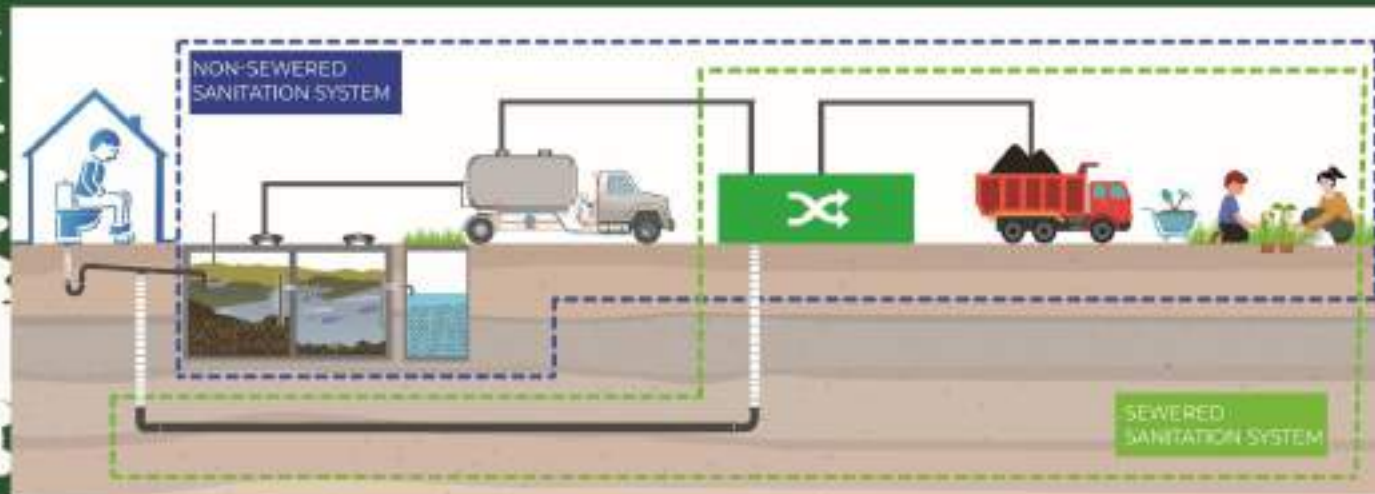


Citywide Inclusive Sanitation Scaling and Sanitation Innovation

Training on 'Introduction to Citywide Inclusive Sanitation Approach'



उपयोग
(User Interface)

अवरोध
(Containment)

निर्वाहण र वहन
(Emptying & Transportation)

प्रयोग
(Treatment)

पुनः प्रयोग वा सुरक्षित निर्यात
(Re-use or Safe Disposal)

Power Point Presentation Handout for Participants
August, 2022

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Introduction

This document, power point presentation Handout for participants, is a supporting document for the participants while conducting the “Introduction to Citywide Inclusive Sanitation Approach” training. This is a compilation of all the slides to be presented in the training along with the space to take notes on particular slide.

Objective

The main objective of the document is to serve the participants as a notebook along with the reference for participants on the slide being presented. To this, it also guide participant on what is being presented and how.

How to Use?

The document consist of slides from all session along with the space to take notes on each slide. A space for taking notes is allocated adjacent to each slide so the participants can note any key points as the trainer or presenter describes the content of the slide.

Disclaimer

Material and Learning Application: This material is prepared by Environment and Public Health Organization (ENPHO) with the support of CWISAN Thematic group for Training Material Development and is to be used for training purposes only. Some of the case scenarios presented in the training are for the practice on the topic only and are completely imaginary to meet the objectives and do not bear responsibility for any resembles with any cases in real.

Session 2: Citywide Inclusive Sanitation- Concept and Introduction

Sanitation



ITN-SLEET

ENPHO

RESEARCH AND TRAINING CENTER FOR COMMUNITY-BASED WATER SUPPLY

Training Structure



ITN-SLEET

ENPHO

RESEARCH AND TRAINING CENTER FOR COMMUNITY-BASED WATER SUPPLY

Learning Outcomes

- Discuss on sanitation movement in Nepal.
- Describe the Citywide Inclusive Sanitation Approach (principles and framework).



Presentation Outline

- Sanitation movement in Nepal
- Legal provisions related to urban sanitation
- Current sanitation practices

- CWIS- concept
- CWIS principles and framework
- CWIS perspective in sanitation service chain

Success



30
September
2019

5,660,214 toilets

8 Year's effort
Invested
Rs. 75,000,000,000
Source: NepalBireni

INBURET

UNEP

UNEP

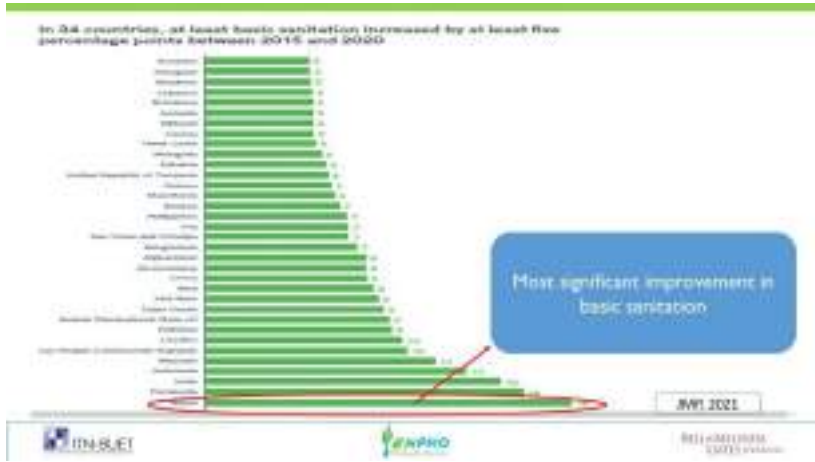
Reason behind the achievement



INBURET

UNEP

UNEP



Safely Managed Sanitation

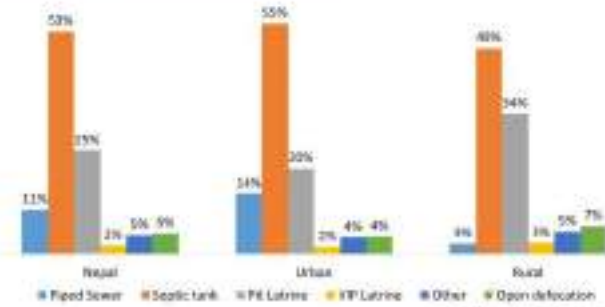
Service Level	Definition
Safely Managed	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or removed and treated off-site
Basic	Use of improved facilities that are not shared with other households
Limited	Use of improved facilities that are shared with other households
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines
Open Defecation	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open places, or with solid waste

INSURE

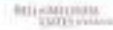
WFP

WORLD FOOD PROGRAMME

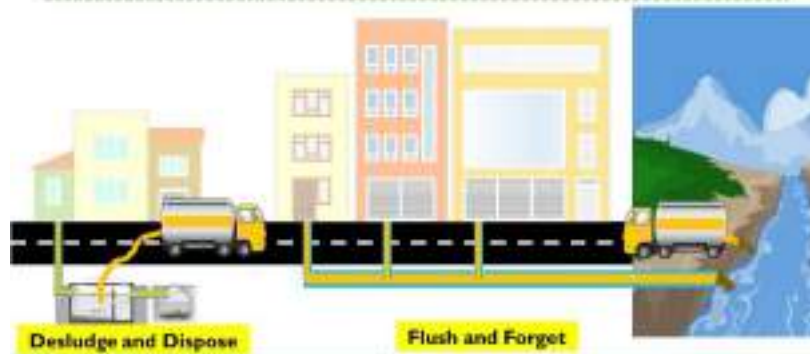
Sanitation Practices: Nepal



Source: Nepal Market Institute, Client Survey (2021)



Sanitation System



Desludge and Dispose

Flush and Forget



Are there any differences



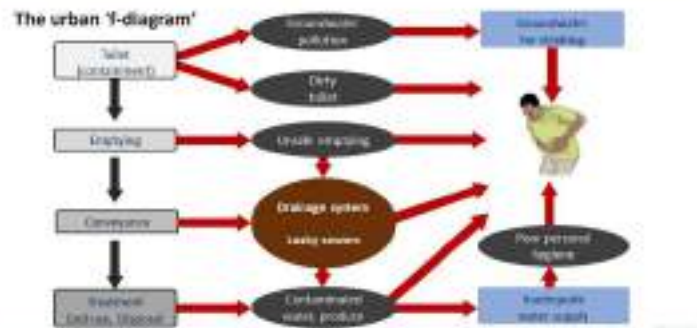
Consequences



Consequences



Health Impacts of Poor Urban Sanitation



Effects on Health and Safety

DALY

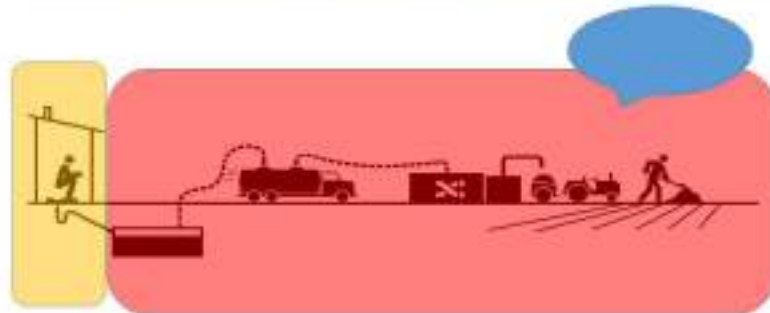
Disability Adjusted Life Year is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.



One DALY = one year of healthy life lost.

- Global Burden of Disease (GBD) studied the top 10 risk responsible for DALY
- DALY increases due to poor WASH (Water, Sanitation and Hygiene) and is in the second list after malnutrition.

Sanitation Service Chain and SDGs



Sanitation Service Chain and SDGs



Sanitation and Urban Sanitation



Sanitation

- Defined as provision of facilities and services for the safe disposal of human urine and feces
- Also refers to the maintenance of hygienic conditions through services such as garbage collection and wastewater disposal (WHO)

Urban Sanitation

- Sanitation related to the urban context
- Can be categorized as solid waste management, fecal sludge management, or wastewater management

Why focusing on FSM?



Technological updates





Facilities under Urban Sanitation

- Public Toilet
- Sewerage system for wastewater management
- Wastewater Treatment Plant
- FSTP
- Dustbin or waste collection bin
- Drainage for rain-water collection
- Waste collection Station

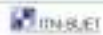


Let's think for a moment..

Why do you think municipalities has constructed these infrastructure ?

Protect Public Health

As a social service provider, it is our major responsibility.



Why is this happening ????



Let's think and answer...

- Is there any person/organization appointed for the operation and management of these facilities?
- Is there any guidelines or performance indicator for the operation of these facilities ?
- Is there proper resources management for the facilities ?
- Are these facilities useful/accessible for all ?
- Are the facilities safe to use ?
- Are the facilities or services sustainable ?



Citywide Inclusive Sanitation

An approach to provide safe and sustainable urban sanitation services to all residence



Responsible and accountable service authorities with proper resource planning and management

Citywide Inclusive Sanitation (CWIS)

An approach to urban sanitation, where all members of the city have equitable access to adequate and affordable improved sanitation services through appropriate systems of all scales (sewered & non-sewered), without any contamination to the environment along the entire sanitation value chain.



(© Nanjan and Lüthi 2020)

Guiding Principles of CWIS Approach

- Sanitation is a human right.
- 'Business as usual' will not sustain (centralized systems cannot provide sanitation for all)
- Poor sanitation brings down the economic growth of cities
- Collaboration for shared responsibilities and work



Why CWIS ??



Changes in aspect of Sanitation

- Addressed all Sanitation system
- Include sewer and non-sewer technology
- Proper coordination in planning and management including the sectors of Solid waste, sewerage, drinking water, land management
- Result based analysis
- Include all community people



Principles of CWIS



Principles of CWIS



In pairs
5 minutes

CWIS Framework



Equity



Safety



Sustainability



Responsibility



Accountability



Resource Planning



Sanitation Service Chain



User Interface > Containment > Emptying & Transportation > Treatment > Reuse or Safe Disposal

CWIS is equally applicable for.....



Applying CWIS lens in Public Toilet

(<https://www.youtube.com/watch?v=iQjz0tEIfxY>)



Applying CWIS lens, Identify the intervention to address






6 Groups
5 minutes



Applying CWIS lens, Identify the intervention to address

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

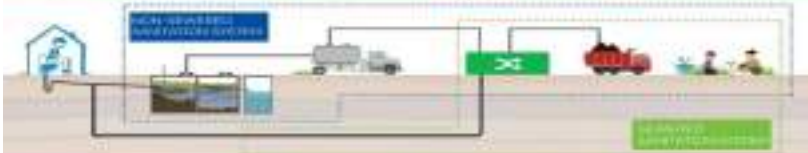
  

Key Messages

- Safely managed sanitation is next target in sanitation sector
- CWIS is an approach to meet the safely managed sanitation for all
- CWIS is a public service approach to planning and implementing urban sanitation systems
- CWIS approach can be used through the sanitation value chain to ensure service provision with safe, equitable and sustainable
- Easy and simple actions can be taken to ensure safety, equity and sustainability
- This approach can be applied in all sanitation services

Session 3: CWIS Service Outcome- Equity

Citywide Inclusive Sanitation Scaling and Sanitation Innovation



CWIS Service Outcome- Equity

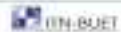
Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person



Instruction for Intro

1. Inform participants that they are going for a small role play.
 2. For this, participants will get a scenario and a chit of paper with a role in it.
 3. Inform further that as per the role assigned to them (through a chit), they are to move around the hall and stand as per the corner/ station that has been set up.
 4. Ask participants if they are clear on the activity.
 5. Provide a cut pieces- chit with different roles to each of the participants and ask to imagine themselves.
 6. Present the case scenario.
 7. After the case scenario, ask participants what kind of participation will be there in the meeting.
 8. Ask participants to move around the hall and stand in the station where they think their participation level will be.
- Once all the participants have placed themselves to a station, present the slide with question and discuss with participants.



Municipality - Mayor
 Municipality - Deputy Mayor
 Municipality - Chief Administrative Officer (M)
 Municipality - Planning Section Chief (M)
 Municipality - Social Section Chief (M)
 Municipality - Health Section Chief (F)
 Municipality - GESI contact person (F)
 Ward Chairperson (M)
 Ward Member female
 Chairperson Toilet Improvement Committee (M)
 Chairperson Mothers Group
 Waste collection vehicle/rickshaw driver (M)
 Sewerage Service provider

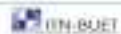
Sanitation Service provider (Regular waste collector) (M)
 Sanitation Service provider (Regular waste collector) (F)
 FSM service provider in house (M)
 Ward Member from Dalit
 Proprietor from private Waste Management
 Squatter representatives from Municipality (M)
 Squatter representatives from Municipality (F)
 Social worker from main cities (M)
 Social worker from main cities (F)
 Representative from School (F)
 Manager from Vegetable market (M)
 Representative from industries and company in cities (M)
 Hardware Business (M)
 Media person (F)



Before Starting...

Role Play

The municipality has received a fund of Rs 3 crore and that fund is for construction and operation of FSTP. Detail planning and implementation and operation have to be done by the municipality. So, Municipality decided to organize a planning meeting with different stakeholders.



Before Starting...

Stations

- Active Participation
- Passive participation
- Could not attend due to busy schedule
- No information

Summary

- In which station the number is maximum ? Why ?
- In which station the number is minimum ? Why ?
- Don't you think this work is relevant to all the stakeholders ?
- How would the situation be like ?

Citywide inclusive Sanitation involve all the stakeholders and assure for their meaning participation.

Training Structure



Learning Outcomes

- Describe Equity and Stakeholder Engagement.
- Describe how equity can be ensured in sanitation service provision.

Presentation Outline

- Equity, Equality and Justice
- Equity in CWIS framework
- Access to sanitation services

???



Equality
All have equal access to all services

Equity
Provide services as per the need

Justice
Services access to all without any legal issues

CWIS Framework



Equity in CWIS Framework

Equity

- Service reflect fairness in distribution and
- Prioritization of service quality, prices, and deployment of public finance/subsidies

• Constitution of Nepal- Sanitation is basic human right

• SDG- Sanitation for all; accessible to all

IIN-BUET ENPHO Ministry of Water, Sanitation and Urban Development

Equity in CWIS Framework

- ✓ Do all have equal access to sanitation service ?
- ✓ Do those infrastructure and services friendly to all ?
- ✓ Are those services and facilities affordable to all ?
- ✓ Does the municipality have managed any subsidies for low-income, remote, and marginalized group ?
- ✓ How about the female participation in decision making ? How about the participation of LGBTQ, physically disabled, Dalits, and poor people in decision making ?
- ✓ How about people perspective towards sanitation workers ?

Access to Sanitation Service | Equity



Proportionate of urban and low income communities in access to toilet and safely management

Access to Sanitation Service | User Friendly



BUET

GENPRO

BUET

Access to Sanitation Service | User Friendly

PahiloPost
ACCOUNT OPEN

जेन्डर न्यूट्रल ट्वाइलेट माग्दै लैंगिक अल्पसंख्यक,
'छिर्नुपर्छ 'पुरुष' लेखिएतर्फ तर महिनावारीमा झनै
सकस

BUET

GENPRO

BUET

Sanitation Service are Affordable to all



Subsidies on Sanitation Service



Sanitation Services in peri-urban area



Sanitation Services in urban area

Stakeholders' Engagement

In the Sanitation Service Chain, the person sitting in the pan (toilet) is the major part, but s/he is not considered.



Perspective towards Sanitation Worker



Results

Routine of Nepal banda 13h · 🌐

Sad News: Chitwan ko Rampur ma safety tank safa garne bela 2 jana ko death vayeko cha. Suru ma ek jana faseko awatha ma bachauna jada arko ko pani death vayeko khuleko cha. 😞

👍👤 21K 899 Comments 32 Shares

👍 Like 💬 Comment ➦ Share

Problems and Issues

- Lack of rules and regulation or weak planning
- Gender Equality and Social discriminator
- Geographical discrimination
- Professional discrimination



What is the Solution? How to get the Solution ?

- Rules and regulation with proper planning
- Stakeholder Engagement
- Gender and Social Inclusion
- Social mobilization
- Subsidy to needed



Access along user friendly



Social Inclusion



Aiming Gender equality and social inclusion in our services, we should conduct situation analysis, and must have positive attitude and willingness to do.

Social Mobilization



Some Good initiations

Local Government	Some Examples related to Planning
Narayan Municipality, Dailech	Establish Breast feeding room
Suklaphata Municipality, Ward no. 8, Kanchanpur	Declaration of equal wages to male and female for same work
Panauti Municipality, Kavre	Declaration of equal wages to male and female for same work, Declaration to provide allowance for unmarried female

Subsidy in Equitable Sanitation Service



Equitable Sanitation Service



Stakeholder Engagement

Female participation in decision making

Equitable Service



Wages to male and female for same work

Equitable Sanitation Service



Perspectives towards Sanitation Workers



Group Work



Groups
5 minutes

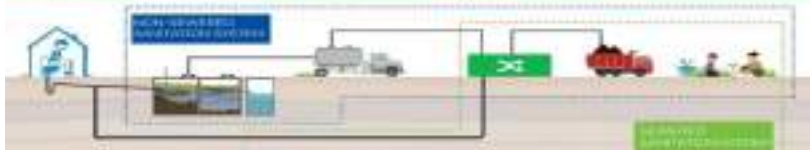


Key Message

- Sanitation for All- Equal access as defined by the constitution of Nepal as basic human right
- Active participation of all stakeholders in decision making and throughout
- Equitable services to all (including gender, caste, geography, disable) in sanitation
- Equitable sanitation services with support to meet Sustainable Development Goals and National Goals on Sanitation

Session 4: CWIS Outcome- Safety

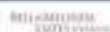
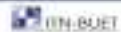
Citywide Inclusive Sanitation Scaling and Sanitation Innovation



CWIS Service Outcome- Safety

Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person



Training Structure



Learning Outcomes

- Discuss the CWIS service outcome 'safety' along with issues related to safety
- Explain Measures to attain safety



Presentation Outline

- Concept and Measurement Indicators of CWIS component- safety
- Public Health and Safety
- Environmental Safety
- Financial Safety
- Occupational Health and Safety (OHS) for Sanitation Workers

CWIS Framework



Safety

- Services safeguard customers, workers, and communities from unsafety and health risks by reaching everyone with safe sanitation
 - Residents and city users have access to **adequate toilet facilities**
 - Toilet facilities and waste services are managed to **protect public health and environmental outcomes**
 - Waste disposal and treatment facilities are **sufficient and operational**

Safety Indicators

- SF-1: % **safely managed sanitation** (citywide Individual Household Latrines/ IHHLs)
- SF-2: % **safely managed sanitation** for LIC IHHLs
- SF-3: % **safely managed** liquid waste for shared facilities (shared HH toilets + Community Toilets/ CTs)
- SF-4: % of public spaces that have **adequate sanitation facilities** (Public Toilet/ PT)
- SF-5: % of **educational institutions** where Fecal Sludge/ Wastewater (FS/WW) generated is safely transported to TP or safely disposed in situ
- SF-6: % of **healthcare facilities** where FS/WW generated is safely transported to TP or safely disposed in situ

Safety Indicators

- SF-7: % of **desludging services** completed mechanically or semi-mechanically (gulper)
- SF-8: % of **desludging vehicles** which comply with maintenance standards
- SF-11: [Indicator Area] **Sanitation worker safety**
- SF-9: % of **water contamination compliance** (on fecal coliform)
- SF-10: Incidence (per 1000) of **fecal-oral pathway diseases**
- SF-12: Presence of **certification mechanism** for which treated WW/FS has to qualify

Safety Questions



Safety in terms of...

- Public Health
- Environment
- Financial Investment
- Occupational Health and Safety (OHS) for Sanitation Workers

Shit Flow Diagram (SFD) of Nepal



User's safety/ Public health safety



Public health issue hindering safety



Measures for Public health and safety

- Ensure public health and safety through risk-based management and proper planning of **sanitation systems**
- Reduce adverse **health impact** from the use of wastewater and greywater, while...
- Maximizing the **benefits** of their use in productive agriculture and aquaculture



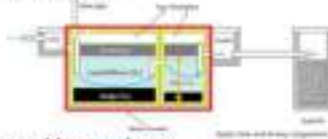
Environmental issues hindering safety

- Leakage from septic tank
- Contamination during transportation (including transportation after desludging and sewerline)
- Desludging and open disposal
- Open Defecation



Measures for Environmental Safety

- Minimize potential contamination of water resources
- Prevent the leakage of raw sewage
- Maintenance of sewer line to prevent the blockage
- Construction of proper septic tank
- Proper and safe transportation
- Safe disposal into treatment plants
- Monitoring and certification of effluent and by-products



Financial issues hindering safety

- Financial burden because of poor Public health;
- Institutional arrangements hindering access to finance
- Less attraction of private sector to invest in Sanitation service -return not insured;
- Low priority and less budget allocation for sanitation in most of the municipalities
- Example: FSTP is low priority and less investment (Investment in sanitation service facility) so there is not allocated operational investment as well;



Measures for financial safety

- Establish institutional capacity
 - Clarification of legal and regulatory systems and institutional roles
 - Capacity-building for regulation
 - Allocation of budgets for regulation and enforcement
- Develop regulation
 - Incremental approach over five or more years
 - Be realistic about enforcement capacity and incentives
- Address critical regulatory needs
 - Containment
 - Mandatory safe disposal
 - Licensing/contract

- ✓ Improves safe sanitation
- ✓ Helps generate business



Health and Safety Issues

Physical hazards

- Collapse of the septic tank/pit wall
- Slips, trips, and falls
- Exposure to sharp objects contained in sludge (glass, metal, blade, etc.)

Chemical hazards

- Suffocation from harmful gases from septic tank (methane, ammonia, sulfur dioxide, carbon dioxide, etc.)
- Fire



Measures for OHS

- Mandatory to wear Personal Protective Equipment (PPE) to avoid any
- To avoid hazard while carrying out desludging services
- to avoid direct exposure to Faecal Sludge.
- Avoid unsafe working practices like entering into containment
- Avoid smoking while carrying out desludging services



Measures for OHS

Immunization for Health and Safety

- Desludging workers should be immunized for: (Tetanus, Hepatitis A & B and Diphtheria)
- First-Aid equipment
- Emergency eye wash facilities
- Emergency contact numbers
- Deworming Tablets (once in three months)

Provide medical/health/life insurance to the sanitation workers

Training Program

- Training program for desludging operators including emptier on health and safety measures
- Training program on use of PPE
- Training program on use of First-Aid

Operational Monitoring plan

Operational monitoring

- What is monitored?
- How is it monitored?
- Where is it monitored?
- Who monitors it?
- When is it monitored?

Corrective actions for non-compliances

- What action is to be taken?
- Who takes action?
- When is it taken?
- Who needs to be informed of the action?

Operational activity or compliance criteria	How is it monitored?	Frequency of monitoring	Who monitors it?	When is it monitored?	Who needs to be informed of the action?
Compliance with standards for health and safety practices when performing hazardous activities, complete identification of formal employees present in the facility	Visual inspection	Frequency of visit to project site for activities involving heavy lifting, pushing, pulling, twisting, carrying, hoisting, etc. depending on the nature of the work being performed	Health and safety officer	When it is monitored	Health and safety officer
Compliance with standards for health and safety practices when performing hazardous activities, complete identification of formal employees present in the facility	Visual inspection	Frequency of visit to project site for activities involving heavy lifting, pushing, pulling, twisting, carrying, hoisting, etc. depending on the nature of the work being performed	Health and safety officer	When it is monitored	Health and safety officer
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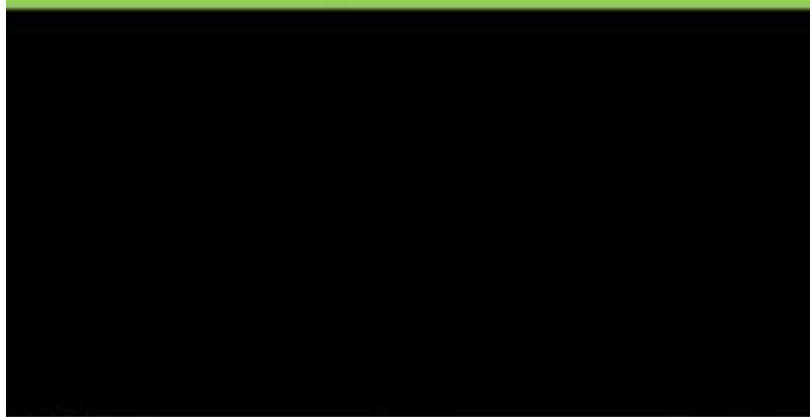
Measures for OHS



UN-BUET

UNPHO

UNEP/WHO



UN-BUET

UNPHO

UNEP/WHO



4 Groups
5 minutes



Group Activity

- Group Work
- Public Health and Safety
- Environmental Safety
- Financial safety
- OHS
- Into 4 groups
- Provide a case scenario on FSM
- One topic to each group and carry out discussion inline with topic
- What actions can be done to ensure Safety in-terms of CWIS ?

Key Messages

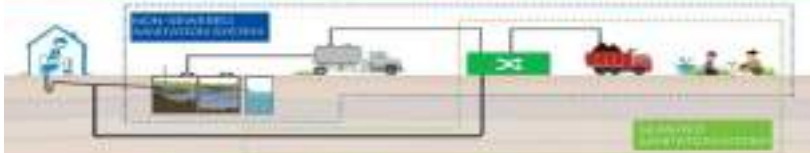
- Safety: Services safeguard customers, workers and communities from safety and health risks by reaching everyone with safe sanitation
- Services ensure access to toilet and safely managed sanitation
- The ultimate goal of safety is the public health outcome or public health safety through environmental safety, financial safety of investment in sanitation and occupational health and safety of all the sanitation related workers.

References

- <https://youtu.be/Apw-dYWJmjs>
- <https://www.youtube.com/watch?v=8Dx9PWJSEyo>
- <https://www.youtube.com/watch?v=1bqhUAQ--1Y>
- <https://www.youtube.com/watch?v=mQFBv2uEcfo>
- <https://www.youtube.com/watch?v=nH0MeZguXeY>

Session 5: CWIS Service Outcome- Sustainability

Citywide Inclusive Sanitation Scaling and Sanitation Innovation

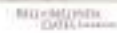


CWIS Service Outcome: Sustainability

Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person





Training Structure



Learning Outcome

- Explain the reasons behind failure of sanitation service providing provision.
- Discuss strategies to make sanitation services more sustainable.

Presentation Outline

- Present scenario of sanitation services/facilities
- Reasons behind the unsustainable sanitation services/facilities
- Interventions for sustainable sanitation service
- Key messages

Do you want to use this public toilet?



Some more examples of sanitation services



UN-BUET

WFP

WFP

Some more examples of sanitation services



Teku, 1998



UN-BUET

WFP

WFP

What are the reasons behind the failure of sanitation service ?

- Equitable Sanitation Service
- Safe Sanitation Service
- Responsible Stakeholders
- Accountable Stakeholders
- Proper Resource Planning and Management



Sustainability

- Services are **reliably and continually delivered** based on
- **effective management of**
- **human, financial and natural resources**



What interventions can be done to make sustainable?

- Equitable Sanitation Service
- Safe Sanitation Service
- Responsible Stakeholders
- Accountable Stakeholders
- Proper Resource Planning and Management



Equitable Sanitation Service for Sustainability (How?)

- Stakeholder Engagement
- Equal Wages
- Ensure Accessible Equitable Services
- Special Support Provision for LIC
- Workplan and guidelines for use and operation
- Develop Positive Attitude



Safe Sanitation Service for Sustainability (How?)

- Easy and Comfortable PFEs
- Safe Environment
- Safe End Products from FS
- Public Health-Centered
- Regular operation and maintenance
- Appropriate sanitation service model



Responsible Stakeholders for Sustainability (How?)

- National and Province Level Policy and Guideline
- Municipal Policy and By-laws Formulation
- Job Description of Individuals with Clear Mandate for Action
- Community Level Awareness
- Capacity Development in Sanitation Sector



Accountable Stakeholders for Sustainability (How?)

- Clarity in Benchmarks
- Transparency in Each Activity
- Documentation with Evidences
- Monitoring and Evaluation Mechanism
- Promotion and Punishment Provision
- Social Auditing



Proper Resource Planning and Management for Sustainability (How?)

- Assessment of Available Resources
- Fund Collection for Infrastructure Construction and O & M
- Capacity Building for Stakeholders
- Business Plan
- Coordination with Stakeholders

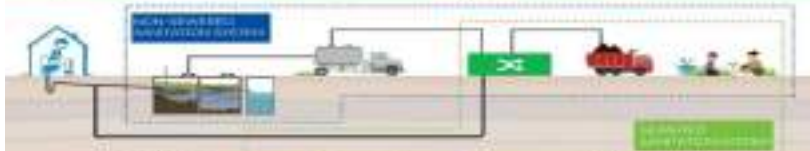


Key Messages

- Initiation of sanitation service/facility is important, but its sustainability is more crucial.
- There are plenty of reasons behind the failure or discontinuity of sanitation service such as lack of ownership, not user friendly, hard to accept the treatment technology or FS products, too low- or high-class equipment, etc. and these points should be considered for sustainability
- For sustainable sanitation services, key interventions under other components of CWIS Framework are essential.

Session 6: CWIS System Functions- Responsibility and Accountability

Citywide Inclusive Sanitation Scaling and Sanitation Innovation



CWIS System Function – Responsibility and Accountability

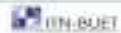
Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person



Before Starting...

- Have you ever faced the clogging of your toilet at your home, and did you know the reason behind that?
- When your toilet (in your house) is clogged, what do you do? Why?
- When a man-hole or a drain is clogged, what do you do? Why?



Training Structure



Learning Outcomes

- Describe on the CWIS system function 'Responsibility' and 'Accountability' along the sanitation service chain
- Identify Key Stakeholders for the Responsibility and Accountability in participants' context
- Explain the roles and responsibilities for delivery of sanitation services

Presentation Outline

- Understanding Responsibility and Accountability– Concept
- Responsibility and service delivery to the poor
- Responsibility and Accountability of different entities in the Sanitation Service Chain
- Role of private sector
- How does responsibility relate to accountability and resource planning

What do we want to see in our Cities?

Service OUTCOMES	EQUITABLE	SAFE	SUSTAINABLE
	Everyone benefits from services, prices and public investment equitably, with a focus on ensure social and gender inclusion	Human waste is safely managed from containment to reuse/disposal	Financial, human, environmental resources can sustain services across areas and time

How do we get there?



CWIS System Function – Responsibility

Authority(ies) executes a clear public mandate to ensure safe, equitable, and sustainable sanitation for all.

- Clear and non-overlapping mandate covering the entire service chain
- Mandates cover all urban areas without exclusions related to land tenure or artificial administrative boundaries
- Mandate is explicitly pro-poor, gender intentional, and inclusive of other vulnerable groups or status
- Develop legal provisions, regulatory framework and institutional arrangements with clear mandates.

Responsibility and Serving the Poorest

- The service jurisdiction of mandates should be complete and inclusive
- Clear responsibilities for serving the poorest begin at the Constitutional level
- The definition of city boundaries is key to inclusive mandates
- Responsibilities should include all residents within the authority's jurisdiction
- Number of authorities are proactively engaging to address the specific challenges of sanitation service provision to informal settlements

CWIS System Function – Responsibility

Authority(ies) executes a clear public mandate to ensure safe, equitable, and sustainable sanitation for all.

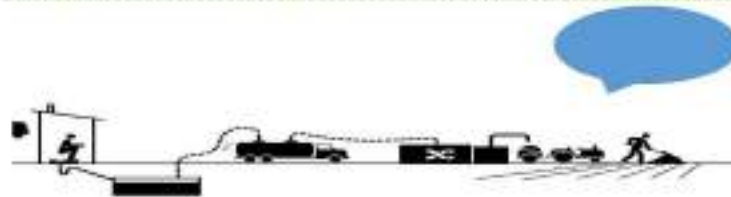
- Mandated authorities are **delivering inclusive services**
- Authorities deploy **sufficient staff and budget** to execute their mandate
- Sanitation budget is a **separate line item** independent of water, solid waste management, health, or environment
- Sanitation revenue is **ringfenced**

Clear Responsibilities are Necessary

- Who is to be held accountable?
- Fragmented and unclear mandates, **no single entity clearly responsible**
- Limits of responsibility is equally important



Responsibility Throughout Sanitation Service Chain



Who is responsible entity along the Sanitation Service Chain?
And why?



Responsibility Throughout Sanitation Service Chain



Different Levels of Government



Service Delivery Action Framework



Institutional and Governance Framework for SSC



Trichy - Current (2020)
No major change since
OWS investment

INSTITUTIONAL MODEL

SS **HH** **TWARD Board & TCC**

Households are responsible for the construction of their own toilets and containment systems. The Trichy Faecal Sludge Supply and Drainage (TWARD) Board is a statutory body corporate established with the development of water supply and sewerage facilities in the State of Tamil Nadu, except for Chennai Metropolitan Development Areas. TWARD Board has the mandate to prepare Detailed Project Reports, build, operate, maintain and transfer water supply and sewerage projects to the local governments. The Trichy Faecal Sludge Corporation (TFC) is the local government mandated to operate and maintain the system. At present, TCC is outsourcing the operations and maintenance to a Project Management Consultancy (PMC).

NSS **HH** **TCC** **TWARD Board & TCC**

Households are responsible for the construction of their own toilets and containment systems. Faecal sludge is collected at the TTP, which is built by the TWARD Board and operated by private contractors under the supervision of TCC.

Role of Local Government in FSM

Stakeholders	Policy and Guidelines	Coordination	Collection & Transport	Treatment	Disposal and use	Regulation	Capacity Building	Monitoring
MoWSS and MoHED	*	*				*	*	*
MoPE	*	*				*	*	*
Municipality/ VDC/Urbiya	*	*	*	*	*	*	*	*
WSSCs		*	*	*	*		*	*
Private Sector/ Entrepreneurs			*	*	*			
Research/ Academic	*						*	*
DPs/NGOs	*	*					*	

Source: Institutional and Regulatory Framework for Solid Waste Management in Urban Areas of Nepal

Trainer note: Overall Responsibility for FSM



The local bodies shall be the key agency responsible for FSM services

Planning, Implementation, Monitoring and Development and application of business model for service delivery



Local Bodies may seek support from different agency



Local Bodies may/ shall establish public health and environment section (as per Need) which shall oversee the activities related to planning, implementation and monitoring of FSM

Role and Responsibility of Private Sector in FSM

Stakeholders	Policy and Guidelines	Coordination	Collection & Transport	Treatment	Disposal and use	Regulation	Capacity Building	Marketing
MoHS and MoRSD	*	*				*	*	*
MoPE	*	*				*	*	*
Ministry/ VDC/Utility	*	*	*	*	*	*	*	*
WSSCs		*	*	*	*		*	*
Private Sector/ Entrepreneurs			*	*	*			
Research/ Academic	*						*	*
DFP/INGOs	*	*					*	

Source: Institutional and Regulatory Framework for Local Solid Waste Management in Urban Areas of Nepal

Private Sector Role

Institution	User Interface	Development	Collection	Transport	Treatment	Reuse
Private	Building toilets	Building septic tanks	Deskulding	Transport of FS	Construction	Recovery rawwery
					Operation	Sale of by Products

PPPs: Why Involve the Private Sector?

Market discipline ✓

Individual services

- Lower prices
- Flexible response to client demand
- Expansion and movement to new areas

Shared services

- Competitive tendering
- Performance targets

Resource mobilisation ✓

- Already present – formally or informally
- Experienced staff
- Equipment, tools and materials
- Access to loans and own capital

But markets might not deliver ✗

- Reliable quality
- Affordable products for the poorest



Institutional Arrangements in Maputo, Mozambique





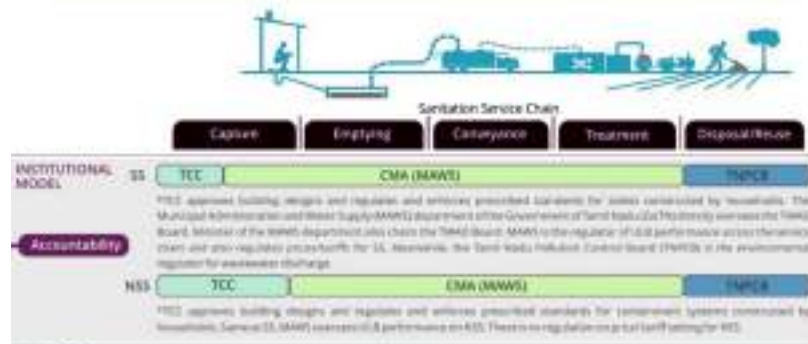
CWIS Framework

Service Outcomes	EQUITY Fairness in distribution and prioritization of service quality, service prices, and public finance/subsidies	SAFETY Human waste is safely managed to protect public goods	SUSTAINABILITY Resources and revenues sustain performance
System Functions	RESPONSIBILITY Authority or authorities have clear mandate for ensuring inclusive, safe sanitation services	ACCOUNTABILITY Performance is transparently monitored and managed with +/- incentives	RESOURCE PLANNING & MANAGEMENT Resources are managed to support implementation of mandate and achieve goals across time / space

Accountability vs. Responsibility



Institutional and Governance Framework for SSC



Group Work



4 Groups
5 minutes



Group Exercise : Institutional and Governance Framework for SSC



Mandate

Accountability

Responsibility related to Accountability and RPM

- **How?**
- **How is responsibility related to accountability and resource planning and Management?**



Responsibility related to Accountability and RPM

- Sanitation mandates often lack associated accountability or financing mechanisms to incentivize implementation
- Clear responsibilities are a pre-requisite if accountability mechanisms are to be effective; and
- Responsibilities cannot be fully executed unless the resourcing mechanisms are in place



Responsibility related to Accountability and RPM

- Depending on the level of fiscal autonomy, local governments may be able to supplement transfers through own-revenue generation
- The resourcing gap has implications for accountability



Key Messages

- Mandates must provide clarity on who is responsible for ensuring different elements of the sanitation service chain.
- Formal legal mandates and actual practice must be aligned.
- Responsibilities for sewered and non-sewered sanitation should be integrated where feasible.
- The service jurisdiction of mandates must include informal settlements.
- Authorities' performance against their mandate is monitored and managed with data, transparency and incentives.

“When performance is measured,
performance improves.

When performance is measured and
reported, the rate of improvement
accelerates.”

– Thomas S. Monson



Session 7: CWIS System Function- Resource Planning and Management

Citywide Inclusive Sanitation Scaling and Sanitation Innovation



CWIS System Function – Resource Planning and Management

Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person:



What do we want to see in our Cities?

Service
OUTCOMES

EQUITABLE

SAFE

SUSTAINABLE

'Everyone benefits from services, prices and public investment equitably, with a focus on ensure social and gender inclusion

Human waste is safely managed from containment to reuse/disposal

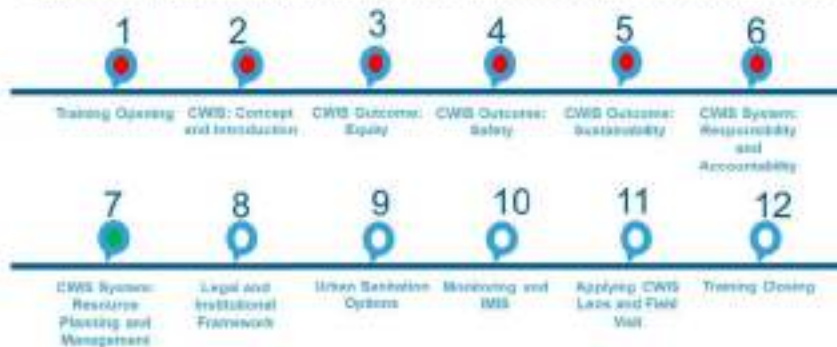
Financial, human, environmental resources can sustain services across areas and time



How do we get there?



Training Structure



Learning Outcomes

- Explain resource planning and management along with CWIS financial framework
- Analyze the financial flows of municipality and identify the gaps

Presentation Outline

- Resource Planning and Management
- Financing framework development
- Components of CWIS financing framework
- Financing flows of municipality
- Financial flow throughout SSC and gap identification
- Common Gaps and Issues with Financing Frameworks

Resources Planning and Management

- **Resources** – human, natural, financial, equipment, assets, facilities, and more.
- **Resource Planning** - A process of **identifying, forecasting, and allocating** resources at the **right time and cost**.
- **Resource Management** - A process of **pre-planning, scheduling, and allocating** resources **efficiently and effectively** to get the best value out of them.

Resources Planning and Management

- Covers the identifying, allocation, distribution, spending and monitoring of resources (financial, assets and people) across time and place.
- Ensure effective allocation and use, and this requires a clear understanding of resourcing needs
- Require engagement of multiple actors
- Investment planning and prioritization processes should be clearly documented, transparent and engage relevant stakeholders

RPM Questions

- Are there any clear financing framework to guide allocation of resources?
- Are the decision-making process for sanitation budget allocation transparent, inclusive and informed?
- Is the cost- impact (benefit) analysis done for sanitation investment?
- Are sanitation revenue generation and operating cost managed?



Financing Framework Development

Assessment & Diagnostic

- Sector Policies –
- Priorities and Targets
- Costs and Financial Needs
- Identifying sources
- Stakeholder Engagement
- Risk Assessment



Strategy & Monitoring

- Financial Principles and Investment Plans
- Financial flows and mechanisms
- Resource Mobilization
- Monitoring for Results



Outcomes

- Appropriate use of Finance
- Attainment of Investment Outcomes
- Scalability of Financing Models
- Sustainability of Finance

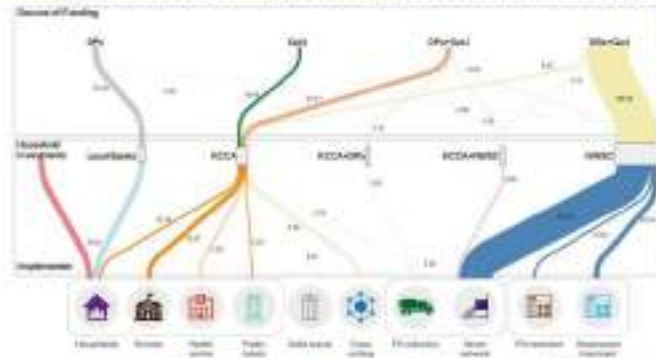
Components of CWIS financing framework

- Precondition to developing a financing framework with clear sector priorities targets and responsibilities, set out in sector strategies and policies
- Requires components that support the assessment and diagnosis of financial needs and revenue sources, and strategic elements that guide the allocation and flow of finance

Financial Flows: Sanitation Service Chain



Financial Flows for Kampala City



Group Work



3 Groups
10 minutes



Group Exercise: Financial Flows

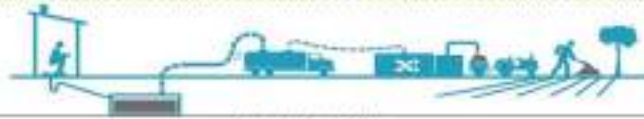
Funding Source

Implementer

Project



Institutional and Governance Framework for SSC



Tripoli - Current (2020)
No major change since
CWS investment

INSTITUTIONAL MODEL

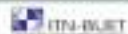


Mandate



*Households are responsible for the construction of their own toilets and containment systems. The Tarabulus Water Supply and Drainage (TWAD Board) is a statutory body corporate established with the development of water supply and sewerage facilities in the State of Tarabulus, except for Central Metropolitan Development Areas. TWAD Board has the mandate to prepare Detailed Project Reports, build, operate, maintain and transfer water supply and sewerage projects to the local governments. The Tripoli Metropolitan City Corporation (TCC) is the local government mandated to operate and maintain the system. At present, TCC is outsourcing the operations and maintenance to a Project Management Consultancy (PMC).

*Households are responsible for the construction of their own toilets and containment systems. Feed sludge is co-treated at the STP which is built by the TWAD Board and operated by private contractors under the supervision of TCC.



Institutional and Governance Framework for SSC



Sanitation Service Chain



INSTITUTIONAL MODEL	SS	TCC	CMA (MAWS)	TWAD Board
Accountability	SS	TCC	CMA (MAWS)	TWAD Board
	NSS	TCC	CMA (MAWS)	TWAD Board

*TCC approves building designs and regulates and enforces prescribed standards for toilets contracted by households. The Municipal Administration and Water Supply (MAWS) department of the Government of Tamil Nadu (GoTN) directly oversees the TWAD Board. Minister of the MAWS Department also chairs the TWAD Board. MAWS is the regulator of L&B performance across the service chain and also regulates prices/rates for SS. Meanwhile, the Tamil Nadu Pollution Control Board (TNPCB) is the environmental regulator for wastewater discharge.

*TCC approves building designs and regulates and enforces prescribed standards for containment systems contracted by households. Same as SS, MAWS oversees L&B performance on NSS. There is no regulation on price/ tariffing for NSS.



Institutional and Governance Framework for SSC



Sanitation Service Chain



SERVICE MODEL	SS	HH	TCC + TWAD Board
Service Provision & Financing	SS	HH	TCC + TWAD Board
	NSS	HH	Open Market + Direct Provision

*For the sewer connections, households are the asset owners and finance the in-house part of the connections. CAPEX for SS connection is routed through state financing institutions from various international funding institutions (IFIs) like JICA, ADB and national schemes like AMRUT through MAWS and CMA whereas the OPEX is managed by CMA, TCC and TWAD.

*On demand desludging is mostly provided by private operators. TCC also owns two desludging vehicles. Fecal sludge and septage is uncollected at desludging stations where it is pumped into the sewer network that ends at the treatment plant. The desludging stations were upgraded from sewage pumping stations under the CWSS program to allow water disposal of fecal sludge by reducing the distance that the vacuum truck drivers have to travel.



Group Work



3 Groups
10 minutes



Group work



Sanitation Service Chain

Capture	Emptying	Conveyance	Treatment	Disposal/Reuse
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• Service Provision and Financing

What are the Gaps ?

Four Steps of Gap Analysis



Group Work



3 Groups
5 minutes



Common Gaps and Issues



- Weak alignment between urban sanitation strategies, targets and financing
- Existing balance of finance is not always clear
- Poor understanding of future investment needs
- Government tax allocations do not reflect public service nature of improved sanitation outcomes
- Tariffs remain an important part of financing mix, but evidence suggests full cost recovery is infeasible

Common Gaps and Issues



- Split responsibilities can hamper cross-subsidies for non-sewered sanitation
- Private sector engagement and commercial finance present an opportunity, provided barriers can be overcome
- The misalignment of responsibilities, decision-making and incentives
- KPIs for urban sanitation are weak and insufficient to guide finance priorities
- Poor and informal communities remain marginalized in finance priorities

Key Messages



- Financing frameworks are key.
- Better understanding of the cost of CWIS is crucial
- Investments in software along with hard infrastructure
- Affordability remains a constraint to a balanced funding mix and viable service delivery
- Evidence based monitoring to improve performance, drive investment and address inequality

Key Messages



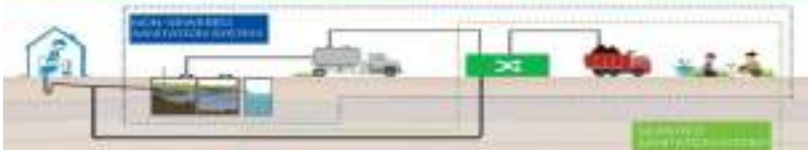
- Financing and investment decisions, asset ownership and operations often sit with different stakeholders.
- Achieving the right mix of finance is critical for long term services, as well as equity and viability of results.
- The tracking of investment results is imperative, but currently overlooked by both lenders and borrowers.

**“Give me six hours to chop down
a tree and I will spend the first
four hours sharpening the axe.”**

Abraham Lincoln, 16th President of USA

Session 8: Enabling Environment- Legal and Institutional Framework

Citywide Inclusive Sanitation Scaling and Sanitation Innovation



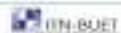
Enabling Environment: Legal Framework & Institutional Arrangements

Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person



Before Starting...

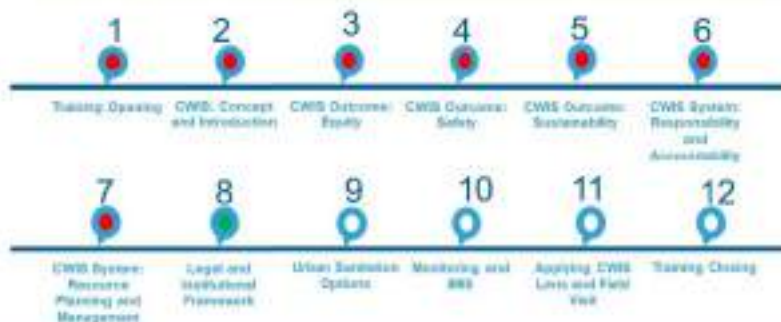


Instruction for Intro

Before presenting the learning outcomes:

- Presenting the picture from earlier slide, ask participants, (take 2 to 3 voices for each question)
 - Importance of such structure for a strong building/ house
 - What other components need to be added to make it liveable? (P/A: wall, doors and windows, roof, plaster and paint, furniture, etc)
- Inform participants as they have responded, to make a house liveable, there are different enabling factors.
- Similarly, to work on any given/ specific topic, FSM for instance, we need a base or foundation as well as an enabling factors/ environment for the implementation of the same. Hence, we are discussing on the enabling environment required for the implementation of CWIS focusing on FSM.
- Present the learning outcomes of the session

Training Structure



Learning Outcomes

- Summarize the importance of institutional and legal framework for FSM
- Define FSM policy framework, regulations and institutional arrangements in context of Nepal
- List out SDG indicators on sanitation and relevance of FSM in Total Sanitation Guideline

Presentation Outline

- Enabling Environment
- Importance of FSM Policy Framework and Institutional Arrangements
- Legal Documents on WASH in Nepal
- FSM in Legal Documents
- FSM in Policy Documents
- FSM Institutional & Regulatory Framework
- FSM Bylaws in Nepal
- SDG 6 : Target and Indicators
- FSM in Total Sanitation Guideline
- CWIS guideline

Enabling Environment



Source: Latham, et al (2014). Community Led Water Enterprises: a practical guide for decision makers

FSM Policy Framework and Institutional Arrangements

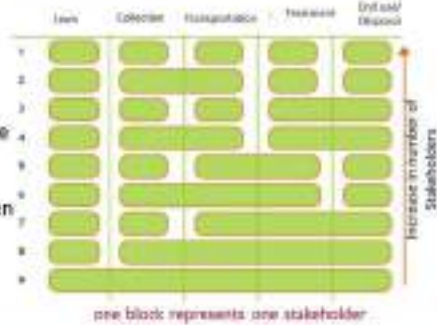
An institutional framework needs to be developed, specific to local situation, in order to:

- Ensure successful implementation of FSM systems
- Foster coordination among the stakeholders by defining their roles and responsibilities;
- Provide stringent and clear laws required to protect the environment from illegal FS disposal;
- Encourage private sector engagement for effective service delivery and sanitation business;

FSM policy and institutional arrangements require strong commitment from the government

Institutional Arrangement along Sanitation Service Chain

- Systems that have more stakeholders involved will be more complex;
- In contrast, if only one stakeholder is in-charge of whole service chain, flexibility may be hard to ensure, and intensive management procedures are then necessary;
- The selection of an institutional arrangement that is appropriate for the local context is crucial.



Constitutional Provisions in Nepal

- **Right regarding clean environment**
 - Article 30 (1) Each person shall have the right to live in a healthy and clean environment.
 - Article 30 (2) The victim of environmental pollution and degradation shall have the right to be compensated by the pollutant as provided for by law.
- **Right to health care**
 - Article 35 (4) Each citizen shall have the right to access to clean water and hygiene.



Legal Provision on Water and Sanitation

- Policy documents – 17;
- Legal documents – 11.

1. Land Acquisition Act 2014
2. Nepal Water Supply Commission Act 2066 (1999) and subsequent amendments and regulation
3. Water Resources Act (WRA) 2049 (1992)
4. Environmental Protection Act 2032 (1996) and Environmental Protection Regulation 2054 (1997)
5. Water (Drinking) Supply Regulation 2002 (1998) framed to regulate water supply for drinking water and sanitation services
6. Local Self Governance Act 2055 (1999) and Local Self Governance Regulation 2056
7. Nepal National Building Code 2003
8. Water Supply Management Board Act 2063 (2006) and regulation
9. Water Supply Tariff Fixation Commission Act 2063 (2006) and regulation
10. Urban Environment Management Directive 2068 (2011)
11. Solid Waste Management Act 2068 (2011) and Solid Waste Management Regulation 2069 (2012)

1. National Policy on Solid Waste Management 2001 (1996)
2. National Water Supply Sector Policy 2003 (1996)
3. Kathmandu Valley Water Supply and Sanitation Sector Policy 2007 (2000)
4. Rural Water Supply and Sanitation National Policy (2004) and Rural Water Supply and Sanitation National Strategy (2004)
5. National Water Resource Strategy (2002) and National Water Plan (2000)
6. National Drinking Water Quality Standards (2000)
7. National Urban Policy (2007)
8. Bagmati Action Plan (2006)
9. Urban Water Supply and Sanitation Sector Policy (2009)
10. TYP 2002-2016, TYP Approach Paper and TYP 2013-2018
11. Nepal Health Sector Programme – Implementation Plan 2 (2016)
12. Conceptual Wastewater Master Plan for Kathmandu Valley (2018)
13. National Sanitation and Hygiene Master Plan (2011)
14. Vision Paper: Ministry of Urban Development 2067 (2012)
15. Nepal HDGs Acceleration Framework (2013)
16. Environment-friendly local government framework (2013)
17. National Urban Development Strategy (2015)

Policy and Legal Documents

Environmental Protection Act, 2076 (2019) and Environmental Protection Regulation, 2077 (2019):

- Prevention and control of pollution or acts harmful to environment. Regulation for WWM to dispose into water bodies. **No specific provisions for FSM.**

Nepal National Building Code 2003:

- Guidelines for construction of septic tanks. **No provisions for sludge removal, treatment and safe disposal.**

Water Supply Tariff Fixation Commission Act 2063 (2006):

- Septic tanks should be properly managed by households and private sector encouraged to treat faecal sludge.

Policy and Legal Documents

SN	Policy documents	Areas covered
1.	National Policy on Solid Waste Management 2053 (1996)	<ul style="list-style-type: none"> • Enhance public participation through increased public awareness of sanitation, focused on urban and peri-urban areas. • Responsible bodies: Local bodies and SWMC.
2.	Urban Water Supply and Sanitation Sector Policy 2009	<ul style="list-style-type: none"> • Encourage community participation and public-private partnerships in service delivery. • Innovative on-site sanitation, like ECOSAN to be promoted. • Responsible bodies: Municipalities, local bodies and NGOs, with line agencies to take a facilitation role.
3.	Kathmandu Valley Water Supply and Sanitation Sector Policy 2057 (2000)	<ul style="list-style-type: none"> • Private sector participation to be encouraged in the management of collection, treatment and disposal of on-site system sludge. • Responsible bodies: MoUD, KVWSMB, KUKL, Private sector.

Policy and Legal Documents

SN	Policy documents	Areas covered
4.	National Water Resources Strategy (2002) and National Water Plan (2005)	<ul style="list-style-type: none"> • On-site sanitation development within Programmes. No clear arrangements for proper management and treatment of sludge. • Responsible bodies: Local bodies.
5.	National Urban Policy 2007	<ul style="list-style-type: none"> • No clear provisions
6.	Fifteenth Plan 2076/77-2080/81, Approach Paper	<ul style="list-style-type: none"> • Clarity on WWM, FSM, need of effluent discharge standard • Envisioned financing WWM/FSM and private sector engagement in the sector
7.	Conceptual Wastewater Master Plan for Kathmandu Valley (2010)	<ul style="list-style-type: none"> • No clear provisions

FSM Policy and Legal Documents

SN	Policy documents	Areas covered
8.	National Sanitation and Hygiene Master Plan (2011)	<ul style="list-style-type: none"> Decentralized sanitation options preferred. Community and private sector participation in waste management. Responsible bodies: Local bodies, government and sector stakeholders.
9.	Vision Paper, Ministry of Urban Development 2069 (2012)	<ul style="list-style-type: none"> Increase public participation and awareness and adopt PPP approach. Responsible bodies: MoUD, municipalities.
10.	National Urban Development Strategy 2015	<ul style="list-style-type: none"> No Clear Provisions

Analysis Through CWIS Lens

Equity:

- PPP in service delivery
- Decentralized sanitation options
- Occupational Health and Safety guideline
- LICs and marginalized is not clearly mentioned



EQUITY

Safety:

- Regulation for WWM to dispose into water bodies
- Guideline for septic tank construction
- Innovative on-site sanitation
- Need of effluent discharge standard
- No provisions for sludge removal, treatment and safe disposal



SAFETY

Analysis Through CWIS Lens

• Sustainability:

- Public participation through increased public awareness of sanitation
- No clear indication for resource recovery and capital investment



• Responsibility:

- Septic tanks should be properly managed by households and private sector encouraged to treat faecal sludge
- No clear arrangements for proper management and treatment of sludge



Analysis Through CWIS Lens

• Accountability:

- No provision for data collection and monitoring



• Resource Planning and Management:

- Envisioned financing WWM/FSM and private sector engagement in the sector
- Lack of financing framework to guide allocation of resources
- No provision for effective management of resources-human, financial, natural, assets



FSM Institutional & Regulatory Framework

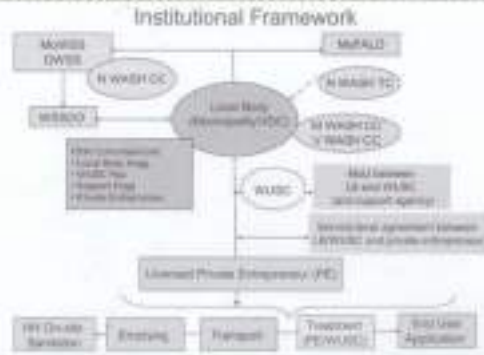
- Endorsed by Ministry of Water Supply & Sanitation in 2074 B.S.;
- First document to focus solely on FSM;
- Clear objectives on FSM;
- Clear roles and responsibilities of different stakeholders on FSM;



Role & Responsibility of Local Government in FSM

Stakeholders	Policy and Guidelines	Coordination	Collection and Transportation	Treatment	Disposal/Reuse	Regulation	Capacity Building	Monitoring
MoWSS and MoKLD	•	•				•	•	•
MoPI	•	•				•	•	•
Municipality/ VDC, city	•	•	•	•	•	•	•	•
WUSCs		•	•	•	•		•	•
Private sector/ entrepreneurs			•	•	•			
Research/ Academia	•						•	•
DPs/ INGOs	•	•					•	

Institutional Framework – IRF-FSM



Role of Local Governments

- Responsible for **planning and monitoring** to manage faecal sludge
- Provide necessary **land and road access** to set up FS treatment plant
- **Form committees** to ensure proper implementation of FSM
- Prepare, approve and disseminate **designs, institutional mechanisms, business plans and operational guidelines** on FSM
- **Engage user committees and private sector** for collection, transport and reuse of faecal sludge

Roles of local governments are very important in FSM local policy formulation, planning, design, implementation, monitoring and regulation

Role of Local Governments

- Issuing a license to private entrepreneur for FS collection, transport and disposal at FSTP
- Providing adequate financial resources for O&M of FSM
- Coordination with neighboring local bodies for FSM
- Linkage and coordination with local WASH committees on sanitation promotion
- Ensuring designs of septic tanks and soak away systems as per approved standards
- Monitoring effective implementation of FSM and ensuring regulation compliance and instituting improvements

Initiation from Local Government

- Implementation as per the existing policies and legal documents
- Update and contextualize
- Analyzing gaps in the legal framework and fulfilling it at local government level

Legal Provision on Water and Sanitation

<ul style="list-style-type: none"> • Policy documents – 17; • Legal documents – 11. 	<ol style="list-style-type: none"> 1. Bangladesh Water Supply and Sewerage Act, 1996 2. Bangladesh Water Supply and Sewerage Rules, 1996 3. Bangladesh Water Supply and Sewerage Regulations, 1996 4. Bangladesh Water Supply and Sewerage (Amendment) Act, 2000 5. Bangladesh Water Supply and Sewerage (Amendment) Rules, 2000 6. Bangladesh Water Supply and Sewerage (Amendment) Regulations, 2000 7. Bangladesh Water Supply and Sewerage (Amendment) Act, 2005 8. Bangladesh Water Supply and Sewerage (Amendment) Rules, 2005 9. Bangladesh Water Supply and Sewerage (Amendment) Regulations, 2005 10. Bangladesh Water Supply and Sewerage (Amendment) Act, 2010 11. Bangladesh Water Supply and Sewerage (Amendment) Rules, 2010 12. Bangladesh Water Supply and Sewerage (Amendment) Regulations, 2010 13. Bangladesh Water Supply and Sewerage (Amendment) Act, 2015 14. Bangladesh Water Supply and Sewerage (Amendment) Rules, 2015 15. Bangladesh Water Supply and Sewerage (Amendment) Regulations, 2015
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Municipal FSM Policies in Nepal

- 5 municipalities (Bheemdatt, Lahan, Lamahi, Waling and Dhulikhel) developed and endorsed Municipal FSM Policy
- Issued in 2077 (2020)
- Major coverage of policy is on-site sanitation system : safe containment, de-sludging, transportation, treatment and reuse or safe disposal.



Municipal FSM Bylaws in Nepal

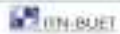
- Nepal's first FSM bylaws developed and endorsed by Mahalaxmi municipality, Lalitpur
- Issued in 2076 (2020)
- Major coverage of bylaws is on-site sanitation system : safe containment, de-sludging, transportation, treatment and reuse or safe disposal.
- Other municipalities (Bheemdatt, Lahan, Lamahi, Waling and Dhulikhel) are in the process of FSM bylaws development.



Commitments



Rt. Hon. PM KP Sharma Oli signing the pledge on FSM along with MuAN President during MuAN Day, 13 March 2019



Former Hon. Minister of Water Supply signing the pledge on FSM during WASH Mela, 8 June 2019 (World Environment Day 20th National Sanitation Week and Sishi Nakha)



CWIS in Legal Documentation

- CWIS guideline – in process of drafting
- N-WASH Policy- Draft version
- Wastewater Management- in process of drafting



Key Messages

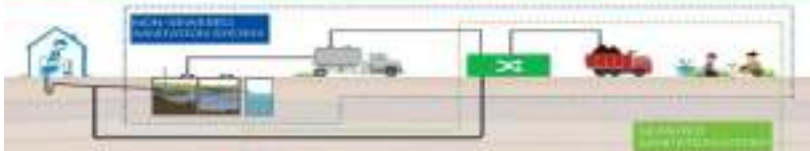
- Most of the legal and policy documents have no clear provisions for FSM;
- As of now, FSM institutional and regulatory framework clearly indicates roles and responsibilities;
- Based on the local context and requirements, local governments (Municipalities and Rural Municipalities) have authority to 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.

References

- Luthi et al., (2011a) :Community-Led Urban Environment, complete guideline for decision makers
- Institutional and Regulatory Framework for faecal Sludge Management in Urban Areas of Nepal
- Sewerage Management Policy 2075
- Fifteenth Plan 2076/77-2080/81, Approach paper
- Environmental Protection Act, 2076 (2019)
- Nepal National Building Code 2003
- Water Supply Tariff Fixation Commission Act 2063 (2006)
- FSM by-laws in Nepal
- Total Sanitation Guideline, 2017

Session 9: Urban Sanitation Options

Citywide Inclusive Sanitation Scaling and Sanitation Innovation



Urban Sanitation Options

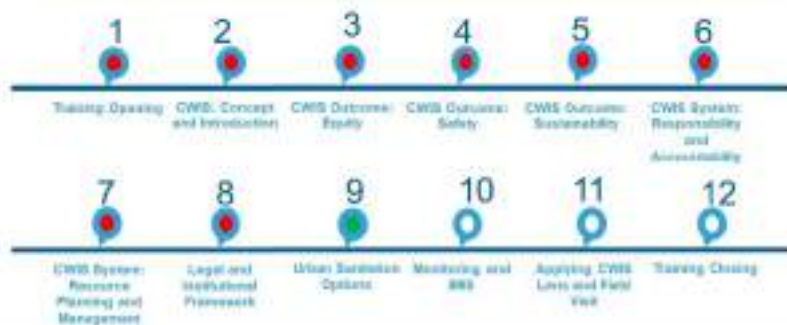
Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person





Training Structure



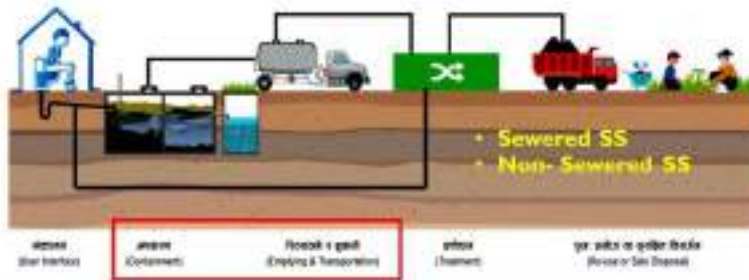
Learning Outcomes

- Interpret various technologies throughout sanitation service chain
- Summarize the transformative technologies for the FS treatment
- Explain urban sanitation options through CWIS approach

Presentation Outline

- Sanitation Service Chain
- Sewered Sanitation
- Onsite sanitation: Hygienic latrines and Containments
- Desludging and conveyance in Nepal
- Challenges of desludging and transportation service
- Decentralized FS treatment technologies
- Centralized FS treatment technologies
- "Reinvent the Toilet", Transformative Technologies

Sanitation Service Chain



Applicability of Sanitation Systems

Sewered Sanitation

- Dense settlement
- Flood-prone areas
- Areas having high water table
- low infiltration capacity of soil
- Highly Sloped terrain
- Higher availability of water
- Land available as site for treatment plant at a lower elevation than surroundings

Non-Sewered Sanitation

- Area with low population density
- Settlement with scattered houses
- Rural and outskirts of urban centers
- Plain terrain or geography with low gradient
- Water-scarce areas
- Land available as site for treatment plant at a higher elevation than surroundings

Applicability of Sewered Systems

Advantages

- Highly preferred by users
- No need to establish desludging service
- Available various efficient and high-tech options for treatment

Limitations

- Requires High Capex and Opex
- Requires regular and high volume of flush water and produces high vol. of wastewater
- Financially not suitable for settlement with scattered HH
- Requires pumping mechanism in case of low gradient area
- Less attractive to private sector for investment

Applicability of Non-Sewered Systems

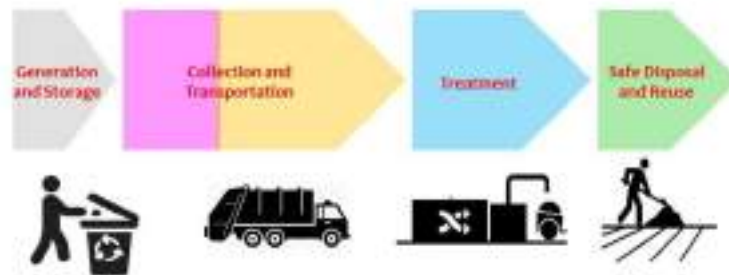
Advantages

- Low capital expenses (Capex) and operational expenses (Opex)
- Financially good option particularly for settlement with scattered HH
- Better business opportunity – easily attract private sector for investment
- Good resource recovery

Limitations

- May not be feasible for dense settlement
- Less attractive to users
- Availability of limited technical options
- Potential groundwater pollution in case of improper containment
- Accessibility of vehicle
- Affordability of desludging service

SWM Service Chain



User Interface (Latrine)



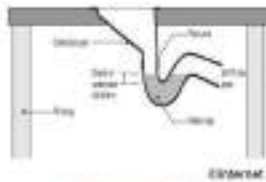
Is your Latrine is "Hygienic" ?

A "hygienic latrine" is defined as a sanitation facility, which effectively breaks the cycle of disease transmission.

Criteria for a "hygienic latrine":

1. Clean with no fecal traces
2. Seal the passage between the squat hole and the containment
3. Venting out of foul gases

Sealing the passage....

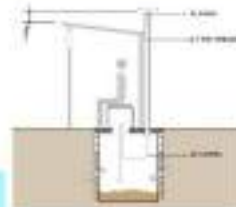
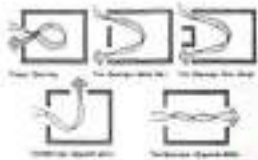


Water Seal

SaTo Pan: "Seal" with Counterweight Mechanism



Venting out the odour



Hygienic latrine through CWIS

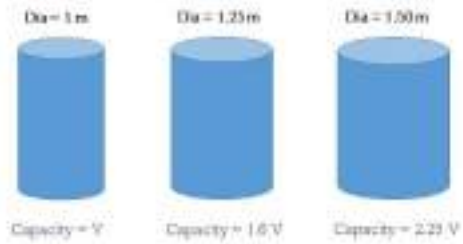
Service Outcomes	EQUITY user friendliness, access to toilet in squatter areas, public places and institutions	SAFETY User friendliness, clean and hygienic, water seal	SUSTAINABILITY Proper operation and timely maintenance
System Functions	RESPONSIBILITY Guidelines for toilet construction, operation guideline and plan	ACCOUNTABILITY Monitoring as per guideline, performance monitoring- rewards or punishment as per the performance monitoring	RESOURCE PLANNING & MANAGEMENT Budgetary plan for O&M, HR management, Capacity development of HR.

Confinement of Waste (In Containments)

- Pit/holding tank
- Septic Tank
- Ecosan Vault
- Biogas Digester



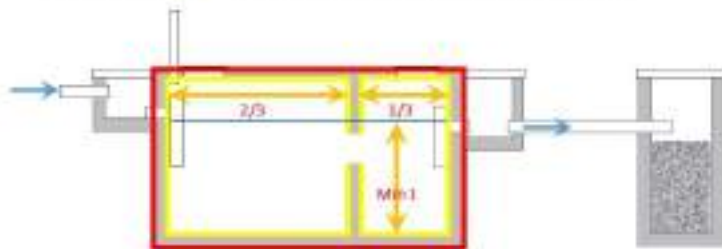
Pit Diameter – Pit Capacity



Increase in diameter of pit significantly increases design life

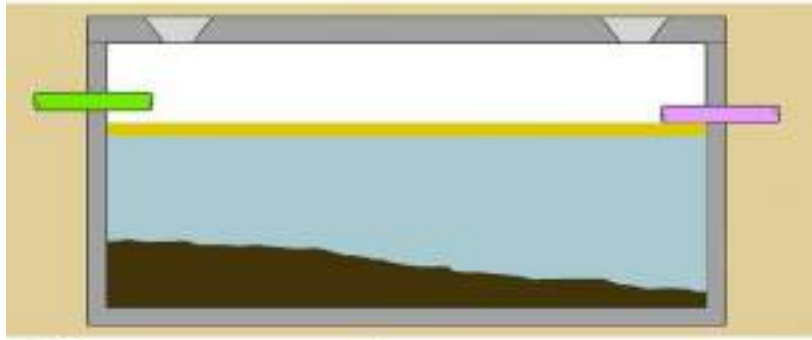
Septic Tank

Septic Tank + System for Disposal of Effluent (Soak Pit)



Major Option in All Urban Areas (including some slums)

Importance of proper inlet and outlet in ST

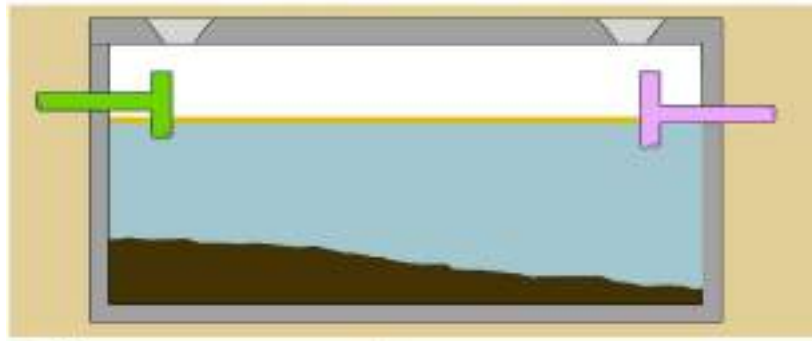


EN-BUET

ENPHO

RESEARCH CENTER

Importance of proper inlet and outlet in ST



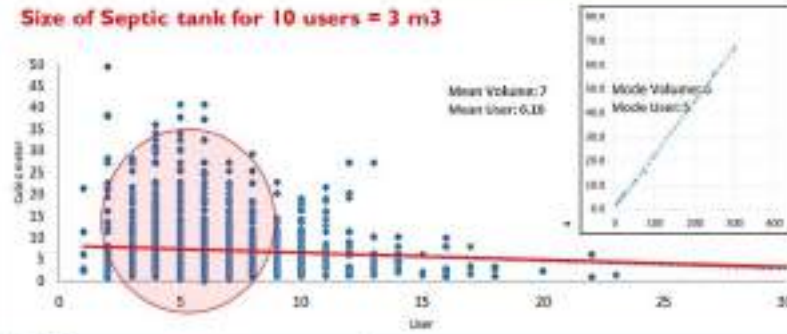
EN-BUET

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RESEARCH CENTER

Size of Containments – Case of Nepal

Size of Septic tank for 10 users = 3 m³





Containment through CWIS



6 Groups
2 minutes



Containment through CWIS

Service Outcomes	EQUITY Fairness in distribution and prioritization of service quality, service prices, and public finance/subsidies	SAFETY Human waste is safely managed to protect public goods	SUSTAINABILITY Resources and revenues sustain performance
System Functions	RESPONSIBILITY Authority or authorities have clear mandate for ensuring inclusive, safe sanitation services	ACCOUNTABILITY Performance is transparently monitored and managed with +/- incentives	RESOURCE PLANNING & MANAGEMENT Resources are managed to support implementation of mandate and achieve goals across time / space

Desludging Service



Methods of Desludging

• Manual Desludging



• Semi Mechanized Desludging



• Fully Mechanized Desludging

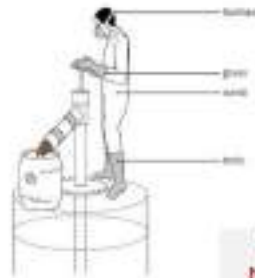


Manual Desludging



Manually Operated Mechanical Desludging

- Guper/ll
- Manual diaphragm
- Pump
- Nibbler
- MAPET



Poop pump/Gulper
Not available in Nepal

GULPERS

Mechanized Gulper
Capacity: 60 Liter/min



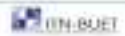
©Practical Action



Motorized Gulper
Capacity: 90 Liter/min



Mechanical Emptying Using a Vacuum Tanker



Desludging Practices in Nepal



Transportation of Fecal Sludge



Non-motorized Transportation



Motorized Transportation



Desludging and Transportation services in Nepal

Cleaning Services with new technology and qualified technicians.

DESLEUDING AND SEPTIC TANK CLEANING SERVICE IN NEPAL

985152299

SEPTIC TANK & TRANSPORT CLEANING SERVICE

Desludging service is growing

IIN-BUET INPRO B&W CONSULTING

Challenges of Desludging and Transportation Service

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



Desludging and Transportation through CWIS



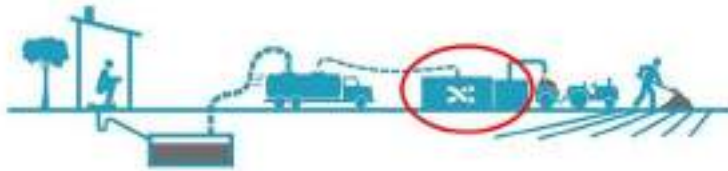
6 Groups
2 minutes



Desludging and Transportation through CWIS

Service Outcomes	EQUITY 'Fairness' in distribution and prioritization of service quality, service prices, and public finance/subsidies	SAFETY Human waste is safely managed to protect public goods	SUSTAINABILITY Resources and revenues sustain performance
System Functions	RESPONSIBILITY Authority or authorities have clear mandate for ensuring inclusive, safe sanitation services	ACCOUNTABILITY Performance is transparently monitored and managed with +/- incentives	RESOURCE PLANNING & MANAGEMENT Resources are managed to support implementation of mandate and achieve goals across time / space

Treatment Technologies



Types of Treatment Technologies

Based on treatment Location

- On-site Treatment (Decentralized)
- Off-site Treatment (Centralized)

Based on treatment mechanism

- Nature based/Biological Treatment
- Mechanical Treatment
- Hybrid treatment

Decentralized Faecal Sludge Treatment Technologies

Twin Pits/ Sulav



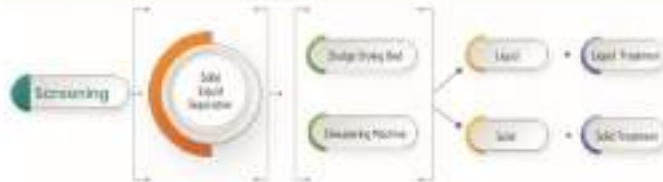
Dry Ecosan



Biogas Digester



Centralized FS Treatment Technologies



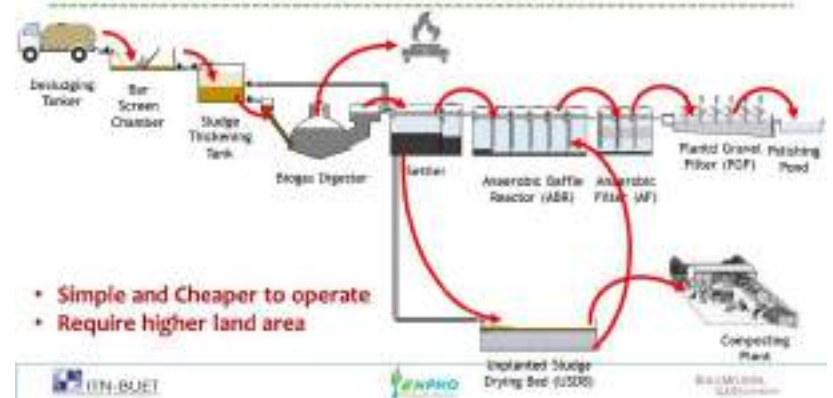
Centralized treatment options

- fully nature based,
- fully mechanized and
- hybrid

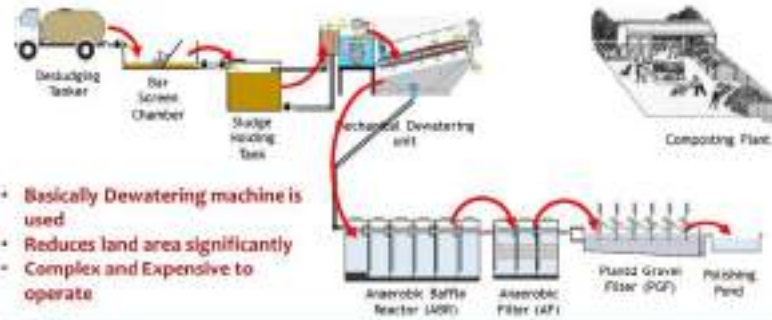
Viabie Centralized FS treatment options



Fully Nature-based treatment option



Hybrid Treatment Option



- Basically Dewatering machine is used
- Reduces land area significantly
- Complex and Expensive to operate

Fully Mechanical Treatment Option



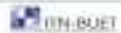
- Land requires minimal
- Complex and Expensive

Innovative and Transformative Technologies

initiated by the BMGF in 2011

Transformative Technologies that:

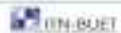
- Remove harmful pathogens from human waste and recover valuable resources
- Operate "off the grid" and require minimal electricity
- Cost less than US\$.05 cents per user per day
- Promote sustainable and profitable sanitation services and businesses in poor urban settings
- Can appeal to everyone,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



Evolving Transformative Technologies

With respect to the processes employed, the evolving transformative technologies could be divided into the following broad categories:

- Thermal
- Electrochemical
- Biochemical
- Mechanical
- Thermochemical



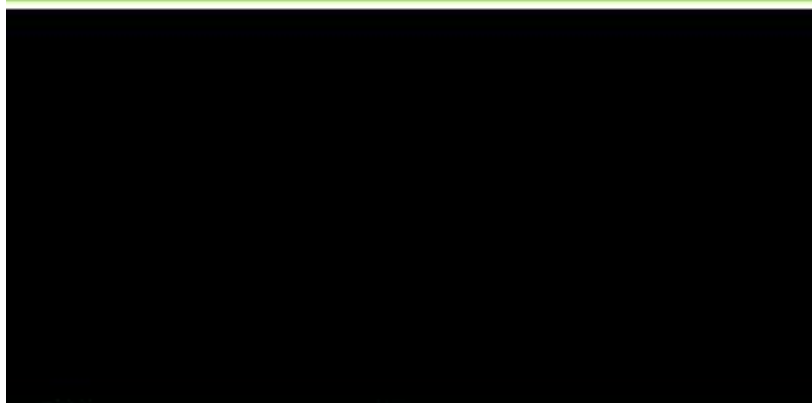
Omni-Processor (Thermal Process)



IN-BUET

ENPHO

BEUMER
SLURRY



IN-BUET

ENPHO

BEUMER
SLURRY

JOHKASAU Technology



UN-BUET

YENPHO

BEJUMEN
S&S



UN-BUET

YENPHO

BEJUMEN
S&S

Nano-Membrane Toilet (Mechanical Processes)

IWA Project Innovation Awards – Gold winner!!



<http://www.nano-membrane-toilet.org/>





Treatment Technologies through CWIS



6 Groups
2 minutes



Treatment Technologies through CWIS

Service Outcomes	EQUITY Fairness in distribution and prioritization of service quality, service prices, and public finance/subsidies	SAFETY Human waste is safely managed to protect public goods	SUSTAINABILITY Resources and revenues sustain performance
System Functions	RESPONSIBILITY Authority or authorities have clear mandate for ensuring inclusive, safe sanitation services	ACCOUNTABILITY Performance is transparently monitored and managed with +/- incentives	RESOURCE PLANNING & MANAGEMENT Resources are managed to support implementation of mandate and achieve goals across time / space

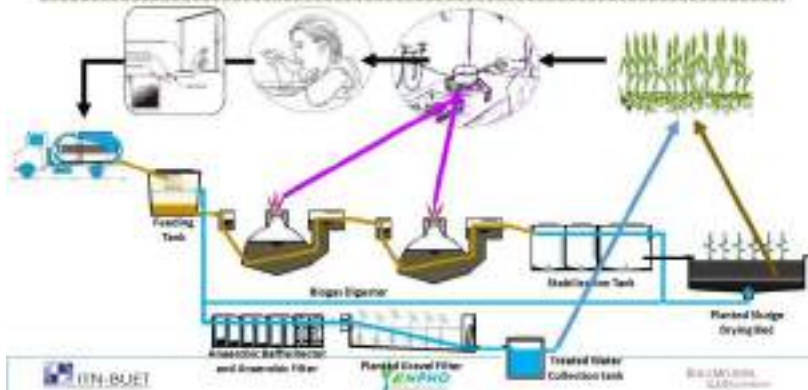
Reuse/Safe Disposal



Reuse and Safe Disposal



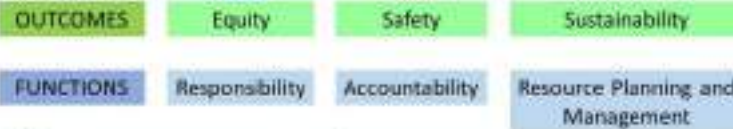
Case Study : FS Treatment with Resource Recovery



Reuse/Safe Disposal through CWIS

Service Outcomes	EQUITY	SAFETY	SUSTAINABILITY Proper plan for reuse of the by-products Revenue generation for O&M
System Functions	RESPONSIBILITY Guidelines and standard for by-products, plans for the use of by-products	ACCOUNTABILITY Monitoring as per standard and guideline, performance monitoring- rewards or punishment as per the performance monitoring	RESOURCE PLANNING & MANAGEMENT revenue generation from the by-products,

CWIS perspective on Sanitation Service Chain

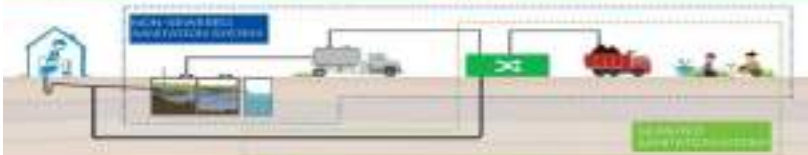


References

- https://www.youtube.com/watch?v=9H_3i2A-onw&t=8s
- <https://www.youtube.com/watch?v=-gkyxsNqhI>
- <https://www.youtube.com/watch?v=bVzppW5JFU0>
- <https://www.youtube.com/watch?v=tRzEtOHLeBk>
- <https://www.youtube.com/watch?v=jGPpXF7y9Rg>

Session 10: Monitoring and IMIS

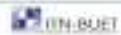
Citywide Inclusive Sanitation Scaling and Sanitation Innovation



Monitoring and IMIS

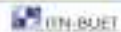
Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person



Before Starting...

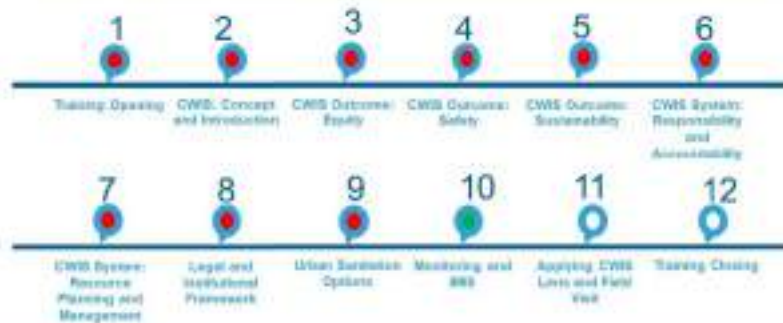
Service Outcomes	EQUITY	SAFETY	SUSTAINABILITY
System Functions	RESPONSIBILITY	ACCOUNTABILITY	RESOURCE PLANNING & MANAGEMENT



Instruction to start with

- Inform participants that now they have gained idea on all components of CWIS framework, now they are going to discuss on monitoring activities through CWIS perspective.
- As a responsible authority, it is one of the major concern to ensure if CWIS is being implemented and it should be monitored at different phases of implementation and hence will be discussing more on it through the session.

Training Structure



Learning Outcomes

- Discuss the importance of monitoring for CWIS implementation
- Introduce 'Integrated Municipal Information System', a data-driven and interoperable system
- Explain IMIS for planning, management and monitoring and evaluation of sanitation and service delivery

Presentation Outline

- Monitoring and importance of monitoring
- When to carry on monitoring?
- Importance of data in CWIS
- Basic understanding of IMIS
- IMIS for
 - Planning
 - Management
 - Monitoring and Evaluation
- Interoperability of IMIS

Monitoring

- Regular observation and recording for progress updates
- Giving feedback to the related stakeholders (ex. local authority, donors, implementers and beneficiaries)
- The feedback and recommendations to be followed by Action points

Why Monitoring?

- For **Accountability and Learning** for the future
- Help to show accountability to stakeholders, aid sustainability and contribute to building an enabling environment



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



Monitoring- when?

- During planning : Outlining the key performance indicators
- During Implementation: Track the progress as per the targets
- Performance phase: Check the outputs versus performance indicator set during the planning.

After monitoring

- Reporting and recommendations to take actions
- Monitoring is not a one-time affair; it must be carried out continuously at different phases

Data and Information

- What is the significance of data and information ?
- Where can we find data needed for sanitation?



Importance of Data in CWIS

SDG 6 and Data

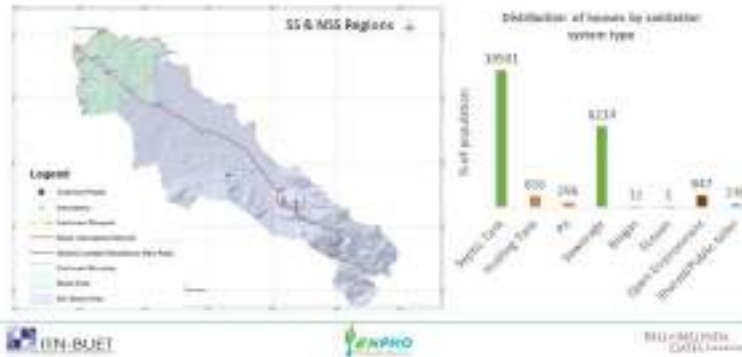
UN Water SDG 6 Global Acceleration Framework has identified data and information as one of the five accelerators of SDG 6 outcomes.



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

Importance of Data in CWIS

Case: Sanitation Situation – Complete Data



Importance of Data in CWIS

Characteristics of Good Data



IMIS is a Data-Driven System developed to catalyze CWIS approach, and achieve SDG 6.2 Outcomes

Basic Understanding of IMIS

Components of IMIS

IMIS is a convergence of **web, mobile and GIS technologies.**

IMIS brings **Innovation** in overall city's sanitation system and services **fostering good Governance**



IMIS DRIVING EFFICIENCY, RESPONSIVENESS AND ACCOUNTABILITY OF MUNICIPALITIES

Basic Understanding of IMIS

IMIS for Planning, Management and M&E

- PLANNING**
- 1) **equitable** access to safe, adequate & efficient infrastructure
 - 2) **available** infrastructure, assets and services
 - 3) **gender** inclusive and equity inclusive view and infrastructure
 - 4) **fair** and **transparent** pricing of services
 - 5) **the use of public finance**, to the reduction of infrastructure and services and
 - 6) **protection worker's rights**, contractual and safety nets



- MANAGEMENT**
- 1) **effective** management of sanitation infrastructure and services
 - 2) **the fair** distribution of **public finance** to the provision of infrastructure and service
 - 3) **improved** service of availability and efficiency of services
 - 4) **responsiveness** of private, public, community and socially inclusive services
 - 5) **continuous** improvement of **key performance indicators (KPIs)**
 - 6) **improved** accountability, transparency and **regulation** (including processes, institutional)

- M&E**
- 1) **the quality** of infrastructure of service and efficient service
 - 2) **service** **quality** performance in service offered to users
 - 3) **financial** **viability** of service delivery and infrastructure
 - 4) **public** health and environmental **sustainability** and
 - 5) **worker's** **gender** **inclusion** and **sustainability** **include** **in** **plans**

Basic Understanding of IMIS

Digitization Of Business Process Along Sanitation Value Chain



IMIS for Planning



IMIS for Management

The screenshot displays a dashboard titled "Customer Information" with a table of data. The table has several columns, including "Customer ID", "Name", "Address", and "Status". The "Status" column contains progress indicators consisting of blue and red squares. The dashboard also features a sidebar with navigation options and a top navigation bar.

Customer ID	Name	Address	Status
10001	John Doe	123 Main St	Progress
10002	Jane Smith	456 Elm St	Progress
10003	Bob Johnson	789 Oak St	Progress
10004	Alice Brown	101 Pine St	Progress
10005	Charlie White	202 Cedar St	Progress
10006	Diana Green	303 Birch St	Progress
10007	Frank Black	404 Spruce St	Progress
10008	Grace King	505 Willow St	Progress
10009	Henry Lee	606 Ash St	Progress
10010	Ivy Hill	707 Hickory St	Progress

IMIS for M&E

The screenshot displays a dashboard titled "M&E Services Dashboard" with several service tiles and a "System Status" section. The service tiles include "M&E Services", "M&E Training", "M&E Support", "M&E Monitoring", "M&E Reporting", and "M&E Compliance". The "System Status" section shows various metrics such as "6200", "10,000", "400", "300", "10", and "50". The dashboard also features a sidebar with navigation options and a top navigation bar.

IMIS – A Data Source for Other Tools





Shit Flow Diagram

- An excreta flow diagram (also often described as shit flow diagram, SFD) is a tool
 - to readily understand and
 - communicate how excreta physically flows through a city or town
- SFDs show how it is or is not managed as it moves from defecation to disposal or end-use.
- SFD is effective for advocacy and awareness raising



Shit Flow Diagram

SFD = starting point for analysis

- ✓ Visual summary of a city's sanitation chain
- ✓ Problem identification tool
- ✓ Advocacy tool: Involve stakeholders
- ✓ Expert judgement is required



Shit Flow Diagram (SFD) of Nepal



City Service Delivery Assessment

- SFD - an advocacy and prioritization tool –illustrates the sanitation situation in a city
- City Service Delivery Assessment (CSDA)- a complementary tool to assess **why** the situation is as it is
- It supports a systematic process
- It also includes an Action Checklist

	Lowest sanitation			High sanitation		
Availability						
Quality						
Accessibility						
Operability						
Reliability						

City Service Delivery Assessment

- Facilitates assessment of the **enabling environment** for Citywide Inclusive Sanitation (CWIS)
- Generates **graphics** to support a systematic process for **working with stakeholders** to build consensus
- Separately addresses both **sewered** and **non-sewered** sanitation
- Includes an Action Checklist to help stakeholders **identify and prioritise actions** to improve sanitation

CSDA Output

A CSDA produces a structured diagnosis of **institutional barriers** to sanitation service delivery, based on 3 pillars:

- **Enabling:** policy, legal and institutional environment
- **Delivering:** resources and mechanisms available to improve sanitation
- **Sustaining:** operating environment, funding and personnel needed to provide ongoing and sustainable sanitation services

It is summarized in a simple traffic light graphic, to facilitate stakeholder debate

Non-sewered sanitation			
	Value on 10	Color of traffic light	Implication
Enabling			
Policy, legislation	7	Yellow	Attention
Planning, budgeting	8	Green	Good
Resources	2	Red	Urgent
Delivering			
Funding	2	Red	Urgent
Capacity, skills etc.	7	Yellow	Attention
Services	2	Red	Urgent
Sustaining			
Regulation, cost recovery	2	Red	Urgent
Institutions, gender equality	7	Yellow	Attention
Environment	2	Red	Urgent

Key Message

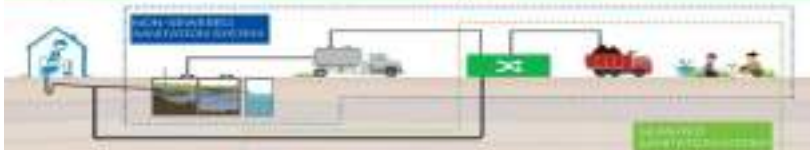
- Monitoring- Regular observation and recording for feedback to related stakeholders
- Data and Information is one of accelerators of SDG 6
- IMIS is a Data-Driven System and data from IMIS is accessible, accurate, complete, reliable, relevant and real time
- IMIS is an interoperable system capable of providing data to other platforms as well as integrating data into itself via API
- IMIS brings innovation in overall city's sanitation system and services fostering good Governance
- Data from the system can be used for advocacy through SFD and situation analysis with CSDA for the appropriate interventions

Additional Reading Materials

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.adh.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=1pxXRRK1SE&ab_channel=StrategieNetherlands
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_Sanitation_Monitoring_toolkit.pdf
6. <https://sfd.susana.org/>
7. <https://incsanprac.com/tools.html>

Session 11: Applying CWIS Lens and Field Visit

Citywide Inclusive Sanitation Scaling and Sanitation Innovation



Applying CWIS lens

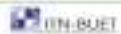
Training on Introduction of Citywide Inclusive Sanitation Approach

Resource Person



Before Starting...

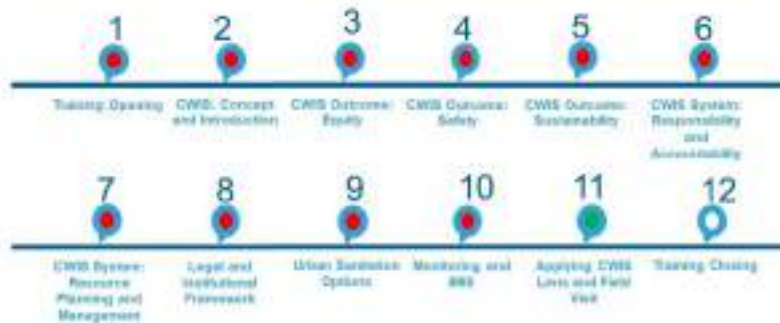
Service Outcomes	EQUITY	SAFETY	SUSTAINABILITY
System Functions	RESPONSIBILITY	ACCOUNTABILITY	RESOURCE PLANNING & MANAGEMENT



Instruction for Intro

1. Ask participants if they gained something from the event/ training.
2. Ask participants what did they learn? *PIA: information on CWIS*
3. Ask participants if they are sure about it. *PIA: yes*
4. Inform participants that they are now going to verify their knowledge on CWIS and will be discussing on the applying CWIS lenses in different activities/ programs.
5. Present learning outcome and presentation outline of the session

Training Structure



Learning Outcomes

- Analyze sanitation facility/ facilities through CWIS perspective
- Describe on the next course of action after the training

Presentation Outline

- Guide on the Site visit
- Field visit to one of the sanitation services
- Analyze through CWIS perspective
- Presentation of the findings
- Way forward/ what is next?

Guide on the Site visit

- Inform participants that they will be visiting a sanitation facility and will be analyzing the facility through CWIS lens
- For the visit, inform participants that they will be divided into 6 groups as per the components of CWIS framework and will be provided a monitoring checklist to note the points along with some of the reference points.
- Inform participants as they visit the field, participants are to make notes on the measures applied and gaps in particular component assigned to the group.
- Inform that after the visit, participants will be presenting their findings to the large group.
- Now divide into groups and assign a topic to each group along with the monitoring checklist and reference points.
- Ask participants to go through the reference points in their respective groups

Site Visit & Evaluation {Let's Practice}

- In 6 groups
- Each group- a CWIS framework component
- Observe as per the component and take notes
- Field visit
 - 45 min observation
 - 15 min to take notes
- Present the major finding



Finding from Presentation



Field Visit
1 hour



Group Discussion



5 minutes



Group Presentation



Next Course of Action

Ask participants-

- What is next?
- How to implement CWIS in their municipality?
- How can we support for CWIS implementation?



References

- FSM trainer's manual of EAWG, SANDEC
- Institutional and Regulatory Framework for Faecal Sludge Management in Nepal, 2017
- Siteriya Sarkar Sanchalan Ain
- Philippe Reymond: Planning Integrated Faecal Sludge Management System
- Luthi et. al (2011a). Community-Led Urban Environment, complete guideline for decision makers
- BORDA, City Sanitation Plan Guide

