CITYWIDE INCLUSIVE SANITATION (CWIS) GUIDANCE MATERIALS

ADB

Introduction to Types of Sanitation Systems

Types of sewered and on-site sanitation and FSM (non-sewered) systems and considerations for selection

Guidance Note	9a
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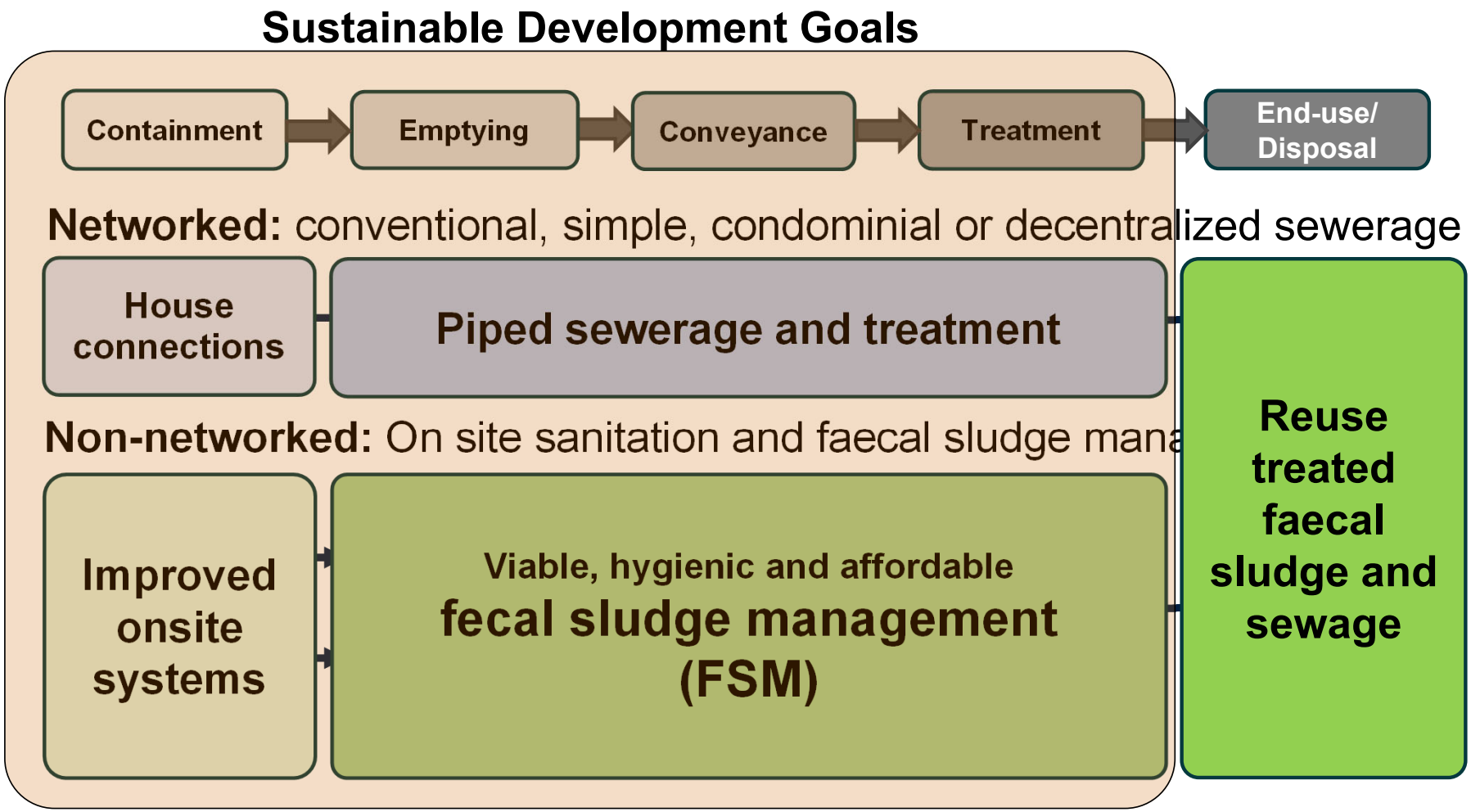
Draft CWIS Guidance Note for ASD 2021

Related GNs	10 Selecting technology for O&M

Outline

1. Types of sanitation system
2. Factors to consider in selecting types of sanitation system
   A. Current sanitation situation and priority gaps
   B. Services and user demand
   C. Policy, institutions and regulations for sustainability
   D. CWIS – a city approach: Complementing government and other investments
3. Conditions for sewerage and non-sewered sanitation investments
4. Where to get more information

1. Types of sanitation system



1. Sewered sanitation systems

Flush toilet → **Piped sewerage network** → **Sewage treatment works** → **End-use/ Disposal**

- Domestic
- Commercial
- Institutional
- Public
- Shared/ community

House connection to sewer

- Conventional sewers
  - Gravity or pumped
  - Separate or combined
- Shallow, simplified or condominial sewers

Centralized treatment

Decentralized treatment – multiple plants medium, small

Direct discharge

Reuse in agriculture, fuels or animal feed

Toilet with septic tank

- Solids free sewers (small bore)

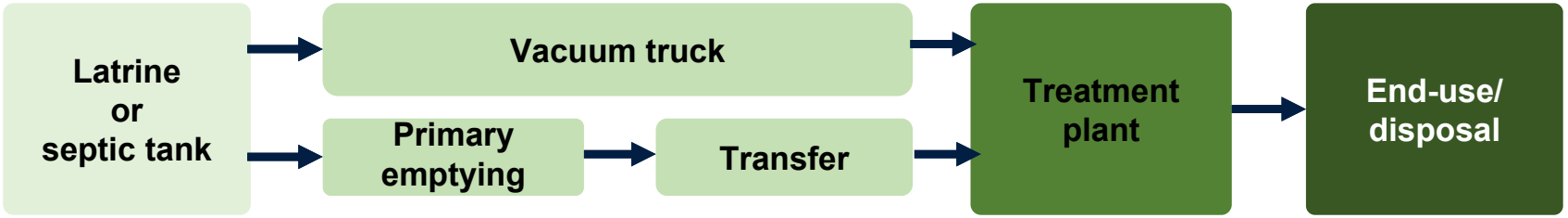
Central or decentralized treatment

For more details:

- GN 11 – Alternative sewerage systems.
- GN 12 – Options for treatment
- Compendium of Sanitation Systems and Technologies, eawag 2014
- 3.8 Sewer Systems

1. Non-sewered sanitation systems

Non-sewered or non-networked: On-site sanitation and faecal sludge management (FSM)



Pit latrines

Septic tanks

Other on-site systems

Tankers, trucks and other motorized vehicles with pumps and tanks

Manual emptying to drums or carts

Transfer station and transfer to treatment

Faecal sludge treatment

For more details:

- GN 12 – Options for sewage, septage and faecal sludge treatment
- Faecal Sludge Management: Systems Approach for Implementation and Operation
- Compendium of sanitation systems and technologies
- Introduction to Faecal Sludge management
- Planning and design of sanitation systems and Technologies

CWIS factors to consider

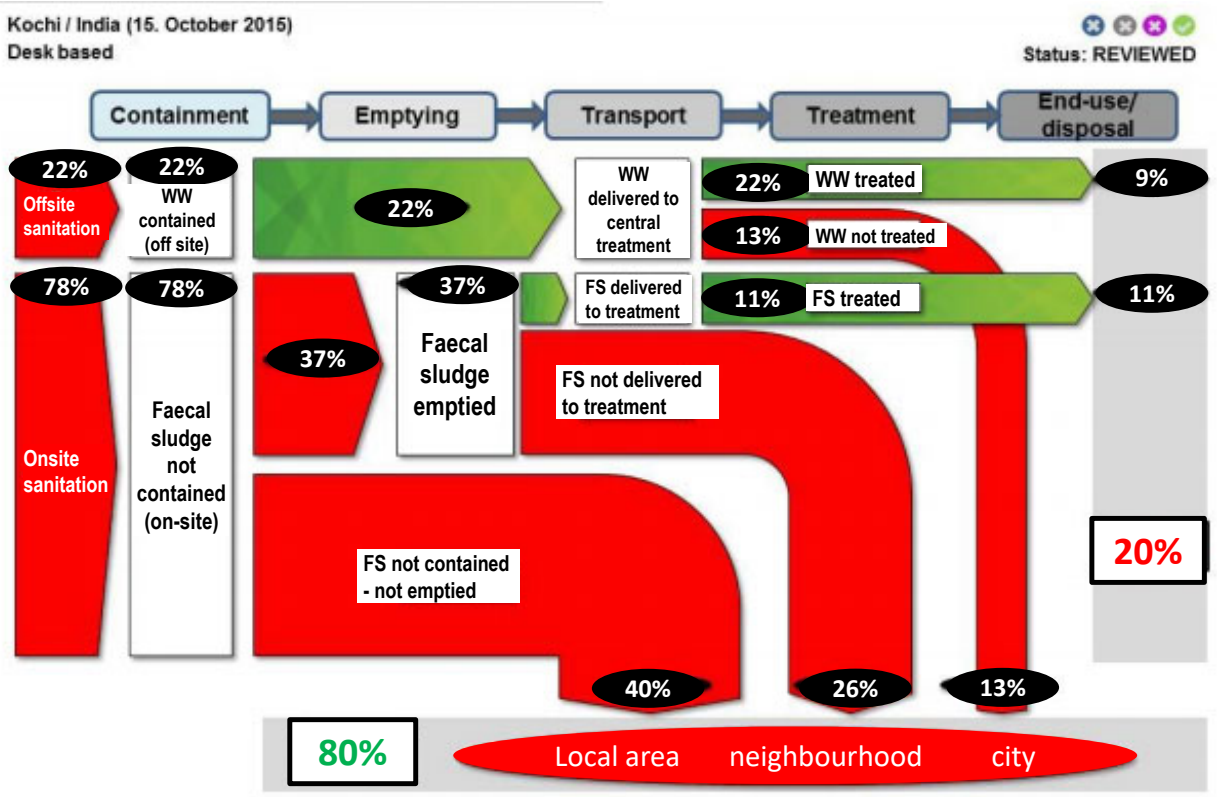
2. CWIS Factors to consider

A: What is the existing city sanitation situation?

Replace this SFD with one for the city, or another in the DMC or a nearby country.

Faecal waste flow diagrams (SFDs) show the sanitation service chain:

- Based on population
- Including formal and informal areas
- For advocacy and planning, not design



% of population

Safe
- managed

Unsafe
- unmanaged

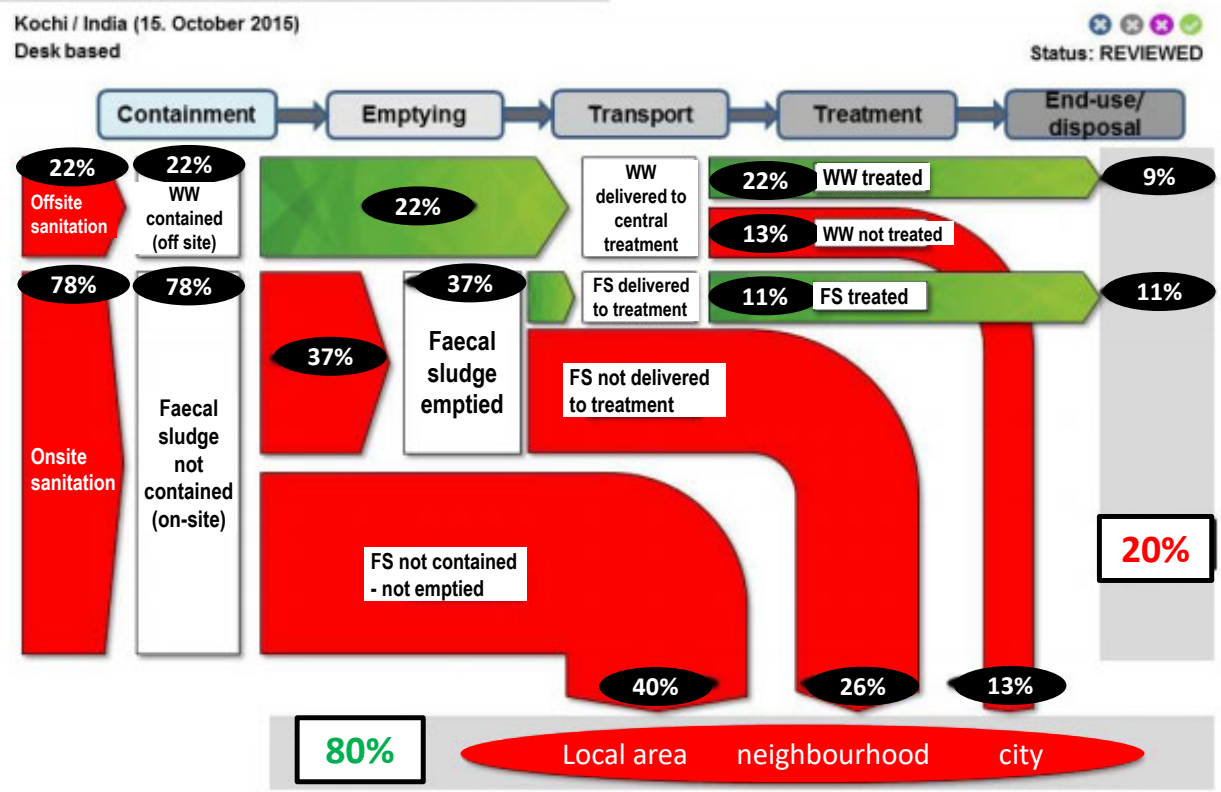
For more details, training, 120+ SFDs and information on how to develop an SFD
SFD Portal

2. Factors to consider

What are the gaps in the sanitation chains?

SFDs enable identification of:

- Where faecal waste is going



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SFD Portal

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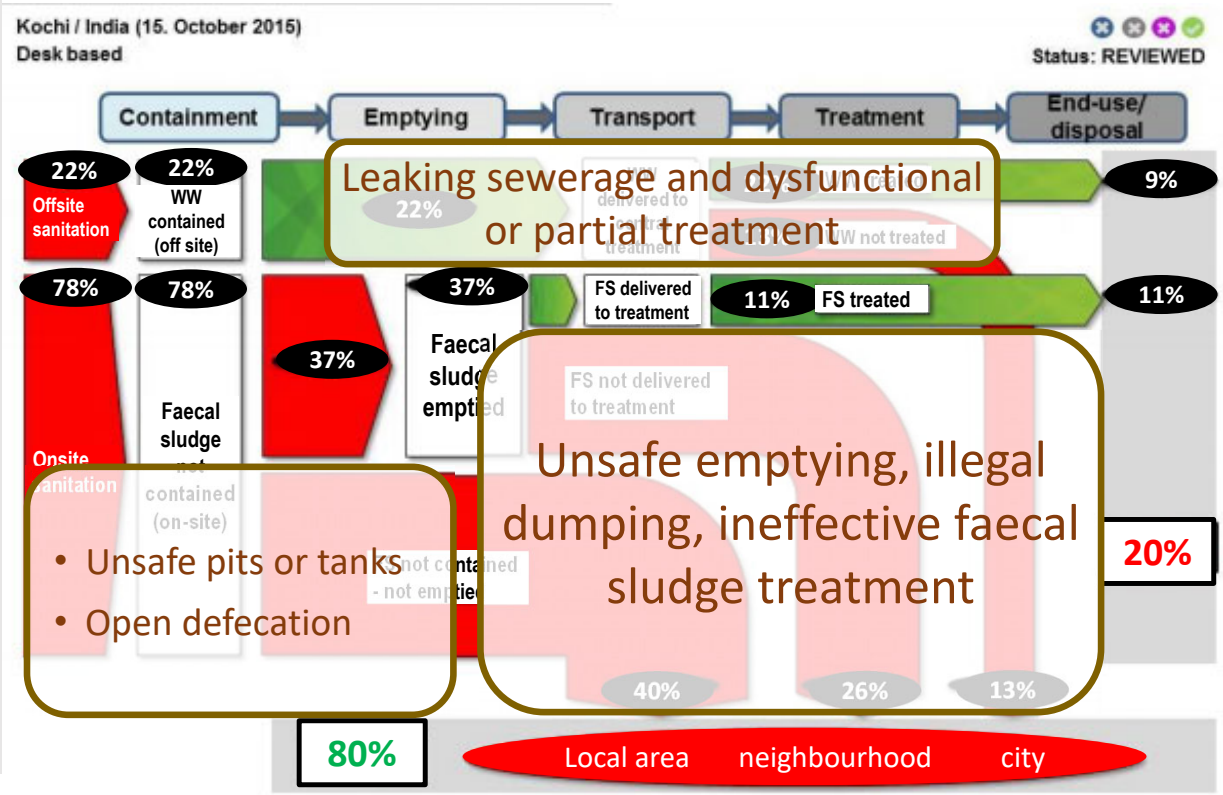
2. Factors to consider

What are the gaps in the sanitation chains?

SFDs enable identification of:

- Where faecal waste is going
- Gaps and problems in the sanitation chain



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SFD Portal

Slide 9

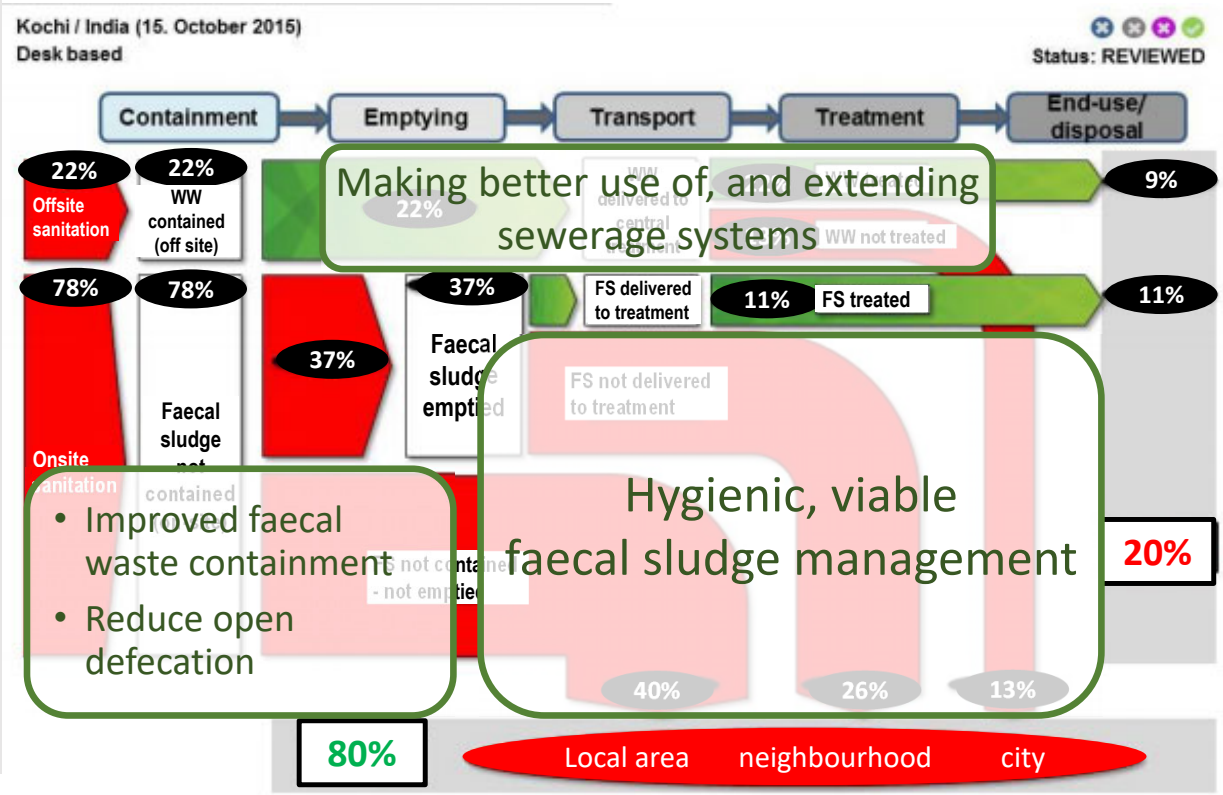
IB2 Isabel Blackett, 11/12/2020

2. Factors to consider

What are the gaps in the sanitation chains?

SFDs enable identification of:

- Where faecal waste is going
- Gaps and problems in the sanitation chain
- Priority areas for improvement



% of population

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SFD Portal

2. Factors to consider:

B: Existing services and user demand

Add any local data that is available

*Which services exist from **a user perspective?***

- Private or shared toilets? Open defecation? Include formal, informal and poor areas.
- Is there access to unregulated FSM and/or formal hygienic FSM? Is it affordable for all?
- Housing type, tenure and density? Access to piped water supply?
- Are users satisfied with their domestic and neighbourhood cleanliness, hygiene, smells etc?
- What level of improvements are users seeking and willing to pay for?

Aim to build on, develop, improve and expand existing sanitation services

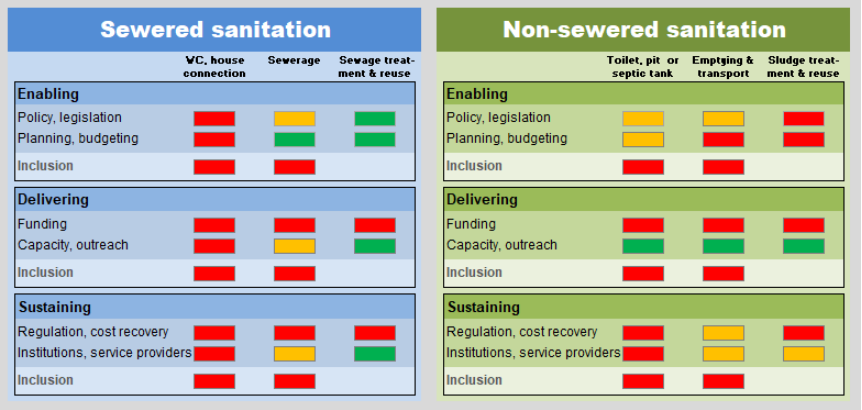
2. Factors to consider:

C: Policy, institutions and regulations

- Are institutional mandates and responsibilities clear for both sewered and non-sewered services?
- What is the capacity of the institutions to effectively operate and manage sewered systems?
- How is the private sector involved, informally or formally?

- What capacity development (systems, finance, equipment, knowledge, skills) is needed?
- Do regulations support the new investments: e.g. mandatory sewer connections, tariffs, legal service providers, regular emptying etc.
- Are regulations practical, enforceable and incentivised?

The City Sanitation Service Delivery Assessment (CSDA) is a complimentary tool for working with stakeholders to review the policy, institutions and regulations for urban sanitation services.

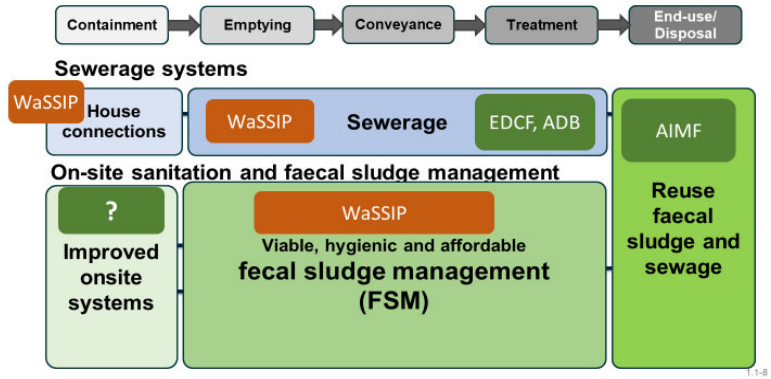


2. Factors to consider:

D: CWIS is a citywide approach – complement other investments

- What are Government sanitation funds being spent on?
- What are other development partners doing in the city?
- What service gaps can the ADB project fill within the overall CWIS approach of the city
- Balance the capital investments with supportive TA, capacity development and community engagement

WaSSIP is complementing others in closing service gaps



In Siem Reap, development partners contributing to sewered and non sewered sanitation. The World Bank's WaSSIP project was designed to fill gaps in the sanitation chains.

Advantages and disadvantages to consider for selection

3. Sewerage services have…

Advantages where

- ✓ Properties have defined, permanent tenure
- ✓ High settlement density makes lifetime cost lower than OSS/FSM
- ✓ In-house piped water supply exists
- ✓ Technically, financially viable utility in place for operations
- ✓ Political support exists for charging cost-covering tariffs
- ✓ Spare capacity exists for more connections, transport or treatment

Disadvantages if

- ✗ Property tenure is insecure and/or unplanned, or layout changeable
- ✗ Settlement density is low
- ✗ Flat terrain requires expensive pumping
- ✗ Utility is not technically or financially viable
- ✗ Lack of political support for cost-covering tariffs
- ✗ Most properties use off-plot or yard taps

Many cities require sewered systems, and onsite sanitation and FSM services

3. Non-sewered sanitation services have…

Advantages such as

- ✓ Flexible for unplanned areas: can be introduced, then removed when sewerage is installed
- ✓ Doesn't need piped water to property
- ✓ Suitable for medium or low density development
- ✓ Can utilize existing on-site sanitation systems
- ✓ Often FSM service providers are available – incl informal services
- ✓ Often, but not always cost-effective.

Disadvantages

- ✗ Where density and soil conditions together prevent sufficient absorption of liquid effluent.
- ✗ If there are no FSM service providers
- ✗ In high density areas
  - where lifetime cost of sewerage systems may be lower
  - Where there is no room for a tank or pit
  - with very limited road access for emptying

Many cities require sewered systems, and onsite sanitation and FSM services

3. Mix of sewered and non-sewered services often necessary

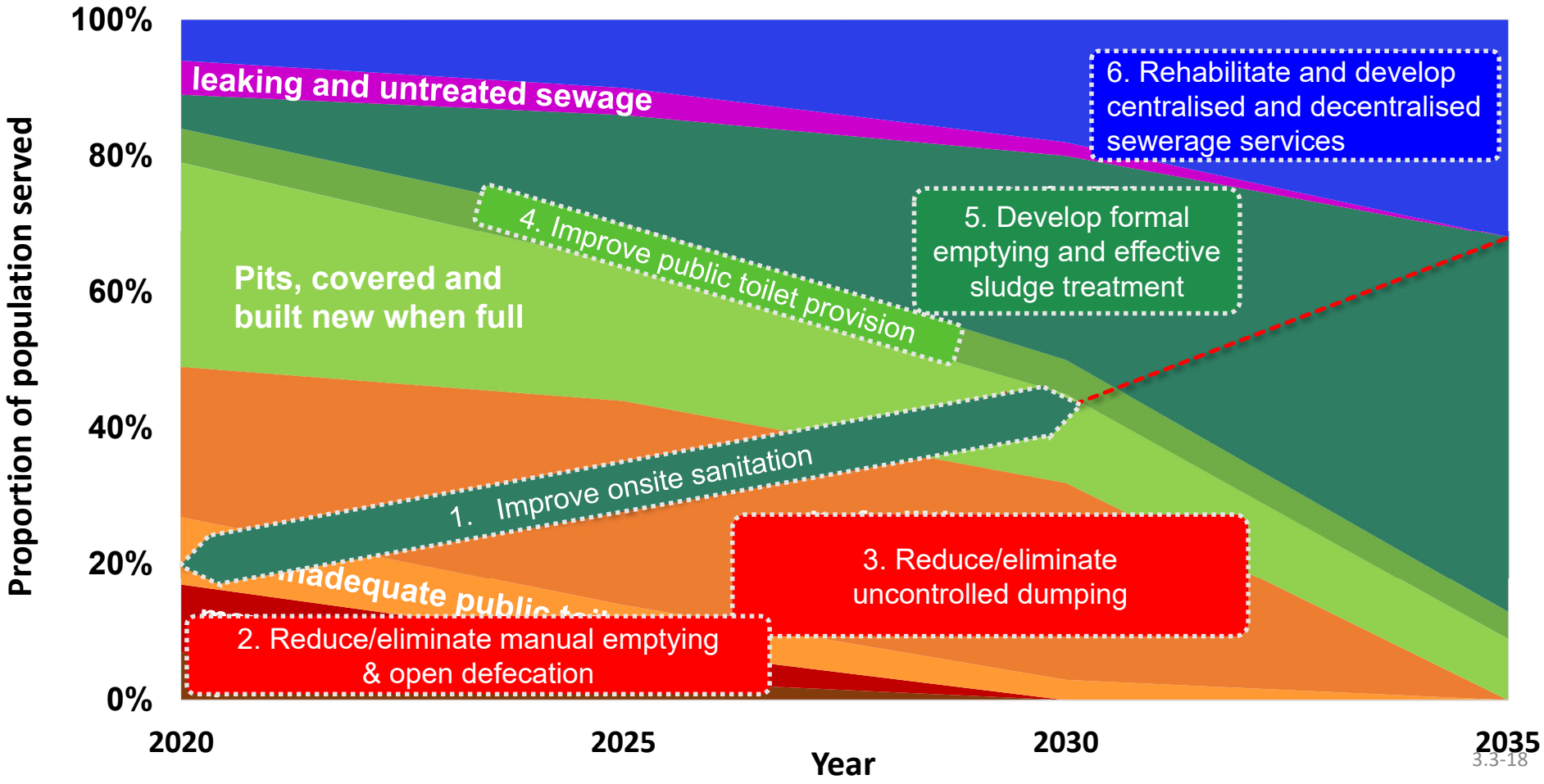
Sewer services typically where

- Sewered systems already exist, can be extended or connections added
- Properties are multi-story, high density and have piped water access
- There is willingness to charge and users are willing to pay O&M costs
- Many properties have flush toilets
- An accountable institution is mandated to provide services

Non-sewered services where

- Water supplies are remote or shared
- Onsite sanitation is common and self-supplied
- FSM service providers already exist, even informally
- Low willingness to charge O&M costs for sewerage
- Low density development mean sewers are expensive to install and operate
- Sewerage systems do not exist yet or only serve a small portion of the city.

CWIS Programs: Improving the city sanitation mix over time



References and resources on CWIS

Capacity development for City Wide Inclusive Sanitation: Online course from EAWAG available on YouTube, backed by extensive resource materials

World Bank CWIS Initiative: Resources and short videos

Sanitation, Water and Solid Waste for Development: Free online courses from EAWAG, including FSM, Planning and Design of Sanitation Technologies.

City Service Delivery Assessment for CWIS: A participatory tool for assessing and discussing the enabling environment for sanitation in a city

Sustainable Sanitation and Water Management Toolbox

Online tools and resources to solve sanitation and water management challenges