



**TN**  
TAMIL NADU

**US**  
URBAN SANITATION

**SP**  
SUPPORT PROGRAMME

**iihs**<sup>TM</sup>  
INDIAN INSTITUTE FOR  
HUMAN SETTLEMENTS

In Association With:



# Training programme on Fecal Sludge Management for Engineers in Trichy Corporation

Introduction to FSM

# Did you know?

## In India...

595 million people do not use toilets and resort to unsafe open defecation

Source:  
WHO

1000 children die from unsanitary defecation practices, every day

Source:  
UNICEF

65,000 tons of excrement are openly discharged, every day

Source:  
WHO

One gram of feces has:

10,000,000 viruses

1,000,000 bacteria

Source:  
UNICEF

43% of children suffer from disease

caused by open defecation

Source:  
UNICEF

Proof of toilet alone increasing the sanitation problem

Children in households with poor FSM had 3.78-10 times higher prevalence of diseases (enteric infection) when compared with children in other households, even those without toilets. CMC Vellore Study

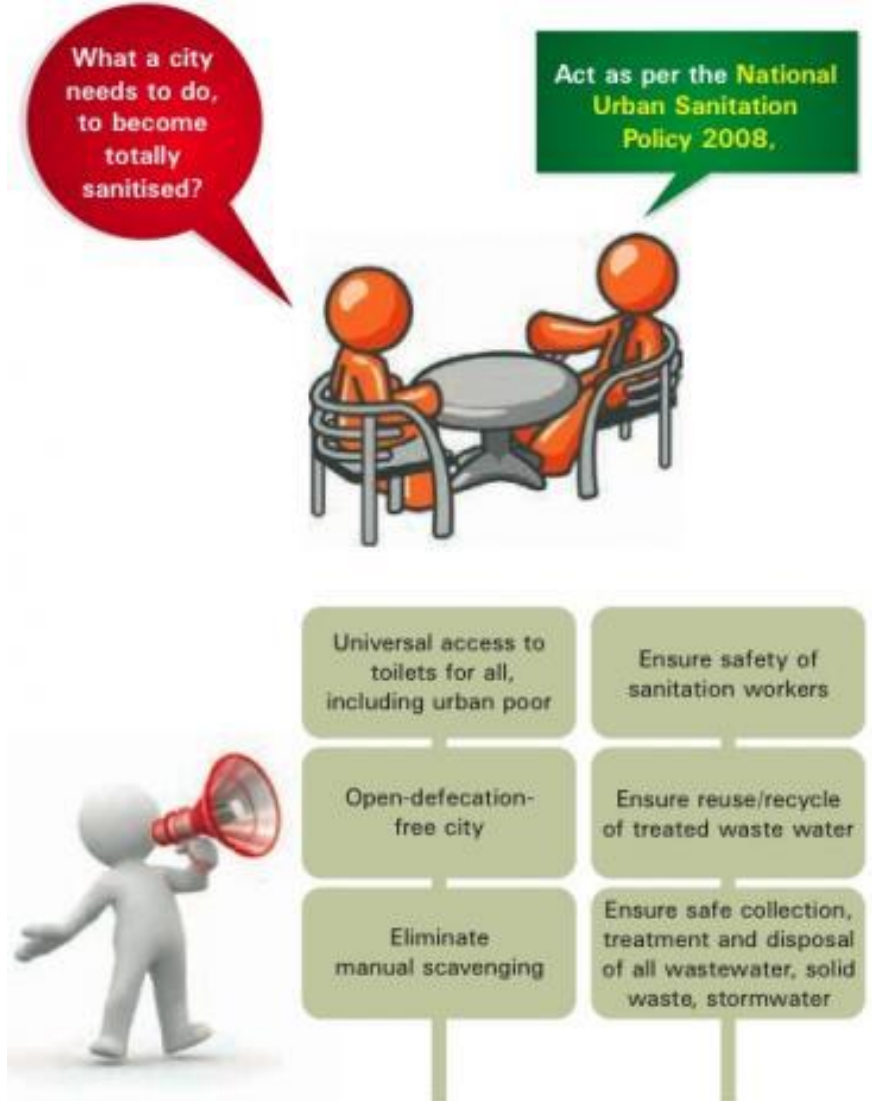


# Policy Goals of Sanitation

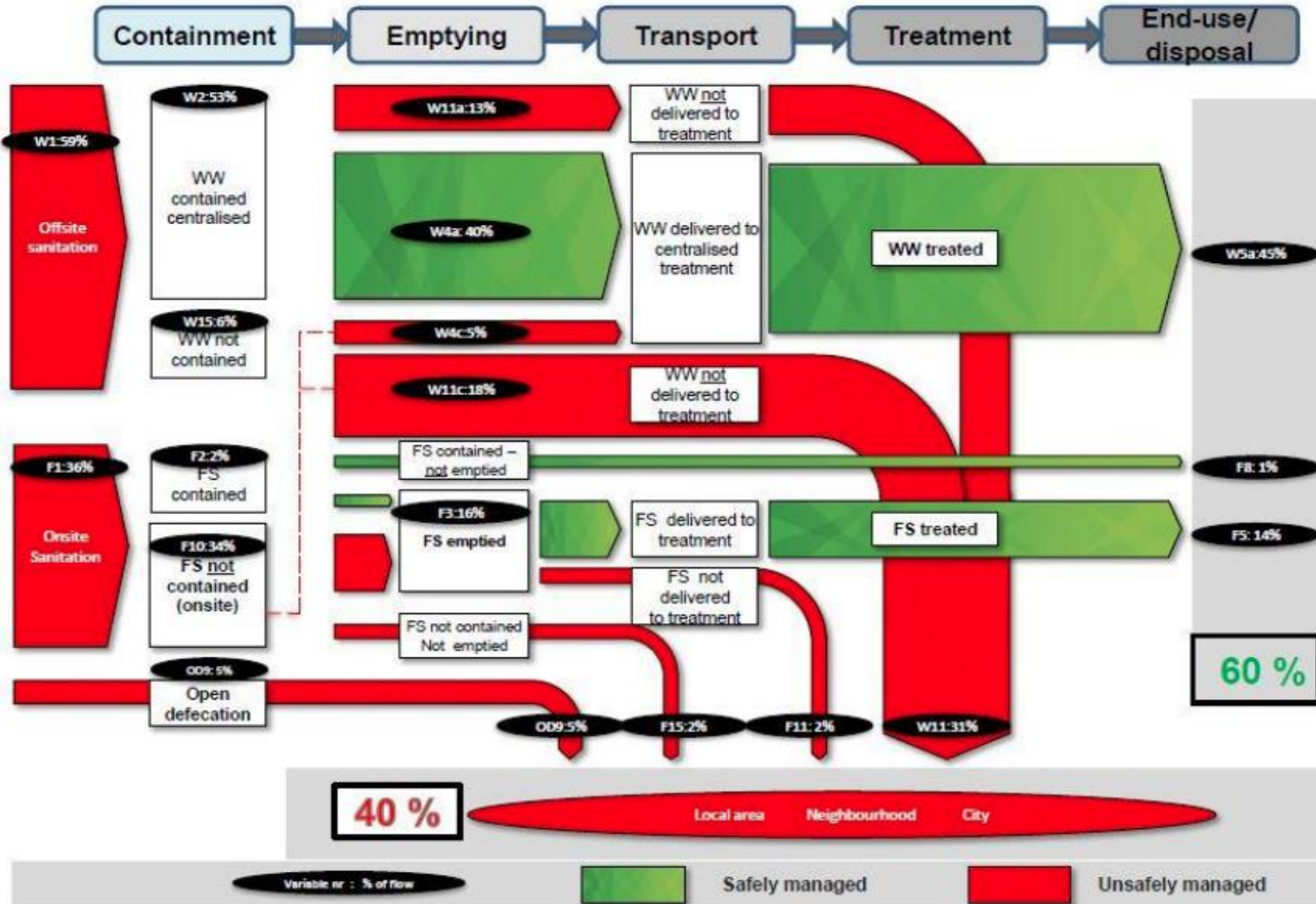
1. **Public Health** : Especially Children
2. **Environment** : Especially lakes
3. **Inconvenience** : Visual and smell
4. **Safety** : Especially for women

Toilet (without treatment) addresses successfully the last two problems **but unintentionally** increases the first two

Sanitation problem doesn't end, but starts after building toilets + (urbanization)



# SFD - Trichy

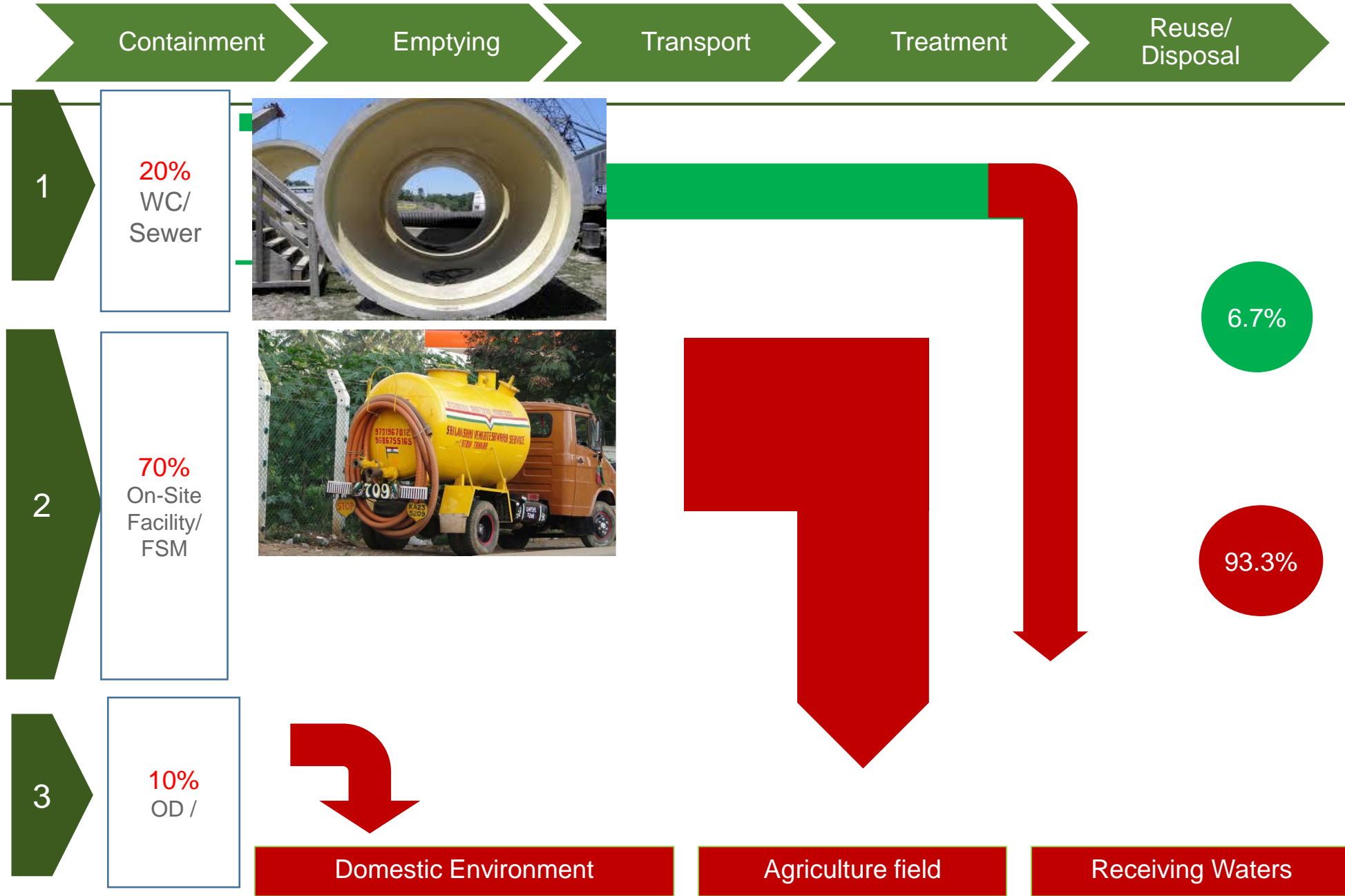


# What is an SFD?

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An excreta flow diagram (also often described as shit flow diagram, SFD) is a tool to readily understand and communicate visualizing how excreta physically flows through a city or town. It shows how excreta is or is not contained as it moves from defecation to disposal or end-use, and the fate of all excreta generated. An accompanying report describes the service delivery context of the city or town.

# Status of liquid waste in India



# Budget for wastewater

Description	Total Budget	Wastewater	
	INR	%	INR/capita/annum
AMRUT	41 B	31%	10
State and City	13 B	100%	10
Smart City	32 B	25%	6
National River Conser	4 B	50%	1
SPM Rurban Mission	3 B	30%	1
Namami Gange	23 B	60%	10
External Assistance	220 B	5%	8
<b>Total</b>			<b>46</b>



# Cost and budget for sewer system

**Cost Per Capita**



**Cost budgeted per capita  
per annum**



Source: CDD internal research by Stanzin

# What is Faecal Sludge?



Faecal sludge (FS) comes from onsite sanitation technologies, and has not been transported through a sewer. It is raw or partially digested, a slurry or semisolid, and results from the collection, storage or treatment of combinations of excreta and blackwater, with or without greywater.

# Faecal Sludge and Septage

## Faecal Sludge



Solid or settled contents of pit latrines and septic tanks. Differs from household to household, from city to city and country to country

## Septage



Settled solid matter in a semi-solid condition at the bottom of septic tank alone; mixture of solids and water with offensive odor

# Wastewater and Faecal Sludge

## Domestic Wastewater



Wastewaters originating from plumbing fixtures and appliances such as sanitary (toilets), bath, laundry, dish washing, garbage disposal, and cleaning wastewaters are defined as domestic wastewater

## Faecal Sludge



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# Sanitation value chain

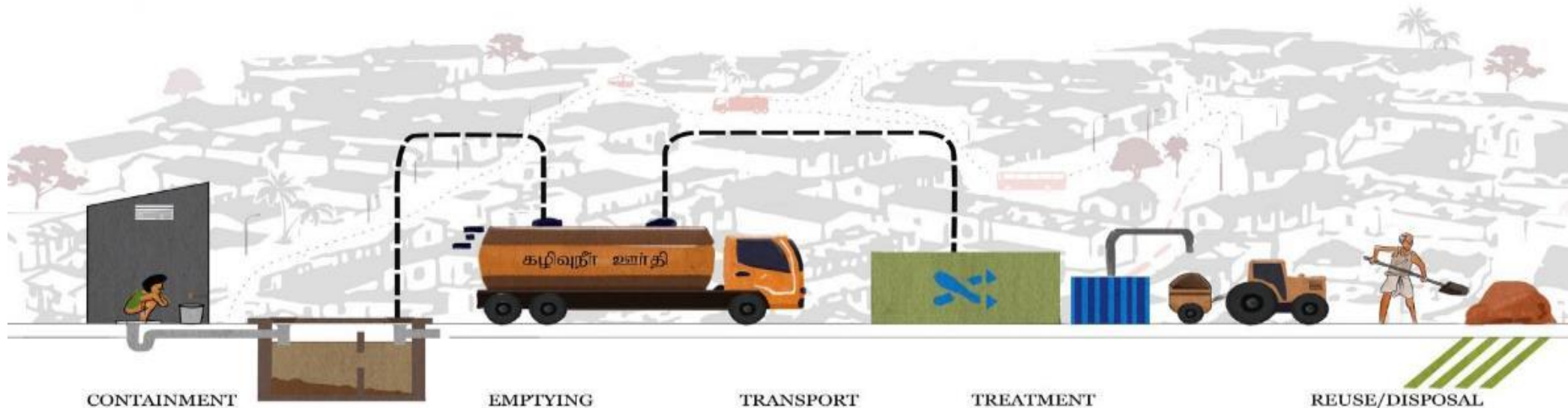
**Capture** – any type of latrine or tank which is used to capture and store faecal sludge;

**Emptying** – any type of device used to empty storage devices;

**Transport** – physically moving the sludge from the storage device to the treatment plant;

**Treatment** – treating sludge so that it is safe to disposed of or, ideally, reused;

**Reuse** – regaining value from the sludge by making it's nutritional or calorific content available for agriculture, energy, etc.



# Toilet (user interface)

Source : Bill and Melinda Gates Foundat



Urine diversion dry  
toilet



Pedestal type toilet



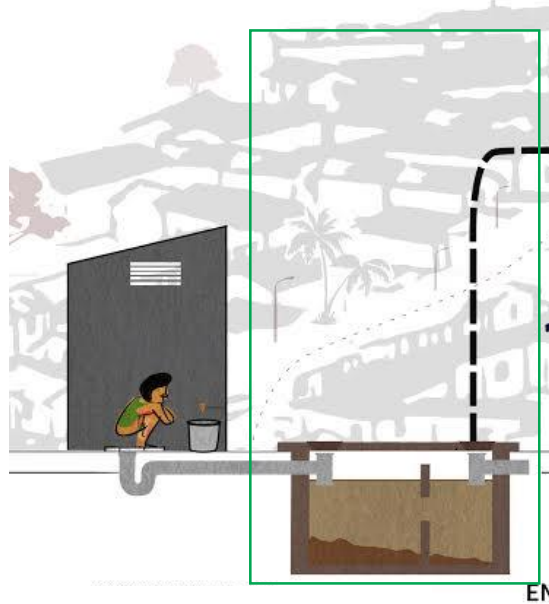
Cistern flush toilet



Pour flush toilet

# Containment

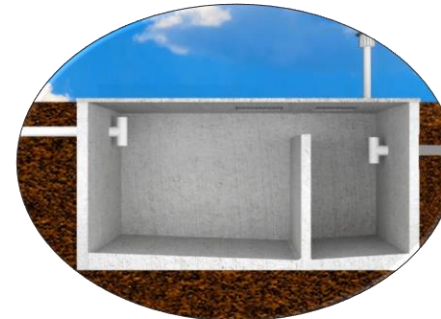
Source : Bill and Melinda Gates Foundation (BMGF)



Soak pit



Twin pit

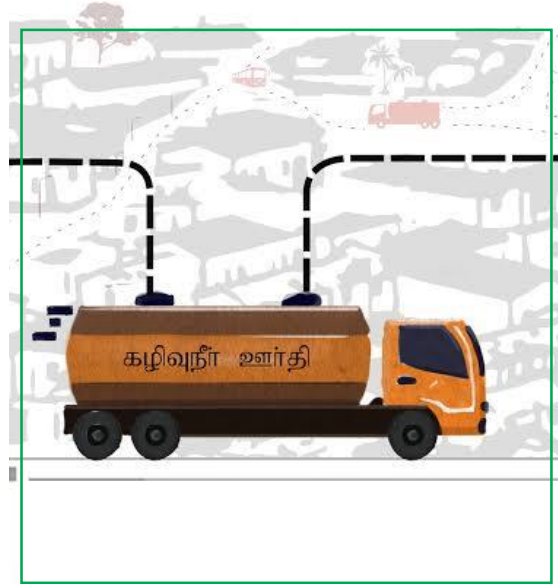


Septic tank

# Transportation



Honey sucker



EMPTYING  
நீக்குதல்

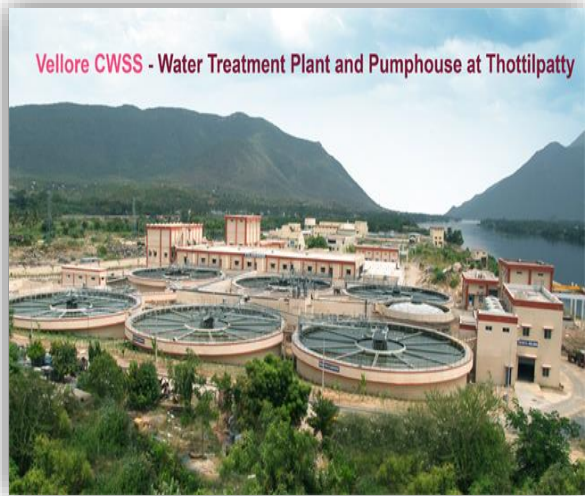
TRANSPORT  
எடுத்துச்செல்லுதல்



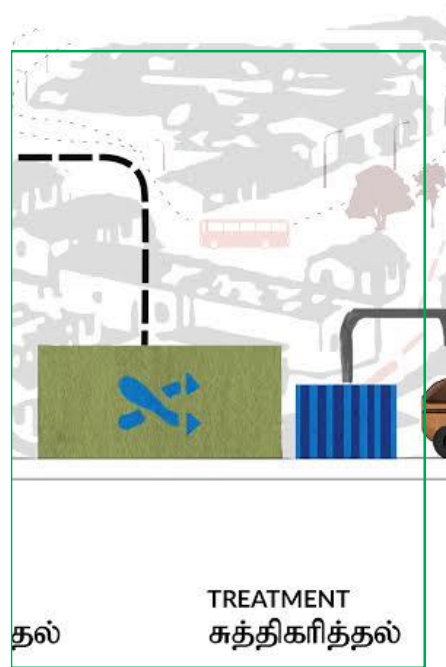
Sewer system



# Treatment



Centralized  
treatment  
plant



# Disposal & Reuse



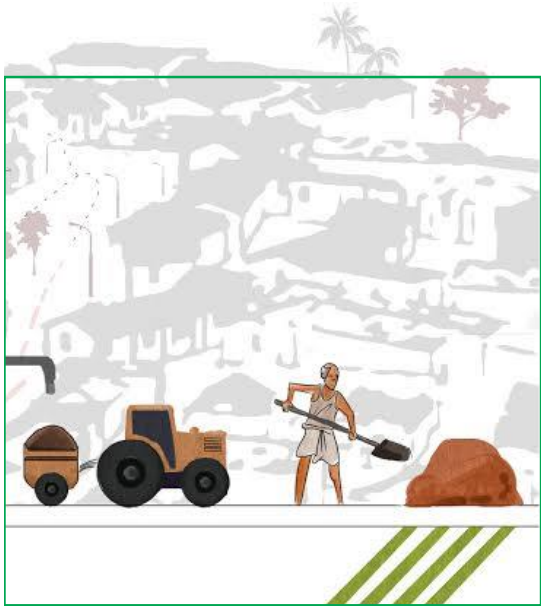
Farm land



Lake / river

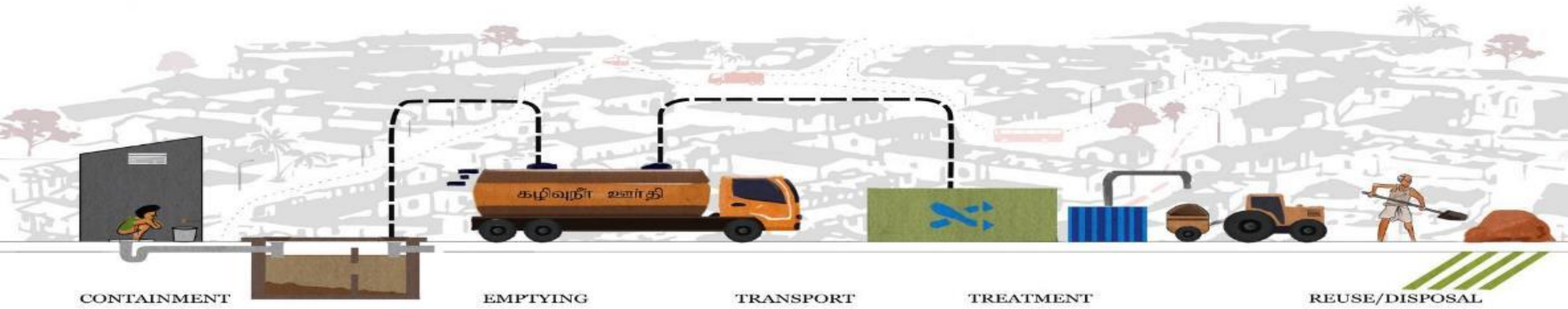


Landscaping



REUSE / DISPOSAL  
மறுபயன்பாடு / அகற்றுதல்

# Threats across the chain



Septic Tanks  
Pit Latrines  
Soak Pits

Vacuum  
Trucks

DEWATS™,  
STP, FSTP

Agriculture lands  
Farmlands  
Landfills

Improper construction and absence of soak away  
Irregular emptying  
Poor O&M

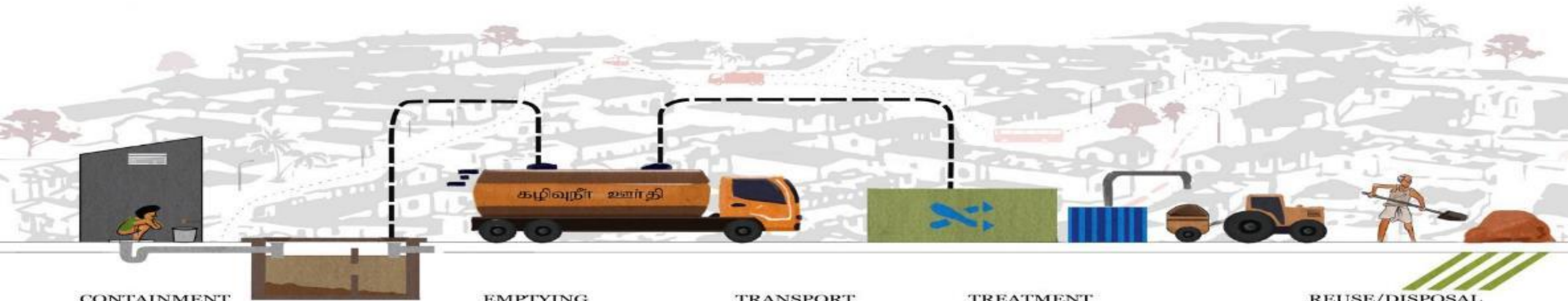
Unsafe emptying, transport and disposal  
Private sector is bridging the gap but poor regulation/ enforcement by

Most cities do not have STPs  
Septage in many cases not brought to STP

No safe disposal (standards)  
Re-use of treated water not being effectively carried out

Poor awareness, monitoring, regulation and enforcement weak finances and institutional capacities

# The Solution...



## CONTAINMENT

1. Reduce Open Defecation
2. Improving the existing latrines and provision of soak aways

## EMPTYING

1. Standard Containment systems to avoid leakages in to the system

## TRANSPORT

1. Safe collection and transportation of FS to avoid health hazard and leakage into environment

## TREATMENT

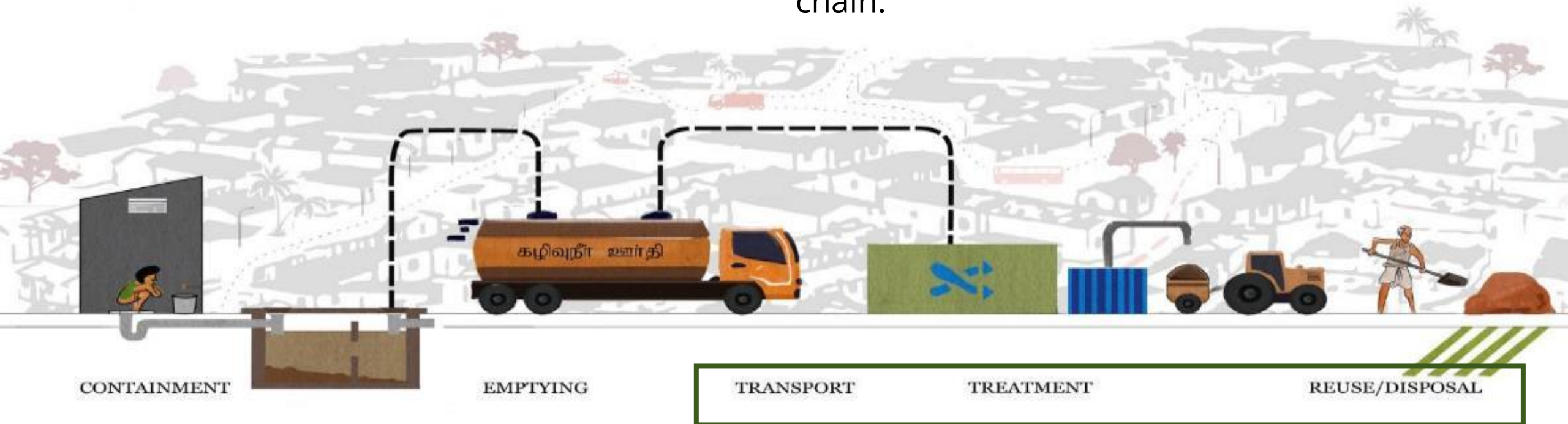
1. Treating septage to safe levels of disposal

## REUSE/DISPOSAL

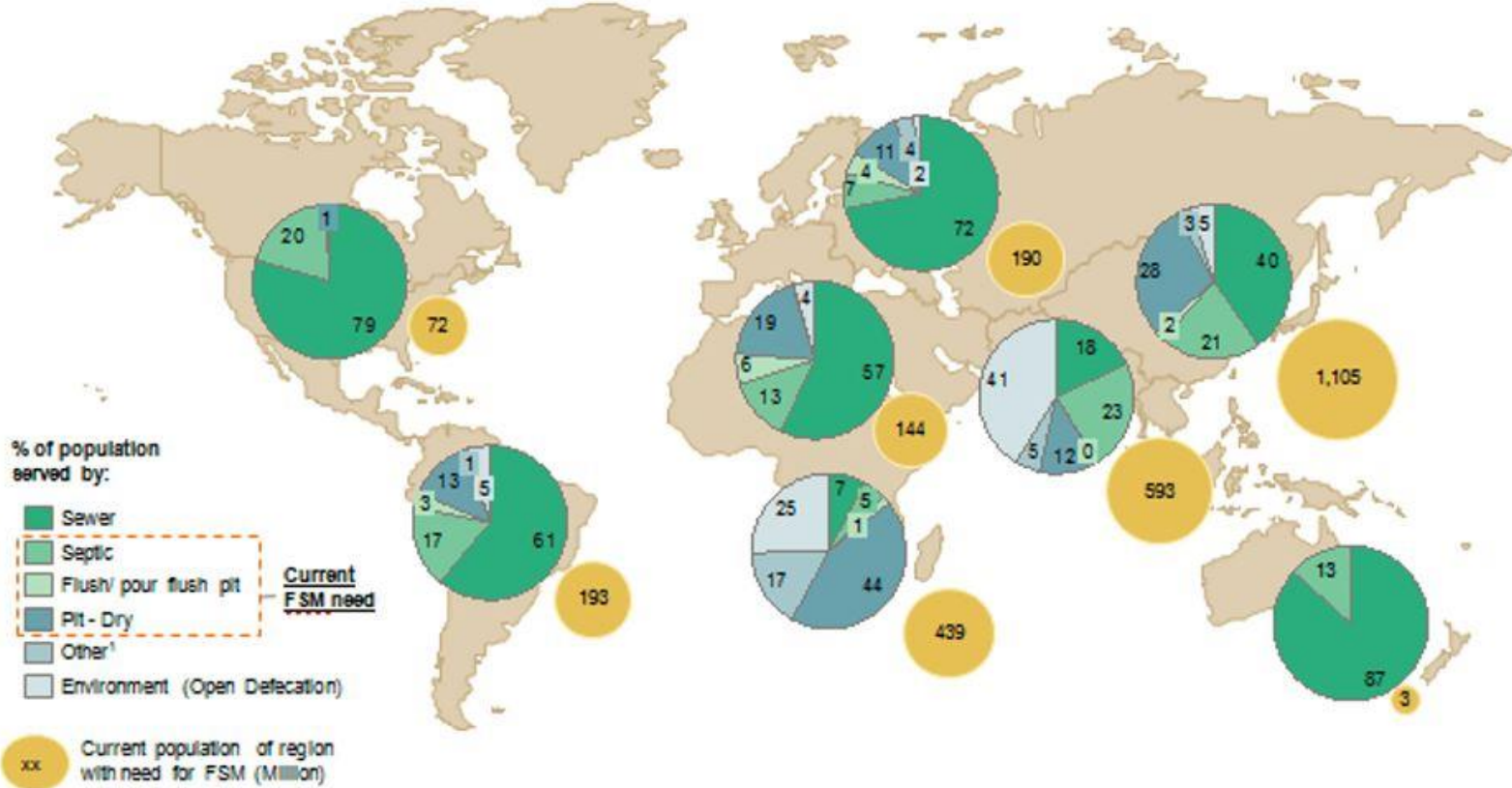
1. Reuse of end products to close nutrient cycle and bring economic benefits

# What is FSM?

Fecal sludge management includes emptying, transportation, treatment, and use or disposal of fecal sludge from an on-site sanitation technology (like a pit latrine or septic tank). It addresses the last three components of the sanitation value chain.



# Importance of FSM?



2.7 Billion people are in the need of FSM interventions across the globe

# Thank You