and direct measurement in the field, to verify data accuracy'.

Slide 18

### Website

The screenshot shows a website interface. At the top, there's a navigation bar with 'HOME', 'ABOUT', 'CONTACT', and a search bar. Below the navigation bar, there's a main content area. On the left, there's a logo for 'EFD' and a navigation menu with 'ABOUT', 'HOW TO MAKE AN IFC', 'NEWS & EVENTS', 'CREATE AN OPERATOR', 'IFD DATA', and 'THIS WEBSITE'. The main content area features a large diagram with red and green elements, and a text box on the right that reads: 'The data is generated by...'. There's also a 'READ MORE' button at the bottom right of the text box.



## Slide 19



**Shit Flow Diagram (SFD)**  
<https://sfd.susana.org/graphic-generator>

## Slide 20



Thank you!  
धन्यवाद !

 Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
DWSM Building, Janapalika, Mahatmarg, Kathmandu, Nepal  
Phone: +91 11 5748 4110754  
Website: [www.dwsrm.gov.np](http://www.dwsrm.gov.np)

Technical Support  
 Environment & Public Health Organisation (ENPHOD)  
Address: 11, Thapaga, Hanuman Nagar, Kathmandu, Nepal  
Phone: +91 11 5748 4110754 | Website: [www.enphod.org](http://www.enphod.org)

**SESSION 13.2**

**CWIS Tools: CSDA**

Slide 1

**"Citywide Inclusive Sanitation – Training of Trainer's"**  
**CWIS Tools – City Service Delivery Assessment**

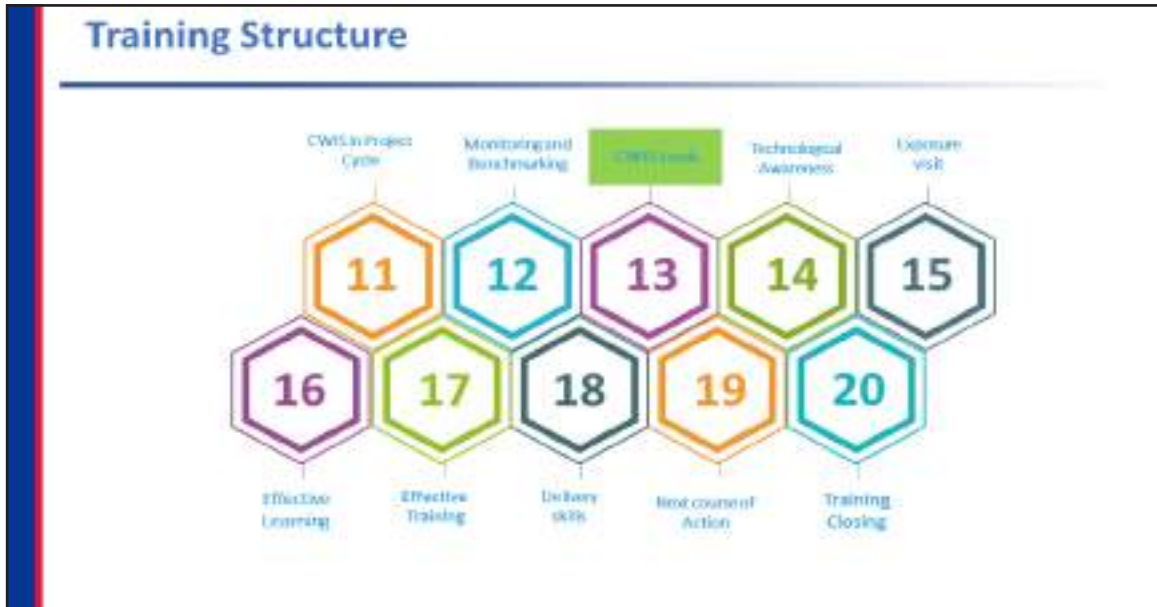
Resource Person

Government of India  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

Slide 2



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools – City Service Delivery Assessment (CSDA)



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools – City Service Delivery Assessment (CSDA)

### Learning Outcomes


- Discuss on CSDA as CWIS tool for an assessment process
- Interpret the sanitation condition through CSDA

At the end of the session, participants will be able to ...

## Slide 5

## Presentation Outline


- What does a CSDA do?
- The enabling environment
- Fitting the CSDA into the project cycle
- The CSDA output



## Slide 6

## Shit Flow Diagram (SFD)

- Overview of **how** sanitation is working or not working in a city:
  - Shows % of **population** contributing to each faecal waste flow
  - Shows % **safely managed** and % **unsafely managed** excreta
  - Reflects how **inclusive** the sanitation service is
  - Is effective for **advocacy** and awareness raising, but not technical design




What are the cause for these issues and challenges in sanitation?

## Slide 7

## CSDA for CWIS

- CSDA assesses why this is happening:
- Facilitates assessment of **enabling environment** for CWIS
- Generates **graphics** to support a systematic process for **stakeholders**
- Addresses both **sewered** and **non-sewered** sanitation
- Includes an Action Checklist to **identify and prioritise actions** to improve sanitation



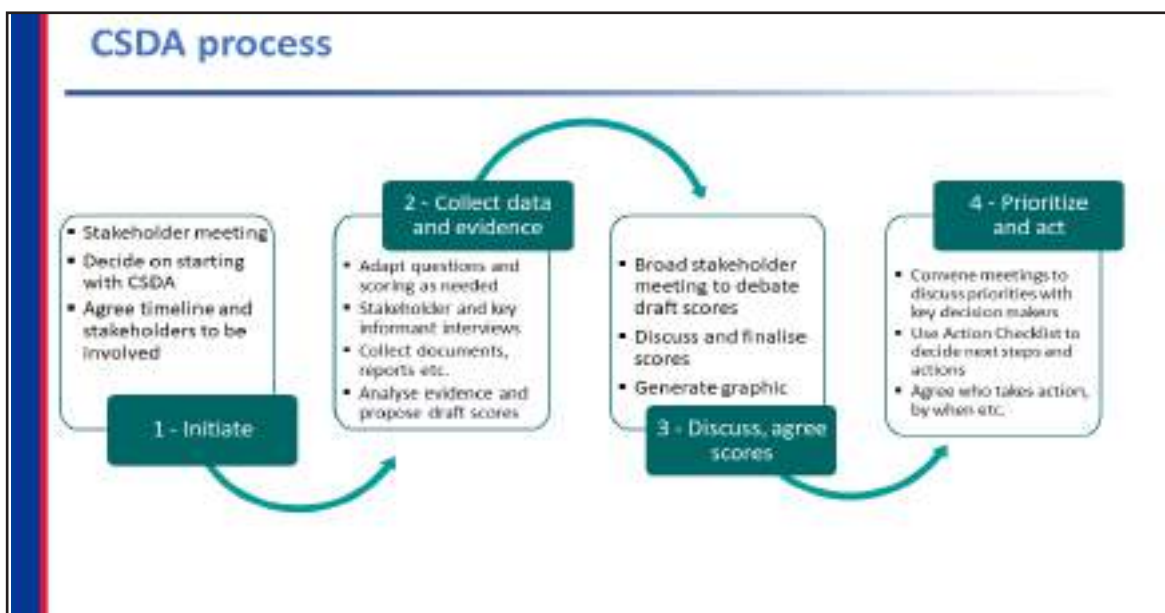
## Slide 8

## Purpose of CSDA

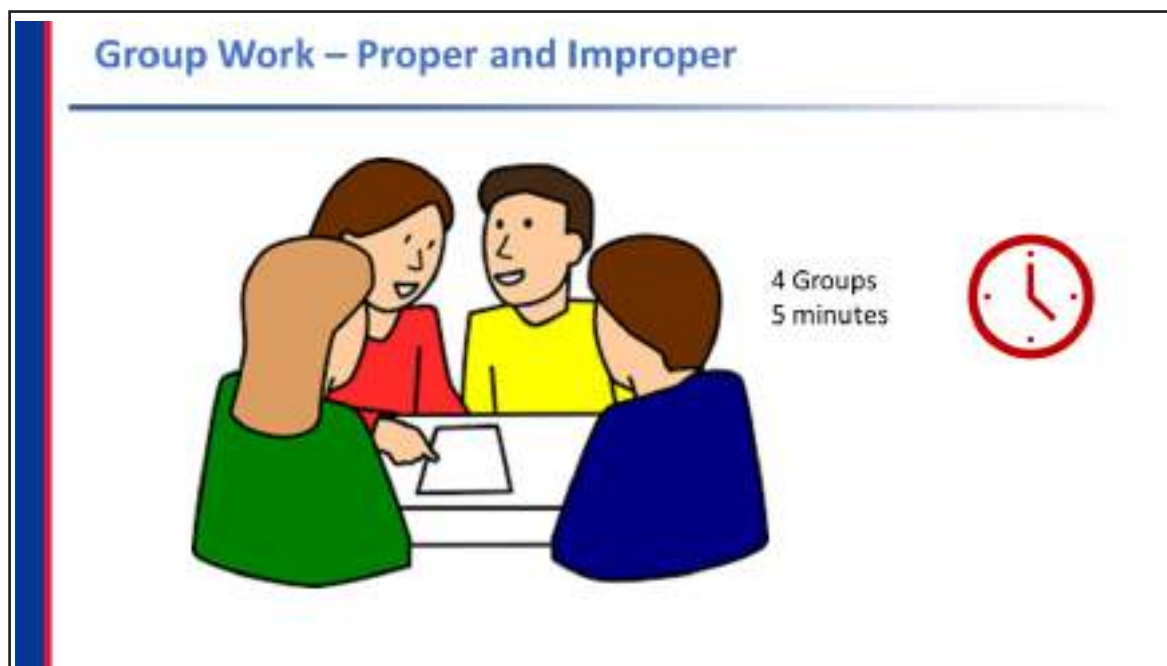
- It supports the **assessment** of the enabling environment for CWIS using structured questions
- It generates simple **graphics** to support a systematic process
- It addresses **sewered and non-sewered** sanitation.
- It includes an **action checklist** to help identify and prioritise actions to improve sanitation

At the end of the session, participants will be able to ...

Slide 9



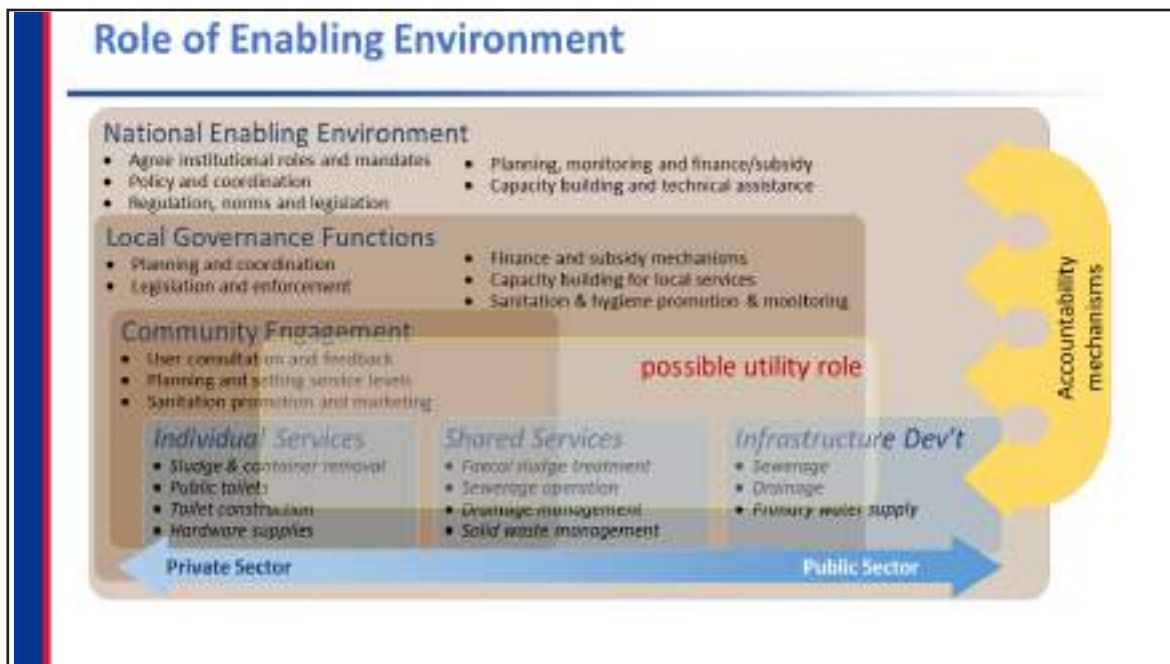
Slide 10



They are going for a group work. For this, participants will be provided a case and will be divided into 4 groups



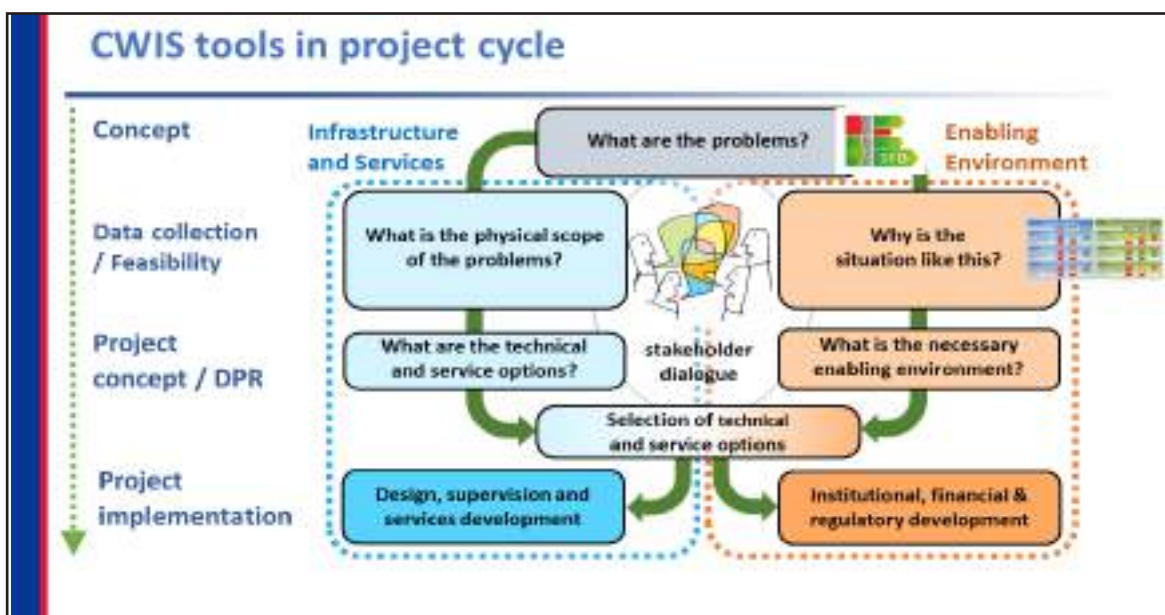
Explain how CSDA is linked with enabling environment.



Link between CSDA and 3 tiers of Government



Slide 13



Link of CSDA with CWIS tools in project cycle

Slide 14

Pillars, building blocks and questions		
Pillar	Building block	Questions in the framework
Enabling	Policy	Policies, institutions, regulation
	Planning and budgeting	Targets, budget lines
	Inclusion	In planning and budgets
Delivering	Funding	Investment plan, adequacy, coordination
	Capacity, outreach	Institutional capacity, staffing/autonomy, outreach
	Inclusion	Technology, funding
Sustaining	Regulation and cost recovery	Staffing, staff development, health and safety, capacity building
	Service providers	Marketing, service provider development
	Inclusion	Growth, planning from evidence, outcomes

As we've already seen, the CSDA has three pillars – enabling, delivering and sustaining services. These are shown on the left side of the table. Each pillar is divided into three building blocks, as shown in the middle column. A score for each building block is calculated by the stakeholders, by answering a series of objective questions.

For example, in the 'Enabling' pillar under the 'Policy' building block, the questions address policy, institutions and regulation.

Or, taking another example, the building block 'Inclusion' in the 'Developing' pillar asks questions about the availability of different affordable technical options and whether funding is available for services to support poor and vulnerable people.

### Example CSDA question and scoring criteria

Question22	Toilet, pit or septic tank Emptying & transport Sludge treatment and reuse			Scoring rubric
<b>N.1.1 Policy:</b> Is use of non-sewered sanitation services enabled by an appropriate, widely-known, acknowledged and available national or local policy?				<b>1</b> Policy is appropriate, widely-known, acknowledged and available <b>0.5</b> Policy is appropriate, but not widely-known, acknowledged or available; or exists only as a guideline or strategy without legal force <b>0</b> Policy is not available, or inappropriate to the context

-Here’s an example of a question from the ‘Policy’ building block of the ‘Enabling’ pillar for non-sewered sanitation services: “Is use of non-sewered sanitation services enabled by an appropriate, widely-known, acknowledged and available national or local policy?” It illustrates that, although the CSDA is focused on the city, national and regional or state policies may also apply.

-On the right side you can see the scoring rubric. If there’s a relevant and appropriate policy (or draft) that’s acknowledged and readily available, you score one. If there’s an appropriate policy or draft but it’s not acknowledged or not widely available, then score half. If there’s no policy or it’s inappropriate, then score zero.

-Each question is answered three times – once for each stage of the sanitation chain.

### Example CSDA question and scoring criteria

Question	Toilet, pit or septic tank Emptying & transport Sludge treatment and reuse			Scoring rubric
<b>N.1.1 Policy:</b> Is use of non-sewered sanitation services enabled by an appropriate, widely-known, acknowledged and available national or local policy?	<b>0</b>	<b>0.5</b>	<b>0.5</b>	<b>1</b> Policy is appropriate, widely-known, acknowledged and available <b>0.5</b> Policy is appropriate, but not widely-known, acknowledged or available; or exists only as a guideline or strategy without legal force <b>0</b> Policy is not available, or inappropriate to the context

Once a number is typed into the spreadsheet, the appropriate colour will automatically appear.

Slide 17

Question	Toilet, pit or septic tank	Emptying & transport	Sludge treatment and reuse	Scoring rubric
<b>S2.7 Technology:</b> Are there affordable, appropriate, safe and adaptable technologies available to meet the needs of poor and vulnerable people, according to the agreed definition?				<p><b>1</b> There are suitable options available to address the needs of most poor and vulnerable people</p> <p><b>0.5</b> There are options that address the needs of some poor and vulnerable people, but they are not sufficient or complete</p> <p><b>0</b> Options available to meet the sanitation needs of poor and vulnerable people are grossly inadequate</p>

-Here's a question from the 'Inclusion' building block of the 'Delivering' pillar: "Are there affordable, appropriate, safe and adaptable technologies available to meet the needs of poor and vulnerable people, according to the agreed definition?" The inclusion questions are the same for both sewered and non-sewered sanitation, because they address access to acceptable sanitation services, of whatever type. -As for all the questions, there are three possible scores. If there are suitable options available to address the needs of most poor and vulnerable people, you score one. If there are options that address the needs of some poor and vulnerable people, but they are not sufficient or complete, then score half. If the options available to meet the sanitation needs of poor and vulnerable people are grossly inadequate, then score zero.

Slide 18

### Aggregation of question scores

- Several questions for each building block
- Others could be added if necessary
- Scores added & normalised for each building block and step in service chain

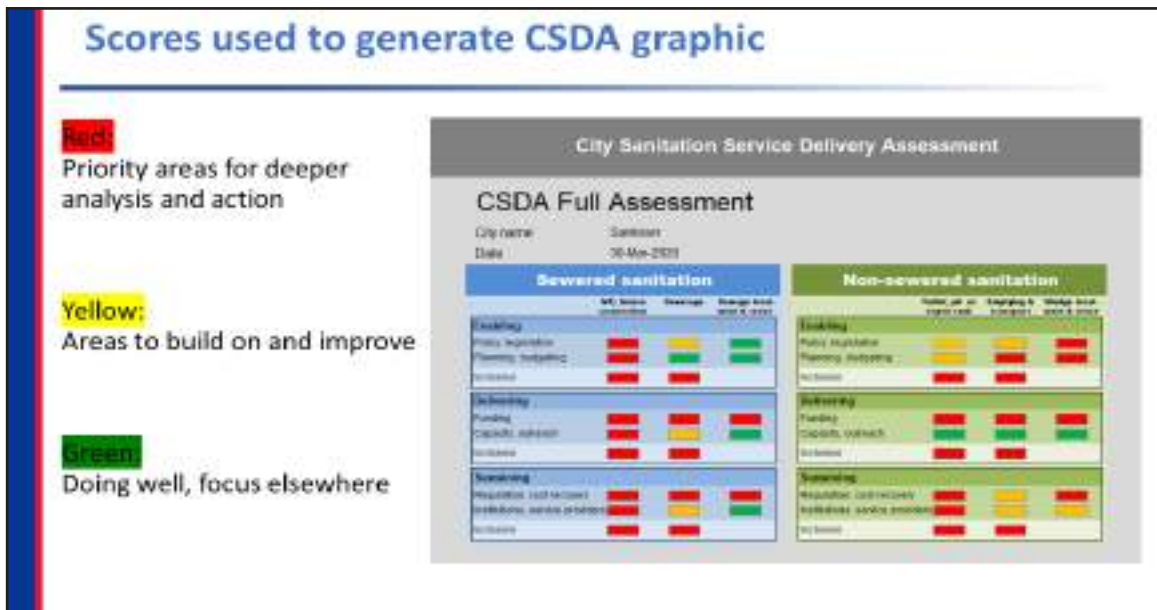
Pillars	Indicators	Numbers of questions		
		Toilet, pit or septic tank	Emptying & transport	Sludge treatment & reuse
Enabling	Policy	3	3	3
	Planning and budgeting	2	2	2
	Inclusion	1	1	-
Developing	Funding	3	3	3
	Capacity, outreach	3	3	3
	Inclusion	2	2	-
Sustaining	Regulation and cost recovery	3	3	3
	Service providers	4	4	4
	Inclusion	3	3	-
<b>Total</b>		<b>24</b>	<b>24</b>	<b>18</b>

There are from 1 to 4 questions under each building block, apart from the inclusion building blocks related to treatment. These have no questions, as there is no difference in how waste from different people is treated – or not treated.

More questions can be added if needed, but it's not recommended to use too many per building block. If more questions are added, the tool must be adjusted to accommodate them and calculate the aggregated scores correctly.

The spreadsheet automatically adds up the individual question scores for each building block. It then normalizes the scores for each building block to a value between zero and one, which is used to assign a corresponding traffic light colour.

The online FSM ToolBox version will also calculate the scores automatically. However you will not be able to add more questions, although editing the wording and terminology is still possible.

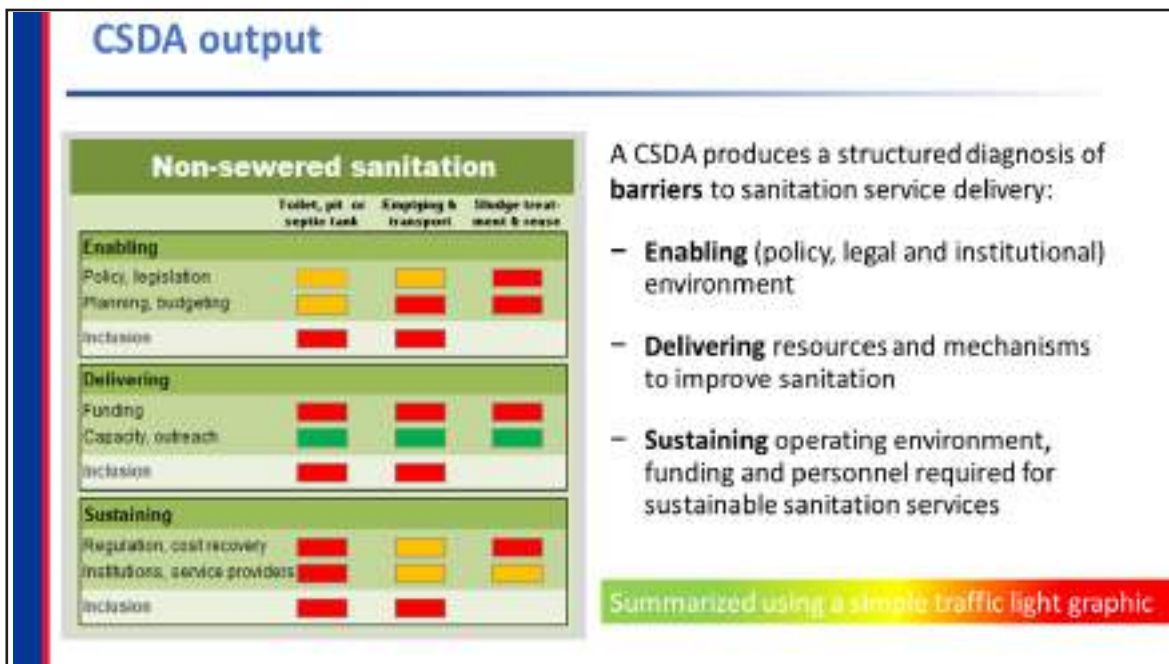


The assigned colours are presented in the graphic that you see here. It is clear and easy for everyone to understand, whatever their technical background, and so can be used to facilitate discussion about priorities and next steps.

Red indicates priority areas that require deeper analysis and substantial stakeholder follow-up and action.

Yellow indicates that there is something to build on, improve and develop. Or in some situations, maybe to finalise and make widely available.

Green suggests that the issue is well managed, and priorities may lie elsewhere.



Slide 21

### CSDA into ACTION

#### Non-sewered sanitation

	Toilet, pit or septic tank	Emptying & transport	Sludge treat- ment & reuse
<b>Enabling</b>			
Policy, legislation			
Planning, budgeting			
Inclusion			
<b>Delivering</b>			
Funding			
Capacity, outreach			
Inclusion			
<b>Sustaining</b>			
Regulation, cost recovery			
Institutions, service providers			
Inclusion			

**Building on CSDA findings:**

- Hold stakeholder discussions to define priorities
- Identify actions in priority areas, indicated by red and yellow boxes
- Service Delivery Action Checklist
- Suggested actions 'next steps' tailored to the current enabling environment
- Based on experience and good practice

Slide 22

### CSDA checklist

	Basic actions Getting started with improving sanitation	Intermediate actions Building on existing foundations	Consolidating actions Focused on sustainability and downstream actions
<div style="display: flex; justify-content: space-between; align-items: center;"> <span style="color: red; font-weight: bold;">More red in the CSDA...</span> <span style="color: green; font-weight: bold;">...more green</span> </div>			
Policy, Legislation, Regula-	<ul style="list-style-type: none"> <li>Develop a policy on sanitation and hygiene</li> <li>Develop a strategy on sanitation and hygiene</li> <li>Develop a regulatory framework</li> <li>Develop a budget for sanitation and hygiene</li> </ul>	<ul style="list-style-type: none"> <li>Develop a regulatory framework</li> <li>Develop a budget for sanitation and hygiene</li> <li>Develop a strategy on sanitation and hygiene</li> <li>Develop a policy on sanitation and hygiene</li> </ul>	<ul style="list-style-type: none"> <li>Develop a strategy on sanitation and hygiene</li> <li>Develop a policy on sanitation and hygiene</li> <li>Develop a regulatory framework</li> <li>Develop a budget for sanitation and hygiene</li> </ul>
Institutional arrangements	<ul style="list-style-type: none"> <li>Develop a strategy on sanitation and hygiene</li> <li>Develop a policy on sanitation and hygiene</li> <li>Develop a regulatory framework</li> <li>Develop a budget for sanitation and hygiene</li> </ul>	<ul style="list-style-type: none"> <li>Develop a policy on sanitation and hygiene</li> <li>Develop a regulatory framework</li> <li>Develop a budget for sanitation and hygiene</li> <li>Develop a strategy on sanitation and hygiene</li> </ul>	<ul style="list-style-type: none"> <li>Develop a budget for sanitation and hygiene</li> <li>Develop a strategy on sanitation and hygiene</li> <li>Develop a policy on sanitation and hygiene</li> <li>Develop a regulatory framework</li> </ul>

**Colour key:**

- Red: High priority
- Yellow: Medium priority
- Green: Low priority

### CSDA Public Sanitation

**Enabling (policy, legal and institutional) environment**

**Delivering resources and mechanisms to improve sanitation**

**Sustaining operating environment, funding and personnel required for sustainable sanitation services**

अधिक वर्ष २०८०/८१ नीति तथा कार्ययोजनाको बुँदा नं. ८७) सङ्घीय तथा राज्यसङ्घीय बरिपरि कापी, पढेटक, प्रोत्साहकीको अन्वयिक भाग हुने सार्वजनिक स्वास्थ्य तथा सामुदायिक सङ्गठनात्मक ब्यवस्थाका एक इञ्जिन सुविधासङ्गठन सार्वजनिक शौचालय र निवासस्थान निर्माण गरिनेछ।



सर्वजनिक शौचालय

सन्धीमा एक इञ्जार

सिङ्गी तथा सामुदायिक सङ्गठनात्मक

सङ्घीय तथा राज्यसङ्घीय बरिपरि कापी

पढेटक, प्रोत्साहकीको अन्वयिक भाग हुने सार्वजनिक स्वास्थ्यमा

Standard, Design guideline?

Geographic distribution?

SOP, Service Model?

Public, Institution, Business?

Towel, Business?


### CSDA FSM

**Enabling (policy, legal and institutional) environment**

**Delivering resources and mechanisms to improve sanitation**

**Sustaining operating environment, funding and personnel required for sustainable sanitation services**

अधिक वर्ष २०८०/८१ नीति तथा कार्ययोजनाको बुँदा नं. ८८) नदीनाला तथा पानीको स्रोतलाई पदुषणमुक्त राख्न शौचरपानी प्रशोधन प्रणालीको विकास र विस्तार गरिनेछ।



पोहोरपानी प्रशोधन प्रणाली

विकास

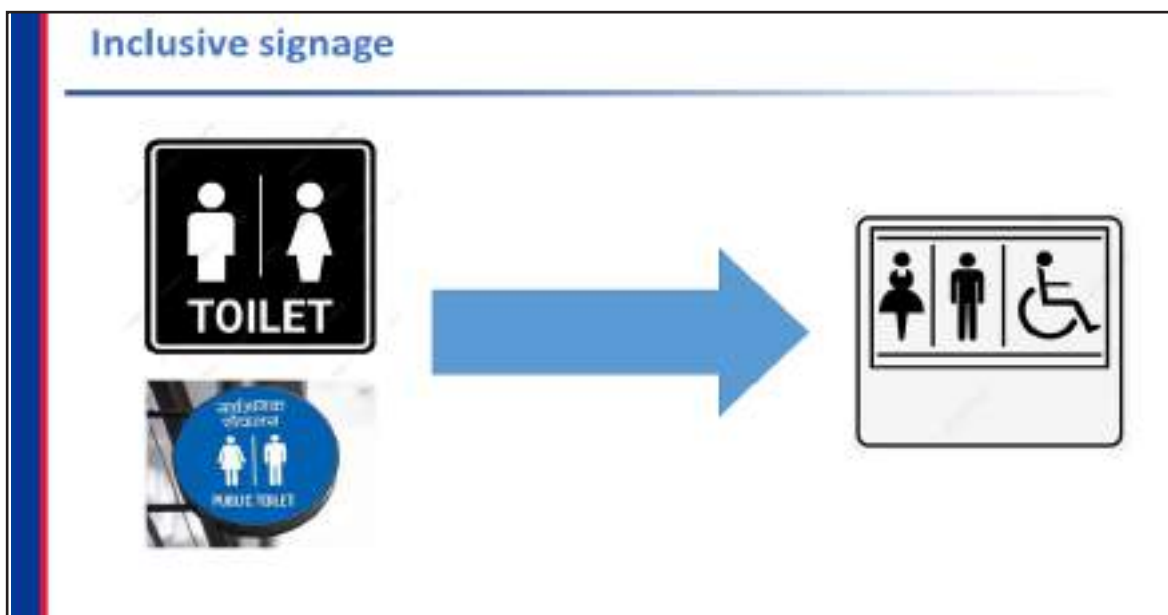
विस्तार

Standard, Design guideline?

R&D, Technology, Monitoring?

SOP, Regulatory Framework, Service Model?

Slide 25



Slide 26

**NWASH**  
**Web based & GIS enabled MIS**  
**Mandatory tool for monitoring, planning, resource allocation as per WASH act/draft policy**

Government of Nepal Ministry of water supply has launched the integrated platform for collecting all the information which are to be monitored for 6.1 and 6.2 it is webbased GIS enabled MIS .

Thank you!  
धन्यवाद !



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
DWSM Building, Panchsathi, Maneganga, Kathmandu, Nepal  
Phone : 977-01-4415745, 4418051  
Website : [www.dwsms.gov.np](http://www.dwsms.gov.np)

Technical Support



Environment & Public Health Department (EPHD)  
Kantipur, Kathmandu, Nepal  
Phone : 977-01-4415745 | Website : [nepal.gov.np](http://nepal.gov.np)



# SESSION **13.3**

## **CWIS Tools: NWASH**

## Slide 1



"Citywide Inclusive Sanitation – Training of Trainer's"  
**CWIS Tools : NWASH**  
 Resource Person



Government of Karnataka  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

## Slide 2

## Before Starting...

- Looking back,
  - Sanitation status
  - CWIS concept and framework
  - Ways to integrate it in our plan or implement at ground
  - Enabling environment and private sector engagement
  - Technological awareness
  - Monitoring and benchmarking
  - CWIS tools
- What do we need next? Do we need to compile all the data and information? Do we need a platform for such?

Till the date, throughout the training, we have been discussing on all the topics. As of now, after the discussion on monitoring and benchmarking along with CWIS tools, what do we need next? Do we need to compile all the data and information? And for the same, do one need a platform?

E/A: Yes,

Hence, now we are going to discuss on one of such platform available at center level, NWASH

Slide 3



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - NWASH

Slide 4




This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - NWASH

## Slide 5

## Learning Outcomes

- Explain N-WASH as a platform for the data compilation and data presentation
- Discuss on the guiding principles for N-WASH
- Go through N-WASH website and its application




At the end of the session, participants will be able to ...

## Slide 6


## Presentation Outline

- NWASH
- Data Layers
- Guiding Principles
- Life Cycle Cost and its component
- NWASH website and its application
- Key Performance Indicator
- Key Messages



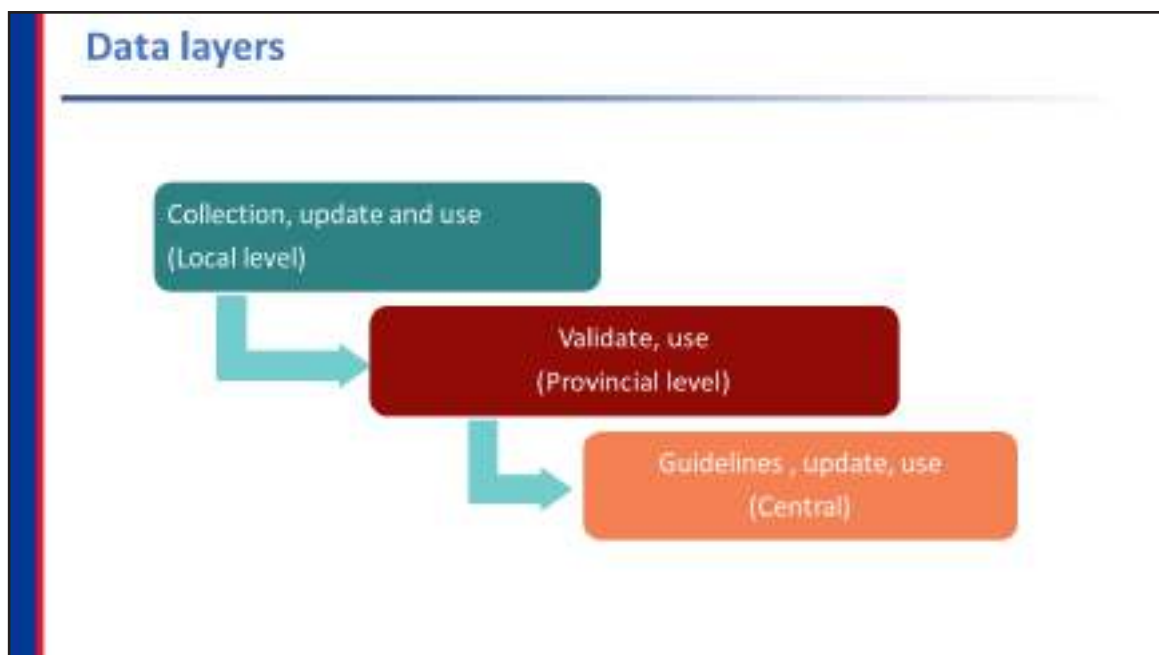
Slide 7

**NWASH**  
**Web based & GIS enabled MIS**  
**Mandatory tool for monitoring, planning, resource allocation as per WASH act/draft policy**



Government of Nepal Ministry of water supply has launched the integrated platform for collecting all the information which are to be monitored for 6.1 and 6.2 it is webbased GIS enabled MIS .

Slide 8



## What should the MIS try to give?

---

**INSTITUTIONAL CAPACITY**

**INVESTMENTS**

**INFORMATION**

## Guiding Principles

---

**1. Leaving No One Behind**

Financing instruments should be such that it would make whole WaSH facility accessible & affordable to everyone including the marginalized communities. Local government should be aware that for some marginalized groups even operational costs might become the cause to limit access the facility.




While monitoring we should think about the tariff and other barriers

## Slide 11

## Guiding Principles

### 2. Monitoring of the Service

Local governments should be aware about the service level they have planned to provide in this WaSH plan and monitor the services. The obtained data after monitoring should be submitted to National MIS portal which can be accessed by provincial government and federal government and that would show the Local governments WaSH performance. Provincial and Federal government can assist temporarily in monitoring the service..



Local governments should be assessed to know whether they are capable enough to operate the national MIS. It should be continuously monitored.


## Slide 12

## Guiding Principles

### 3. Institutional Setups

Local governments should be fully aware about the institutional arrangements needed to ensure WaSH facilities.

In this WaSH plan HR cost such as Technical assistance in each scheme, monitoring cost in each scheme, Cost for Hygiene Inspector, Hygiene promoter and Human resources set up in Schools and Health care facilities are mentioned. Local government should try to ensure the human resource arrangement. Provincial and Federal government can assist temporarily in setting up the institution.




Local governments should be assessed to know whether they are capable enough to provide SDG 6.2, HR, legal frameworks, lab set ups, financing instruments should be properly placed and they should be monitored too.

## Guiding Principles

### 4. Capacity Development

This WaSH plan has estimated the **resources for capacity development**. However before developing the capacity the current capacity should be assessed. Depending upon the human resource and sustainability requirements from MIS data capacity development master plan of local government can be formulated. Local government can develop their capacity based upon the requirements suggested by MIS. This can be assisted by Provincial and Federal governments.




TOR should be linked with capacity development, the impact of capacity development should be monitored and the process should be iterative

## Guiding Principles

### 5. Priority Setup

While setting up the Priority it is expected that the planners would keep special considerations in development of managerial capacity of the utilities in first few years, **small level capital investments in medium term and ,big capital investments in later years** so that investment generation becomes easier. It should be done by local governments




To set the priority, the local government should be aware about the importance of sanitation services, local governments should be assessed whether they are aware enough or not.



### Guiding Principles

**6. Availability of Fund and Bridging the Gap**  
 The Life-Cycle Cost Approach (LCCA) provides useful frameworks, tools and methodologies for providing better insight into this in the future.

- While bridging the gap local government should be fully aware that there may be requirements of guidelines, procedures for accessing different investments. Local government should try to formulate those in the first few years and develop it as a milestone. Local government can take help from Federal government, Provincial government ,NGOs, INGOs in doing so.

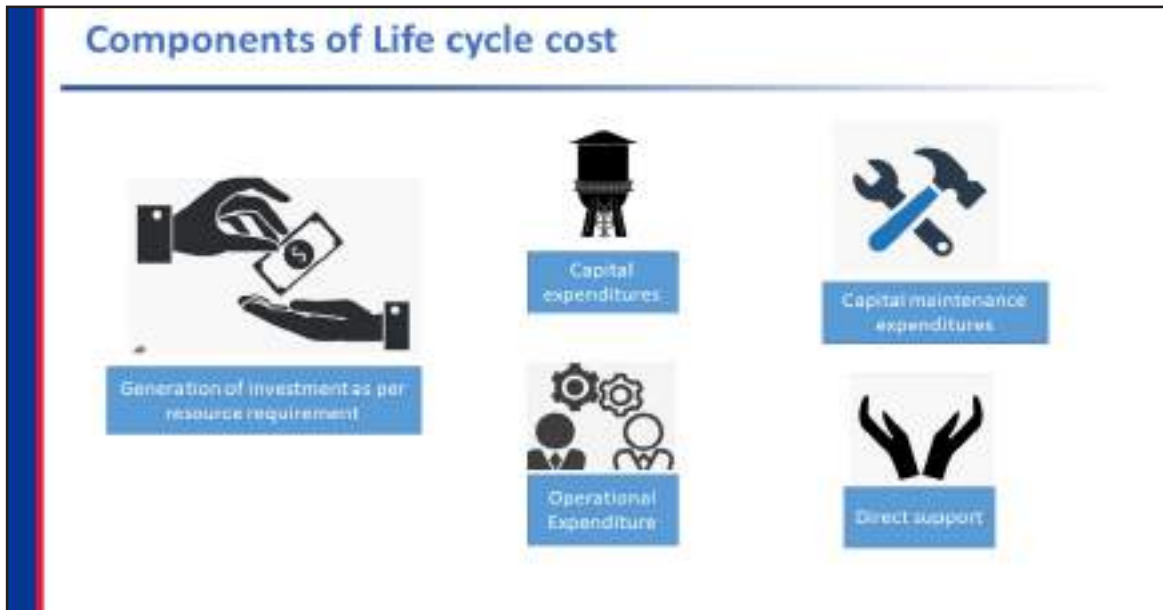


Costing calculations will be the recommendation of monitoring

### Life cycle cost should be assessed ...recommended

THE MAJOR FUNDING REQUIREMENTS ARE NEITHER SEEN NOR ADDRESSED





The recent planning process includes the sanitation systems, it checks the household sanitation systems in N-WASH and community safely managed services such as fecal sludge management, solid waste managed, sewers with waste water treatment units

Slide 19



The recent planning process includes the sanitation systems, it checks the household sanitation systems in N-WASH and community safely managed services such as fecal sludge management, solid waste managed, sewers with waste water treatment units

Slide 20

**NWASH WEBSITE**

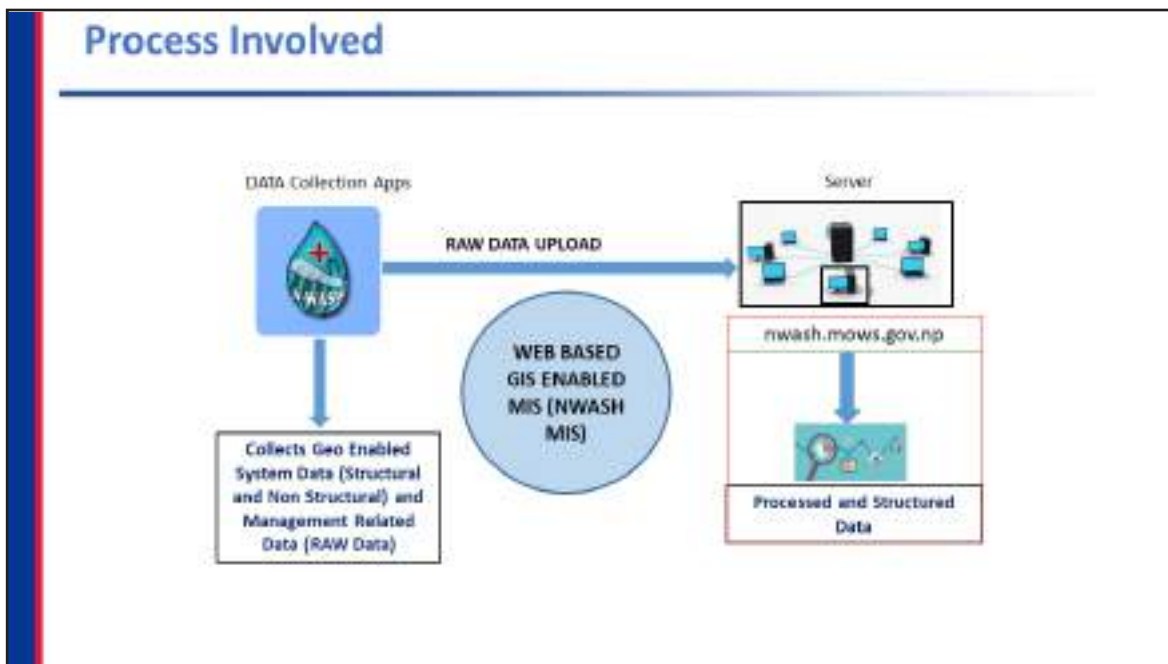
---

<http://nwash.mows.gov.np/>

The trainer needs to have the hands-on idea of NWASH-MIS and he/she should be able to pitch the system demo of 10 minutes.



The data are collected through the mobile application. It has separate application to create the household level sanitation data sets.



Slide 23



Lot of household sanitation related data has been collected. The data can be aligned to monitor the CWIS performance. Similarly the system is now monitoring and assessing the local level governance where the capacity of the local governments is assessed and there also the data can be used to implement the CWIS.

Slide 24



To support the output process should be checked, governance pillars should be assessed and is assessed in NAWASH

Are the local governments updating the data base?

WASH सेवा सुधार

1. NAWASH MS सर्वेक्षण डेटाबेस (NAWASH MS) सुदृश्य है?
2. क्या सर्वेक्षण डेटाबेस को अपडेट किया गया है?
3. क्या NAWASH MS अपडेटिंग है?
4. क्या NAWASH MS का प्रयोग किया गया है, NAWASH डेटाबेस में से डेटाबेस निकाला गया है?

Service Outcomes	EQUITY	SAFETY	SUSTAINABILITY
Spoken Functions	RESPONSIBILITY - ACCOUNTABILITY		RESOURCE PLANNING & MANAGEMENT

We are improving the dashboard as per the need of goal 6.2

To support the output process should be checked, governance pillars should be assessed and is assessed in NAWASH

संरचना, नीति र समर्थन

5. दृष्टिकोण
6. संरचना
7. समर्थन व प्रभाव
  - Local Sanitation Master Plan
  - ODP Sustainability Guidelines
  - Regulation, Standard, or Guideline for Toilet construction
  - Citywide Inclusive Sanitation (CIS) guidelines
  - Standard Operating Procedure (SOP)
  - Others

Service Outcomes	EQUITY	SAFETY	SUSTAINABILITY
Spoken Functions	RESPONSIBILITY - ACCOUNTABILITY		RESOURCE PLANNING & MANAGEMENT

File Description for Local Sanitation Master Plan	Choose File	Not Yet Chosen
File Description for ODP Sustainability Guidelines	Choose File	Not Yet Chosen
File Description for Regulation, Standard, or Guideline	Choose File	Not Yet Chosen
File Description for Citywide Inclusive Sanitation (CIS) Guidelines	Choose File	Not Yet Chosen
File Description for Standard Operating Procedure (SOP)	Choose File	Not Yet Chosen
File Description for Others	Choose File	Not Yet Chosen

Assessed whether they have the legal frameworks ,equipments ready to move ahead? We are improving the dashboard as per the need of goal 6.2

Slide 27

To support the output process should be checked, governance pillars should be assessed and is assessed in NWASH

The screenshot shows the NWASH assessment tool interface with several dropdown menus for selecting assessment criteria. To the right is a 2x4 grid of governance pillars:

Service Outcomes	EQUITY	SAFETY	SUSTAINABILITY
System Functions	RESPONSIBILITY	ACCOUNTABILITY	RESOURCE PLANNING & MANAGEMENT

A red oval highlights the bottom row (System Functions).

Assessing the lab facilities, TOR of the people and capacity development plans

Slide 28

### Key Performance Indicators (KPIs)

KPI No.	Key Performance Indicator (KPI)
<b>Level and Quality of Water Supply Service</b>	
1	Population Coverage
2	Sufficiency ( <i>Quantity</i> )
3	Quality ( <i>Safety</i> )
4	Accessibility ( <i>Convenience</i> )
5	Reliability ( <i>Continuity</i> )

### Key Performance Indicators (KPIs)

KPI No.	Key Performance Indicator (KPI)	KPI No.	Key Performance Indicator (KPI)
<b>Operation and Management (O&amp;M) Efficiency</b>		<b>Commercial Operation</b>	
<b>Technical Operation</b>		14	Metering Ratio
6	Asset Management	15	Billing and Collection Efficiency
7	Maintenance (Preventive)	<b>Users' Satisfaction</b>	
8	Mean Time to Repair (MTTR) (Reactive Maintenance)	16	Complaints about Services
9	Non Revenue Water (NRW)	17	Users' Satisfaction
<b>Financial Management</b>		<b>Organization and Management</b>	
10	Average Domestic Tariff and Connection Charge (Affordability)	18	Business Plan
11	Operating Ratio	19	Customer Database
12	Percentage Contribution to Investment (CTI)	20	Human Resource Development (HRD)
13	Financial Accountability	21	Gender Equality and Social Inclusion (GESI)
		22	Annual General Meeting (AGM)
		23	Organizational Maturity

### Key Messages

- For monitoring one needs data and such data can be compiled through a system as N-WASH,
- a useful management system for government, utilities and service providers
- which can be then presented to the stakeholders for advocacy or could be used to analyze the situation for the development of appropriate interventions through different sanitation tools

Hence, Monitoring is a regular observation and recording for progress updates and must be carried out continuously at different phases, giving feedback to the related stakeholders to be followed by Action points.

For monitoring one needs data and such data can be compiled through a system as IMIS, a useful management system for government, utilities and service providers which can be then presented to the stakeholders for advocacy or could be used to analyze the situation for the development of appropriate interventions through different sanitation tools like SFD and CSDA



Slide 31

## IMIS

- For monitoring one needs data and such data can be compiled through a system as IMIS, a useful management system for government, utilities and service providers which can be then presented to the stakeholders for advocacy or could be used to analyze the situation for the development of appropriate interventions through different sanitation tools like SFD and CSDA

Slide 32

## Digital Data Integration

Integration of various data in digital format with geo-referenced maps

**INTEGRATED MUNICIPAL INFORMATION SYSTEM**

IMIS driving efficiency, responsiveness and accountability of municipalities

**Business**

10,341	14,004	181	100
2,081	100	100	100

**Sanitation Systems**

11,000	175	10	10
1,000			

Thank you!  
धन्यवाद !



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
DWSM Building, Farquharan, Mahabagicha, Kathmandu, Nepal  
Phone : 91 447244, 441475  
Website : [www.dwsrm.gov.np](http://www.dwsrm.gov.np)

Technical Support



Environment & Public Health Department (EHPHD)  
Bhadrakali, Mahabagicha, Farquharan, Kathmandu, Nepal  
Phone : 91 447811, 447812, 447813

# SESSION 13.4

## CWIS Tools: IMIS

Slide 1



"Citywide Inclusive Sanitation – Training of Trainer's"  
**CWIS Tools : IMIS**  
Resource Person



Government of Karnataka  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management

Slide 2



**INTEGRATED MUNICIPAL INFORMATION SYSTEM (IMIS)**  
CATALYZING CWIS APPROACH TO ACHIEVE SDG 6.2 OUTCOMES

Many International Financing Institutes (IFIs) , have endorsed IMIS as integral part of any CWIS projects to ensure that mandated authorities are fulfilling their responsibility to ensure accountability and transparency.

Slide 3

### Data and Information is a Key Accelerator for SDG 6

UN Water SDG 6 Global Acceleration Framework

Disaggregated data & information at city level is required for policy-making, decision-making and well targeted investment.

Indicator 6.2.1a: Proportion of population using safely managed sanitation services  
Nepal: 49 % - 2020

GON SDG commitment – 90 % urban HH connected to SS or access to FSM by 2030

Sanitation data is usually limited availability.

Comprehensive Data & information needed on each aspect of the sanitation chain

2. ...that maximize health, environmental and economic gains

Slide 4

### Sanitation Situation of Nepal

89 % of Nepal's population dependent on On-site Sanitation facility (OSS)

Unavailability of credible data to report the state of sanitation service chain

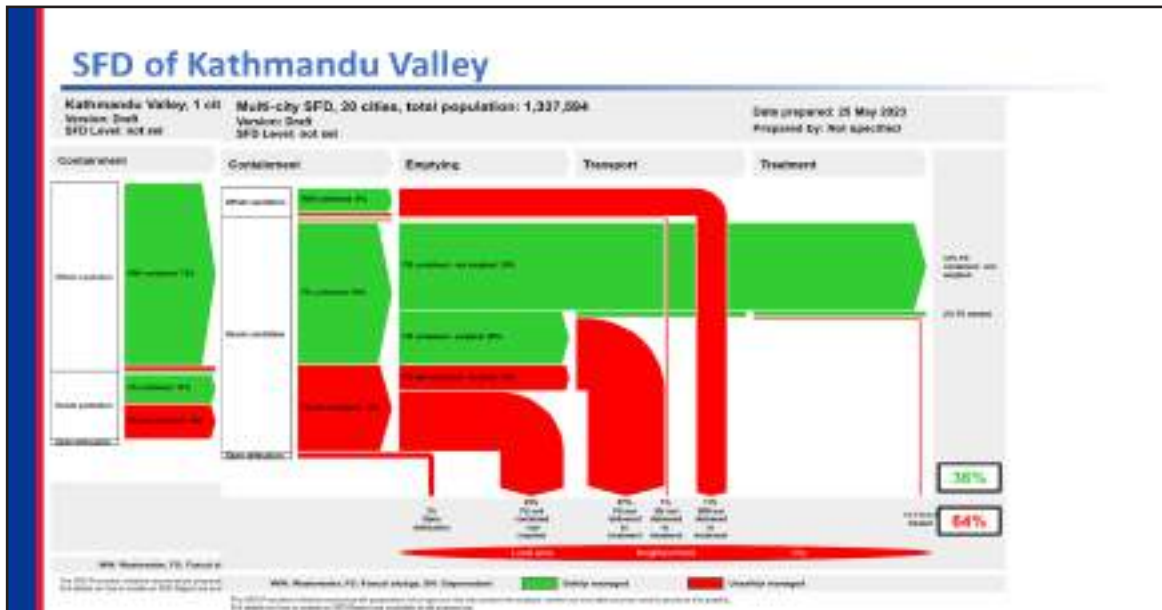
X % Safely managed, X% unsafely managed ??

Most investment has been for centralized wastewater treatment and sewerage. Extending such sewer systems to low-income and informal settlements can be challenging and costly

A 5 m3 truck of faecal sludge dumped into the open is the equivalent of 5,000 people defecating in the open.

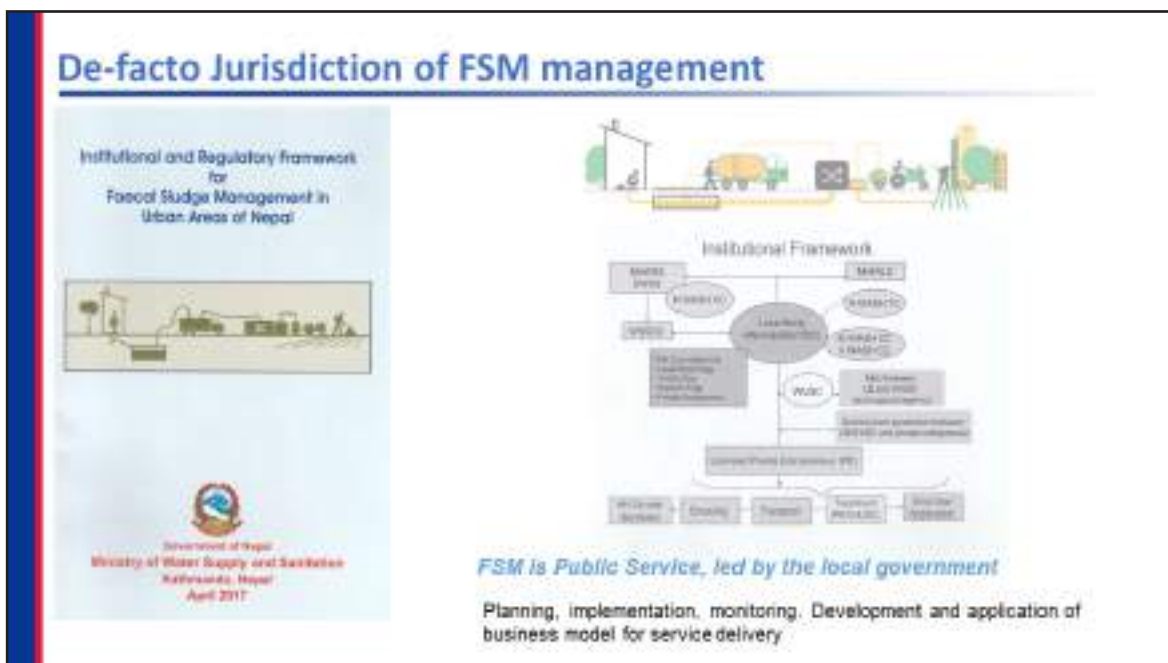
MICS survey

Slide 5



KV- no FSTP at all, lubhu 6m3/week with prefabricated components (BRODA, CDD, ENPHO).. 2016

Slide 6



In Nepal, we are good at forming policy, but implementation on the ground is weak.

LG may seek technical and management help

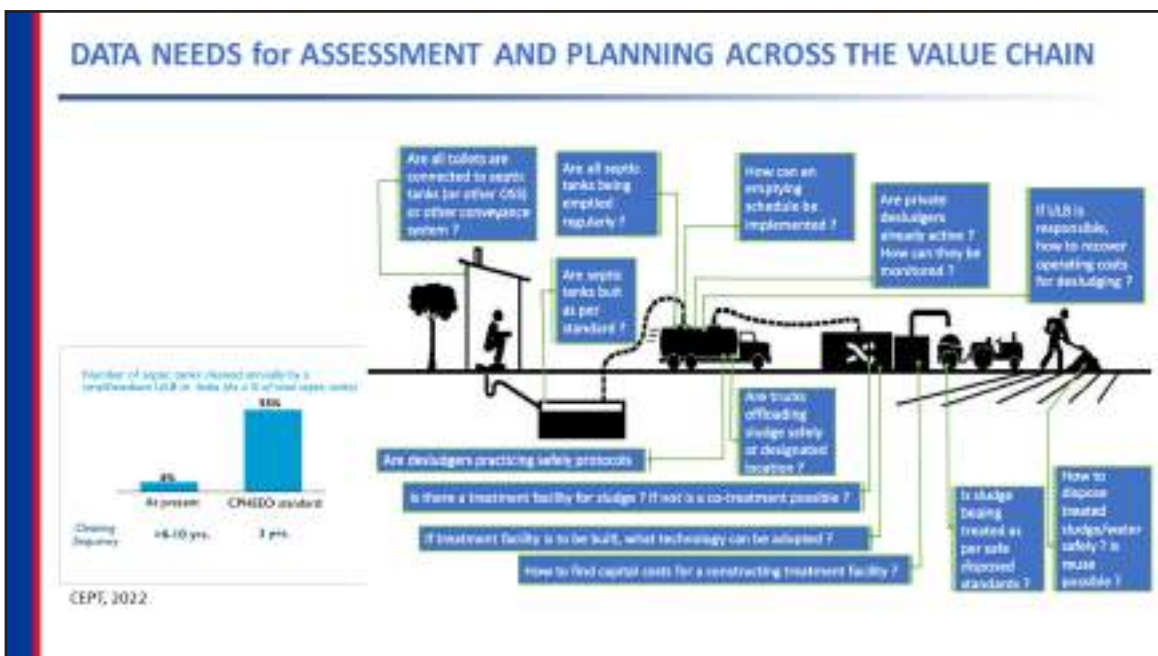
Municipal function: framework, functional entity ( dedicated sanitation department), functionaries ( equipped staffs) , Finance (Finance)

Slide 7



Safe sanitation: for public health and environmental quality  
 Inclusive, particularly focusing on urban poor, vulnerable population, women and children  
 City wide – not just for select area  
 Leaving no one behind,  
 pro-poor, inclusive mandates

Slide 8



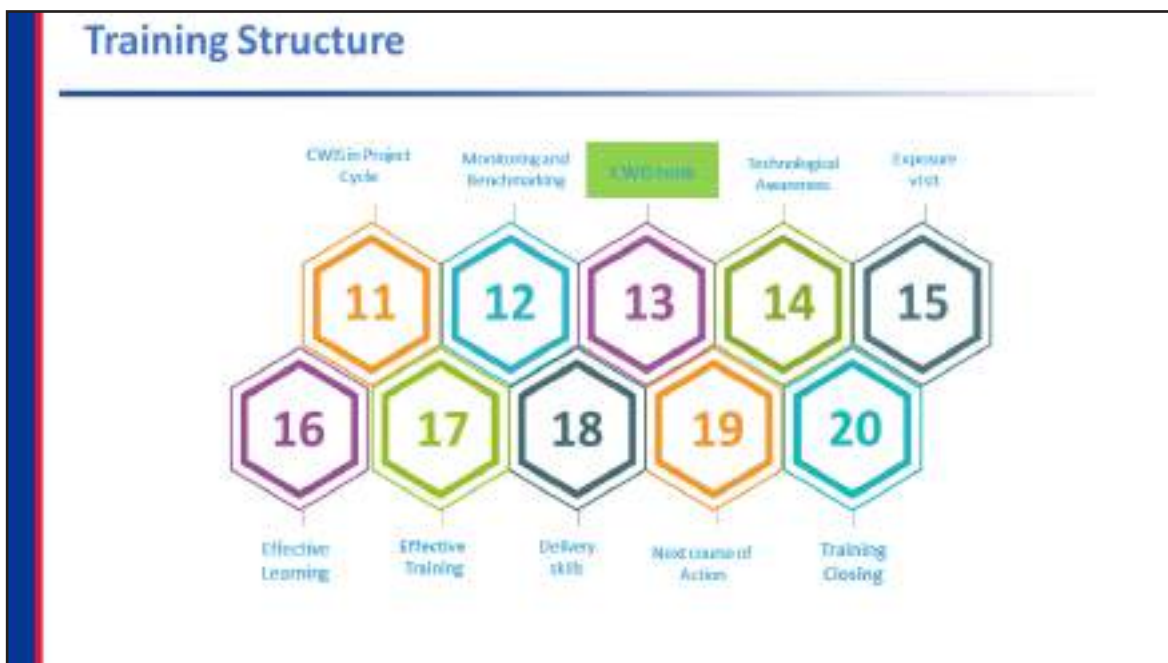
Monitor all these data to allow evidence-based strategic and tactical changes to optimize performance and service delivery.

Need of an information system to manage all these information at all these information.

Crux of accountability functions...



This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - NWASH




This training includes 20 main technical sessions, and are currently on session 13: CWIS Tools - NWASH



## Slide 11

## Learning Outcomes

- Explain IMIS as a platform for the data compilation and data presentation
- Discuss IMIS for planning, management, monitoring and evaluation and for data source of other tools


A yellow lightbulb icon with black outlines and several short black lines radiating from the top, symbolizing an idea or insight.

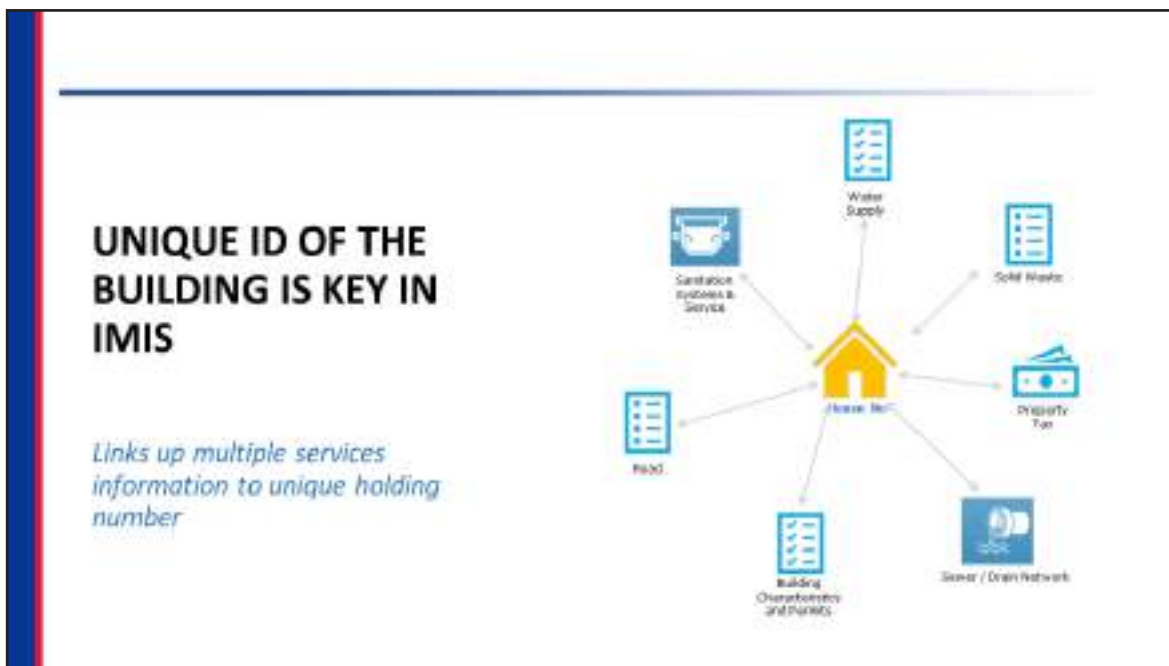
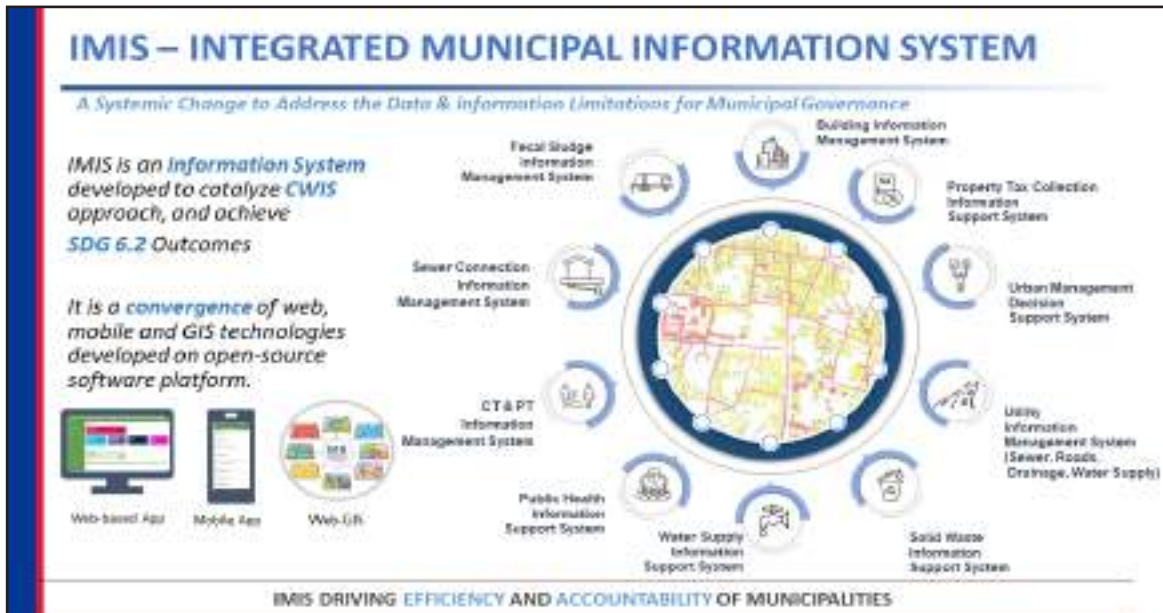
At the end of the session, participants will be able to ...

## Slide 12

## Presentation Outline

- IMIS
- IMIS for Planning
- IMIS for Management
- IMIS for Monitoring and Evaluation
- IMIS for data source of other tools
- Key Messages

An icon of a person with an orange head and green body standing next to a whiteboard on a tripod stand. The whiteboard has several horizontal lines representing text.



Slide 15



Identifying the appropriate sanitation system (sewage or non-sewage) based on the population density, land use pattern, topography, environmental vulnerabilities of areas, etc

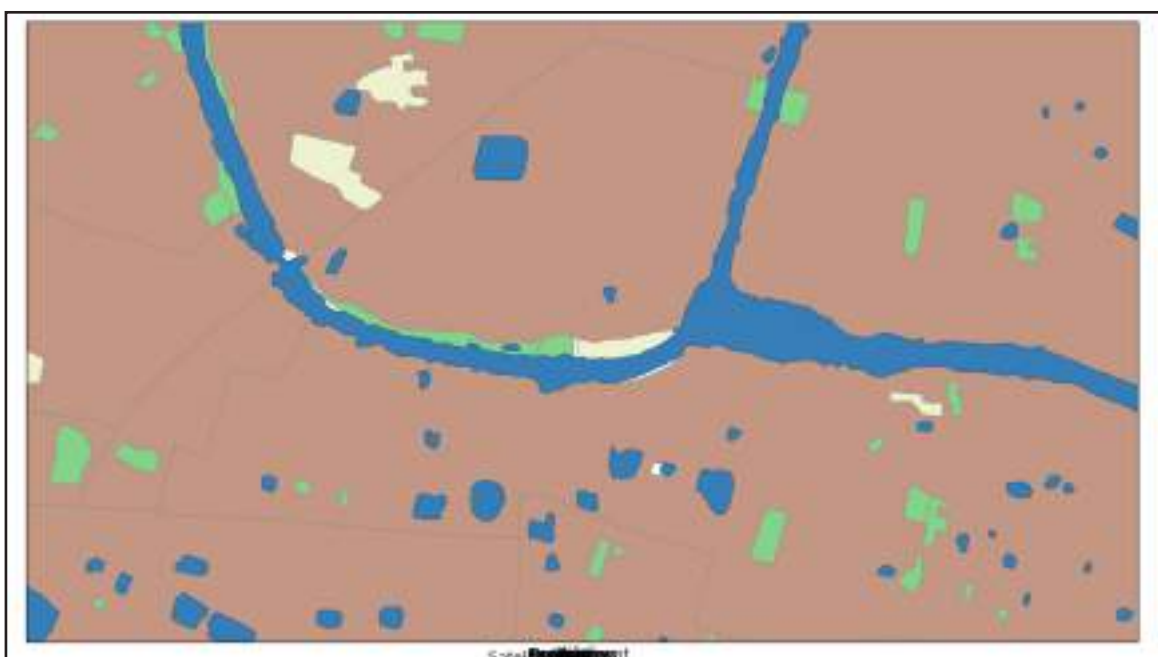
Identifying best locations and capacity of gender intentional and socially inclusive services and infrastructure specially for shareable infrastructure and services such as public toilet / community toilet fair and strategic pricing of services with special focus for households in low and vulnerable areas and the sharable services.

Identifying the best locations for STP and FSTP and developing investment plan using proximity analysis

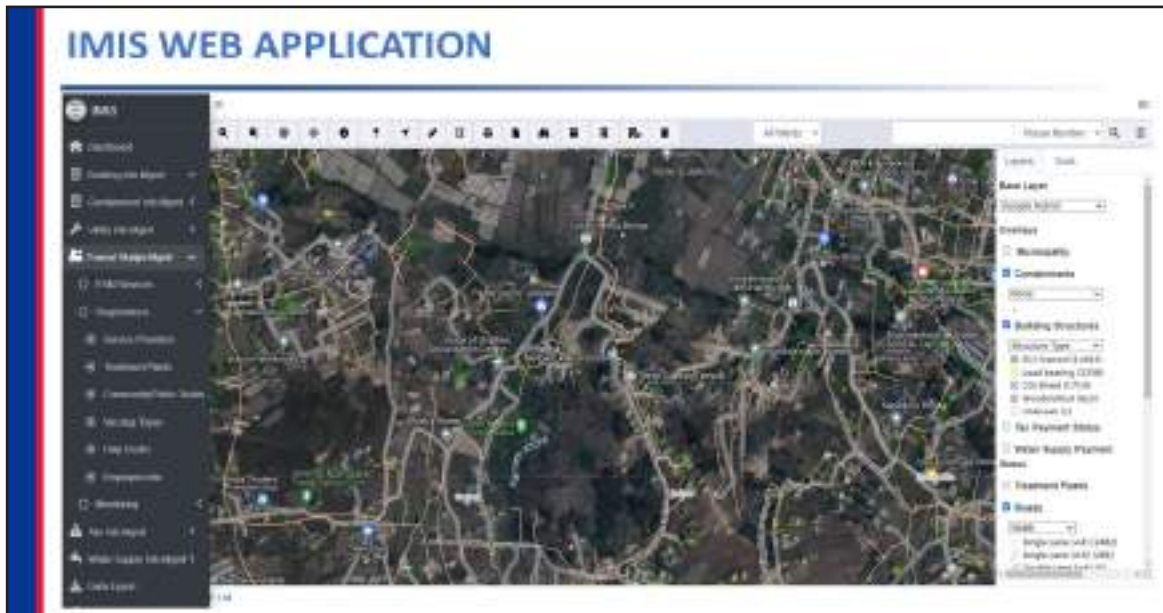
Establish baseline, prepare plans and EMP ( outcome indicators, process indicators), management, performance monitoring, assessing impact and sustainability.

Update and improvement based on evaluation.

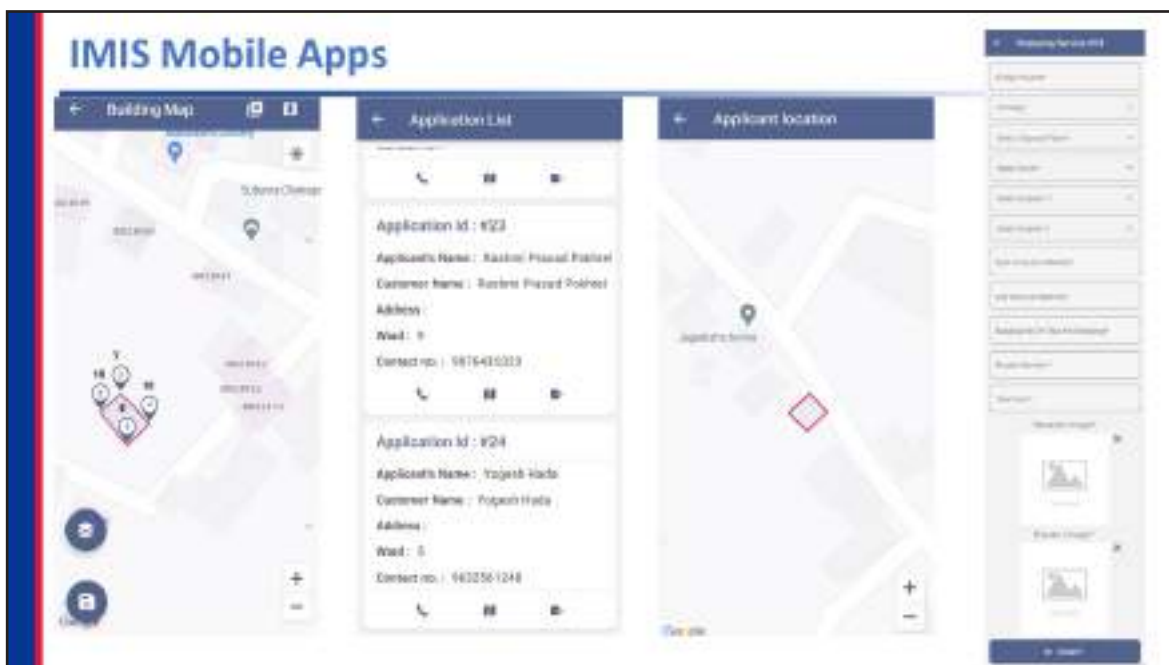
Slide 16



Slide 17



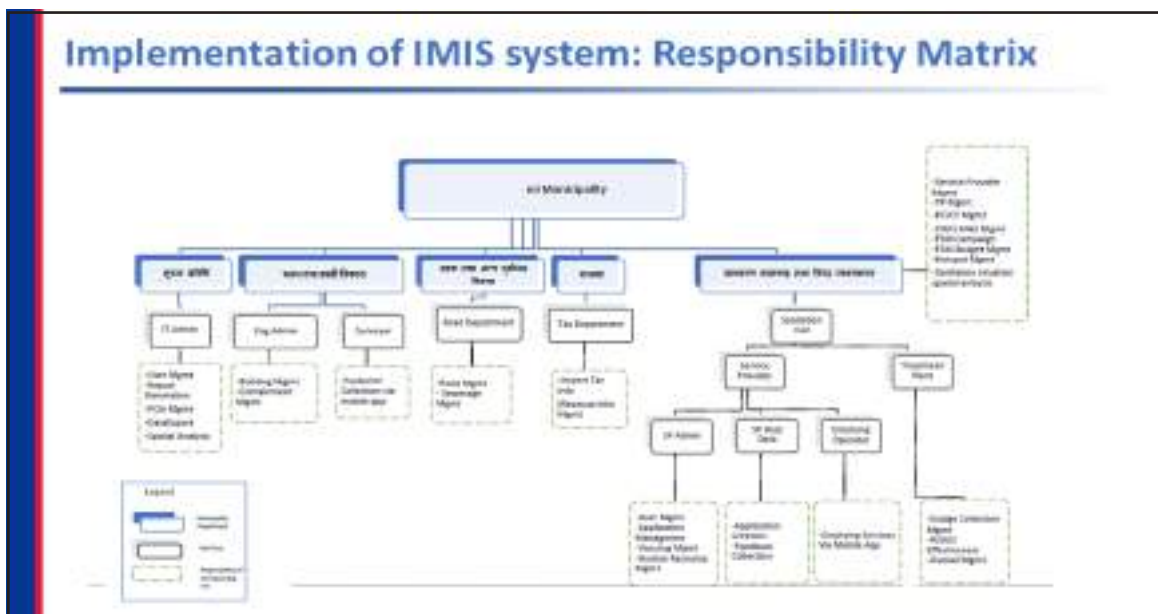
Slide 18



Single mobile app, based on the credentials relevant app is shown.

Emtypers log in app for performing emptying list

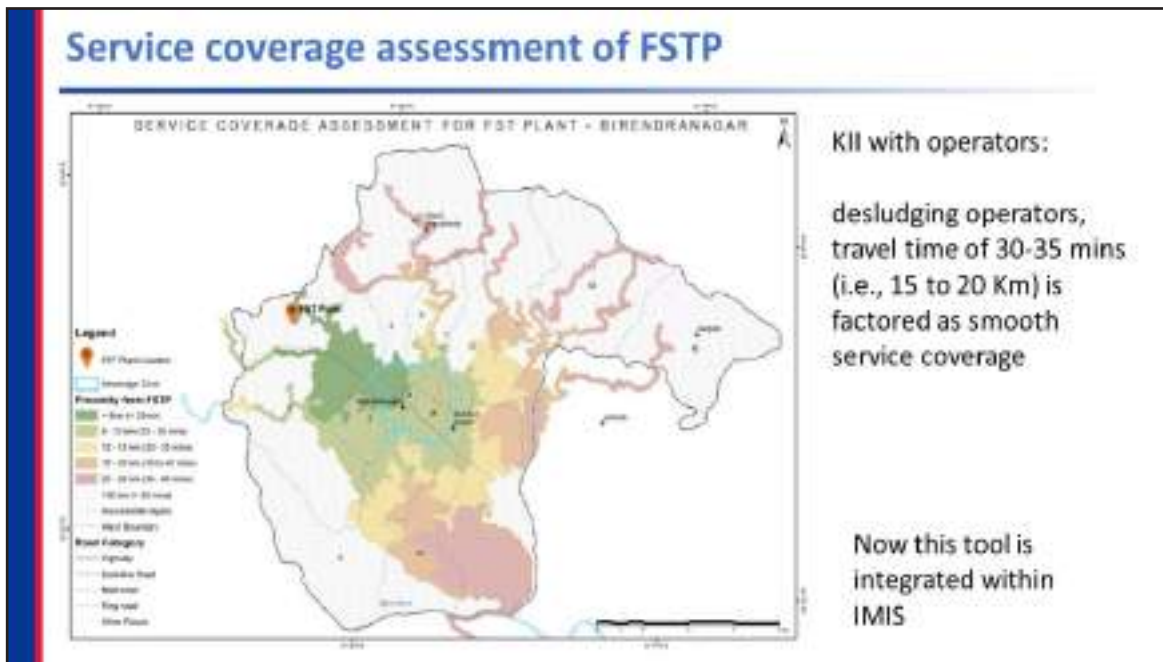
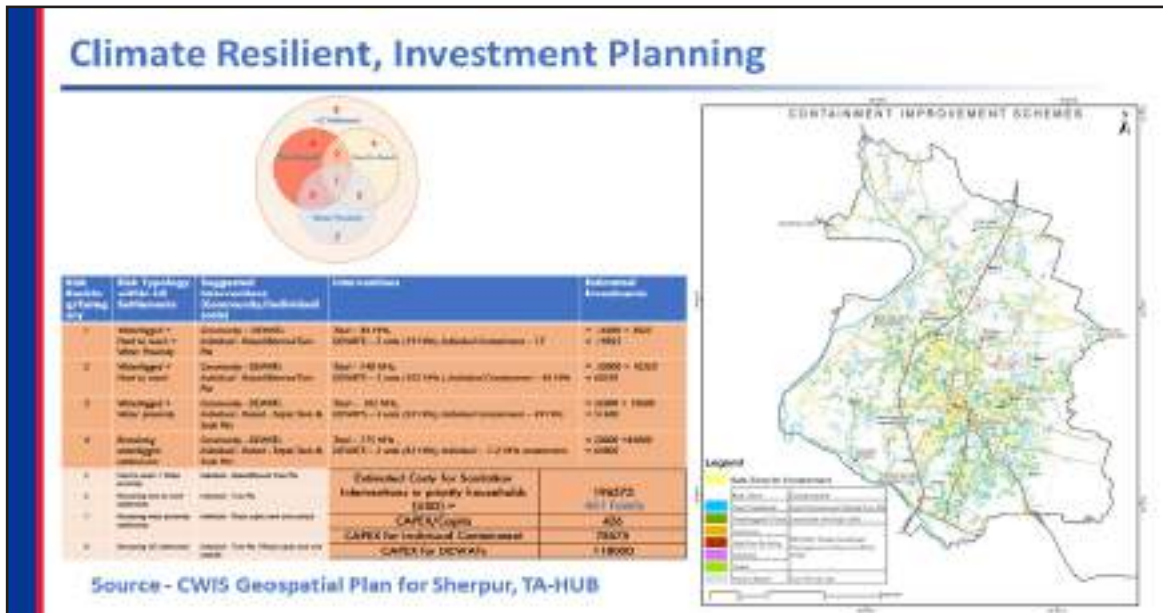
Slide 19



Slide 20



Identifying the appropriate sanitation system (sewage or non-sewage) based on the population density, land use pattern, topography, environmental vulnerabilities of areas, etc



Slide 23

### Data-driven planning for environment protection

- Identify the containments in flood risk areas for investment planning
- Detail information about numbers and types of containment information within a 100 m distance from a river.

Structure Type	Building No.	Height
Residential	100	400
Commercial	100	100
Public	100	100
Industrial	100	100
Total	1000	1000

Slide 24

### Data-driven inclusive planning for LIC

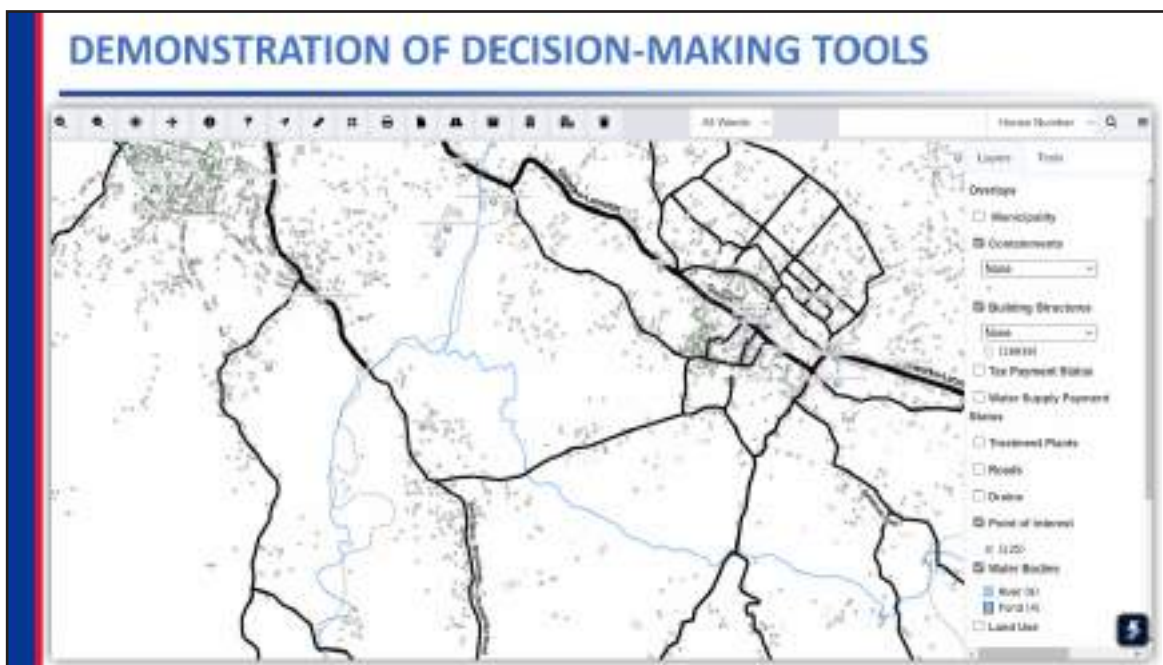
**ENSURING ACCESS FOR VULNERABLE AND MARGINALIZED GROUPS**

Adopting Pro-Poor tariffs planning and implementation. Base Levelized Tariff (BLT/m<sup>3</sup>). Subsidy for LICs.

Slide 25

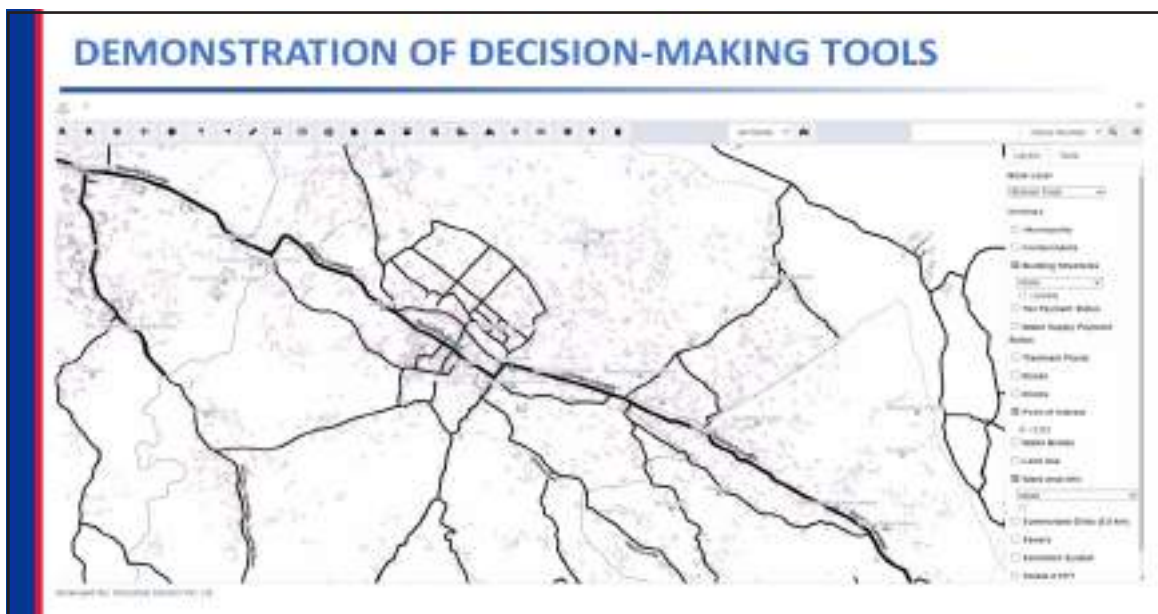


Slide 26





Slide 27



Slide 28





In some cases, in Bangladesh, SSP providers also maintain detail inventory of insurance benefits, salary payment status

### Managing Sanitation service delivery

Check new Application Generate Monthly Report Report Filter Reset

Application ID	Contentment	Status	Emptying Date	Assessment	Emptying	Disposal	Feedback	Action
0411	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0412	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0409	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0404	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0407	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0405	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0403	020100	Approved	2021-08-01	✓	✓	✓	✓	📄📄📄📄
0401	020100	Approved	2021-07-30	✓	✓	✓	✓	📄📄📄📄
0402	020100	Approved	2021-07-19	✓	✓	✓	✓	📄📄📄📄

Slide 31

## On-site Sanitation Compliance Assessment & Enforcement

Proper containment to protect ground water & environmental health



Comprehensive field survey of containments for Compliance check

**one day 100 volume**  
all sewage flow

System generated notice to partial and non-compliant septic tank with QR code

Human waste is safely managed along the service chain, starting from containment

Slide 32

## Institutionalization of standard septic tank



**Current Situation in the municipality**

Septic Tank design is submitted during the building permit application

Verification of Septic Tank design **not carried out**

Verification of Septic Tank construction **is not carried out**

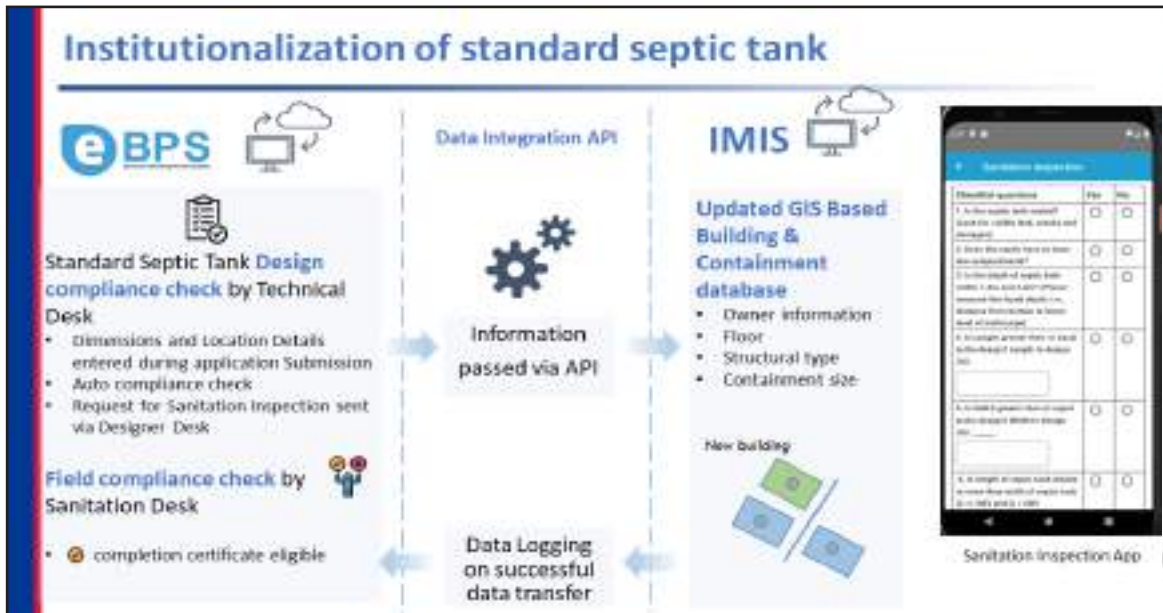
**Only 12%** of reported as septic tank satisfies criteria

Imperative to raise public awareness about actual septic tank and clarify misconception

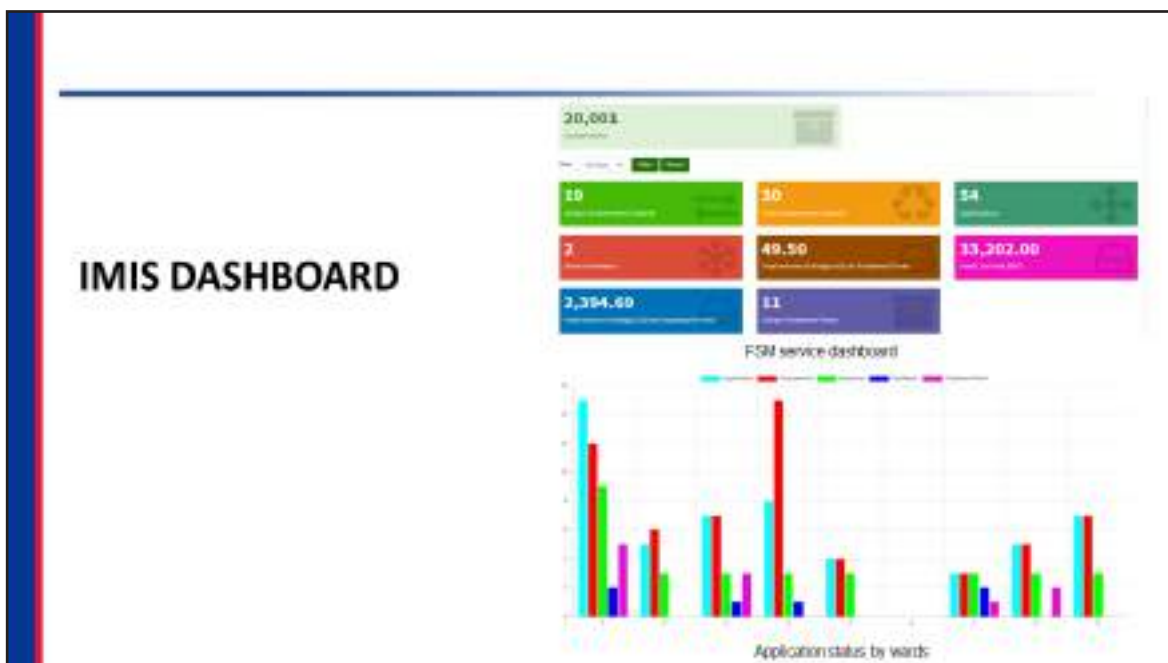
“.....new house permits shall include design of the standard septic tank or Improved technology. Otherwise, no building permit shall be issued for new house or building”

18925 HH 10501 reported as septic tank  
 400 HH census survey, 362 reported to have septic tank.  
 Municipality.  
 Rectangular in shape 2. Two chambers inside 3. Sealed all four walls and base 4. Outlet at the top of the tank

Slide 33



Slide 34



Slide 35

## Key Performance Indicators target setting and M&E

**CWIS FUNCTION : ACCOUNTABILITY**    Mandate monitored (KPIs), targets, reward/penalty

KPIs for Emptying and Transport

**1. Penetration Rate of FSC Service**

Total of collections reached in last 5 years / Total of accessible collections...

**2. Total Sludge Collection Rate (TRCR)**

Total amount of Sludge being emptied / Total generated sludge TO BE EMPTIED

**3. Application Response Efficiency**

Total services delivered / Total Applications...

**4. Response time**

Average time between application and delivery of service.

**5. Customer satisfaction**

Average Customer Service Quality Rating.

**6. Safe Disposal**

Total amount of RS (with correct or FSC) / Total amount of collected RS (TMS)

**7. Occupational Health and Safety on F&T**

Amount of services delivered following OHS guidelines / Total of services delivered...

**8. Inclusions**

% delivery services in LCC and TMS / Total delivered services

**FSCR Tied With Reward/ Penalty Mechanism**

IMS Jhenaidah

Slide 36

## REPORTING ON SERVICE DELIVERY

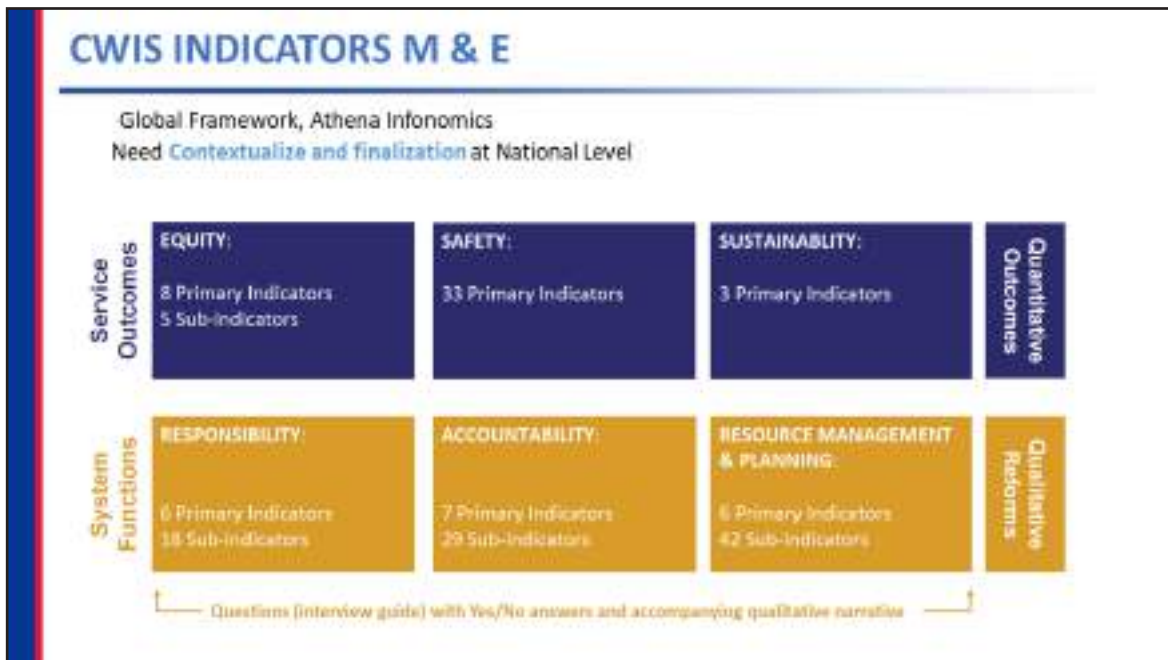
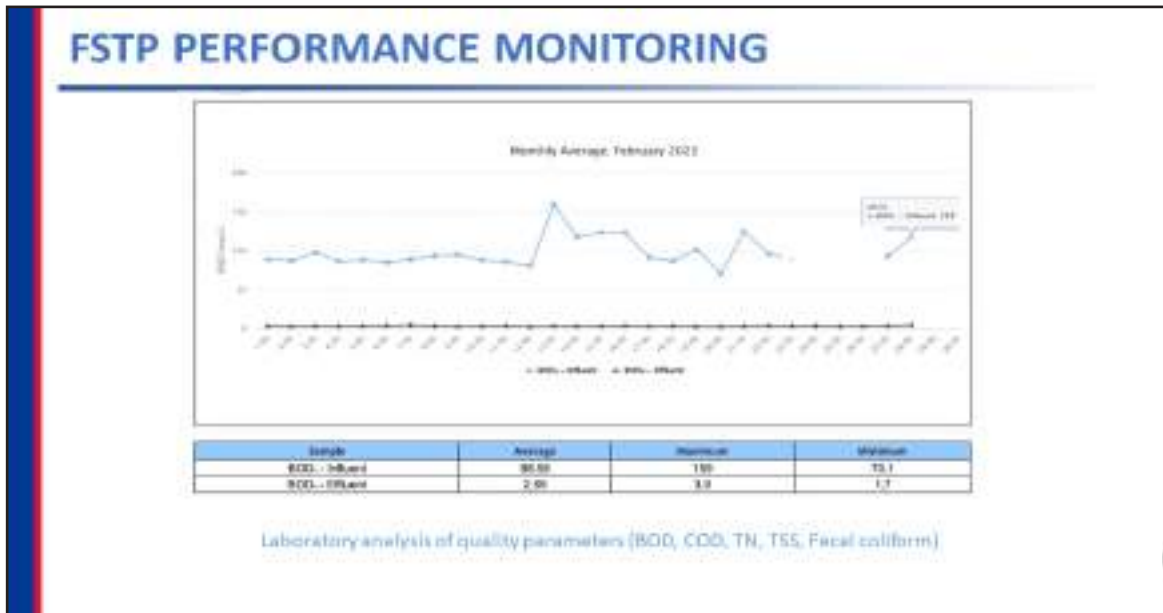


**Service Delivery Report**



**Monthly and Yearly Report Generation**

Progress Report	Year 2022			
	Application	Response	Emptying	Disposal
Transparency	100	100	100	100
Completed reporting period	300	300	337	377
Planning of the next reporting period	100	100	100	100
<b>Reporting Period: Sludge Collection</b>				
Sludge Emptying	447 (From 700.00)	110 (From 1000.00)	110	110
Sludge Disposal	100 (From 100.00)	100 (From 1000.00)	100	100
Compliance (F&T)	100 (From 100.00)	100 (From 1000.00)	100	100
<b>Revenue Collection of reporting period</b>				
Total Revenue earned (BDT)	1000000.00	1000000.00	1000000.00	1000000.00
<b>Report Submission and Signature</b>				
IMS Manager Signature	Head, Service Provider (Emptying)	Paurashava F&M Official Stamp	Paurashava Sign (with seal)	

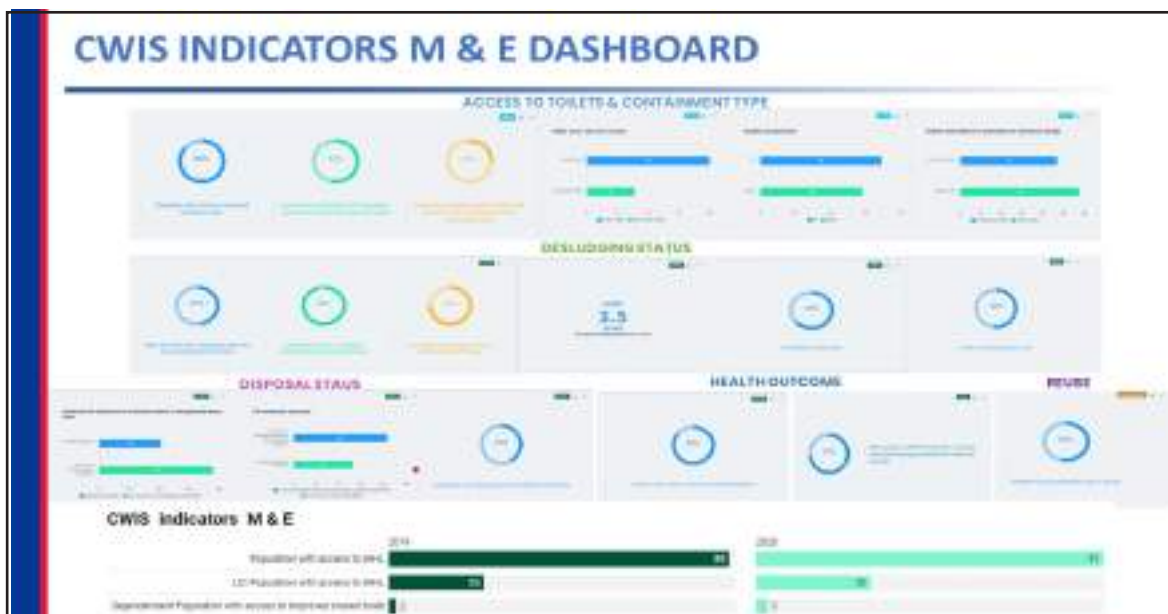


Indicator definitions and calculations can be accessed from [www.cwiscities.com](http://www.cwiscities.com)

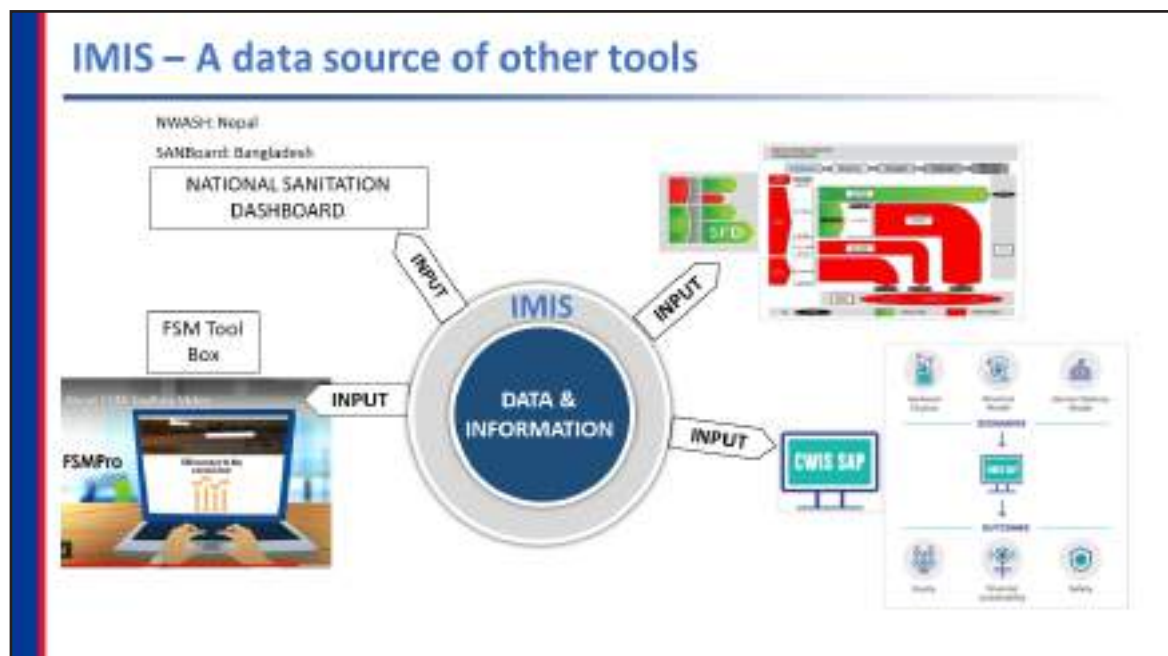
Mentor cities practice In Bangladesh, 600 score

1. % of treated FS and WW that is reused
2. % of O&M cost recovered for sanitation infrastructure
3. % of sanitation capital investments covered by budget line/government transfers

Slide 39



Slide 40



IMIS as data repository that can be used for data input,,

## Key Take Aways

- IMIS is a **sub-national Public Data System (PDS)**, driven by **ULB and utility providers** so that information along the service chain gets collected during the actual service delivery in **real-time**
- IMIS facilitates for **efficient and effective planning, management, M & E** of sanitation systems & sanitation service delivery to through harnessing power of **Information Technology (IT)**
- IMIS enables **better information decision-making, targeted investment planning** not only for sanitation but for overall urban management of the city.
- **IMIS is a robust monitoring** mechanisms to track policy and regulation (FSM – Bylaws) to ensure **Accountability & Transparency**

## IMIS FOR SCHEDULED DESLUDGING

20.2 Scheduled emptying of septic tanks or other containment systems at an interval of 2-3 years as recommended by CPHEEO Manual, Ministry of Urban Development advisory on Septage management (2013).

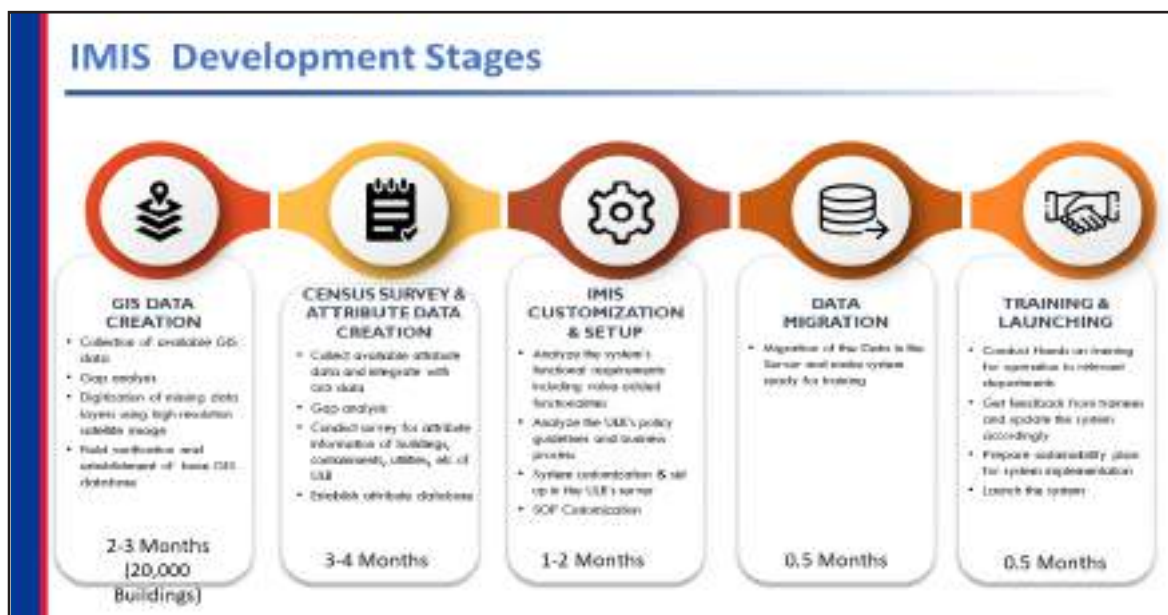
	Scheduled Desludging	On-demand Desludging
Nature	Mandatory	Voluntary
Implementation	Scheduled by the municipality	Requested by the households
Customers	Registered	—
Institutional	Requires a reliable managing service provider	—

**INFORMATION REQUIREMENT FOR SCHEDULE DESLUDGING**

- ✓ City level containment database with building categories
- ✓ Zonation of city for desludging
- ✓ Daily and monthly desludging plan
- ✓ Desludging vehicle route planning
- ✓ Issue Schedule notice to customers
- ✓ Finance administration for payment to private operator
- ✓ Finance administration for monitoring "Sanitation Tax" collection
- ✓ Periodic Reporting



Slide 43



Slide 44

## Thank you!

## धन्यवाद !

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**Government of Nepal**  
**Ministry of Water Supply**  
**Department of Water Supply and Sewerage Management**  
 DWSSM Building, Patanmari, Maneganga, Kathmandu, Nepal  
 Phone : 977-01-4415245, 4418252  
 Website : [www.dwssm.gov.np](http://www.dwssm.gov.np)

**Technical Support**



**Environment & Public Health Department (EHPHD)**  
 Building No. 1, Patanmari, Maneganga, Kathmandu, Nepal  
 Phone : 977-01-4418252 | Website : [www.ehp.gov.np](http://www.ehp.gov.np)

**SESSION 14.1**

**Technological  
Awareness 1**

## Slide 1



"Citywide Inclusive Sanitation – Training of Trainer's"  
**Technical Awareness 1 (User interface to Transportation)**  
 Resource Person



Government of Nepal  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

## Slide 2

### Before starting...

- **Play a game**
- Draw and color as per the instruction of the facilitator
  - Group 1 : **Terai region**
  - Group 2 : **Hilly region**
  - Group 3 : **Himalaya region**
- With given information, ask groups to draw following:
  - **A house/ housing style- 5 mins**
  - **Dress/ dressing style- 5 mins**
  - **Foods- 5 mins**



3 Groups  
15 minutes

Provide 1 newsprint paper to each group,

1 group will have a newsprint paper with Terai region written on a meta-card

1 group will have a newsprint paper with Hilly region written on a meta-card

1 group will have a newsprint paper with Himalaya region written on a meta-card

Optional: 1 group will have a newsprint paper with America or Europe written on a meta-card

As per the given information on the newsprint paper, ask groups to draw

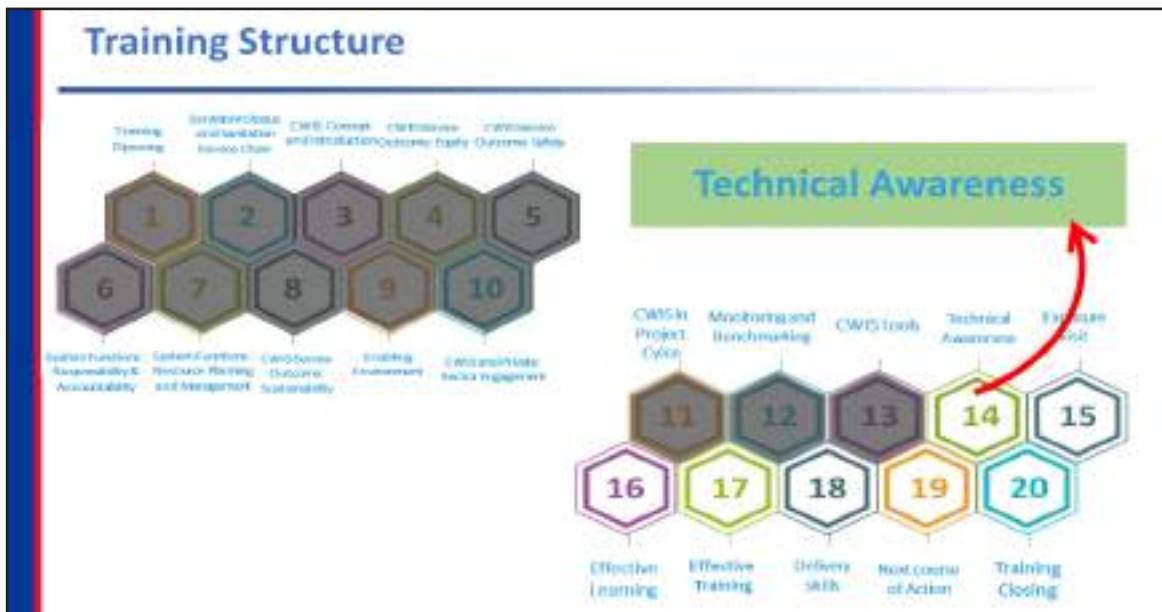
a house/ housing style- 5 mins

Dress/ dressing style- 5 mins

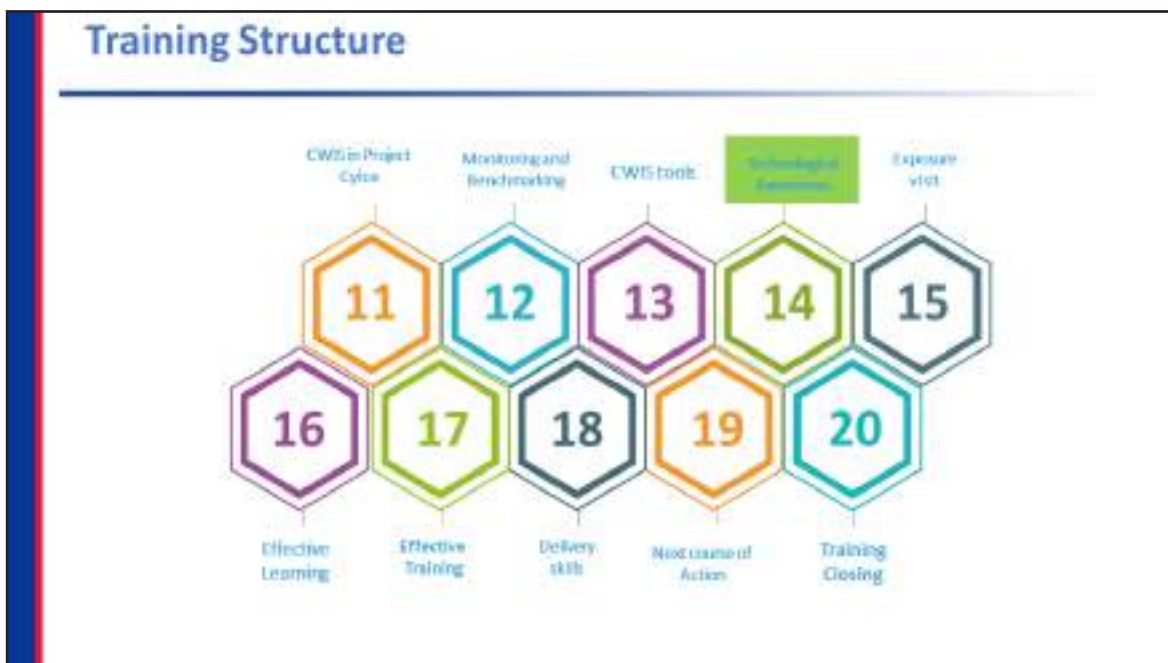
Foods- 5 mins

After the time ask to paste the newsprint only on the walls or at the front of the hall and act as you are surprised as you provided same instructions but you got different pictures, ask why

Link: similar to these difference, with same reasons, don't you think the sanitation facilities should also differ?



This training includes 20 main technical sessions, and are currently on session 14: Technical Awareness




This training includes 20 main technical sessions, and are currently on session 14: Technical Awareness

## Slide 5

## Learning Outcomes

- Explain pre-requisite and parameter for appropriate sanitation technology
- Discuss the different types of containment technologies used in Nepal
- Discuss about different types of collection and transportation methods



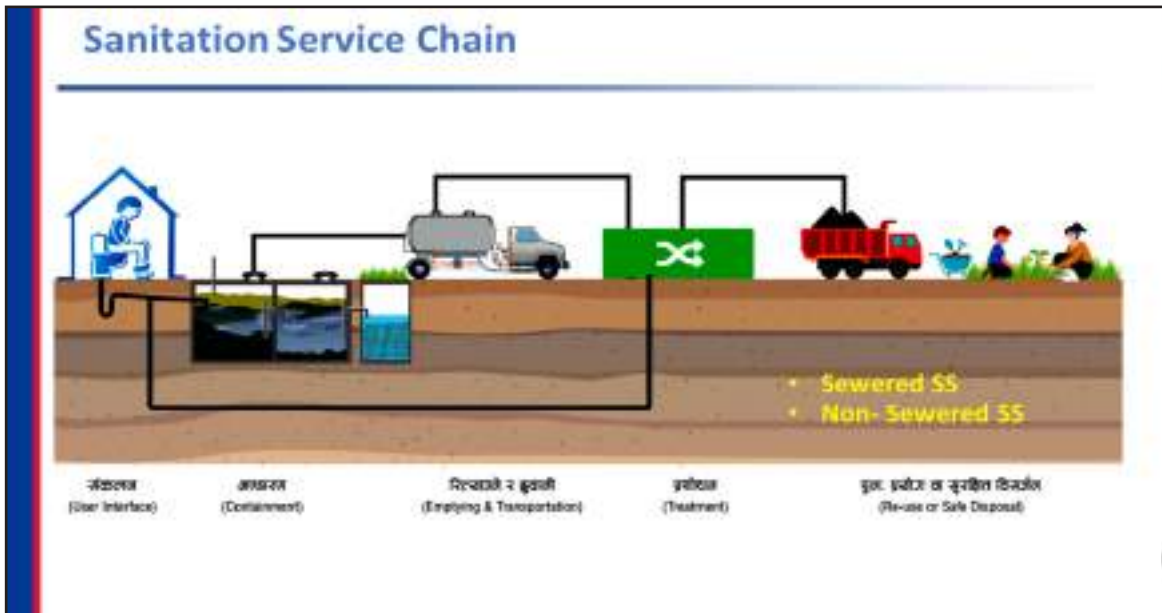
Linking to earlier session, where the need to update the sanitation technology was highlighted, inform participants that the particular session will be discussing on it.

## Slide 6

## Presentation Outline

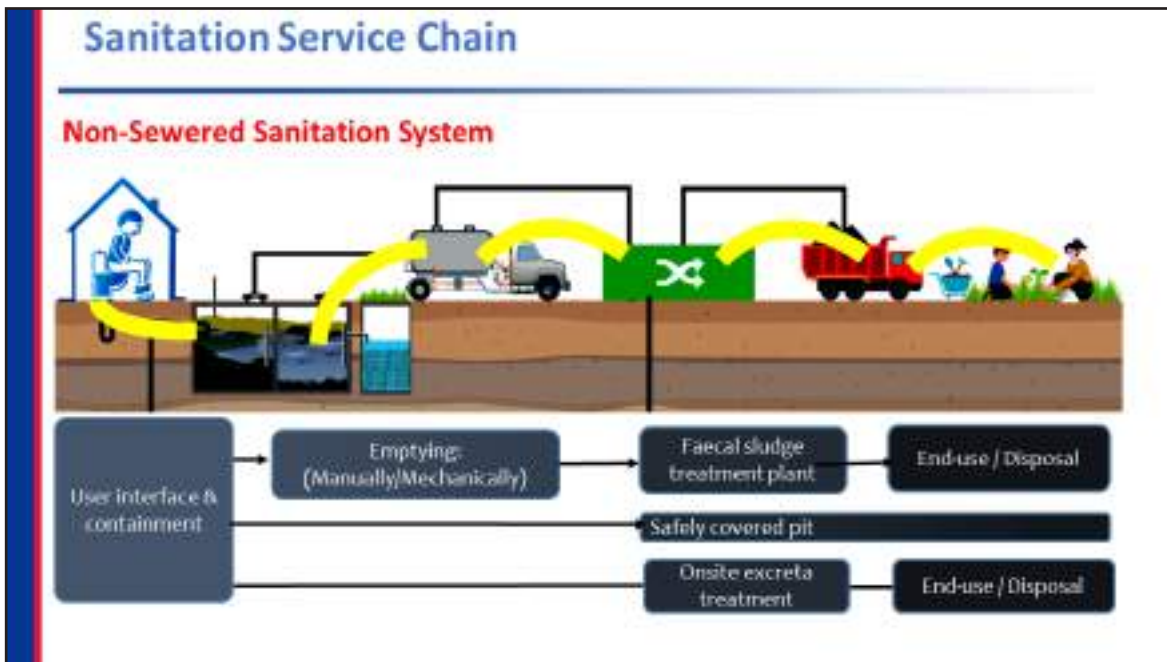
- Parameters for appropriate sanitation technology
- Pre-requisite for appropriate sanitation technology
- Applicability of sanitation systems
- Pros and Cons of sanitation systems
  - Sewered system
  - Non-sewered system
- Desludging and conveyance in Nepal
- Challenges of desludging and transportation service





Explain sanitation system as it is a chain of services starting from the origin of waste/ waste generation to the end use or disposal. The whole sanitation system comprises of 5 components namely:

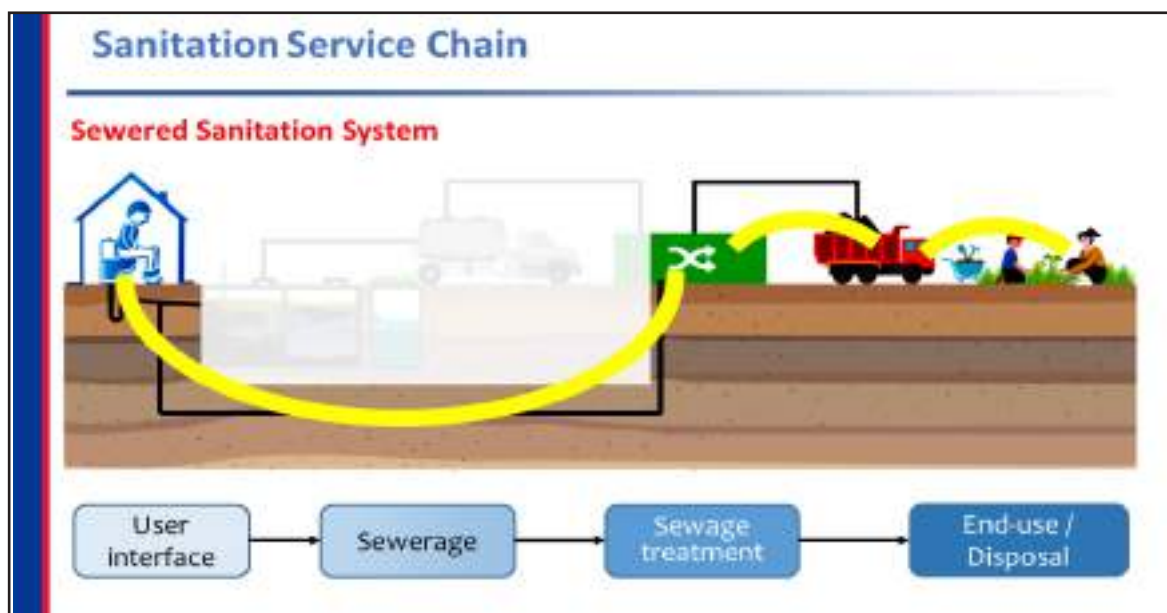
1. User interface
2. Containment
3. Emptying and transportation
4. Treatment
5. Reuse and safe disposal



Explain sanitation system as it is a chain of services starting from the origin of waste/ waste generation to the end use or disposal. The whole sanitation system comprises of 5 components namely:

1. User interface
2. Containment
3. Emptying and transportation
4. Treatment
5. Reuse and safe disposal

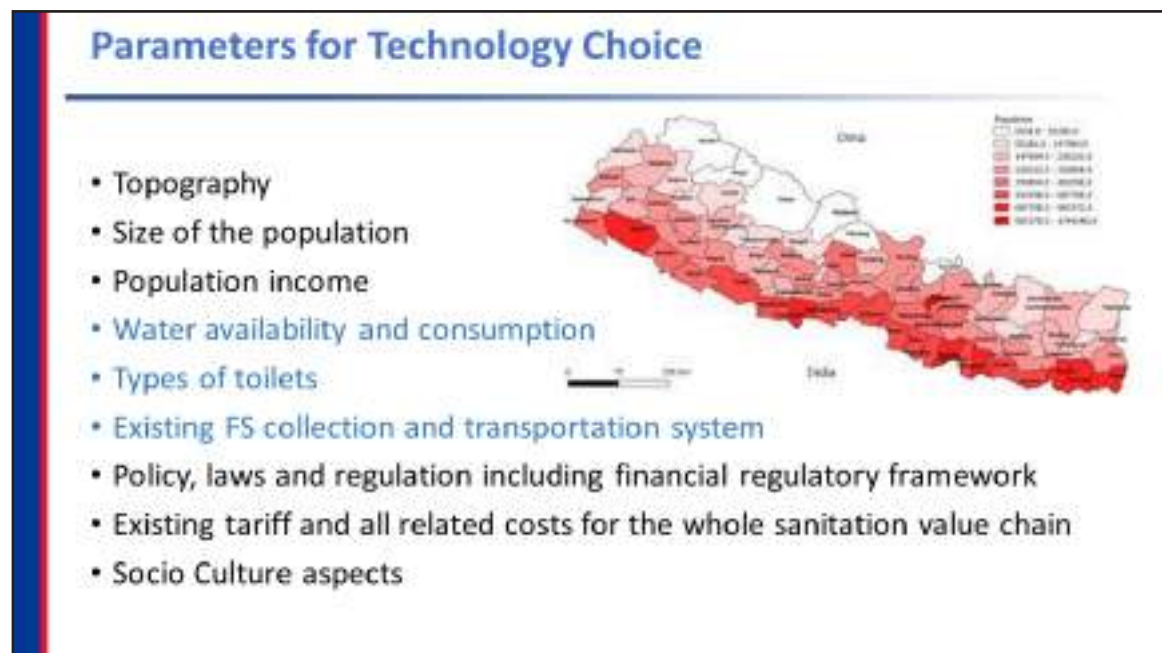
## Slide 9



Explain sanitation system as it is a chain of services starting from the origin of waste/ waste generation to the end use or disposal. The whole sanitation system comprises of 5 components namely:

1. User interface
2. Containment
3. Emptying and transportation
4. Treatment
5. Reuse and safe disposal


## Slide 10



In their earlier group, ask participants to list out the parameters for appropriate sanitation technology.

### Pre-requisite for Technology Choice

- **Accessibility** (particularly for women, girls, elderly, disabled and sick)
- **Affordability** (for low-income individuals and communities)
- **Functionality and efficiency** - simple and smart
- **Durability**
- **Minimum land requirement**
- **Minimum Operation and maintenance (O&M) Cost**
- **Meeting environmental and health compliance** (No water pollution, No nuisance in surroundings, effluent quality should meet the standard, No air pollution, No noise pollution)
- **Resource recovery** of water, water and biogas
- **Maintain gravity flow system/No use of electricity or mechanical system**



### Choose your technology

The graph plots Cost on the vertical axis and Efficiency on the horizontal axis. Three technology options are shown:

- 'Perfect' solutions, high investment, higher O & M costs, High level skill**: Located in the upper right quadrant, labeled as **High cost**. It is represented by an image of a mechanical shredder.
- Nature based**: Located in the middle of the graph, labeled as **Cost effective, Efficient and 'high impact' solutions**. It is represented by an image of a green roof or urban garden.
- Inefficient & ineffective '0-impact' solutions**: Located in the lower left quadrant, labeled as **Low cost**. It is represented by an image of a traditional brick structure.



## Slide 13

Applicability of Sanitation Systems	
<b>Sewered Sanitation</b> <ul style="list-style-type: none"> <li>• <b>Dense settlement</b></li> <li>• <b>Flood-prone areas</b></li> <li>• Areas having high water table</li> <li>• <b>Low infiltration capacity of soil</b></li> <li>• Highly Sloped terrain</li> <li>• <b>Higher availability of water</b></li> <li>• Land available as site for treatment plant at a <b>lower elevation than surroundings</b></li> </ul>	<b>Non-Sewered Sanitation</b> <ul style="list-style-type: none"> <li>• Area with low population density</li> <li>• <b>Settlement with scattered houses</b></li> <li>• Rural and outskirts of urban centers</li> <li>• <b>Plain terrain or geography with low gradient</b></li> <li>• <b>Water-scarce areas</b></li> <li>• Land available as site for treatment plant at a <b>higher elevation than surroundings</b></li> </ul>

Ask participants to think about the applicability of SS

Provide a minute time to think on sewerage sanitation system and ask participants to share their thoughts

Take 3 to 4 points from participants and present the points of sewerage sanitation

Similarly, ask participants to share their thoughts on non-sewerage sanitation

Take 3 to 4 points from participants and present the points of sewerage sanitation

## Slide 14

Pros and Cons of Sewered Systems	
<b>Pros</b> <ul style="list-style-type: none"> <li>• <b>Highly preferred by users</b></li> <li>• <b>No need of desludging service</b></li> <li>• <b>Available various established efficient and high-tech options for treatment</b></li> </ul>	<b>Cons</b> <ul style="list-style-type: none"> <li>• <b>Requires High Capex and Opex</b></li> <li>• <b>Requires regular and high volume of flush water and produces high vol. of wastewater</b></li> <li>• <b>Financially not suitable for settlement with scattered HH</b></li> <li>• <b>Requires pumping mechanism in case of low gradient area</b></li> <li>• <b>Less attractive to private sector for investment</b></li> </ul>

Similarly, present the advantages and limitations of SS to participants with the slide.

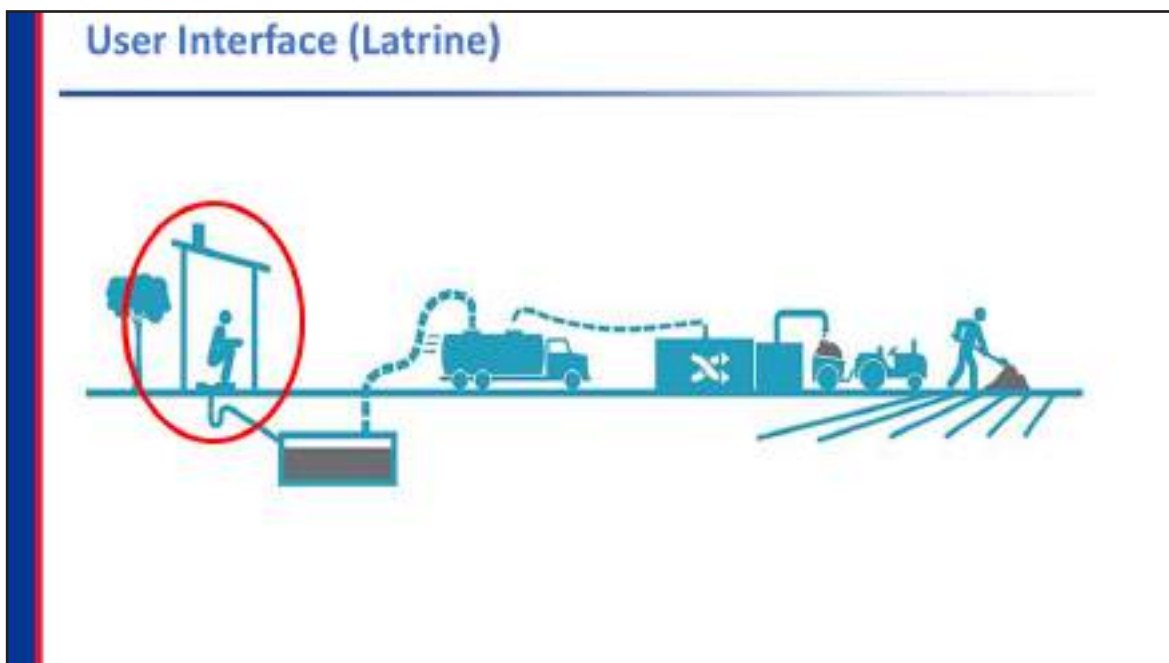
Capex- Capital Expenses

Opex- Operational Expenses

### Pros and Cons of Non-Sewered Systems

Pros	Cons
<ul style="list-style-type: none"> <li>• Low capital expenses (Capex) and operational expenses (Opex)</li> <li>• Financially good option particularly for settlement with scattered HH</li> <li>• Better business opportunity – private sector investment high</li> </ul>	<ul style="list-style-type: none"> <li>• May not be feasible for dense settlement</li> <li>• Less attractive to users</li> <li>• Availability of limited technical options</li> <li>• Potential groundwater pollution in case of improper containment</li> <li>• Accessibility of vehicle</li> </ul>

Similarly, present the advantages and limitations of Non-SS to participants with the slide.



Explain participants that they are going to discuss in each components of sanitation system, starting from user interface or latrine/ toilet.

## Slide 17

## Is your Latrine "Hygienic" ?

- Clean
- Water seal
- Ventilated
- User friendly
  - Accessible
  - Light
  - safe

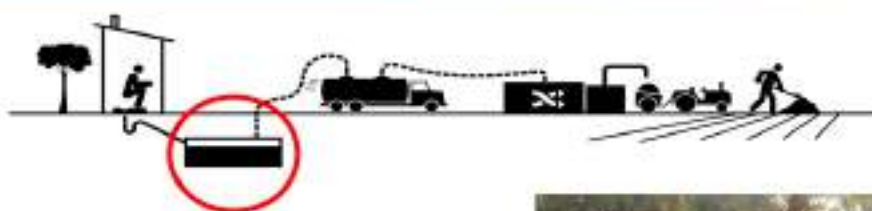


A hygienic latrine would include all of the following:

1. Clean with no fecal traces
2. Sealing of the passage between the squat hole and the pit to effectively block pathways for flies and other insect vectors, thereby breaking the cycle of disease transmission, and
3. Venting out of foul gases generated in the pit through a properly positioned vent pipe to keep latrine odor free and encourage its continual use.

## Slide 18

## Containment

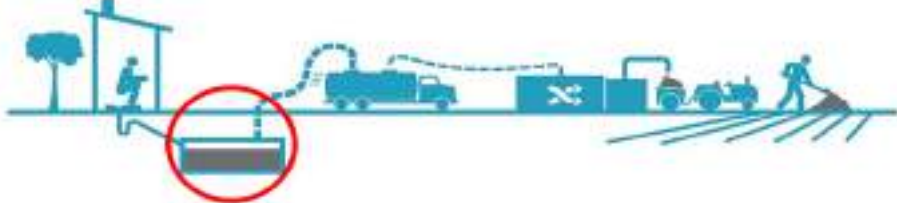


- Technology that **stores the product** generated at the User Interface
- Some of the containment also **treat along with storage**



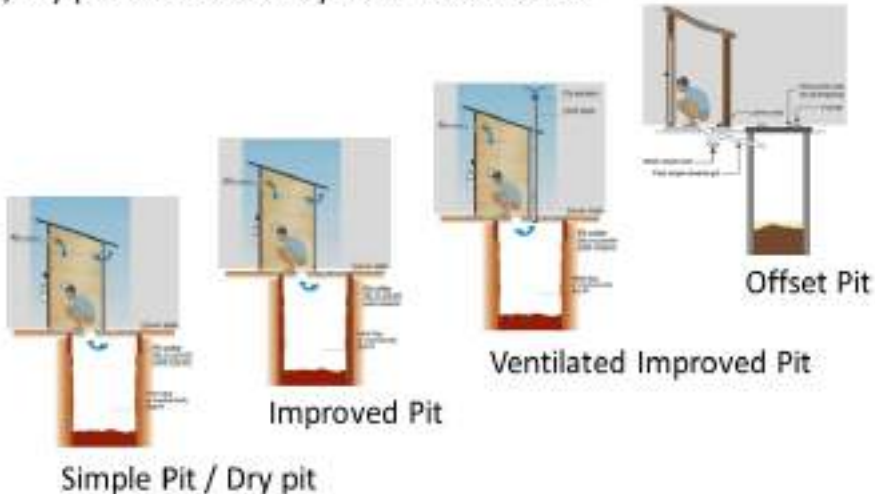
### Types of Containments

- Simple containment
  - Simple / Dry pit
  - Improved/ Simple Lined Pit
  - Ventilated Improved Pit
  - Offset Pit
  - Twin Pits
  - Holding tank
- Septic Tank
- Ecosan Vault
- Biogas Digester



### Types of Pit

Simple pit/Dry pit should be away from Water source



Simple Pit / Dry pit

Improved Pit

Ventilated Improved Pit

Offset Pit

Slide 21

### Holding tank

- Mistakenly considered as septic tank
- Simply rectangular in shape
- Single chambered
- Generally, no outlet
- Leaky structure

The diagram illustrates a holding tank's internal structure. At the top, a green line represents the ground level, with a manhole cover positioned just below it. On the left, a pipe labeled 'Sewage Enters From House' leads into the tank. The tank is divided into three horizontal layers: a top layer of white 'Scum', a middle layer of blue 'Wastewater', and a bottom layer of grey 'Sludge'. A red double-headed arrow at the bottom right indicates the thickness of the sludge layer.

In this system also, the pits are used alternatively. It is used for flush toilets where diversion system is installed to use the pits alternatively.

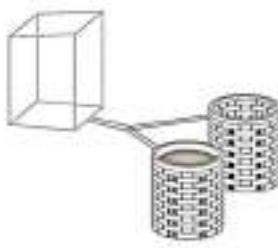


Slide 22

### Pit Containment Cont...

This slide displays four different methods of pit containment. The top-left image shows a large, circular concrete ring. The top-right image shows a circular pit lined with bricks. The bottom-left image shows a circular pit lined with stones. The bottom-right image shows a rectangular pit under construction, with brick walls and a concrete floor, and workers visible inside.

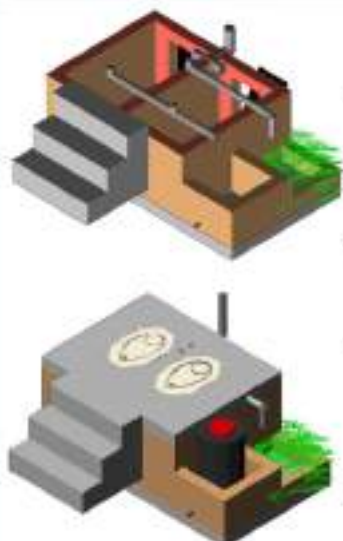
### Twin Pits

- Two pit alternatively used
- Generally, known as Sulav Toilet
- Small manhole is provided to divert flow
- Sludge is taken out after dried
- Min 1 m space between two pit






In this system also, the pits are used alternatively. It is used for flush toilets where diversion system is installed to use the pits alternatively.

### Dry Ecosan Vault



- Also called UDDT
- Collects only feces and additives
- Constructed above ground
- Two vault is used alternatively for 6 months
- Emptied after 1 year



In this type of toilet, urine and excreta are collected separately. Excreta is collected in dehydration vaults where ashes is applied after each defecation. Urine are collected in plastic container. The anal cleansing water is connected to soak pit/wetland. The dehydration vaults are used alternatively.

## Slide 25

### Biogas Digester



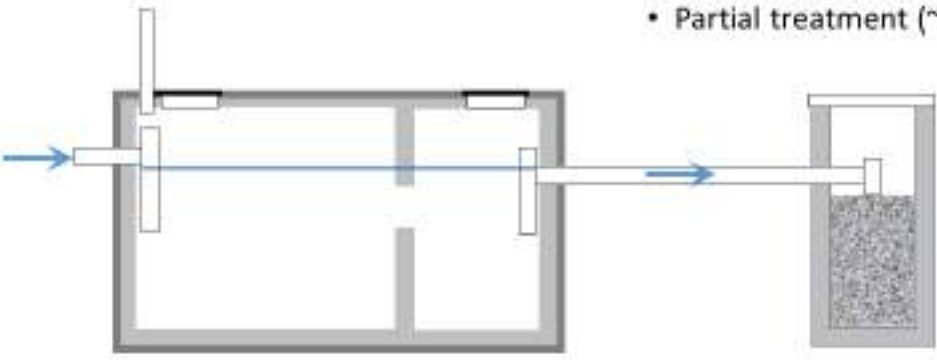
- Basically, treatment technology
- Produces biogas
- Various design is available

The popular biogas in Nepal is Gobar gas. In this type of biogas plant, the animal excreta (especially from cows, buffalo) are used for biogas plant in which the excreta from household toilet is also connected. Organic waste are also mixed. The biogas obtained is used for cooking. The digested sludge obtained is called bio-slurry which is used in farming.

## Slide 26

### What is Septic tank ?

- Major Option in All Urban Areas (including some slums)
- Settler as well as treatment technology
- Partial treatment (~ 30%)

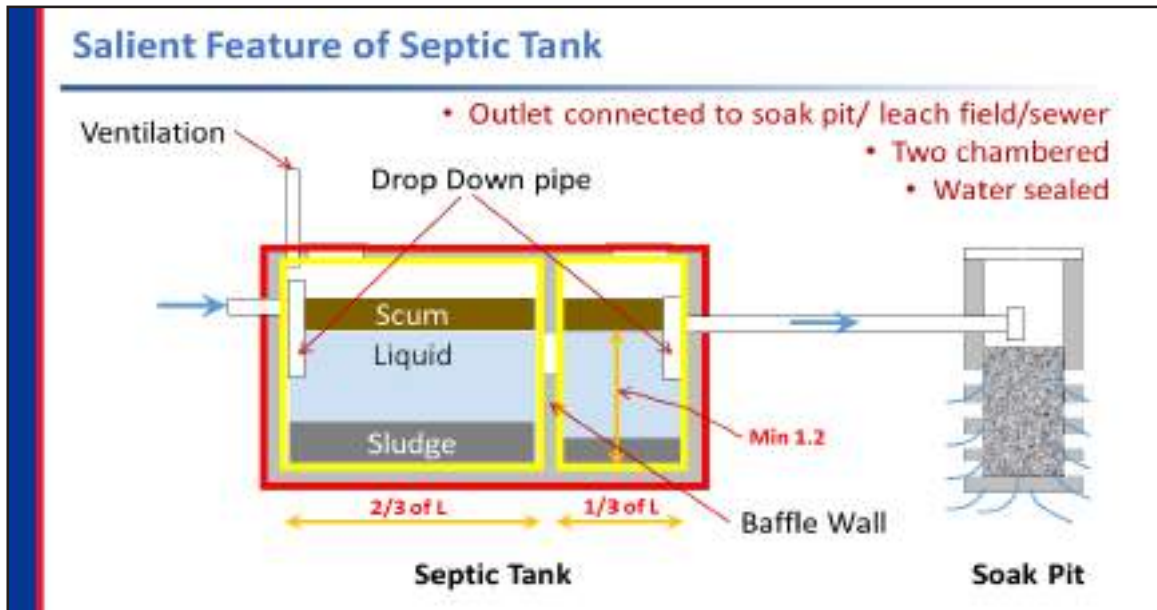


Septic Tank                      Soak Pit

Septic tank is one of the infrastructure for containment of the FS. Around 30-40% waste is treated in the septic tank, hence the septage (FS) needs to be taken for further treatment. One of the major component of the septic tank is soak-pit.

The minimum depth of the septic tank should be 1.2 meters while the first compartment of the septic should be of  $\frac{2}{3}$  of the total length leaving  $\frac{1}{3}$  of the total length for the second compartment.

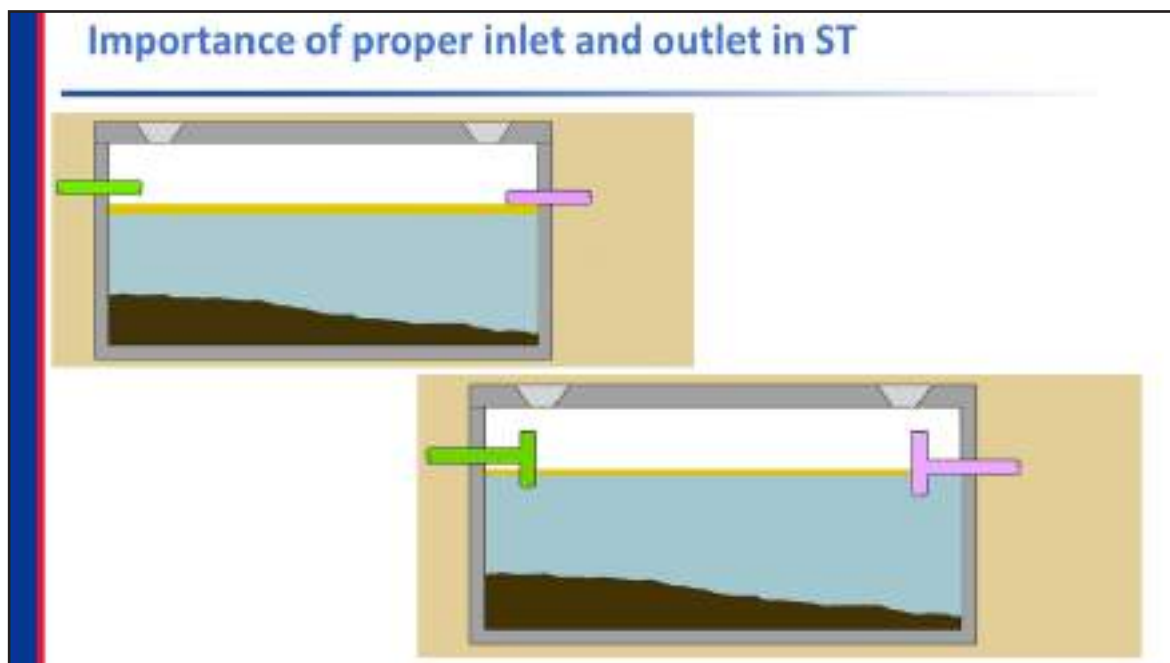
Septic tank is one of the major option in all urban areas including some slums.



Septic tank is one of the infrastructure for containment of the FS. Around 30-40% waste is treated in the septic tank, hence the septage (FS) needs to be taken for further treatment. One of the major component of the septic tank is soak-pit.

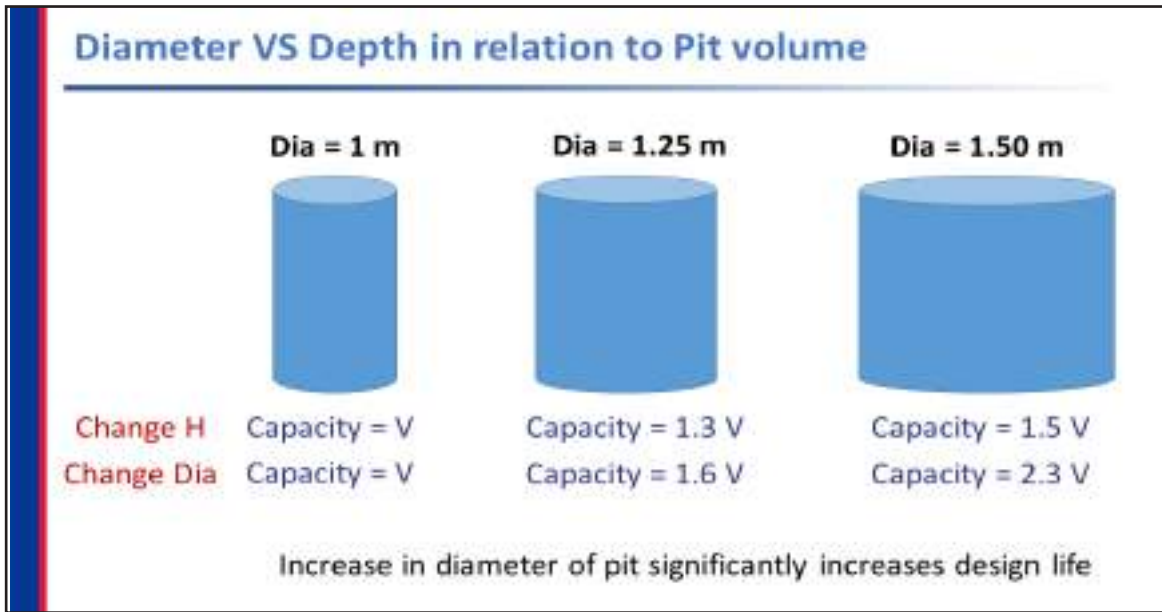
The minimum depth of the septic tank should be 1.2 meters while the first compartment of the septic should be of 2/3 of the total length leaving 1/3 of the total length for the second compartment.

Septic tank is one of the major option in all urban areas including some slums.



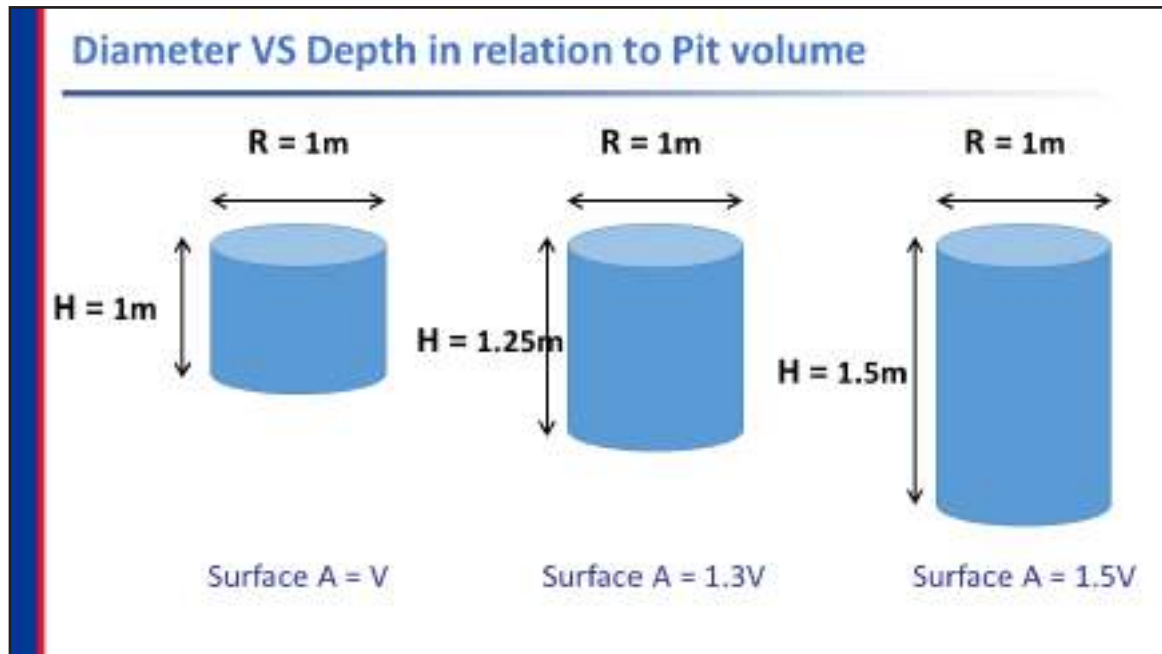


Slide 29



Just make the point that if ring is bigger, it will last long. Do not discuss on technical details.

Slide 30



Just make the point that if ring is bigger, it will last long. Don't talk about the technical details.



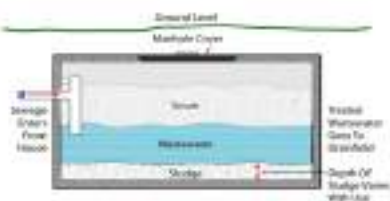
### Size of Septic tank

In Nepalese context

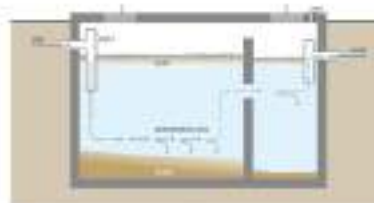
HRT	24					18						
	User Nos	5	10	15	20	25	50	75	100	150	200	250
Length (m)	1.50	2.10	2.60	2.90	3.10	3.60	4.40	4.90	5.90	6.70	6.90	7.50
Breadth (m)	0.80	1.00	1.30	1.40	1.60	1.80	2.20	2.40	2.90	3.30	3.50	4.00
Height (m)	1.30	1.50	1.40	1.50	1.50	1.80	1.80	2.00	2.10	2.10	2.30	2.30

## Slide 33

## Rectangular tank is not septic tank



- Only collects and stores
- Does not have outlet
- Need frequent desludging
- Single chambered
- Leaky tank



- Treat wastewater
- Provision of outlet connected to Soak pit/sewer
- Requires less desludging
- Double chambered
- Water sealed

## Slide 34


## Desludging Service



- Desludging : manually, semi mechanical and mechanical
- Transport : Manually, semi manually and vehicle

## Methods of Desludging

- Manual Desludging
- Semi Mechanized Desludging
- Fully Mechanized Desludging



The diagram illustrates three methods of desludging. The top illustration shows a person manually using a long pole to reach into a tank. The middle illustration shows a person using a mechanical device to desludge a tank. The bottom illustration shows a fully mechanized desludging system with a truck and a specialized machine connected to a tank.

## Manual Desludging



The first photograph shows a person using a long pole to desludge a septic tank. The second photograph shows a person using a shovel to desludge a dry ecosan toilet.

The first picture is desludging of septic tank or pit whereas the second picture is desludging of containment of a dry ecosan toilet.

Dry ecosan toilet:

is a urine diverting dry toilet (UDDT) that operates without water. It uses a differently designed pan or comode which separates feces and urine.

Thus, separated feces is composted and used as a soil conditioner and urine is used as liquid fertilizer.

It was introduced in 2002 by ENPHO in Nepal,

Manual desludging, in general is not safe, and is also prohibited by the government. However manual desludging of dry ecosan toilet and sulav toilet is safe.

Slide 37

### Manually Operated Mechanical Desludging

- **Gulper/II**
- Manual diaphragm
- Pump
- Nibbler
- MAPET

Till date Poop pump/Gulper  
Not available in Nepal

Poop pump/Gulper is a manual operated pump which is used to pump out sludge from containment. This is basically useful and financially viable both for an entrepreneur and house owner to empty small sized containment. This equipment is not available in Nepal till date.

Slide 38

### GULPERS

Mechanized Gulper  
Capacity: 60 Liters/min

©Practical Action

Gulpers are used for collecting sludge in Faridpur Municipality



Vacutug mini-tanker manufactured in Bangladesh. Source: EAWAG/SANDEC (2008)

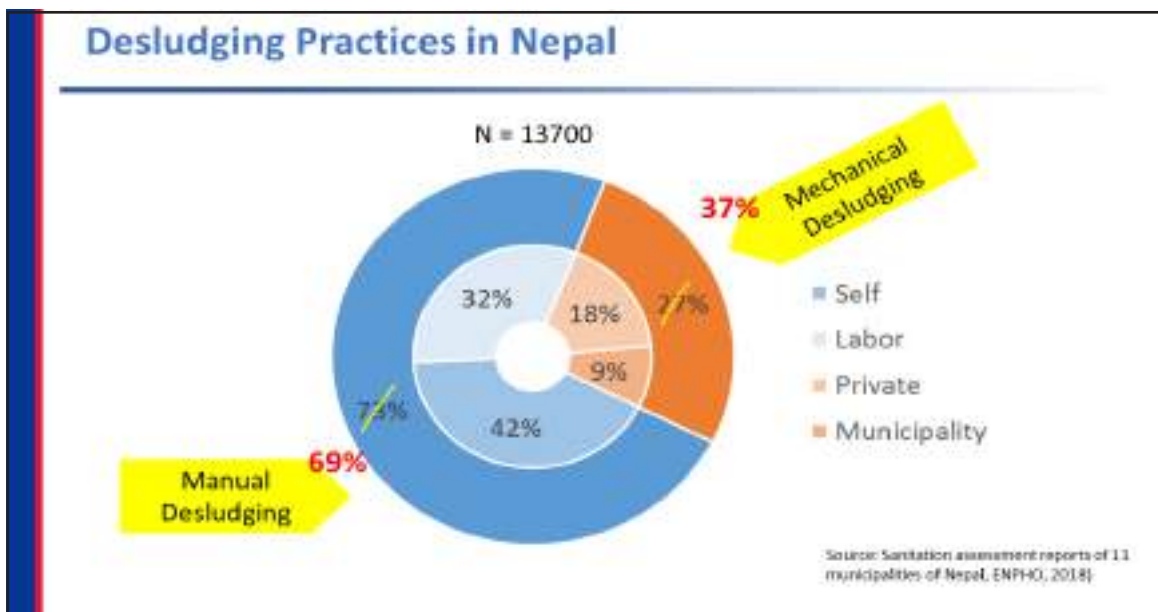
- A small-scaled motorised alternative to trucks.
- Designed for areas where big trucks can not enter.
- 0.5 m<sup>3</sup> steel vacuum tank, vacuum pump, gasoline engine.
- The vehicle has a speed of 5 km/h (level ground)
- Emptied by gravity or pressure

### Components of Desludging Vehicle

- The high-pressure cleaning vehicle (pipe dredging vehicle) is mainly composed of
  - automobile chassis (national warranty),
  - water tank,
  - water system,
  - hydraulic system,
  - hose reel,
  - flushing pipe,
  - high-pressure nozzle, etc.

It is done using a truck is fitted with a pump which is connected to a hose that is lowered down into a tank (ex. septic tank) or a pit and the sludge is pumped up into the holding tank on the vehicle

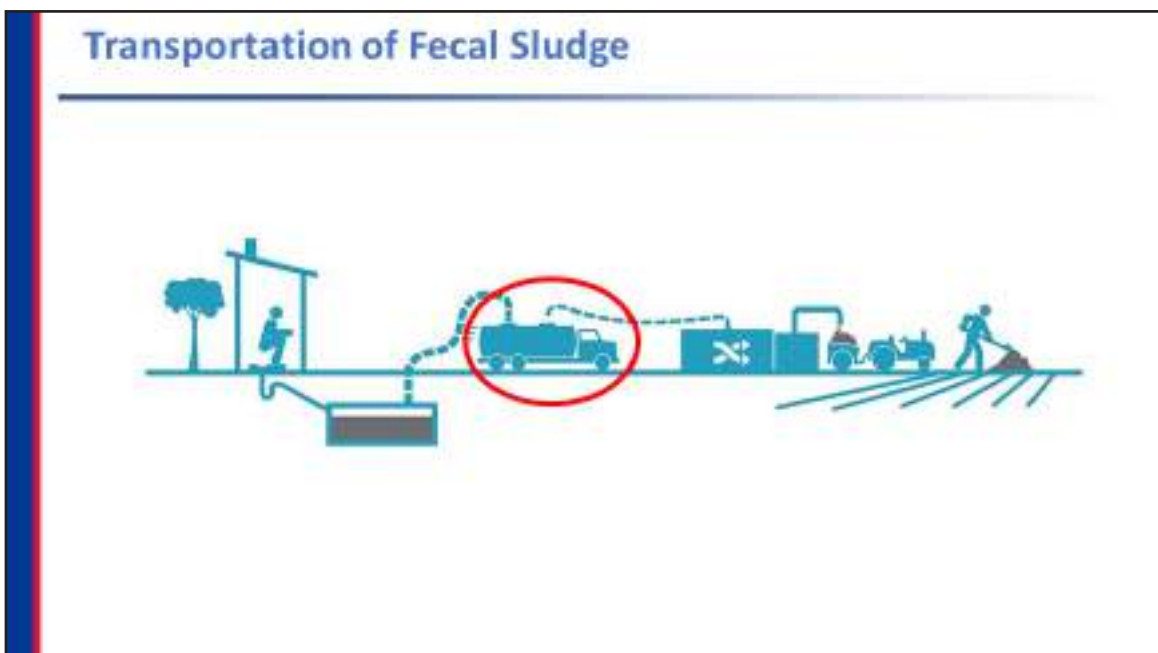
Slide 41



Study conducted by ENPHO (2018) reveals that approximately 31% of households with pits or septic tank has been emptied at least once. Among which 73% of people do desludging of their containment manually either using labor or by house owner themselves. While, mechanical desludging practice covers 27% of the population due to various reasons. Some of the major reasons are

- affordability,
- accessibility and
- availability of desludging services.

Slide 42





Add an example of tuk tuke





## Slide 45



Desludging service is growing in the city. There are several companies who provide desludging service in the cities.

Interesting fact is, sewer line is laid down to collect fecal matter but discharging of fecal sludge into the drain is illegal. Since there is not sufficient treatment facilities in the cities, these companies discharge sludge into river via sewer, or open land. Some of the private companies dispose FS openly into their own land.

Most of the companies discharge it in a designated place with small intervention making discharge station and it goes into sewer network whereas few companies/service providers are dumping it into their private land away from the city area.

Average cost for desludging is 3-5 thousand, depending up on cities, haulage distance and containment volume

## Challenges of Desludging and Transportation Service

- Technical Challenges
- Behavioral Challenges
- Social Challenges
- Rules and Regulations



### Technical Challenges

- Location of containment
- Access to containment
- Accessibility to containment
- No regular desludging practice
- Old equipment and vehicles – low efficiency
- Lack of proper disposal site

### Behavioral Issues

- Flushing solid waste into containment
- Desludging only after overflow
- Health and personal hygiene of the operators
- Social stigma

### Rules and Regulations

- Licensing system
- Lack of rules and regulations

## Slide 47

## Key Messages

- Septic tank, pits, biogas, UDDT, etc are some of common types of containments used in Nepal
- Septic tank should be two chambered, lined and with outlet connected to soak-pit/leachate pit
- Collection and transportation can be done manually, with manually operating equipment and fully mechanized vehicles.
- Desludging workers have occupational hazards which should be considered while doing their task
- There are challenges of private desludging service providers in Nepal

UDDT- Urine Diverting Dry Toilet

## Slide 48

## References

- Compendium of Sanitation technologies
- FSM book
- CAWST , FSM trainer manual
- [www.coursera.org](http://www.coursera.org)
- [www.commons.wikimedia,.org](http://www.commons.wikimedia,.org)
- [www.cawst.org](http://www.cawst.org)
- [www.eawag.ch](http://www.eawag.ch)
- [https://www.youtube.com/watch?v=9H\\_3i2A-onw&t=8s](https://www.youtube.com/watch?v=9H_3i2A-onw&t=8s)
- <https://www.youtube.com/watch?v=-qlxyxsNqhI>
- <https://www.youtube.com/watch?v=bVzppWSIFU0>
- <https://www.youtube.com/watch?v=tRzEtOHLeBk>
- <https://www.youtube.com/watch?v=jGPpXF7y9Rg>

Thank you!  
धन्यवाद !



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
DWSM Building, Kathmandu, Maneganga, Kathmandu, Nepal  
Phone : 977-01-4415745, 4418051  
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Technical Support



Environment & Public Health Department (EPHD)  
Kantipur, Kathmandu, Nepal  
Phone : 977-01-4415745, 4418051  
Website : [www.ephd.gov.np](http://www.ephd.gov.np)

**SESSION 14.23**

**Technological  
Awareness 2**

Slide 1




"Citywide Inclusive Sanitation – Training of Trainer's"  
**Technical Awareness 2 (Treatment & Safe Disposal)**  
Resource Person



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management

Slide 2

### Treatment Technologies

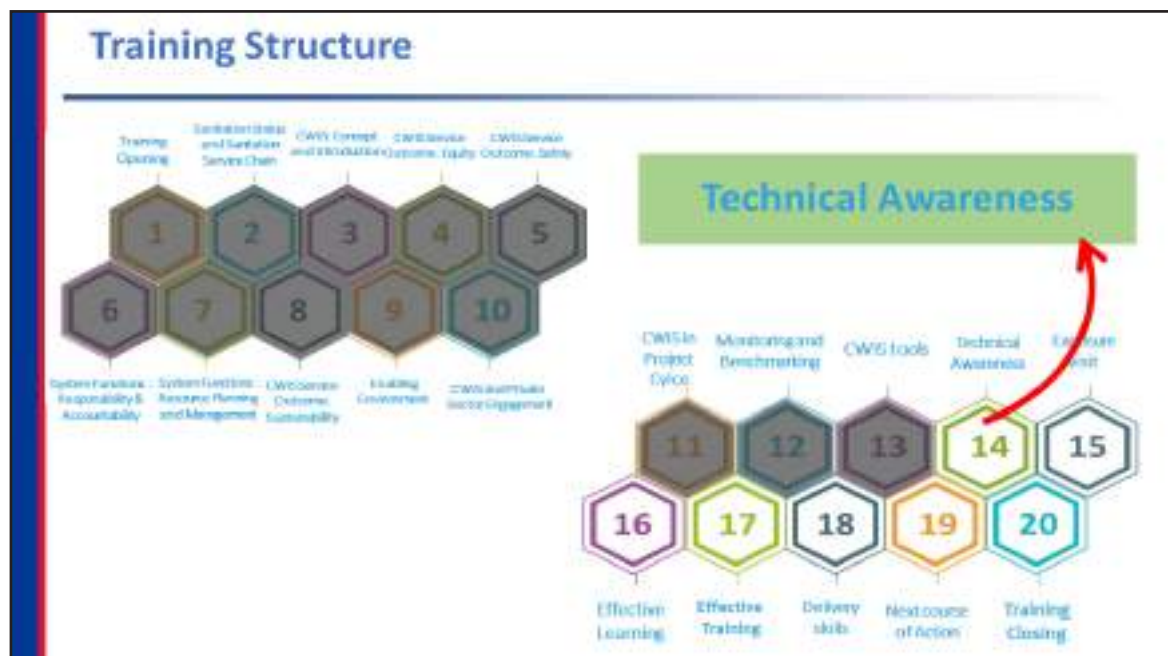


Slide 3



This training includes 20 main technical sessions, and are currently on session 14.2, Technical Awareness 2


Slide 4



This training includes 20 main technical sessions, and are currently on session 14.2, Technical Awareness 2


## Learning Outcomes

- Explain objectives of Faecal Sludge Treatment Technologies
- Identify FS treatment technologies
- Discuss on the treatment technologies used in Nepal



## Presentation Outline

- Treatment Objectives and Process
- Types of treatment systems
- Reuse/safe Disposal





Slide 7

## Treatment Objectives

<ul style="list-style-type: none"> <li>• Pathogen reduction depends upon                             <ul style="list-style-type: none"> <li>• Time,</li> <li>• Temperature</li> <li>• Characteristics of pathogen</li> </ul> </li> </ul>	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="background-color: #00b050; color: white; padding: 10px;">Pathogen Reduction</td> <td style="background-color: #c4a037; color: white; padding: 10px;">Nutrient Management</td> </tr> <tr> <td style="background-color: #d62728; color: white; padding: 10px;">Stabilization</td> <td style="background-color: #1f77b4; color: white; padding: 10px;">Dewatering</td> </tr> </table>	Pathogen Reduction	Nutrient Management	Stabilization	Dewatering	<ul style="list-style-type: none"> <li>• Nitrogen, Phosphorus and Potassium and others</li> <li>• Bio-solids : Improve productivity of soil, stimulates plant growth, increase water holding capacity</li> </ul>
Pathogen Reduction	Nutrient Management					
Stabilization	Dewatering					
<ul style="list-style-type: none"> <li>• Degradation of organic matters</li> <li>• Reduces biological oxygen demand</li> <li>• Reduces pathogen and odour</li> </ul>		<ul style="list-style-type: none"> <li>• Reduce water content in sludge</li> <li>• Techniques- Gravity settling, Percolation and evaporation, evapotranspiration, polymer addition</li> <li>• Fresh sludge - difficult but digested sludge - easy to dewater</li> </ul>				

Slide 8

## Types of FS Treatment Systems

<p><b>Based on treatment Location</b></p> <ul style="list-style-type: none"> <li>• On-site Treatment (Decentralized)</li> <li>• Off-site Treatment (Centralized)</li> </ul> <p><b>Based on treatment mechanism</b></p> <ul style="list-style-type: none"> <li>• Nature based/Biological Treatment</li> <li>• Mechanical Treatment</li> <li>• Hybrid treatment</li> <li>• Innovative Technologies</li> </ul>	
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## On-site Faecal Sludge Treatment Technologies

### Twin Pits/ Sulav

### Dry Ecosan

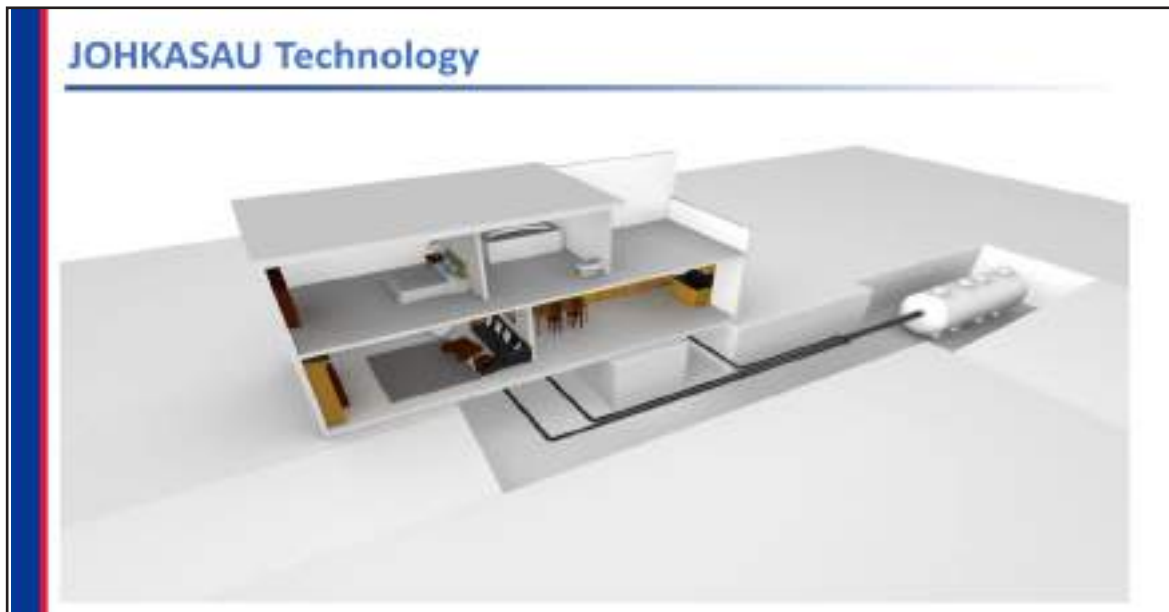
### Biogas Digester

In general, on-site treatment consist/comprises of single technology

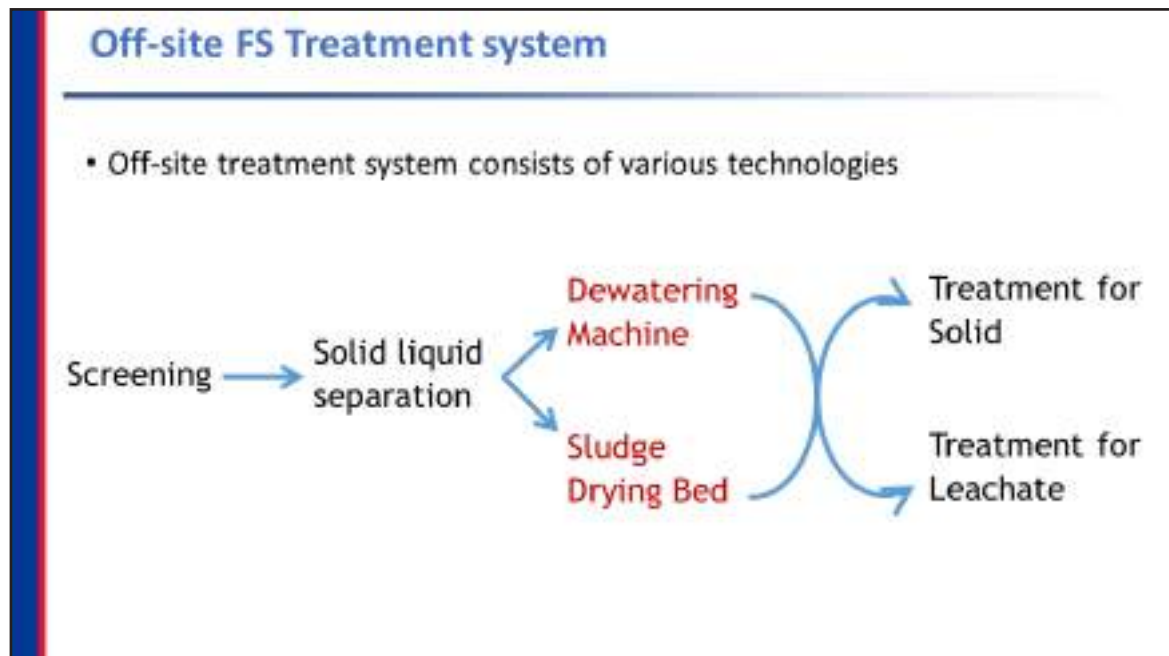
Twin-pit for pour-flush toilets are improved pit latrines, which allow on-site treatment and transformation of fecal sludge into a hygienized soil amendment. This technology consists of two alternating pits connected to a pour flush toilet. Fecal sludge is collected in the pits and allowed to slowly infiltrate into the surrounding soil. Over time, the solids are sufficiently dewatered and can be manually removed with a shovel and reused on-site, much like compost, to improve soil fertility and fertilize crops

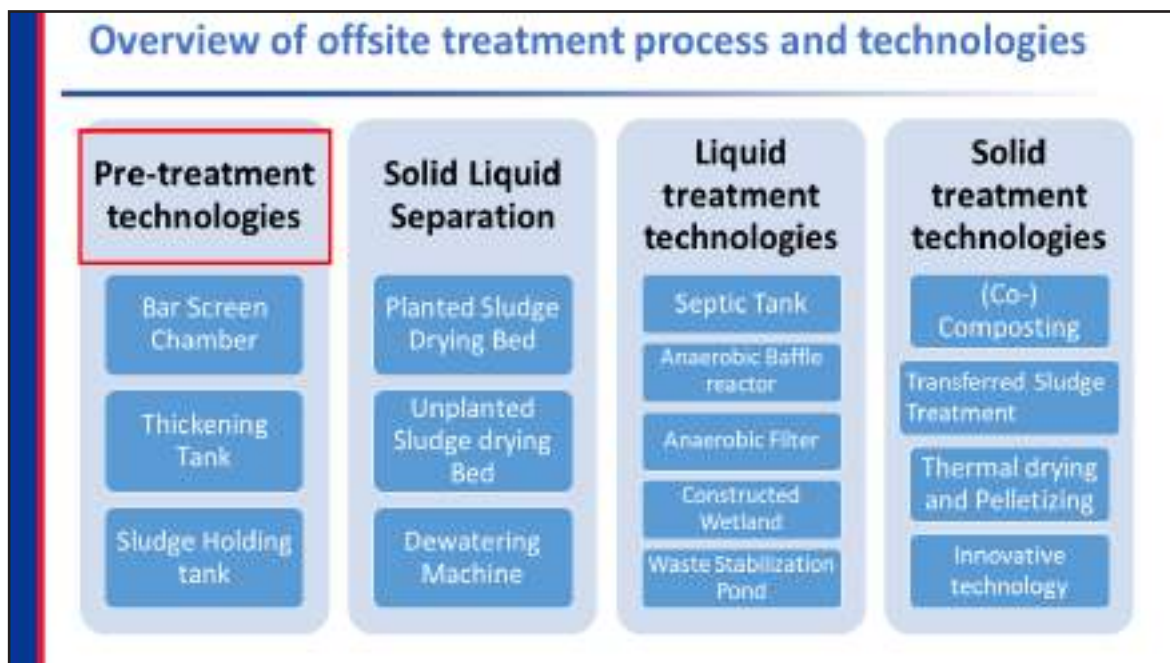
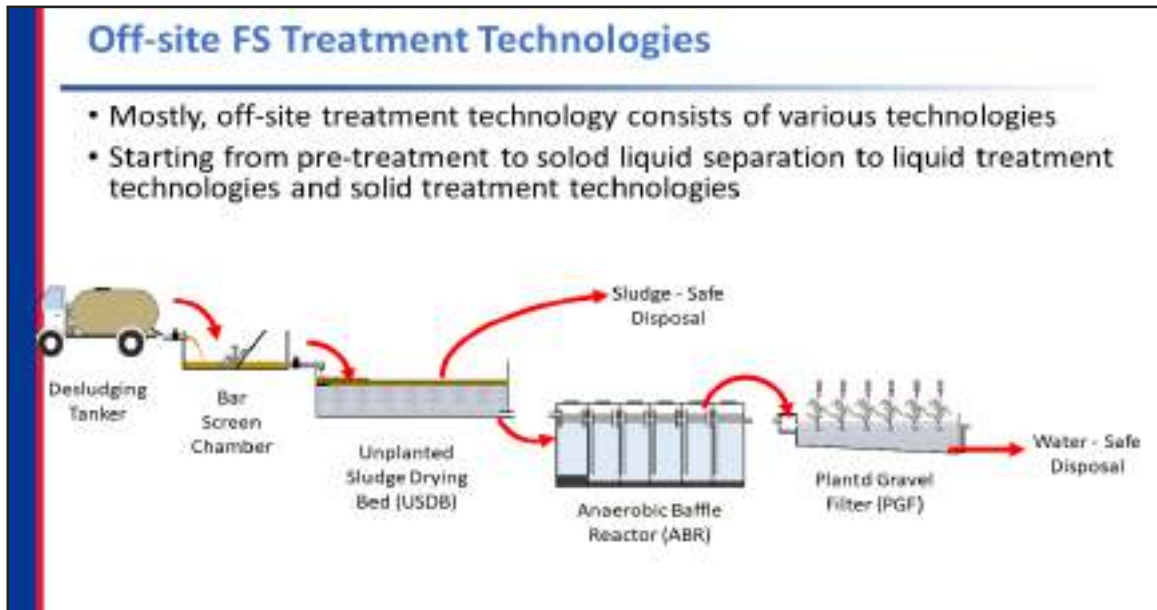
## JOHKASAU Technology

Slide 11



Slide 12





These are some of the example of treatment technologies under various stages of treatment process. There could be more to this example.

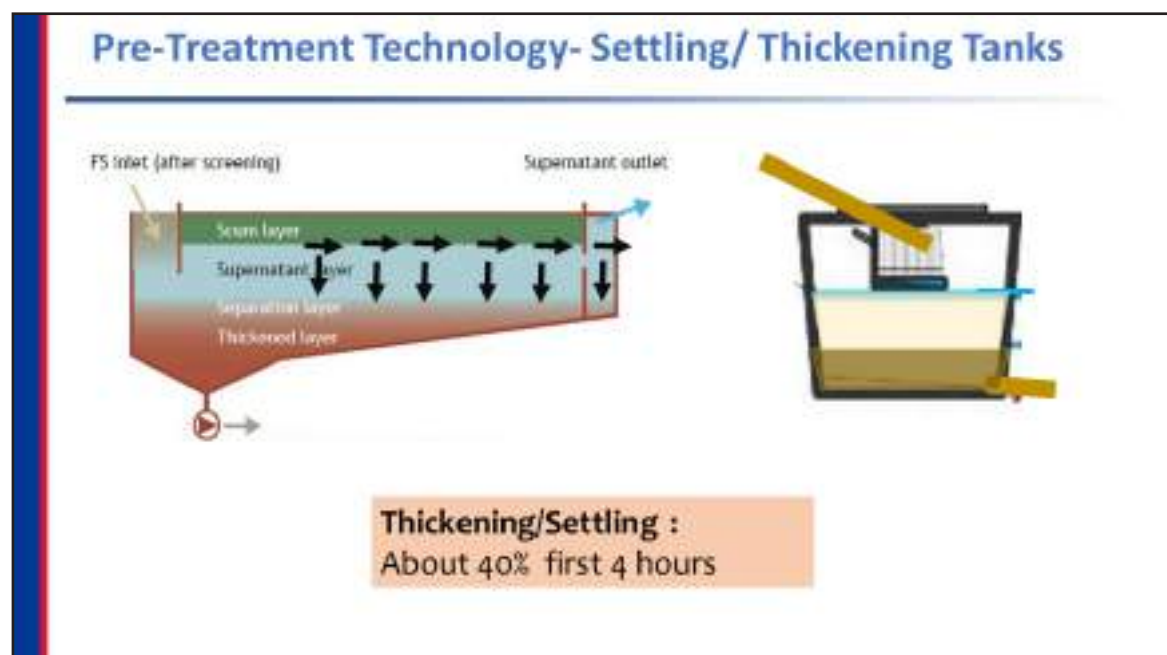
## Slide 15



Passing through a barrier, Screening - solids are screened by various barriers depending on the size of the solids.

Coarse material, such as rocks, sticks, leaves, plastics and other debris, should be removed because they could damage pumps or settlers. Screening devices such as bar racks and screens are recommended for this kind of pre-treatment.

## Slide 16



Settling thickening tank : for solid and liquid separation

Primarily used also in wastewater treatment plant

It is designed with settling velocity more than the flow velocity due to which the solid particle retains below and only supernatant passes out outlet.

The FS should undergo screening before input to settling tank to avoid the solidwaste in the tank.

There are mainly 3 layers in the tank: scum layer, supernatant layer and thickened sludge layer

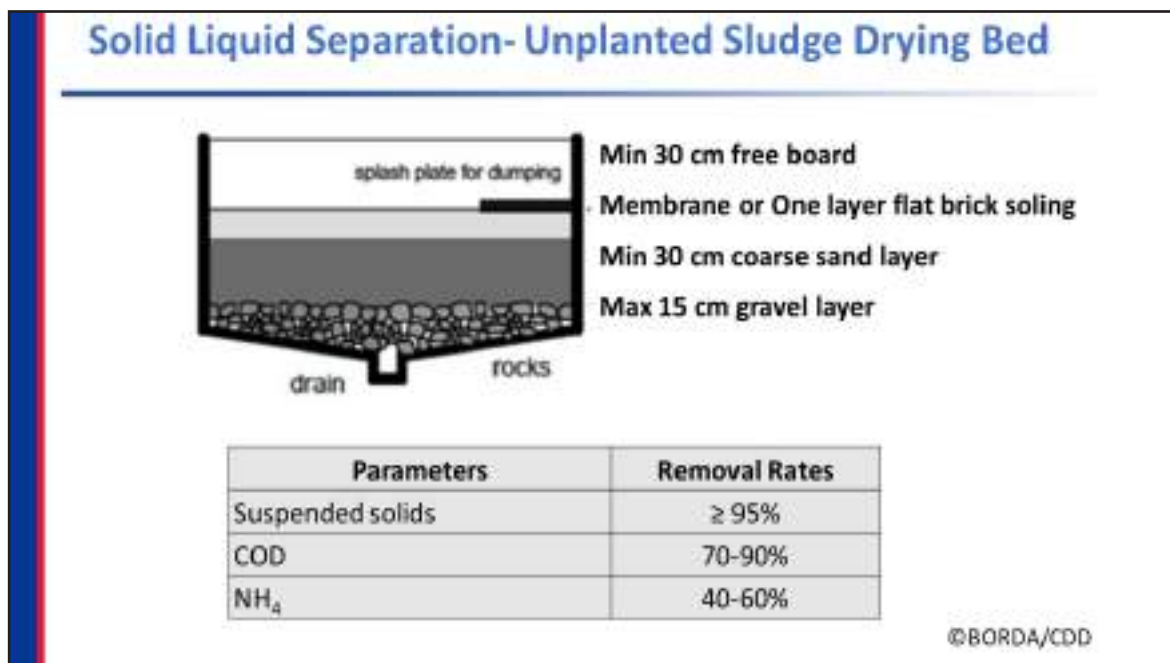
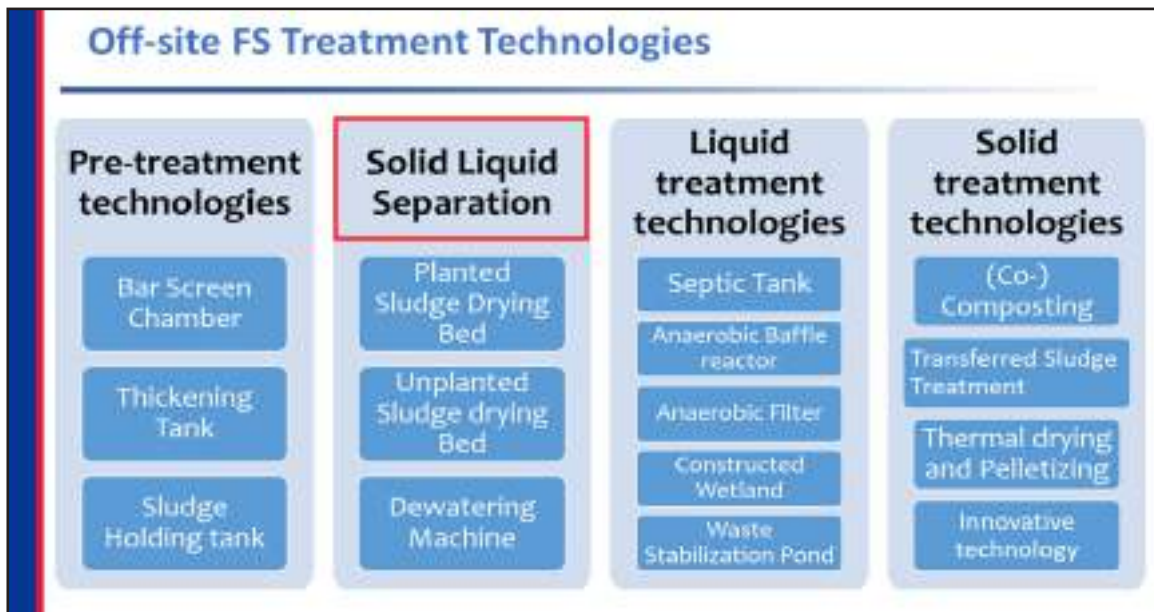
scum layer: oil and grease that floats in liquid

supernatant layer: layer with liquid portion

thickened sludge layer: layer of sludge at bottom which has thickened over time due to addition of sludge on top of each other

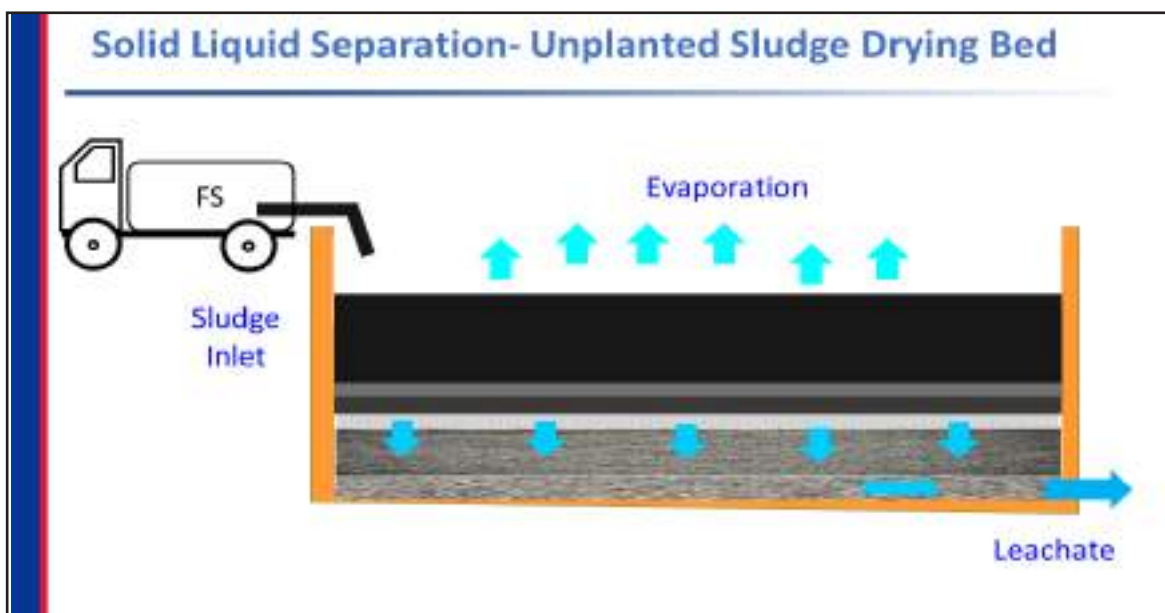
The mean settling efficiency of operating tanks and ponds is about 50-60% of SS in the

settled volume. This efficiency can reach up to 80% where the tanks have been adequately designed and operated (Heinss et al., 1999).



Unplanted drying bed is one of the established technology for sludge dewatering. The bed consists of filter media of 40 cm depth with 20 cm depth of 15-30 mm size gravel layer at bottom, 10 cm depth of 7-15mm size gravel at middle and 10cm of 0.2-0.6mm size sand layer at top. Generally the it is designed for sludge layer of 30cm.

Slide 19



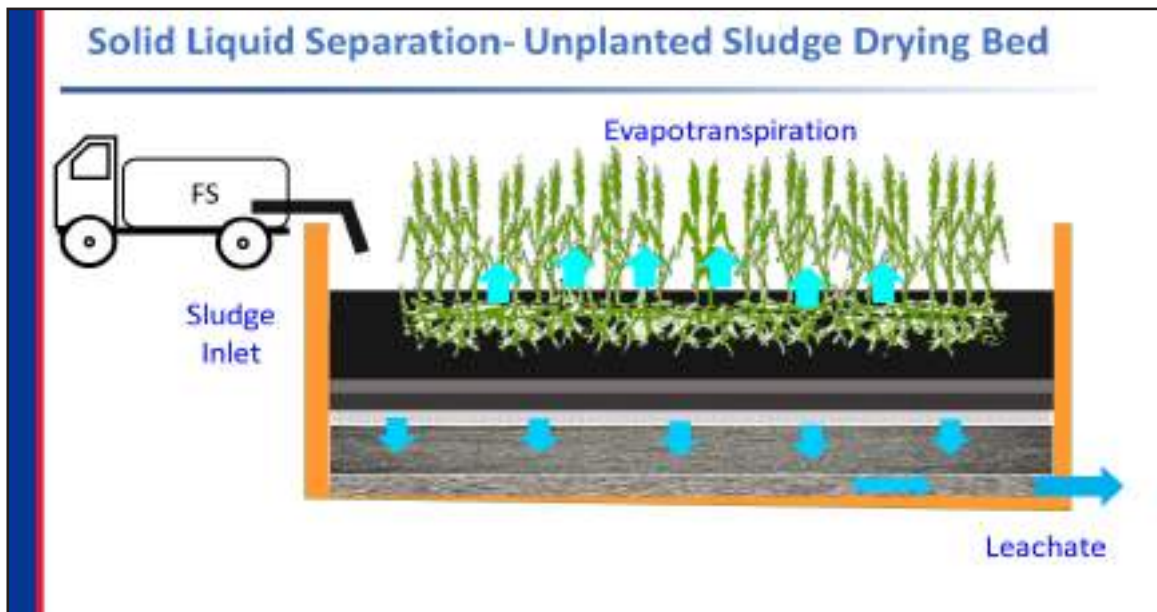
When the sludge is applied at the top, the dewatering process occurs by filtration from filter bed where solid retains and leachate is drain out from drainage pipe at the bottom. Besides filtration, evaporation also plays important role in dewatering  
 Dried sludge is obtained from this treatment technology

Slide 20



Example of the unplanted sludge drying bed

## Slide 21



When the sludge is applied at the top, the dewatering process occurs by filtration from filter bed where solid retains and leachate is drain out from drainage pipe at the bottom. Besides filtration, evaporation also plays important role in dewatering  
Dried sludge is obtained from this treatment technology

## Slide 22



- Depth and characteristics of filter media same as unplanted drying bed
- Plantation of reeds, cana, cattails, bulrushes, etc on filter media
- sludge dewatered by filtration, evaporation and evapo-transpiration
- Liquid fraction flows vertically downwards through media and is collected at bottom and treated separately
- Sludge retention time is 2-3 years depending on sludge loading rate TS



Slide 23

### Solid Liquid Separation- Mechanical Dewatering

- Reduction of Faecal Sludge Volume
- Technology
  - Belt Filter
  - Centrifuge
  - Frame Filter Press
  - Screw Filter Press

**High investment, sophisticated O&M, high energy requirement**

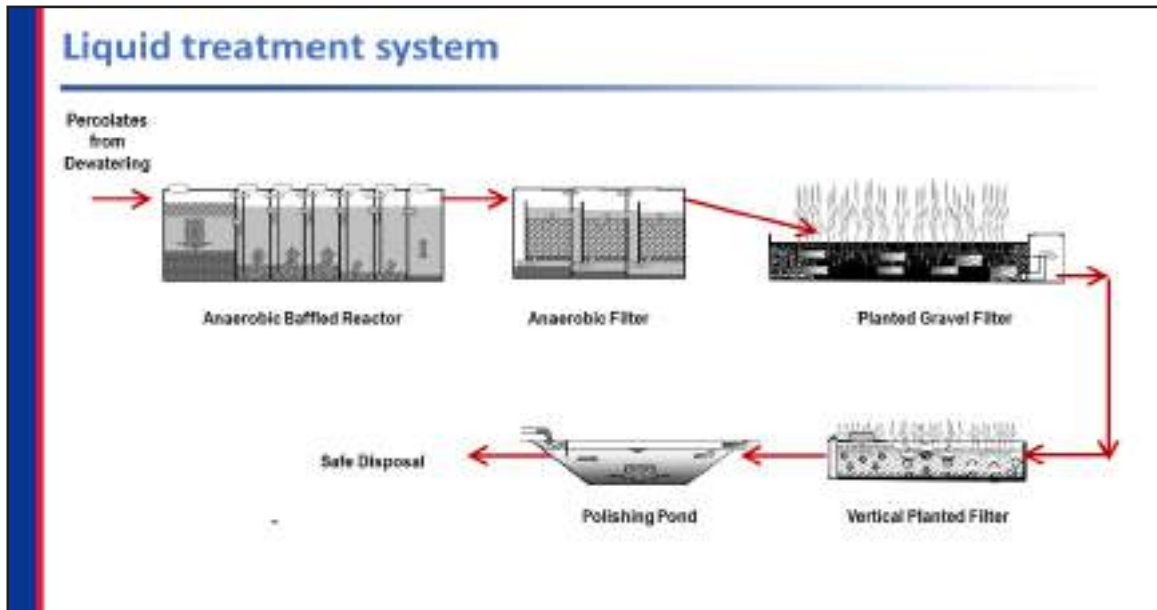
Mechanical dewatering conducted by machine process such as centrifugation or pressing.  
 belt filter: sludge compressed between two belts.  
 centrifuge: cylinder rotating around its horizontal axis, due to the centrifugal force  
 frame filter press: porous vertical frames fixed in two walls that are positioned in front one of the other to create a chamber.  
 screw press: rotational screw placed in a perforated cylinder

Mobile Dewatering-

Slide 24

### Off-site FS Treatment Technologies

Pre-treatment technologies	Solid Liquid Separation	Liquid treatment technologies	Solid treatment technologies
Bar Screen Chamber	Planted Sludge Drying Bed	Septic Tank	(Co-) Composting
Thickening Tank	Unplanted Sludge drying Bed	Anaerobic Baffle reactor	Transferred Sludge Treatment
Sludge Holding tank	Dewatering Machine	Anaerobic Filter	Thermal drying and Pelletizing
		Constructed Wetland	Innovative technology
		Waste Stabilization Pond	



- Anaerobic treatment (in the absence of oxygen)
- Wastewater passes a series of up-flow chambers
- Bacteria mass (activated sludge) at bottom of each chamber
- Further treatment (degradation) of suspended and dissolved solids by anaerobic bacteria
- Efficiency 75% - 85%
- Desludging is needed only if excess sludge is generated

## Slide 27

### Anaerobic Baffle Reactor

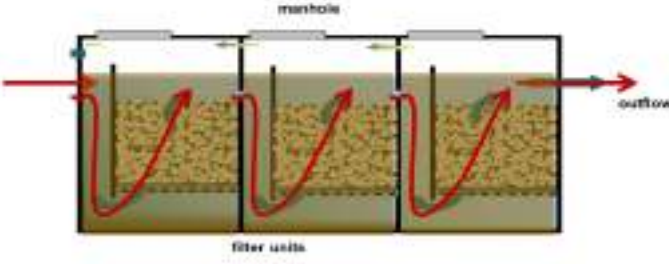
- This is Secondary treatment unit consisting series of up-flow chamber
- It functions under anaerobic digestion
- Liquid comes in contact with the activated sludge (bacteria mass) and dissolved/suspended matters undergoes into degradation by anaerobic bacteria

## Slide 28

### Anaerobic Filter

- Anaerobic treatment (in the absence of oxygen)
- Wastewater passes in a series of up-flow chambers with carrier material (filter material)
- The filter is made out of gravel, slag or plastic elements
- To avoid plugging pre-treatment (sedimentation) is necessary.
- Efficiency 75% - 90%
- Desludging is needed only if excess sludge is generated


## Anaerobic Filter



- This is Secondary treatment unit consisting series of up-flow chamber embedded with filter media
- Filter media is made up of gravel, slag, plastic materials
- To avoid clogging of filter bed, pre-treatment unit is necessary before it

- Anaerobic treatment (in the absence of oxygen)
- Wastewater passes in a series of up-flow chambers with carrier material (filter material)
- The filter is made out of gravel, slag or plastic elements
- To avoid plugging pre-treatment (sedimentation) is necessary.
- Efficiency 75% - 90%
- Desludging is needed only if excess sludge is generated

## Constructed Wetland



Constructed wetlands are treatment systems that use natural processes involving wetland vegetation, soils, and their associated microbial assemblages to improve water quality. Wetland plants also foster the necessary conditions for microorganisms to live there. Through a series of complex processes, these microorganisms also transform and remove pollutants from the water. Nutrients, such as nitrogen and phosphorous, are deposited into wetlands from stormwater runoff, from areas where fertilizers or manure have been applied and from leaking septic fields. These excess nutrients are often absorbed by wetland soils and taken up by plants and microorganisms.

Picture source: (Sketch- <https://www.frtr.gov/matrix/Constructed-Wetlands/>)

[https://upload.wikimedia.org/wikipedia/commons/1/1b/S\\_Koirala\\_Hospital\\_Constructed\\_Wetland\\_%284975034182%29.jpg](https://upload.wikimedia.org/wikipedia/commons/1/1b/S_Koirala_Hospital_Constructed_Wetland_%284975034182%29.jpg)

Slide 31

### Constructed Wetland

- Tertiary treatment unit consisting plants and stone pebbles as filter media
- Used to remove odour/colour, to enrich dissolved oxygen and reduction of nutrients
- To avoid clogging of filter bed secondary treatment unit is necessary

Constructed wetlands are treatment systems that use natural processes involving wetland vegetation, soils, and their associated microbial assemblages to improve water quality.

Wetland plants also foster the necessary conditions for microorganisms to live there. Through a series of complex processes, these microorganisms also transform and remove pollutants from the water. Nutrients, such as nitrogen and phosphorous, are deposited into wetlands from stormwater runoff, from areas where fertilizers or manure have been applied and from leaking septic fields. These excess nutrients are often absorbed by wetland soils and taken up by plants and microorganisms.

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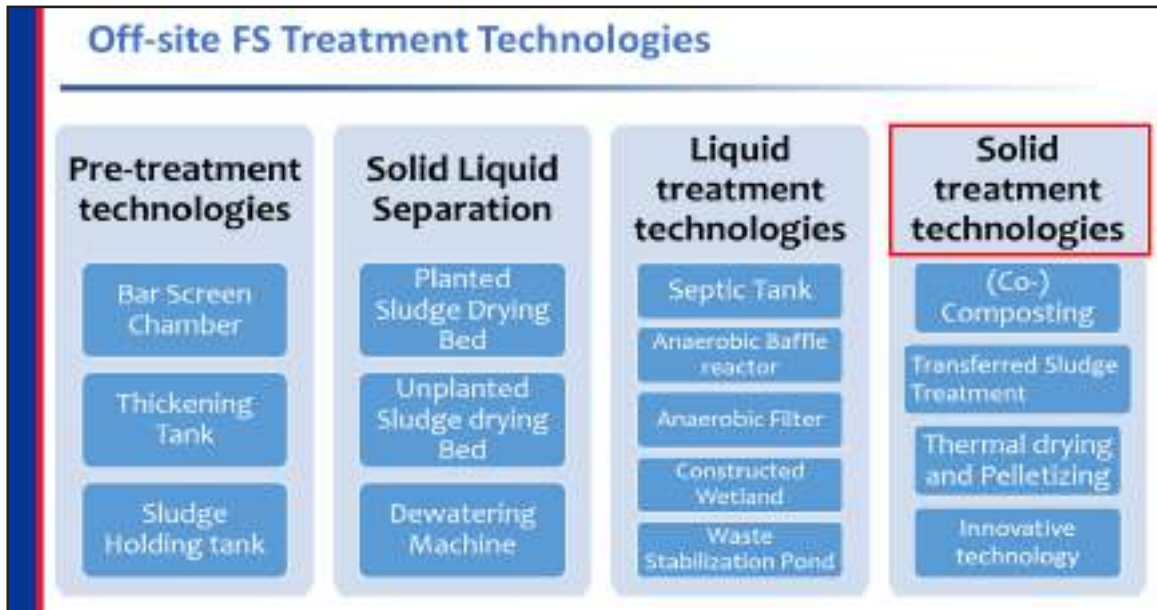
Slide 32

### Waste Stabilization pond for co-treatment

Waste stabilization ponds (WSPs or stabilization ponds or waste stabilization lagoons) are ponds designed and built for wastewater treatment to reduce the organic content and remove pathogens from wastewater. They are man-made depressions confined by earthen structures. Wastewater or "influent" enters on one side of the waste stabilization pond and exits on the other side as "effluent", after spending several days in the pond, during which treatment processes take place. (Wikipedia)

Waste stabilization ponds consists of 3 types of ponds: anaerobic, facultative and aerobic maturation pond  
 Anaerobic pond is deeper (2-5)m for anaerobic condition to occur at bottom of pond. Facultative ponds are (1-2)m where both anaerobic and aerobic condition occurs. The aerobic pond are shallower (0.5-1)m to allow aerobic condition in pond.

Picture source: <https://sswm.info/taxonomy/term/3932/waste-stabilization-ponds-%28wsp%29>

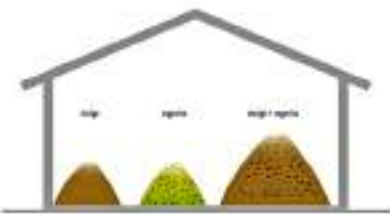


Co-composting is process in which Faecal sludge is composted along with municipal solid waste. We have to know about composting before going to co-composting  
 Composting: Decomposing of organic matter under controlled predominantly aerobic condition. It is basically of two types: open composting and closed composting. Open composting is cheaper and requires lots of space. Closed composting are windrow method and box composting where the space is minimized

Slide 35

### Preconditions for proper co-composting process

- Carbon to nitrogen ratio (C:N): 20-30:1
- Oxygen concentration: 5-10%
- Moisture content: 40-60% by weight
- Particle diameter < 5 cm for static pile
- Composting period: 6-8 weeks
- Peak heap temperature: 60°C - 70°C



Sketch Source: TILLEY et al. (2014)

Slide 36

### Types of Composting



Pile composting



Windrow composting

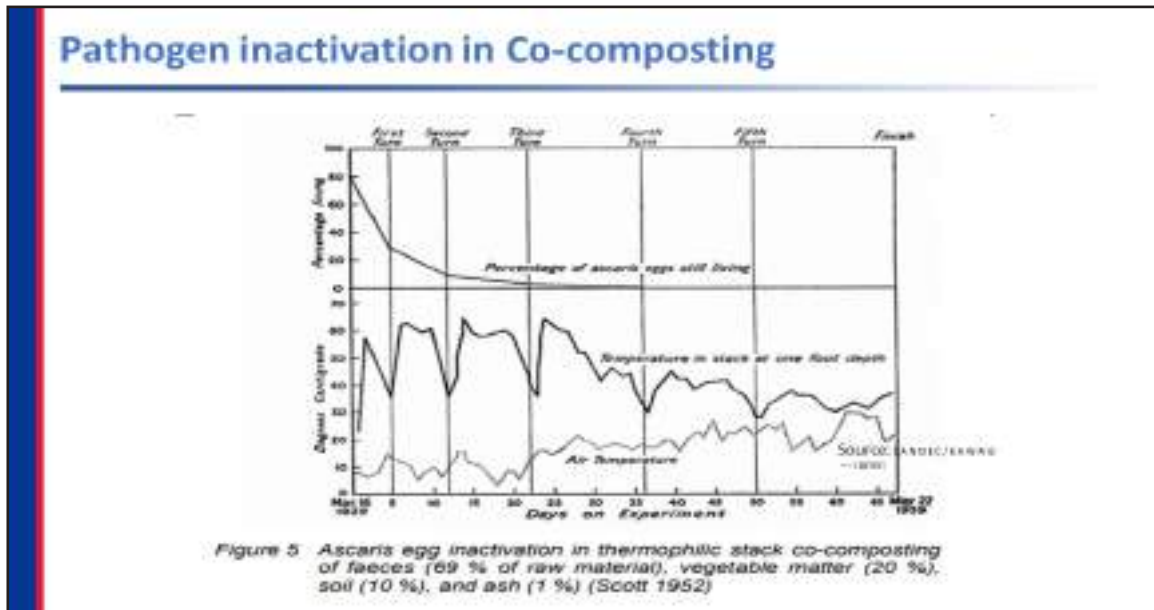


Box composting



Vermi-composting

[http://extension.ohio.umn.edu/extension/ohio.umn.edu/files/styles/caption/\\_results/public/Fall-house-compost-pile.jpg?itok=8W8nuPv8](http://extension.ohio.umn.edu/extension/ohio.umn.edu/files/styles/caption/_results/public/Fall-house-compost-pile.jpg?itok=8W8nuPv8)



Co-composting is process in which Faecal sludge is composted along with municipal solid waste. We have to know about composting before going to co-composting

Composting: Decomposing of organic matter under controlled predominantly aerobic condition. It is basically of two types: open composting and closed composting. Open composting is cheaper and requires lots of space. Closed composting are windrow method and box composting where the space is minimized

optimal composting parameters to be controlled

C:N=20-30:1

carbon- source of energy for organisms

nitrogen- source for building cell structure for organisms

Higher C:N ratio- optimal growth of microbial population due to insufficient nitrogen

- degradation process becomes slower
- when the soil with higher C:N ratio is applied in soil, it robs the available nitrogen hindering its availability for plants

Oxygen concentration: 5-10% for aerobic microbiological decomposition and oxidation

Moisture content: 40-60% by weight

Temperature rises upto 60-70% in heap. In the maximum temperature, pathogen die off.

Cocomposting with Municipal solid waste:

organic solid waste of moisture 40-60%

Dewatered sludge with Total solid higher than 20%.

Mix in 3:1 proportion


can obtain good compost which can be used for good soil conditions



Slide 38

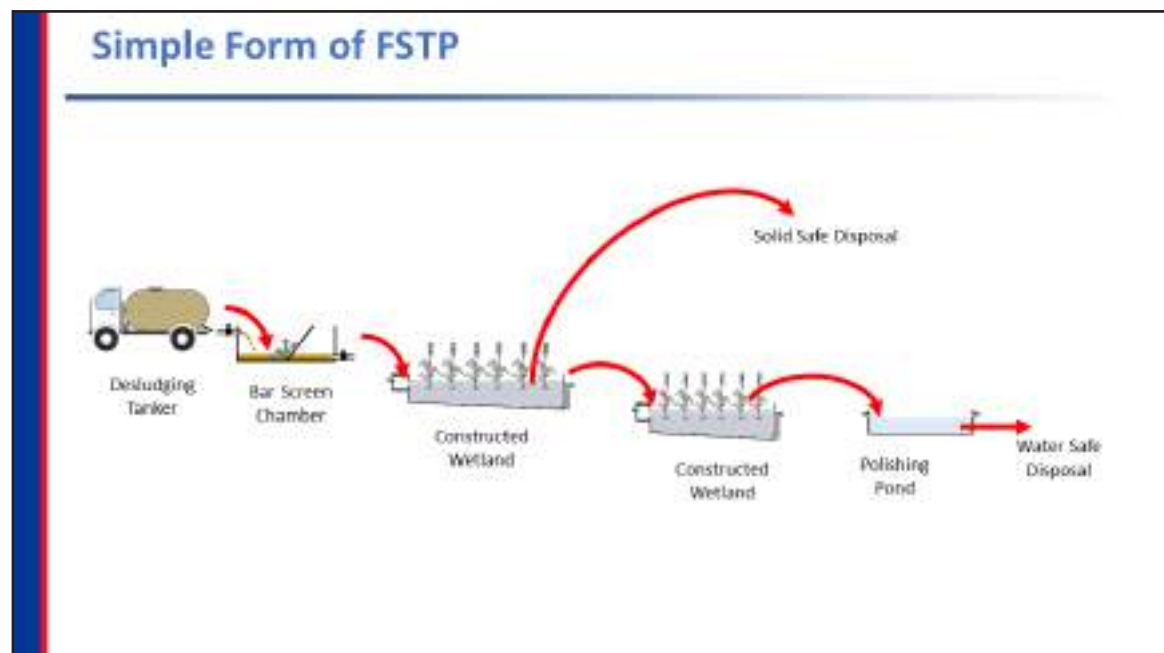
### Faecal Sludge Incineration

- Burn at 850-900°C.
- Dewatering is required before combustion
- potential emission of pollutants; the need for highly skilled operating
- Maintenance staff, high capital and O&M costs;
- Electrical can be generated

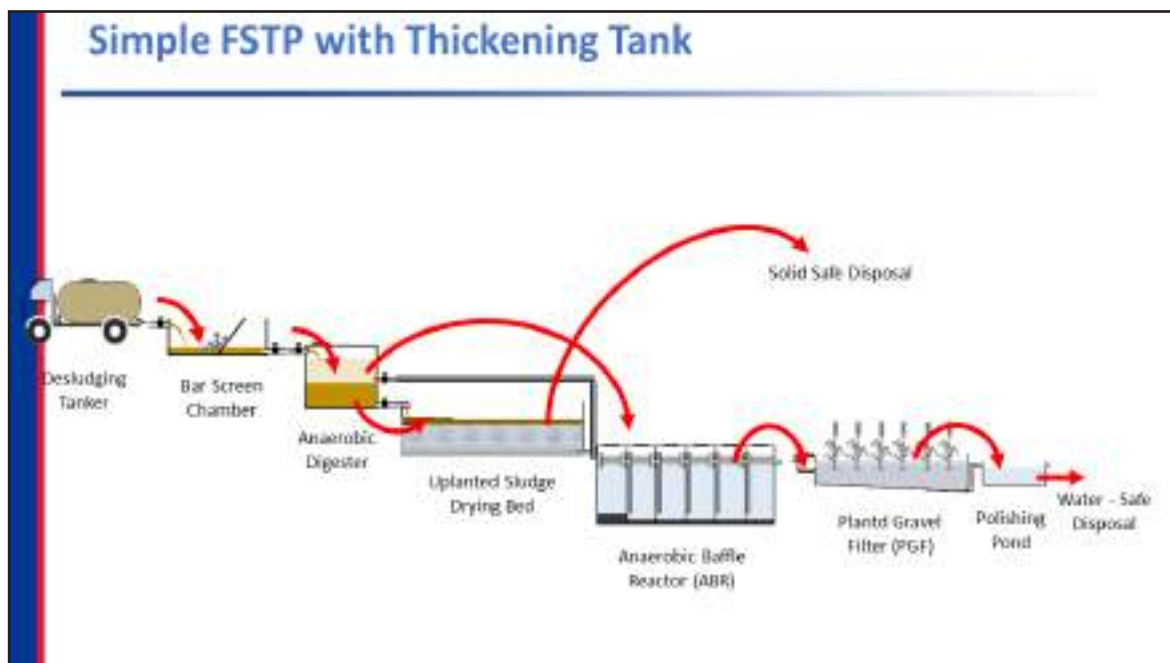
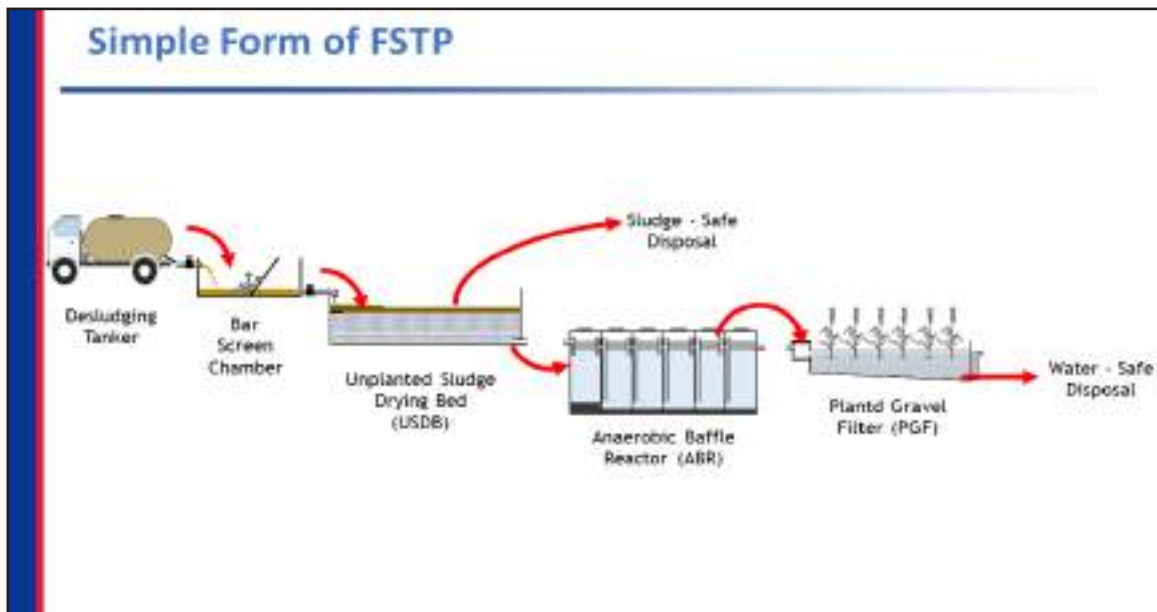


Widely used technologies for Faecal sludge treatment plant  
 Deep row entrenchment: traditional and simpler technology  
 Unplanted drying bed: Dewatering of sludge in filter bed  
 Planted drying bed: Dewatering of sludge in filter bed with the help of plants  
 Co-composting: mixing of sludge with municipal waste and composting it together  
 settling thickening tanks: helps in solid liquid separation

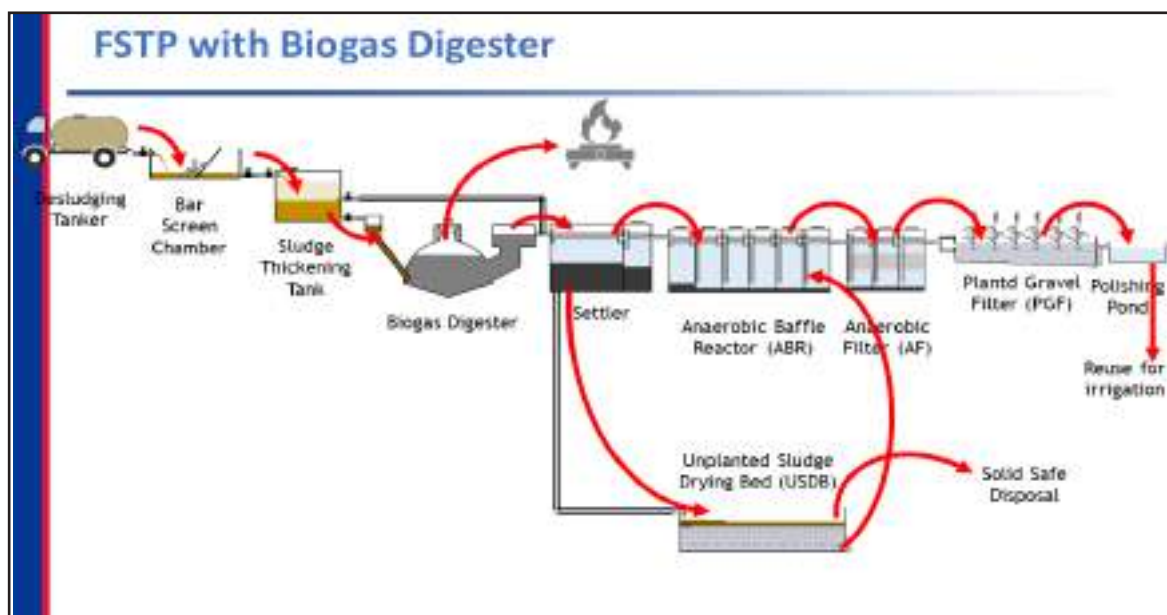
Slide 39



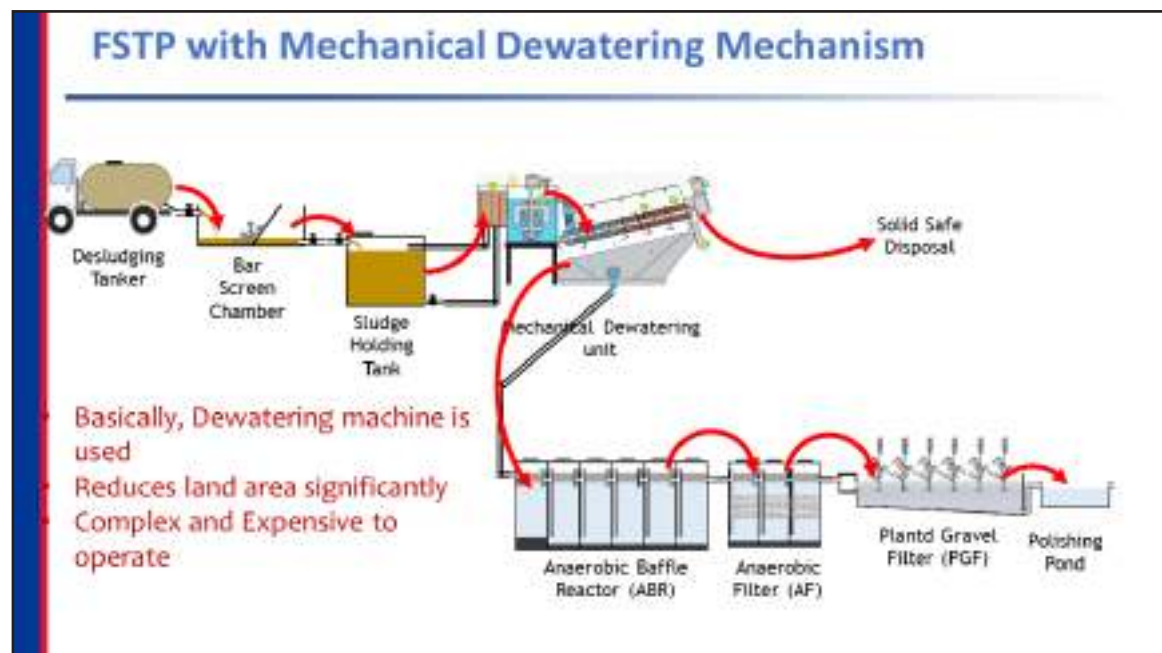
The combination of each of these technologies of the different process of the FS treatment makes a treatment system or treatment plant.  
 Ex. the above shown example is a very simple form of FSTP.



Slide 42



Slide 43



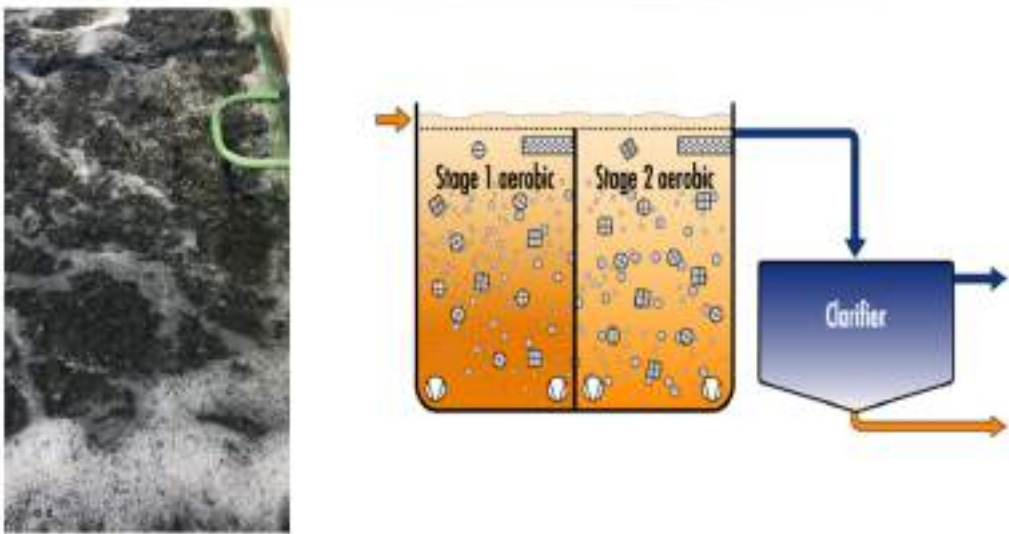
### Fully Mechanical Treatment Option



- Land requires minimal
- Complex and Expensive

Ex. Guheswori WWTP

### Fully Mechanical Treatment Option



The diagram illustrates a two-stage aerobic treatment process. It shows two rectangular tanks labeled "Stage 1 aerobic" and "Stage 2 aerobic". Both tanks contain brown liquid with numerous small white circles representing aeration. An orange arrow indicates the flow of wastewater into the first stage. A blue arrow shows the effluent from the second stage flowing into a blue trapezoidal tank labeled "Clarifier". From the clarifier, a blue arrow points to the right, and an orange arrow points downwards, representing the return of sludge.

Ex. Guheswori WWTP

Slide 46

## Innovative Technologies

---

**Initiated by the BMGF in 2011**

**Transformative Technologies that:**

- Remove harmful pathogens from human waste and recover valuable resources
- Operate “off the grid” and require minimal electricity
- Cost less than US\$.05 cents per user per day
- Promote sustainable and profitable sanitation services and businesses in poor urban settings
- Can appeal to everyone, in developed as well as developing nations



“Reinvent the Toilet Challenge” initiated by the BMGF in 2011, continues today and supports the development and commercialization of products that:

- Remove harmful pathogens from human waste and recover valuable resources such as energy, clean water, and nutrients
- Operate “off the grid” without connections to water and sewers and require minimal electricity
- Cost less than US\$.05 cents per user per day
- Promote sustainable and profitable sanitation services and businesses in poor urban settings
- Can appeal to everyone, in developed as well as developing nations

In addition, there have been other initiatives aimed at developing “transformative technologies” – that can quickly contribute to improving safely managed sanitation.

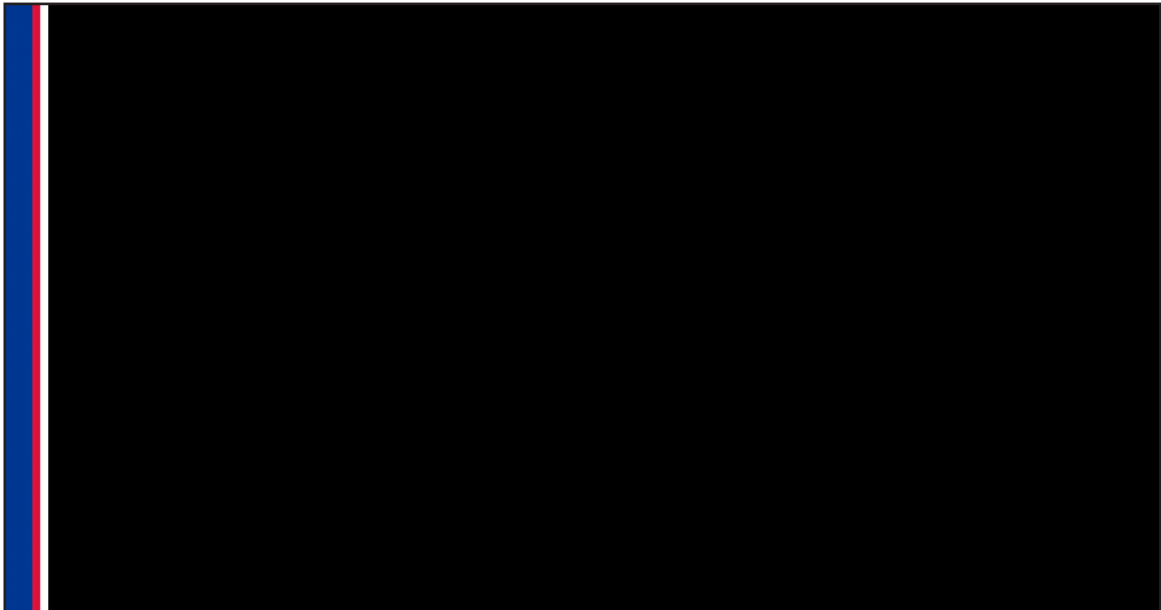
Slide 47

## Omni-Processor (Thermal Process)

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**Nano-Membrane Toilet (Mechanical Processes)**

**IWA Project Innovation Awards – Gold winner!!**



<http://www.nanomembranetoilet.org/>

The slide features three images: on the left, a white, compact toilet unit with a blue seat; in the center, a small, dark, outdoor structure with an open door, where several people are gathered; on the right, a detailed diagram of the toilet's internal mechanical and filtration components.

Nano-membrane toilet: Cranfield University

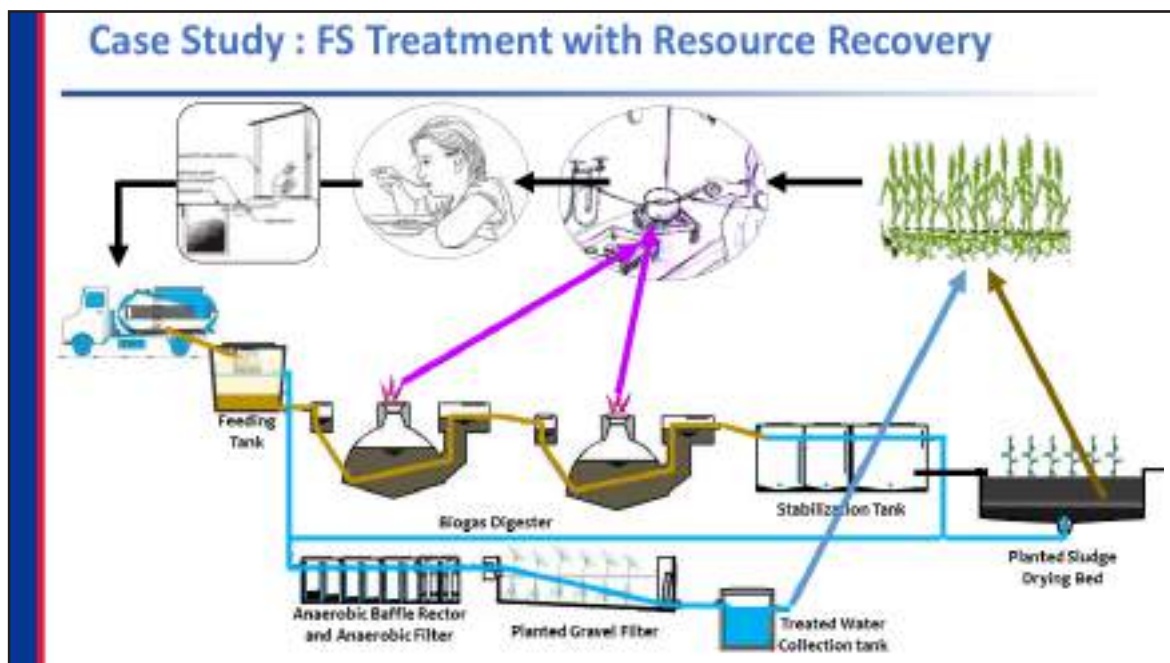
Slide 50



Slide 51

### Reuse/Safe Disposal

- End product/ end use
  - Soil conditioner
  - Water
  - Nutrients
  - Bio gas
  - Fodder and plants
  - Building materials
  - Bio-fuels





## Slide 54

### Other reuse of sludge



The image displays three different ways to reuse sludge. On the left, a person's hands hold a large quantity of small, dark, cylindrical pellets. In the middle, a close-up shows a pile of dark, porous biochar particles. On the right, a large stack of dark, cylindrical briquettes is shown, neatly arranged in rows.

Pellets                      Biochar                      Briquettes

## Slide 55

### References

- [https://www.youtube.com/watch?v=9H\\_3i2A-onw&t=8s](https://www.youtube.com/watch?v=9H_3i2A-onw&t=8s)
- <https://www.youtube.com/watch?v=-glxyxsNqhl>
- <https://www.youtube.com/watch?v=bVzppWSIFU0>
- <https://www.youtube.com/watch?v=tRzEtOHLeBk>
- <https://www.youtube.com/watch?v=jGPpXF7y9Rg>
- Regmi, S. 2013. Wastewater treatment in Kathmandu: Management, treatment and alternative. Bachelor's thesis in Environmental Engineering, Mikkeli University of Applied Sciences, Finland.
- <https://www.youtube.com/watch?v=qzYSryXk2FE>
- <https://www.youtube.com/watch?v=1UXIZpRHo08>

Thank you!  
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## Vermi-composting

- Earthworms effective in organic waste reduction
- Worms cannot survive in Fresh Faeces – Need support
- Less reliable in pathogen removal – Need further treatment



**Worm – Red Wiggler Worm**

**Worms are sensitive to Thermophile Temperature (41-122 deg)**

**Output – Compost with pathogen**

Vermi-composting treats diluted domestic wastewater sludge in a system inoculated with earthworms (Zhao et al., 2010).

Worms cannot survive in fresh faeces and need some kind of support in the form of layers of soil and vermi-compost.

Vermicomposting is not a reliable method to ensure adequate pathogen removal. However, when carried out under proper conditions the technology of vermicomposting can lead to a complete removal of coliforms. Rodriguez-Canche et al. (2010) found helminth egg removal in experiments with vermicomposting on septic tank FS. Permissible levels for reuse in agriculture were achieved after 60 days, starting from the initial earthworm inoculation, faecal coliforms, Salmonella spp., and helminth ova were reduced to <1000 MPN/g, <3 MPN/g, and <1 viable ova/g on a dry weight basis, respectively.

Slide 58

## Fly Larvae composting

- Black soldier Fly (BSF) (*Hermetia illucens*)
- Feeds only at larvae stage
- Reduction of organic waste volume by 75%
- Prefer Temperate and Warm Climate
- Prepupal stage larvae as animal feed

Black Soldier Fly "*Hermetia illucens*"  
Life cycle in days=44

Residue remaining after BSF need further Composting or anaerobic digestion to produce a soil conditioner

The Black Soldier fly (*Hermetia illucens*) originated in America, but is commonly found in temperate and warm climates.

Slide 59

## LaDePa

LaDePa refers to **Latrine Dehydration and Pasteurization** is example of thermal drying and pelletizing

©FSM book

# SESSION 15

## Field Visit Preparation

Slide 1

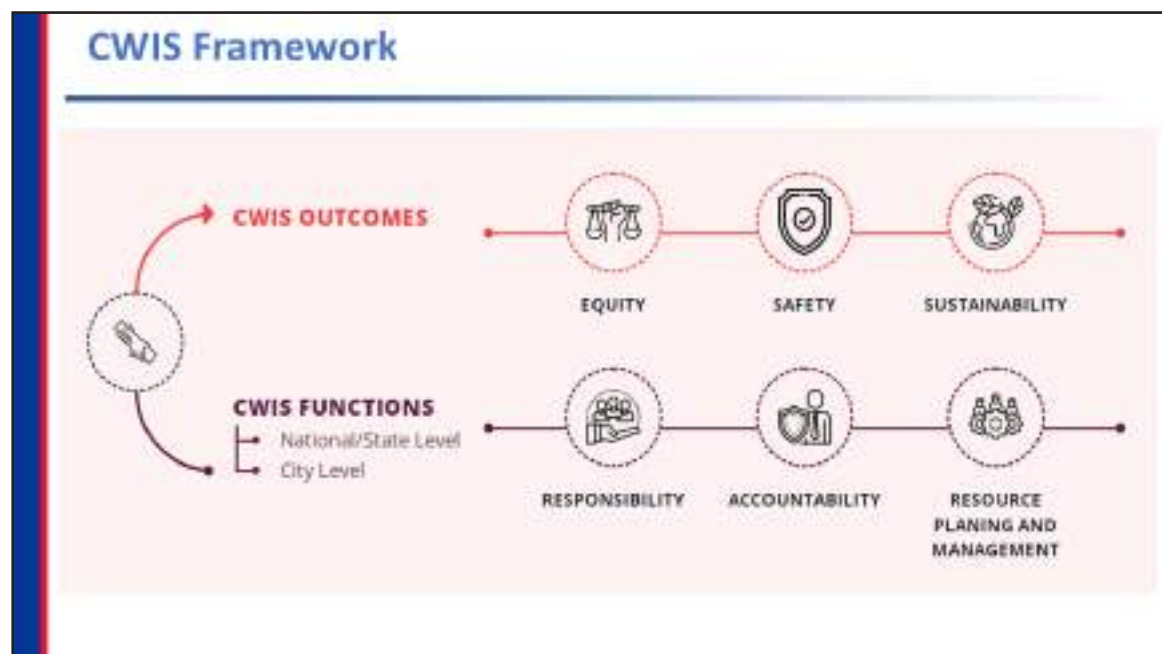
**"Citywide Inclusive Sanitation – Training of Trainer's"**

**Field Visit- Preparation**

Resource Person

Government of Karnataka  
Ministry of Water Supply  
Department of Water Supply and Knowledge Management


Slide 2



Slide 3

## Equity

- Desludging from which location
- Staffs engaged- male or female, people with disability, marginalized community
- Training to the staff
- Provision for WASH facilities to the staff




The icon for Equity shows a hand holding a scale of justice, enclosed in a dashed red circle. Below the circle, the word "EQUITY" is written in bold, black, uppercase letters.

Slide 4

## Safety

- Provision for safely managed liquid waste (wastewater and effluent)
- Vehicle used for the transportation (if it is safe or not)
- Provision of effluent quality testing in the catchment area/yearly
- Provision of PPE for staffs/yearly
- Wearing/ using PPE by staff
- Availability OHS guideline for operation and maintenance
- Incidence (per 1000) of fecal oral pathway disease
- Standard or guidelines for operation and maintenance
- Leakages- Foul smell,
- Complain from surrounding
- Availability of toilet for the staffs and visitors
- Personal safety of the staff




The icon for Safety shows a shield with a checkmark inside, enclosed in a dashed red circle. Below the circle, the word "SAFETY" is written in bold, black, uppercase letters.

## Slide 5

## Sustainability

- Availability of operation and maintenance plan/Business plan
- Yearly operation and maintenance cost for facility
- Yearly budget for trained human resource for operation and maintenance for the facility
- Yearly revenue generation through resource recovery
- No. of staffs and expense for staffs and others operational cost
- Yearly expenses for operation and maintenance
- Reuse of waste/ safe disposal of treated waste (liquid/ solid)




**SUSTAINABILITY**

## Slide 6

## Responsibility

- Availability of private sector/committee for operation and maintenance of facility
- Clearly defined responsibility of stakeholders (private sector/ committee/ municipality) for the proper operation and maintenance
- Yearly operation and maintenance cost for facility (either through revenue generation or budget allocated from the engaged stakeholder)
- Enough staffs for the proper operation and maintenance of the facility
- Availability of operation and maintenance plan/Business plan
- Job description of operator
- Role of engaged stakeholders




**RESPONSIBILITY**

Slide 7

## Accountability

---

- Provision of performance monitoring /yearly for the facility
- Managed data of the performance monitoring
- Provision of reporting the findings from performance monitoring to concern stakeholder
- Provision of implying the recommendations and reporting in transparent way
- Provision of reward/ punishment as per the data of performance monitoring Mechanism of social and public audit of facility/yearly
- Provision of enough number of capable human resources for the monitoring



**ACCOUNTABILITY**

Slide 8

## Resource Planning and Management

---

- Training and capacity development of the staffs
- Operation and maintenance cost
- Budget allocation is based on the responsibility/ mandate
- Strategies for the service area including business plan
- Decision making process for budget allocation is transparent and inclusive (social audit)
- Cost benefit analysis of the services is carried out (study report)
- Availability of detail project information board with budget is installed
- Yearly budget for trained human resource for operation and maintenance for the facility
- Availability of resources allocated as per the business plan




**RESOURCE  
PLANING AND  
MANAGEMENT**



## Slide 9

## Format for Presentation

- **Group and Members: ...**
- **Points observed/ Measures incorporated in sanitation facility from your assigned group (equity, safety, sustainability, responsibility, accountability and resource planning and management) perspective**
- **Gaps or points to improve from your assigned group (equity, safety, sustainability, responsibility, accountability and resource planning and management) perspective**
- **Recommendations**



## Slide 10

**Thank you!**  
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**SESSION 15.1**

**Field Visit  
Presentation Format**

Slide 1



**"Citywide Inclusive Sanitation – Training of Trainer's"**  
**Field Visit- Presentation Format**  
Resource Person



Government of Karnataka  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management

Slide 2

**Group Name and Members**

---

Slide 3

**Measures incorporated in sanitation facility**

---



Slide 4

**Gaps or points to improve**

---



Slide 5

## Recommendations

---

Slide 6

Thank you!  
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---

**Government of Nepal**  
**Ministry of Water Supply**  
**Department of Water Supply and Sewerage Management**  
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# SESSION 16

## Effective Learning

## Slide 1



"Citywide Inclusive Sanitation – Training of Trainer's"  
**Effective Learning**  
 Resource Person



Government of India  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

## Slide 2

### Before Starting...

- Video clip
  - *Taree zameen par*
- What is going on in the video
- 3 -4 responses



The student/ boy shown in the video was not able to get the information provided to him. Similar to it, a trainer should not focus on passing information as is not the goal of a trainer/ training rather should focus on if the participants are being able to grab the information being provided to them or not.

Effective training and learning are such that the information being passed is being grabbed by the participants as well hence will be discussing on making the learning more effective in the session.



This training includes 20 main technical sessions, and are currently on session 16: Effective learning



## Slide 5



This training includes 20 main technical sessions, and are currently on session 16: Effective learning

## Slide 6


### Learning Outcomes

- Explain what participants need for the effective learning.
- Discuss strategies for effective learning

A yellow lightbulb icon with rays emanating from it, symbolizing an idea or learning outcome.


## Presentation Outline

- 1) Learner's need for effective learning
- 2) Strategies for effective learning
  - 1) Safe learning environment
  - 2) Connecting to existing knowledge
  - 3) Motivation
  - 4) Practice




An illustration of a person with an orange head and green body standing next to a whiteboard on a tripod stand. The whiteboard has several horizontal lines representing text. The person is pointing towards the board with their right hand.

## Group Work



4 Groups  
5 minutes



Points/ issues that might hinder effective learning

An illustration of four people (two women and two men) sitting around a table, engaged in a group discussion. They are looking at a document on the table. The people are colored green, red, yellow, and blue.

In their groups, note the points that might hinder effective learning, one point in a meta-card.

Slide 9

## Group Work



4 Groups  
5-7 minutes



**Strategies to Overcome**

In their groups, ask to discuss the strategies to overcome the given issues

Slide 10


## Learner's Need

- 1) A safe learning environment
- 2) Connection to existing knowledge
- 3) Motivation
- 4) Practice



## Safe Learning Environment

1. Address the physical needs of participants
  - Peaceful environment with open and spacious training hall
  - Manage sound and visual systems
  - Provide additional reference materials on the subject
  - Provision for physical needs like-snacks and lunch, clean and safe toilets
  - Ensure the participants are all able to hear and see information easily



After presenting the information, ask participants to relate some of the points being done in the training for the physical needs of participants.

## Safe Learning Environment

2. Address
  - 
  - 
  - 
  - 
  -

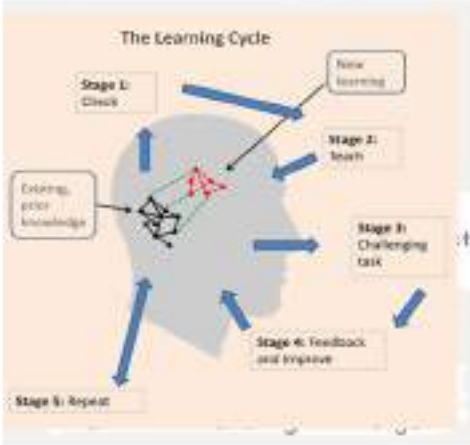


mphasizes  
  
 styles and  
  
 ledge and

Slide 13

### Connecting to Existing Knowledge

- More points to connect new information,
- To existing knowledge and experience
- The stronger the relevance better chance of grabbing and retaining the information



Science has proven that adult learn by connecting to existing knowledge, example: ‘water’ in Newari language in Bhaktapur is called ‘Na:’ and in other parts of Nepal it is called ‘La:’ If we are to give this information to participants, participants may recall it by linking it to something they already know.

Trainer’s note: You may ask if they are to remember it, how/ what would they do. Collect 2 to 3 responses from participants.

Present information from slide.

Discuss on how the information is retrieved in the mind, more the connection more is the chance of learning/ remembering.

Slide 14

### Motivation



One of the other thing that helps to learn is the motivation. The motivation for different participants may be different.



Thank you!  
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# SESSION 17

## Effective Training

Slide 1

"Citywide Inclusive Sanitation – Training of Trainer's"  
**Effective Training**  
 Resource Person

Government of Karnataka  
 Ministry of Water Supply  
 Department of Water Supply and Sewerage Management

Slide 2

**Before Starting...**

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- An activity

Refer to lesson plan for details on activity

Participants understand things differently based on their experiences and if you as a trainer do not clearly communicate the desired outcome, people may end up doing things differently from how you anticipated. So, as a trainer, one should always focus on giving clear instructions and making sure all participants are on the same page.

Link: similar to giving clear instructions there are other points that a trainer should focus on for effective training and are going to discuss them in the session.



Slide 3



This training includes 20 main technical sessions, and are currently on session 17: Effective Training


Slide 4



This training includes 20 main technical sessions, and are currently on session 17: Effective Training


## Learning Outcomes

- Describe the qualities of trainers for an effective training delivery
- List the tips for the effective presentation



## Presentation Outline

- Qualities of effective trainers
  - Knowledge
  - Skills and
  - Attitude
- Tips for effective presentation
- ARCS model for effective training



Slide 7

### Relation to Training

The diagram illustrates the components of training. On the left, two hands are shown with a blue button labeled 'Skills' below them. In the center, a red heart is shown with a blue button labeled 'Attitude' above it. On the right, a human brain is shown with a blue button labeled 'Knowledge' below it.

Slide 8

### Group Work

The group work activity is detailed as follows: An illustration of four people (two women and two men) sitting around a table and discussing. To the right, a clock icon is accompanied by the text '3 Groups' and '5 minutes'. Below the group illustration, there are three icons: two hands (representing Skills), a heart (representing Attitude), and a brain (representing Knowledge).

In their groups, participants are to discuss what are the qualities that a trainer should have relating to the pictures that they got in groups. Ex. what knowledge he/she should have or what kind of attitudes that he/she should have or what skills that he/she should have.

## Knowledge

Trainers need knowledge about:

- How people learn
- What learners need – connection to past experiences, motivation, safe learning environment and practice
- Group dynamics
- What resources are available for training and how to use them
- Cultural understanding of the area and participants' background
- Water, sanitation and hygiene



## Attitude

Trainers need the following attitudes:

- Self-reflective
- Open to feedback and willing to learn
- Humble
- Respectful
- Friendly
- Patient
- Flexible
- Professional
- Honest and confident in being able to say "I don't know"
- Positive and engaged
- Energetic
- Resourceful
- Calm presence




## Slide 11

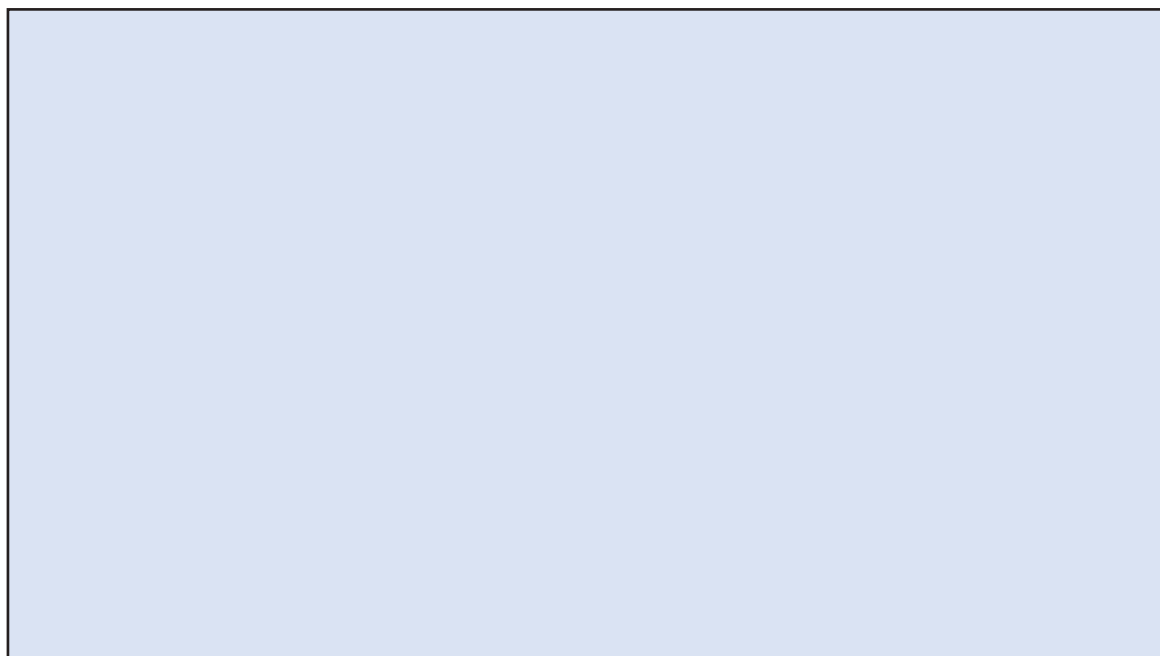
## Skills

Trainers need skills in:

- Communication
- Active listening
- Effective questioning
- Thinking and adapting quickly
- Time management
- Adapting lessons to fit participants' needs
- Giving clear instructions
- Workshop preparation and lesson planning
- Problem solving and stress management
- Inclusive nature that makes participants feel safe
- Developing relationships with participants and support staff
- Motivating



## Slide 12



In their groups, participants are to discuss what are the qualities that a trainer should have relating to the pictures that they got in groups. Ex. what knowledge he/she should have or what kind of attitudes that he/she should have or what skills that he/she should have.



**Tips for Effective Presentation**


- Use participatory activities as much as possible
- Focus on key messages
- Select appropriate IEC materials for the group
- Link content with practical and local issues
- Give the examples, participants can relate

PERFECTING THE PRESENTATION

## Slide 15

## Tips for Effective Presentation

- Respect the opinions of participants
- Always practice before delivery
- Practice responding to typical questions that may occur
- Use of different learning styles: audio, visual, kinesthetic
- End with an action commitment



PERFECTING THE PRESENTATION


## Slide 16

**Effective Training through ARCS model**

## Slide 17

## Attention

- refers to the ways that you can attract your participants' attention. Attracting attention is achieved in three main ways:
  - **Perceptual arousal:** Using surprise or uncertainty
  - **Inquiry arousal:** Stimulating curiosity by asking challenging questions or providing problem solving activities
  - **Variability:** Using a variety of activity types



Clap your hands and see how participants responds to it. Explain attention as referred in the slide and inform clapping is one of the way to grab the attention. Other way might be simply keeping quiet or as following.

## Slide 18

## Attention



Presenting your materials differently is one of the way to grab attention.



## Slide 19

## Attention- Examples

- Use humour
- Present your **material in different ways**: discussions, projects, small group discussions
- Take the role of **devil's advocate** to challenge your participants understanding
- Ask your learners to **brainstorm solutions to a problem**
- Use games, role-plays or other active methods of **engaging participants** with the content

## Slide 20

## Relevance

- Refers to the ways that you communicate how the participants will benefit from your learning experience.
- Explain how the new learning builds on their existing skills and knowledge.
- Explain how the learning will help them today
- Explain how the learning will help them tomorrow



## Slide 21

## Relevance

- Tie the instruction to their motives for learning it: power, achievement, a desire to belong
- Model what you want them to learn, or ask some participants to model it for the class
- Allow your participants to choose the learning activities or the order of the activities

An illustration of two stylized human figures on a flat, orange-brown ground. The figure on the left is holding a large, solid red shape above its head. The figure on the right is holding a large, solid blue shape that has a wedge-shaped section missing from its right side. The background is a gradient of light yellow and orange, suggesting a sunset or sunrise over a horizon.

## Slide 22

## Confidence


- refers to the ways that you convey the participants' likelihood of success. Some strategies for developing confidence include
  - Assuring them they can do it
  - Explaining the performance requirements and evaluation criteria

A graphic featuring a quote by Marcus Garvey. The quote is in a bold, black, sans-serif font: "With confidence, you have won before you have started." Below the quote, in a smaller font, is the attribution: "—Marcus Garvey, activist and orator". The background is a teal color with a white circular shape behind the text. In the bottom right corner, there is a black and white portrait of Marcus Garvey, a man with a beard and a military-style uniform with a star on his chest. In the bottom left corner of the graphic, there is a small white square with the letters "RD" in blue.

## Slide 23

## Confidence

- Building on what they already know in small steps
- Providing consistent and constructive feedback
- Help the participants to see the relationship between their effort and their success by allowing them some personal control over the learning



## Slide 24

## Satisfaction

- refers to the sense of achievement your participants should feel after taking your training. People gain satisfaction from learning something meaningful. Examples of activities that encourage satisfaction are
- Opportunities to demonstrate their new knowledge and skills in meaningful ways



Excellent    Good    Medium    Poor    Very Bad

## Satisfaction

- Solving a real-life problem
- Earning a badge or certificate
- Receiving constructive feedback and sincere praise for completing challenging tasks
- Not being overly-rewarded for simple tasks



## Training of Trainers

- Train.
- Direct.
- Lead.
- Listen.
- Observe.
- Support.



Train on knowledge and skills  
 Direct them towards goals  
 Lead group activity, lead an example  
 Listen, intently

Slide 27

Thank you!  
धन्यवाद !



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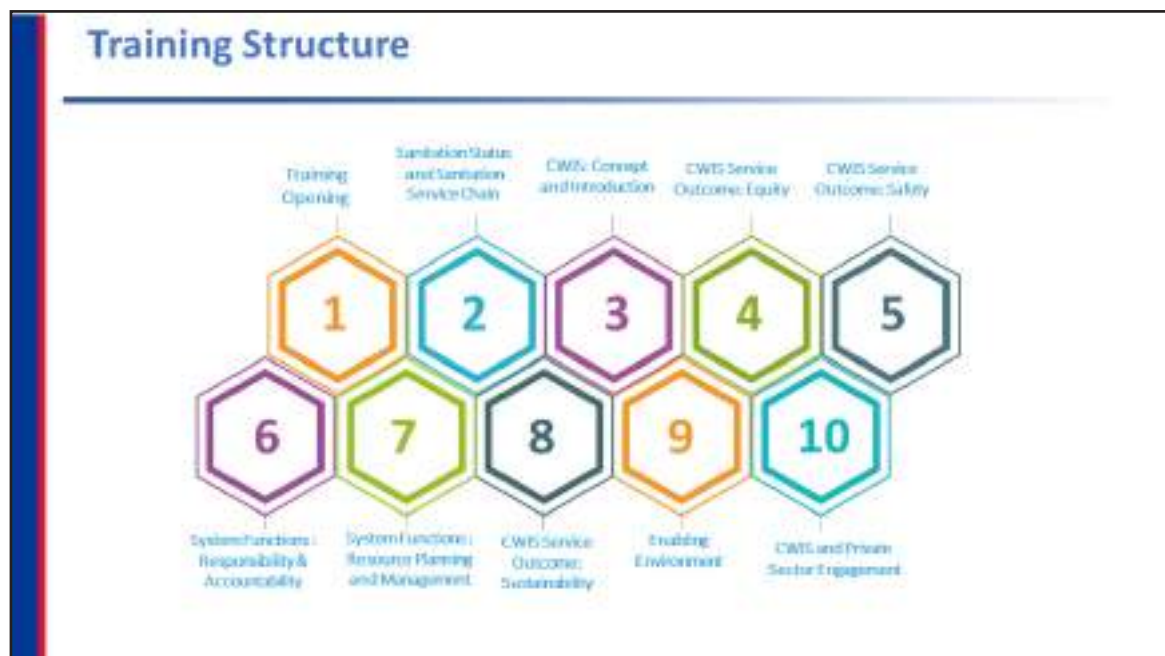
# SESSION 20

## Training Closing

Slide 1



Slide 2



This training includes 20 main technical sessions, and are currently on session 20: Training Closing



This training includes 20 main technical sessions, and are currently on session 20: Training Closing

### Learning Outcomes

1. Complete post-test
2. Evaluate whether learning expectations were met
3. Complete a final evaluation


The slide lists three learning outcomes for the training. To the right of the list is a yellow lightbulb icon with rays emanating from it, symbolizing an idea or learning outcome.



## Slide 5


## Presentation Outline

- Revisiting Expectations
- Post-test
- Training Evaluation
- Voices from participant
- Certificate Distribution
- Group Photo

An illustration of a person with an orange head and a green body standing next to a whiteboard on a tripod stand. The whiteboard has several horizontal lines representing text. The person is pointing towards the whiteboard with their right hand.

## Slide 6


## Revisiting Expectations

An illustration of a stick figure with a white head and black body standing next to a whiteboard on a tripod stand. The whiteboard has a green squiggle drawn on it. The stick figure is pointing towards the whiteboard with its right hand.

Slide 7

### Assessment

- Post-test form
- To evaluate the learning




15 minutes

Inform participants about the pre and post test and provide the form for pre-test. Provide 15 minutes time for the activity.

Slide 8

### Training Evaluation

- Evaluation Form
- 2 voices from participants




20 minutes

Inform participants about the training evaluation form and provide the form. Provide 20 minutes time for the activity.

## Slide 9

## Certificate Distribution

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- One strength of the participant
- Congratulation for the completion of the event
- Best wishes for future endeavor with the knowledge



## Slide 10

## Group Photo

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- Request for group photo
- And close the training

Thank you!  
धन्यवाद !



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