# Shit Flow Diagram (SFD)

from

# Performance Assessment System (PAS)

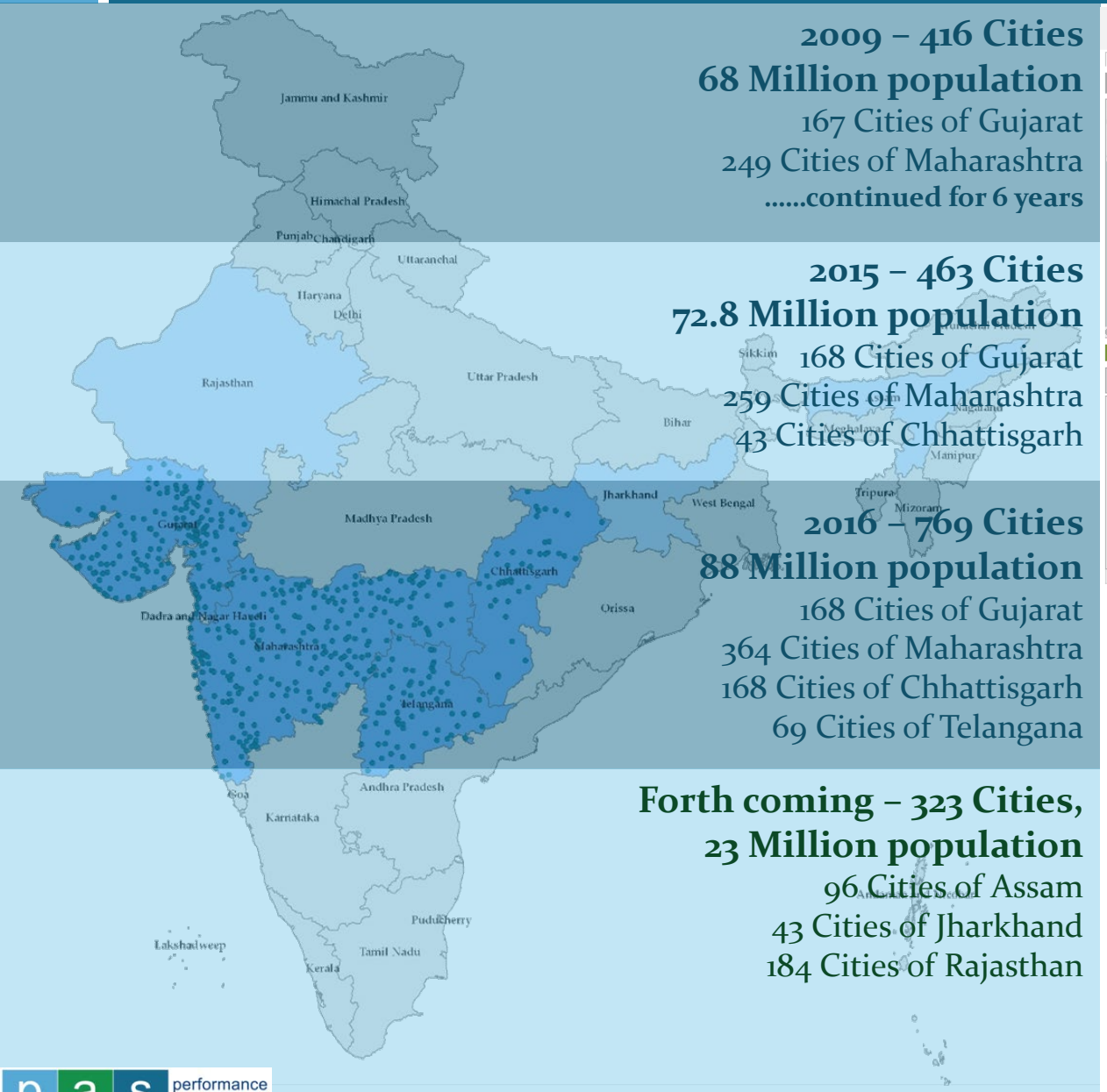
pas performance assessment system

PAS Project, CEPT University, Ahmedabad

# PAS @ CEPT University

- A major action **research project** funded by a grant from Bill and Melinda Gates Foundation for developing a statewide Performance Assessment System (PAS) in Maharashtra and Gujarat, and sanitation assessment and improvement
- Now extended to state of Chhattisgarh, Telangana, Assam, Jharkhand….and may be Rajasthan
- PAS Project has three main components:
  - **Performance Measurement** using commonly agreed relevant Key indicators (SLB) and Drilled down indicators
  - **Performance Monitoring** at State and Local level, civil society
  - **Performance Improvement** through various tools and innovative financing

# PAS Journey from 2009....

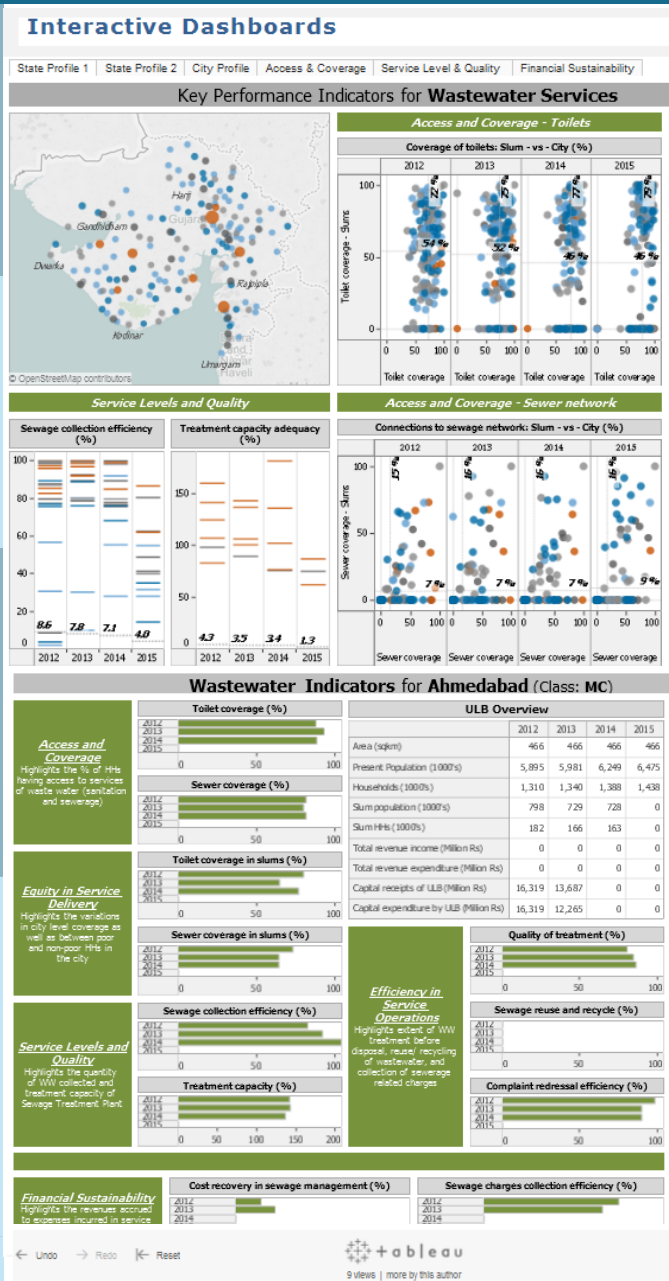



**2009 – 416 Cities**
**68 Million population**
167 Cities of Gujarat
249 Cities of Maharashtra
.....continued for 6 years

**2015 – 463 Cities**
**72.8 Million population**
168 Cities of Gujarat
259 Cities of Maharashtra
43 Cities of Chhattisgarh

**2016 – 769 Cities**
**88 Million population**
168 Cities of Gujarat
364 Cities of Maharashtra
168 Cities of Chhattisgarh
69 Cities of Telangana

**Forth coming – 323 Cities,**
**23 Million population**
96 Cities of Assam
43 Cities of Jharkhand
184 Cities of Rajasthan




pas performance assessment system

# PAS

Performance Assessment System

Annual service delivery profile for

750+ cities in 5 States

Time-series data for 7 years for 400 cities

## National database for 1800 cities
## For 18 states for 3 years

www.pas.org.in

**Water supply, Waste Water, Solid waste Management & Storm Water**

# Sanitation Activities under PAS Project

## Worked at city levels – From planning to implementation support

**PIP**
Performance improvement plans

**CSP**
City Sanitation Plans

**ODF**
Open Defecation Free Plans

**FSM**
Fecal Sludge Management Plans

## Supporting Statewide Program - Maharashtra

Monitoring SBM

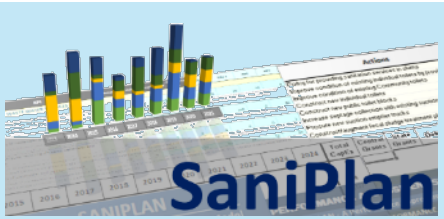
ODF framework

State level guidelines for ODF , IFSM

Capacity building programmes

Documentation support

## Sanitation Planning tools






PSP in IFSM

## Onsite sanitation

FSM guidelines

SanBenchmarks

Capacity building of cities and local contractors

## Sanitation Finance

Sanitation Credit

City Sanitation Fund

Demand assessment

Crowdfunding

pas performance assessment system

# PAS – Indicators for WSS

## WATER SUPPLY

9
Key Indicators

36
Local Action indicators

## WASTE WATER

9
Key Indicators

38
Local action Indicators

## STORM WATER

2
Key Indicators

## SOLID WASTE

8
Key Indicators

12
Local action Indicators

## EQUITY

4
Key Indicators

13
Local action Indicators

# SLB – PAS Indicator Framework

## Key Indicators (SLB)

Monitored by local governments as well as higher level of governments at state and national level

## Drill Down Indicators

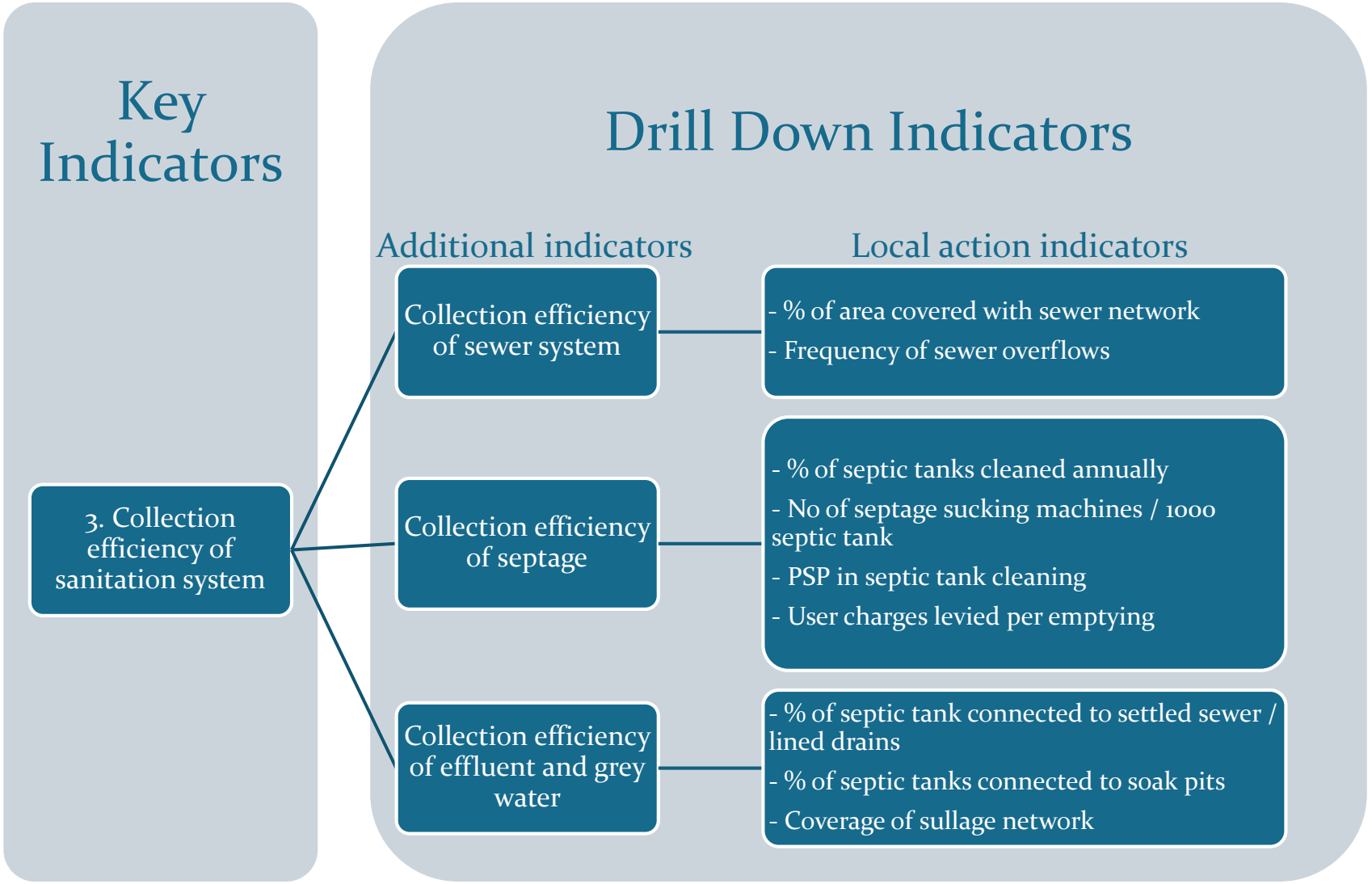
### Additional indicators

- Monitored by local governments
- Provide more details on the key indicators and explain the indicator better to the city officials.

### Local action indicators

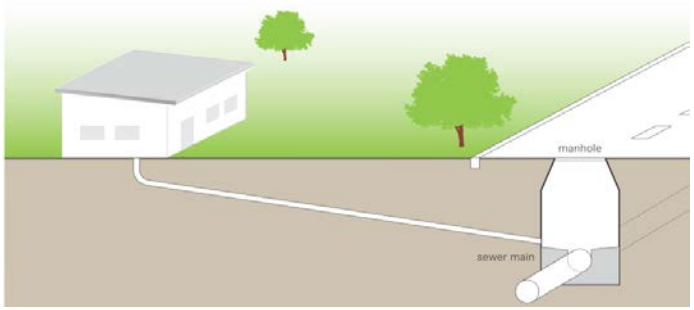
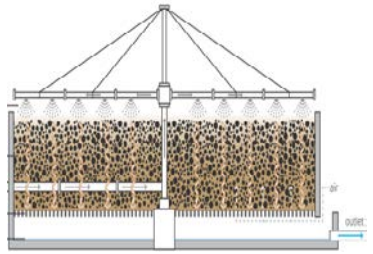
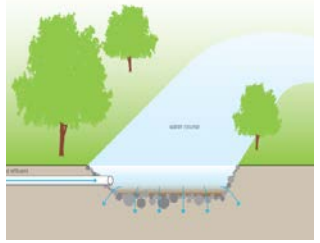
- Monitored by local governments
- Facilitate in identifying local actions required and set sub-targets to achieve improved performance on service delivery.

# Sanitation Indicators - CEPT



# GoI indicators (SLB) - Sanitation

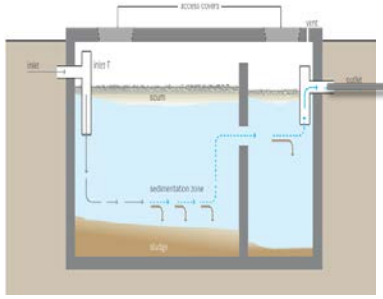
## Conventional Underground Sewerage system

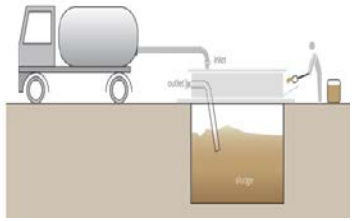
| User interface | Collection | Conveyance | Treatment | Recycle & Reuse |
|---|---|---|---|---|
|  |  |  |  | |
| 1. Coverage of toilets | 3. Collection efficiency of sewerage network | | 4. Adequacy of sewage treatment capacity | 6. Extent of reuse and recycling of sewage |
| 2. Coverage of sewerage network | | | 5. Quality of sewage treatment | |

# CEPT Indicators for Onsite sanitation systems

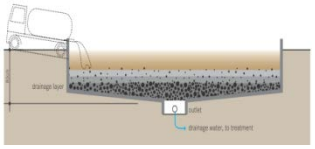
## Onsite system – Septic tank with Settled Sewer/lined drain

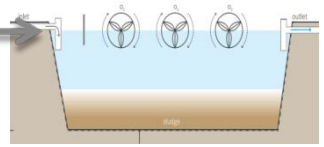
| User interface | Collection | Conveyance | Treatment | Recycle & Reuse |
|---|---|---|---|---|

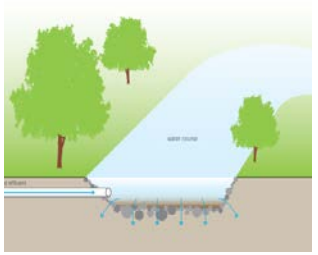




Settled sewers/drains







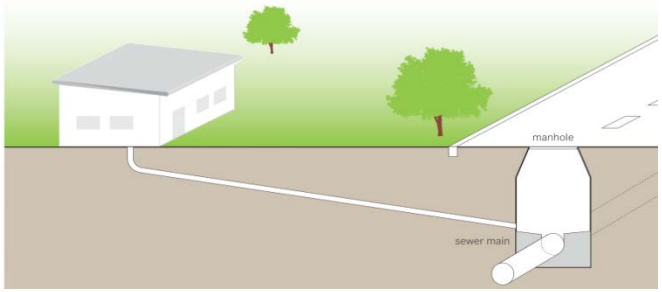
| | | | | |
|---|---|---|---|---|
| 1. Coverage of toilets | 2. Coverage of onsite sanitation system | 3a. Collection efficiency of septage | 4a. Adequacy of septage treatment plant | 6a. Extent of reuse and recycling of treated Septage |
| | | | 4b. Adequacy of effluent and grey water treatment plant | |
| | | 3b. Collection efficiency of effluents from septic tank and grey water | 5a. Quality of septage treatment plant | 6b. Extent of reuse and recycling of treated effluent and grey water |
| | | | 5b. Quality of effluent and grey water treatment plant | |

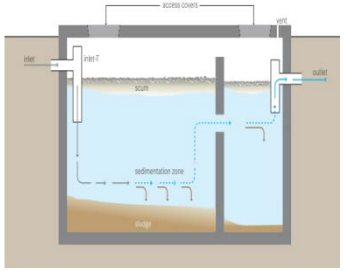
# SAN Benchmarks: *Citywide assessment of sanitation service delivery Including on-site sanitation*

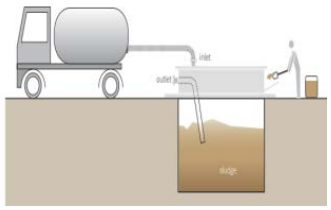
SAN Benchmarks provides a framework for performance assessment of city wide sanitation by capturing onsite sanitation systems along with the conventional sewerage systems.

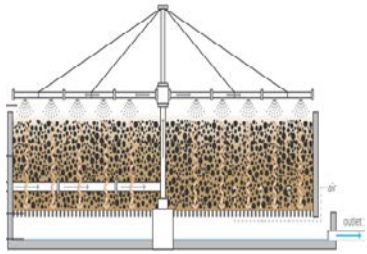
## Mixed Sanitation System

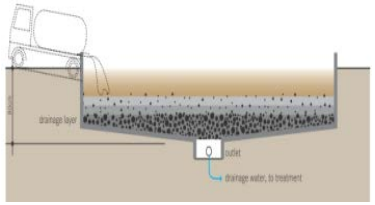
| Access | Collection | Conveyance | Treatment | Recycle & Reuse |
|---|---|---|---|---|

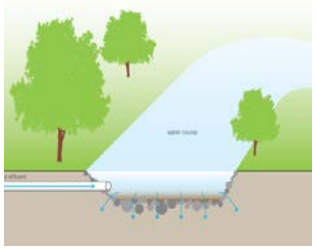


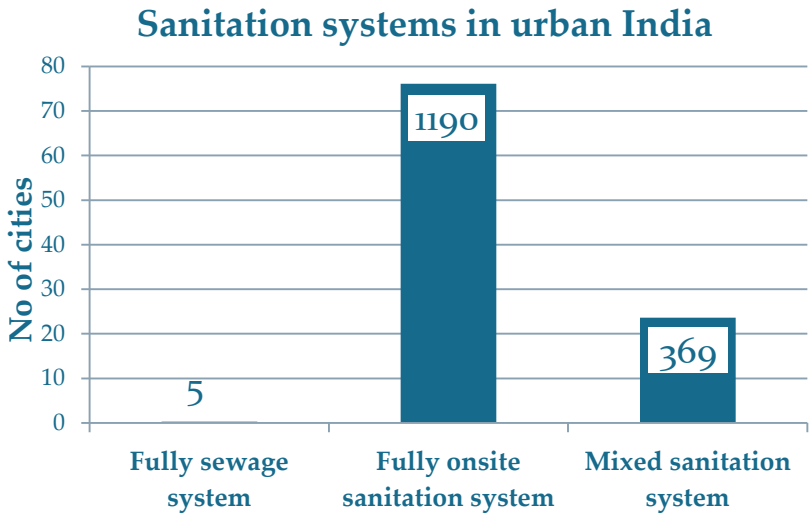



| | | | |
|---|---|---|---|
| 1. Coverage of toilets | 3. Collection efficiency of sanitation system (weighted average) | 4. Adequacy of treatment capacity of sanitation system (weighted average) | 6. Extent of reuse and recycling in sanitation system (weighted average) |
| 2. Coverage of adequate sanitation systems | | 5. Quality of treatment of sanitation system (weighted average) | |

# performance measurement framework for Sanitation




*Source: Based on the gazetted data submitted to GOI by 16 states covering 1564 cities*

**76 % of cities in India are fully dependent on on-site sanitation systems**

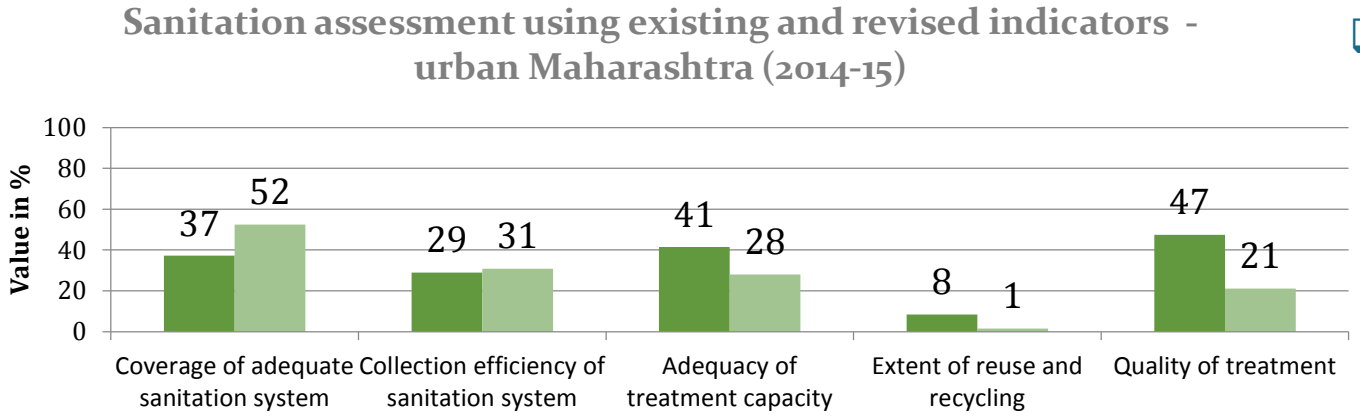
**24% are dependent on mixed sanitation systems**

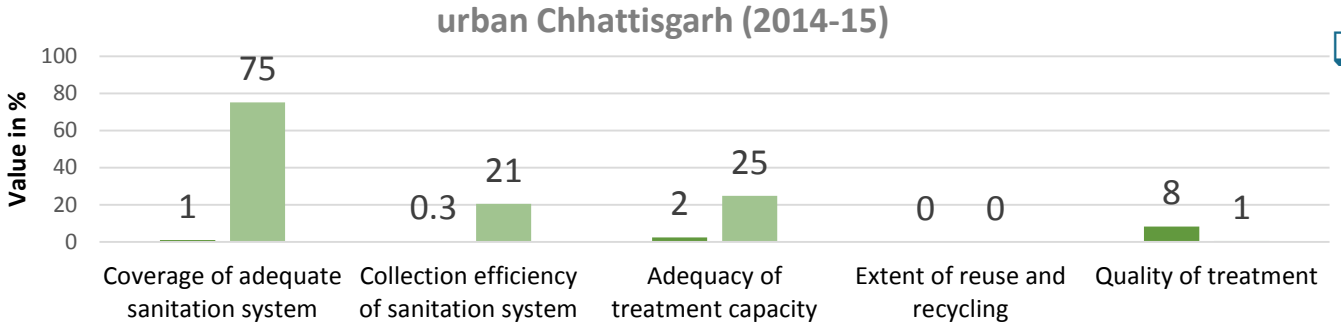
**Yet GoI's SLB indicators only capture performance of underground sewer network**

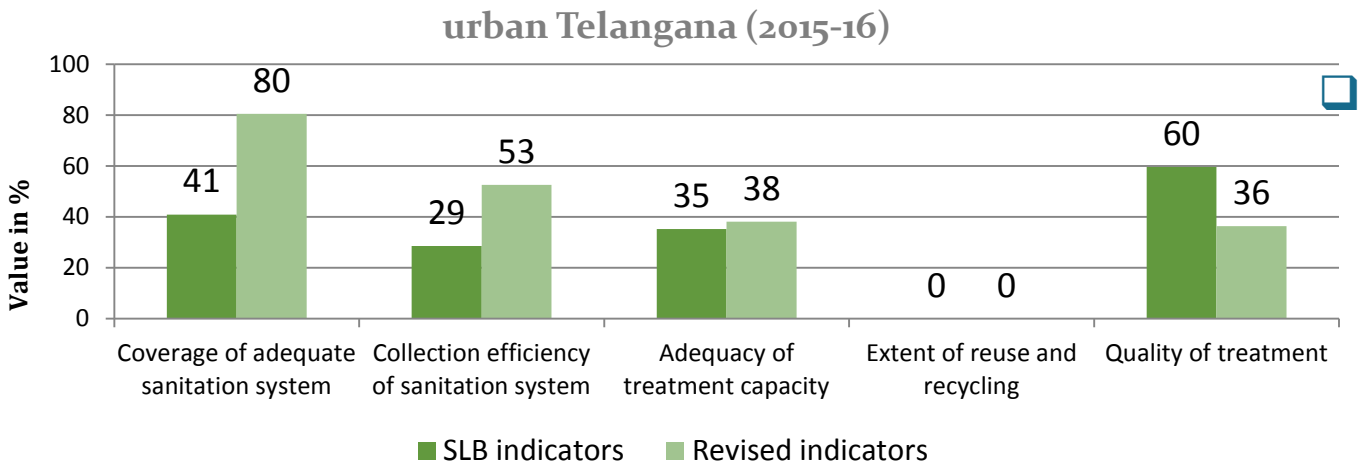
Framework Developed by PAS

| | SLB/GoI | SLB - PAS | SLB – PAS$^{+}$ |
|---|---|---|---|
| Basic | **28 basic indicators** of water supply, sewerage system, solid waste management and storm water drainage | | |
| Intermediate | | **4 Equity related Indicators** (for services in slum area)<br>**100+ Drill down indicators** for detailed and local action planning | |
| Advanced | | | **6 indicators** to assess **onsite sanitation** |

# SAN Benchmarks: *State Level Sanitation Assessment*



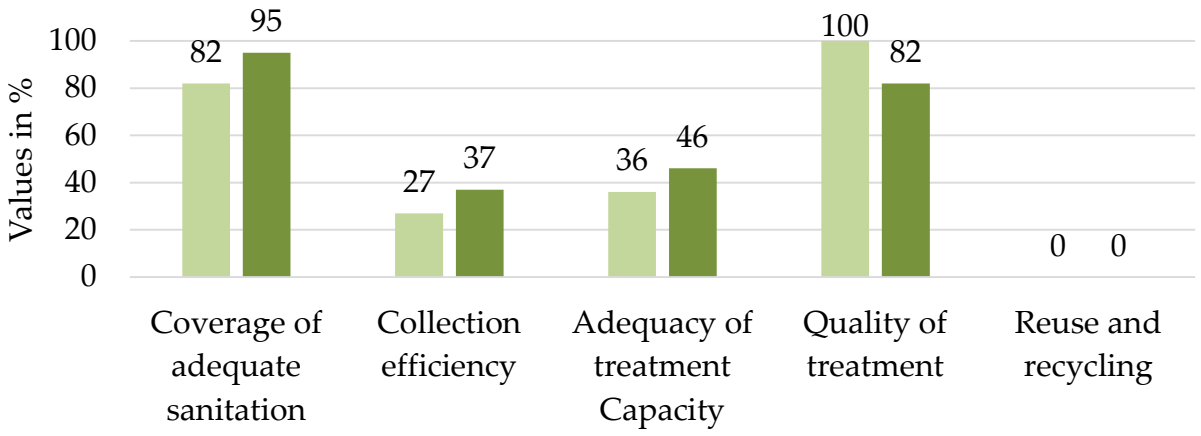



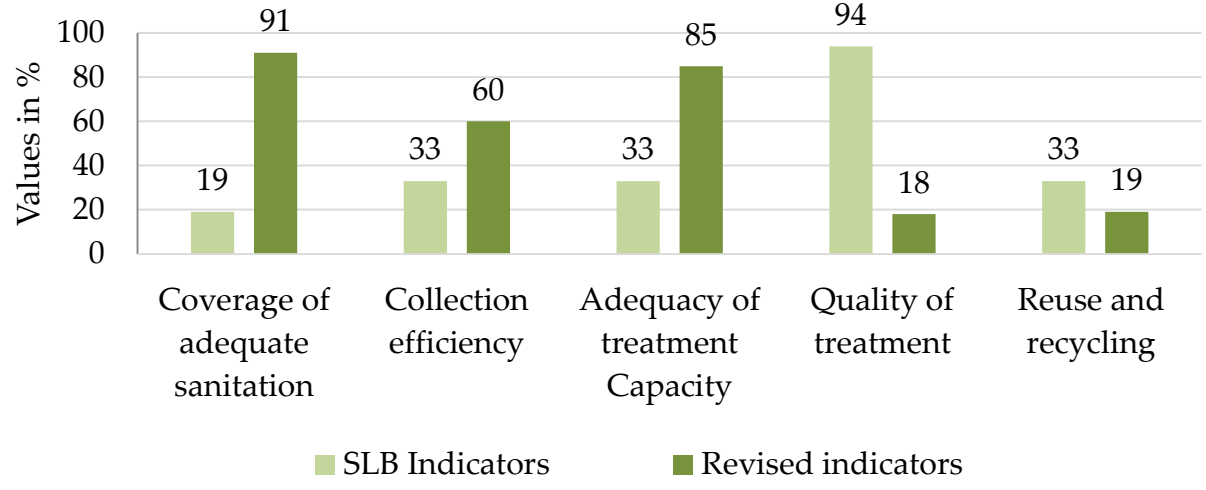

- Maharashtra has 259 urban local bodies (ULBs) of various sizes ranging from 3000 to 3.5 million population *(excluding greater Mumbai)*
- Chhattisgarh has 43 urban local bodies (ULBs) of various sizes ranging from 11,000 to 1.2 million population
- Telangana has 69 urban local bodies (ULBs) of various sizes ranging from 24,000 to 9.3 million population

# SAN Benchmarks: *City Level Sanitation Assessment*

Sanitation assessment using SLB and proposed sanitation indicators framework (mixed sanitation system - Nagpur)




Kalyan Dombivli




**Nagpur :**

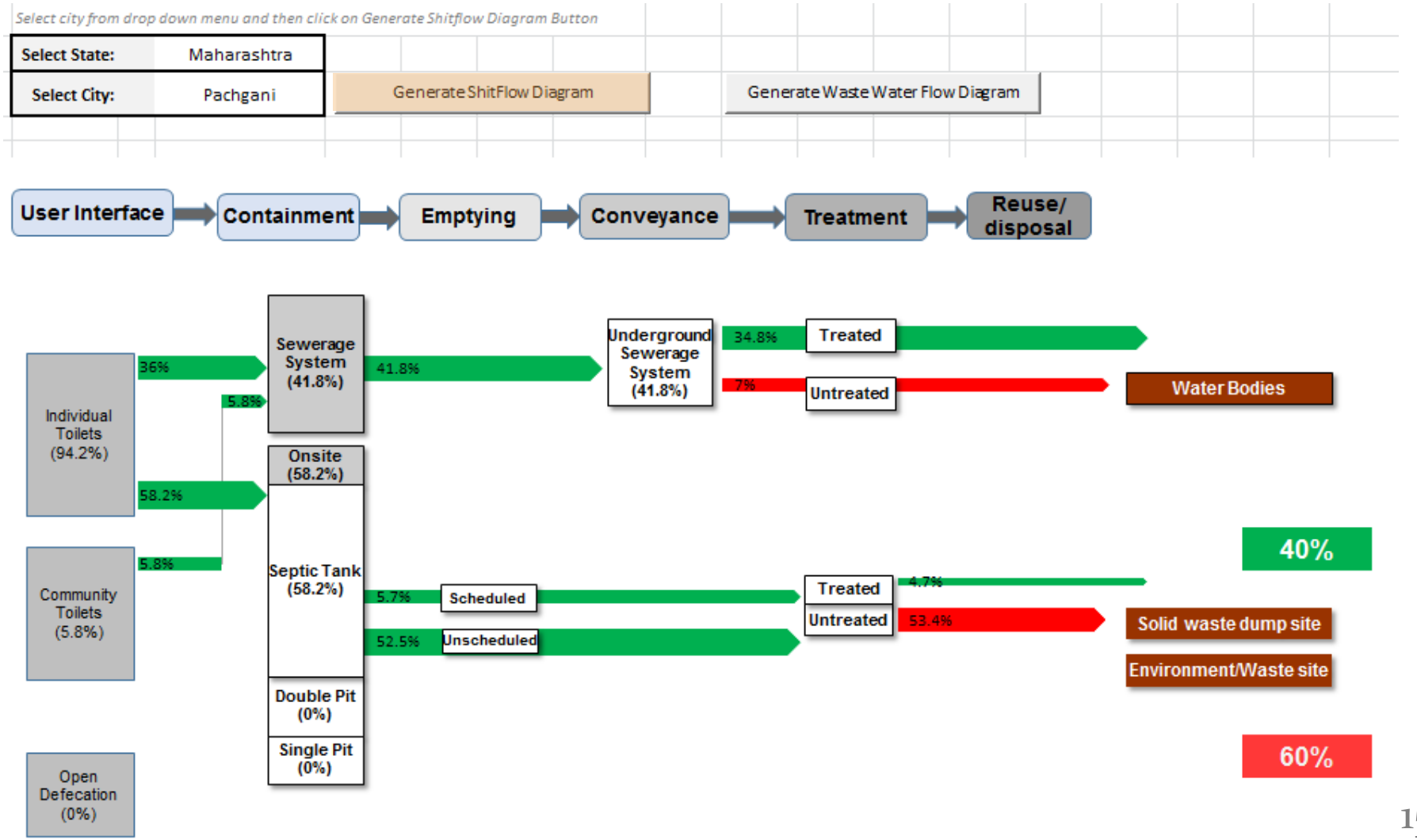
- 82% of properties are connected to sewer network. 13% have septic tanks with soak pits.
- WW generated: 276 MLD
- STP capacity: 100 MLD
- 12% of septic tanks are cleaned annually and treated in existing STP
- Quality tests are not carried out for sludge treatment

**Kalyan Dombivli:**

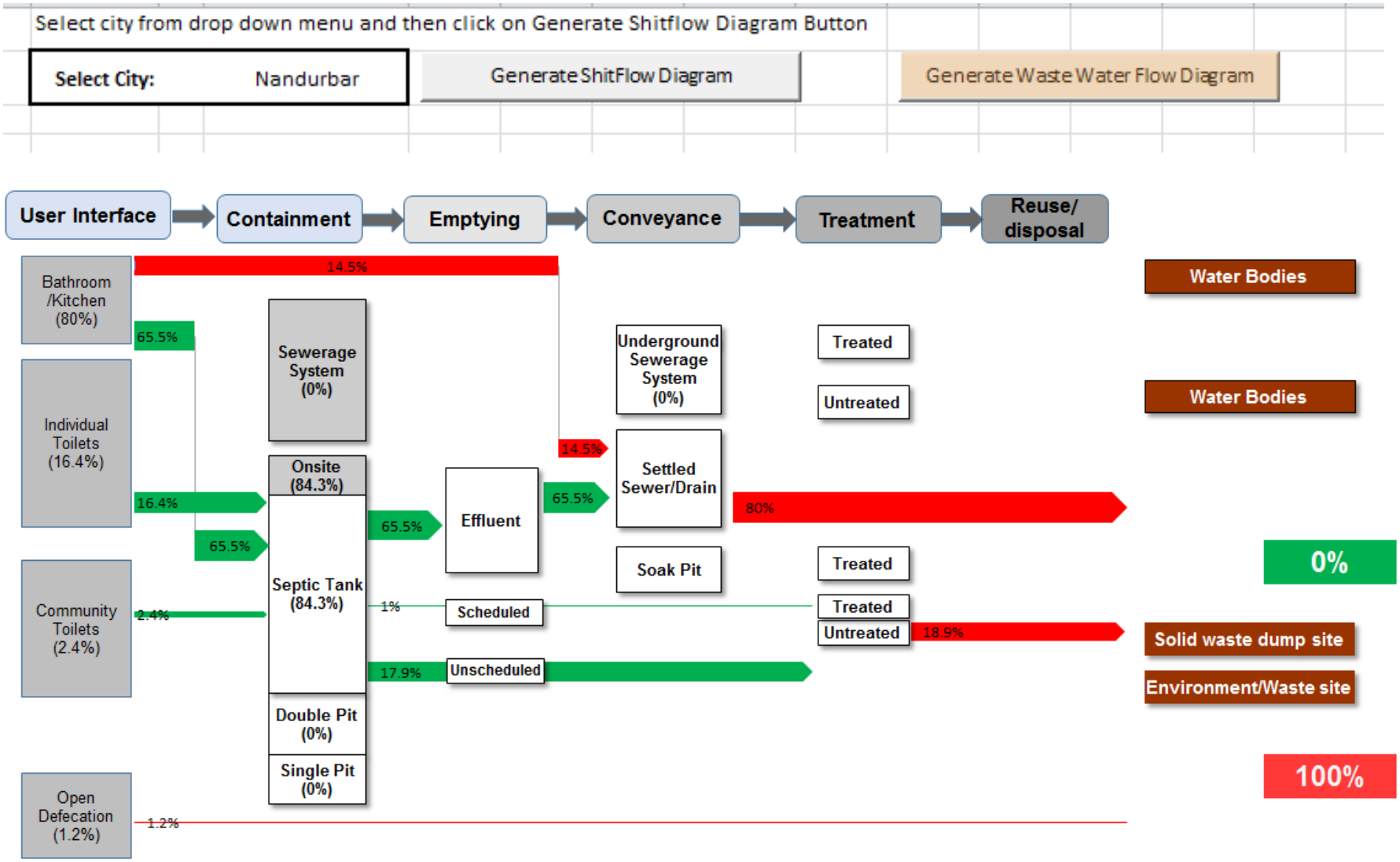
- 19% of properties are connected to sewer network. 78% have septic tanks with soak pits.
- WW generated: 370 MLD
- STP capacity: 123 MLD
- 8% of septic tanks are cleaned annually and treated in existing STP
- Quality tests are not carried out for sludge treatment
- 30 MLD treated sewage is reused

# Automatic SFD & WW Flow diagram Generation tool (Excel based)

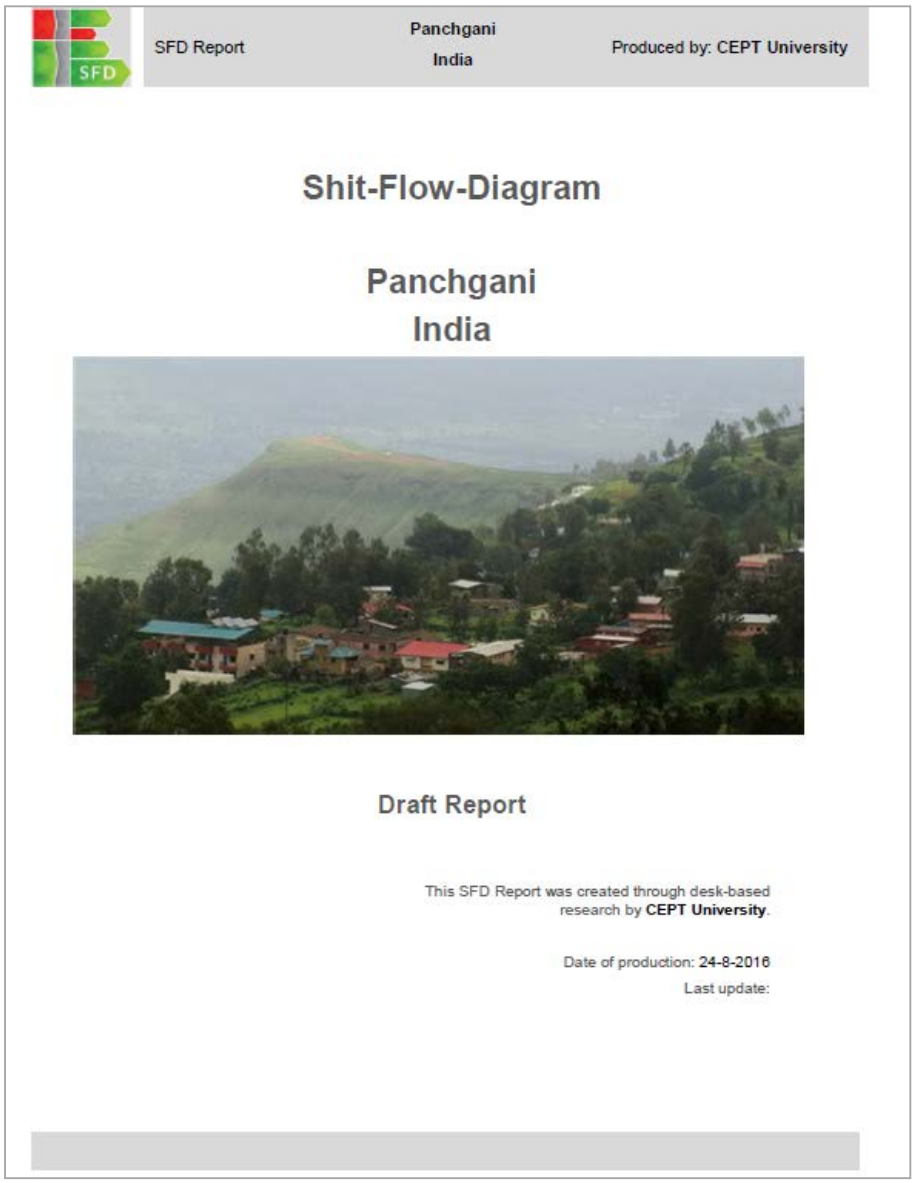
Automatic SFD generation tool will generate **SFD diagrams and WW Flow diagram** for around 400 cities using **PAS data** of 4 Indian states (Maharashtra, Gujarat, Chhattisgarh and Telangana states)



# Automatic SFD & WW Flow diagram Generation tool (Excel based)



# SFD Report


SFD Report | Panchgani India | Produced by: CEPT University

Shit-Flow-Diagram

Panchgani
India

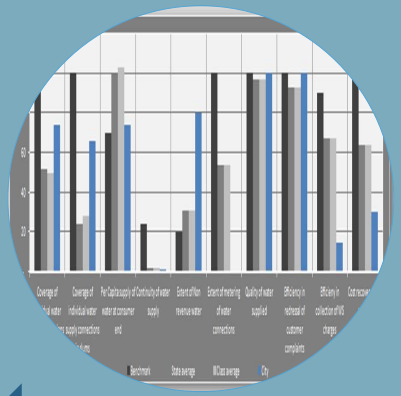
Draft Report

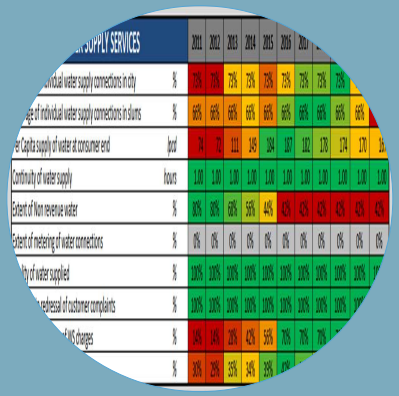
This SFD Report was created through desk-based research by **CEPT University**.

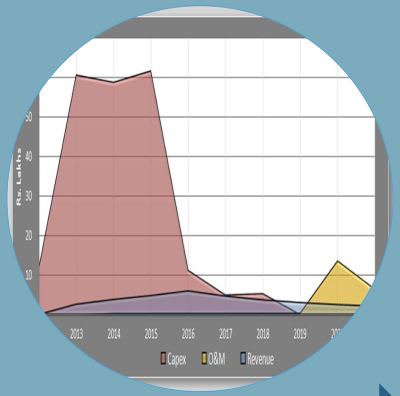
Date of production: 24-8-2016
Last update:

- SFD report for Panchgani city based on PAS database
- Components included in the report
  - City context
  - Policy, Regulation and Institutional roles
  - Water and sanitation service provision
  - SFD matrix and Diagram explanation
  - Stakeholder engagement

# Using SFD in City Sanitation Planning








**Sanitation Assessment**

Sanitation assessment using performance indicators and peer comparison to assess situation across the sanitation ladder.

**Plan Options**

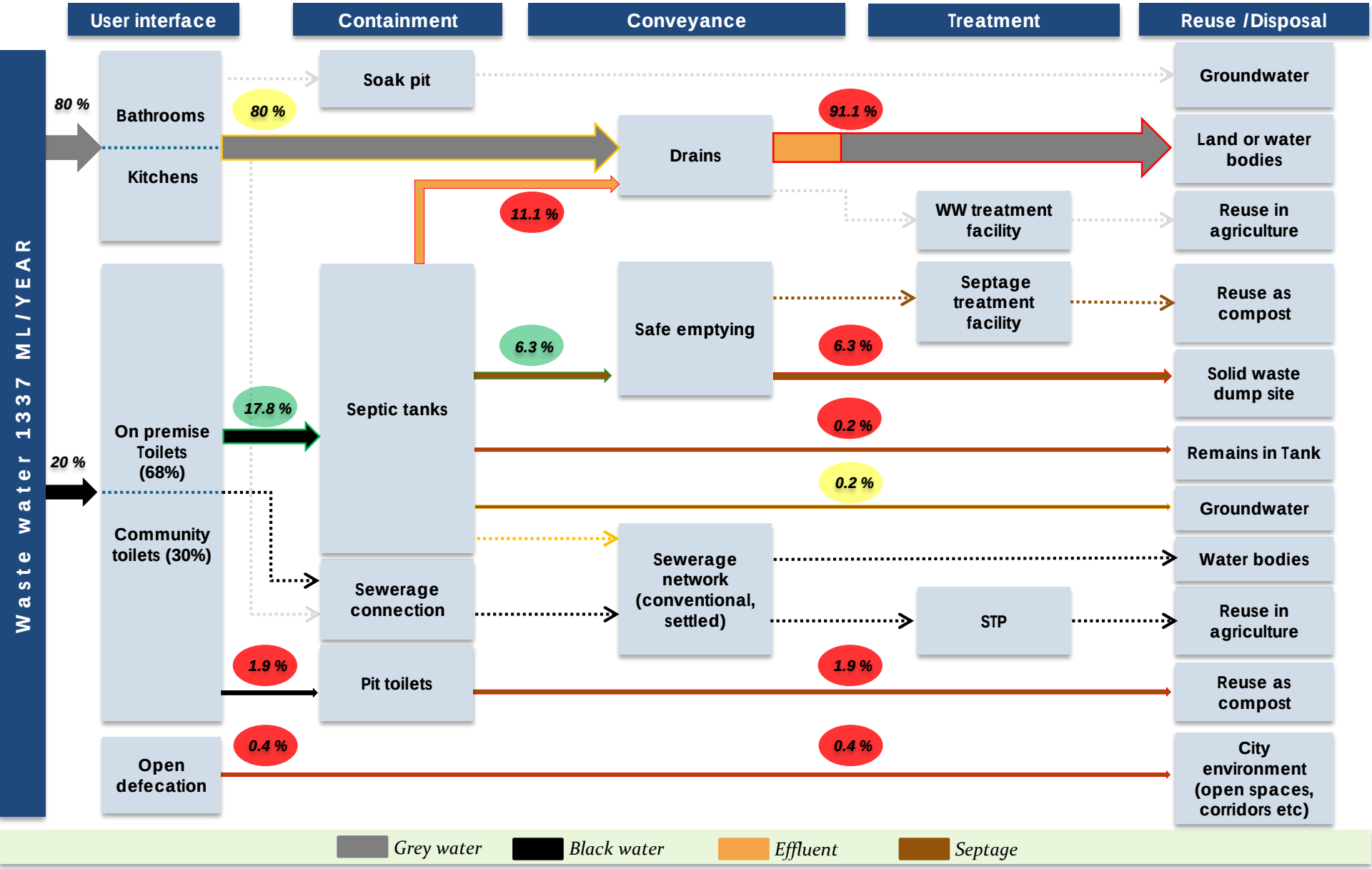
Assess technology options and process changes needed to develop citywide plan options.

Assess impact on sanitation performance and capital /O&M costs

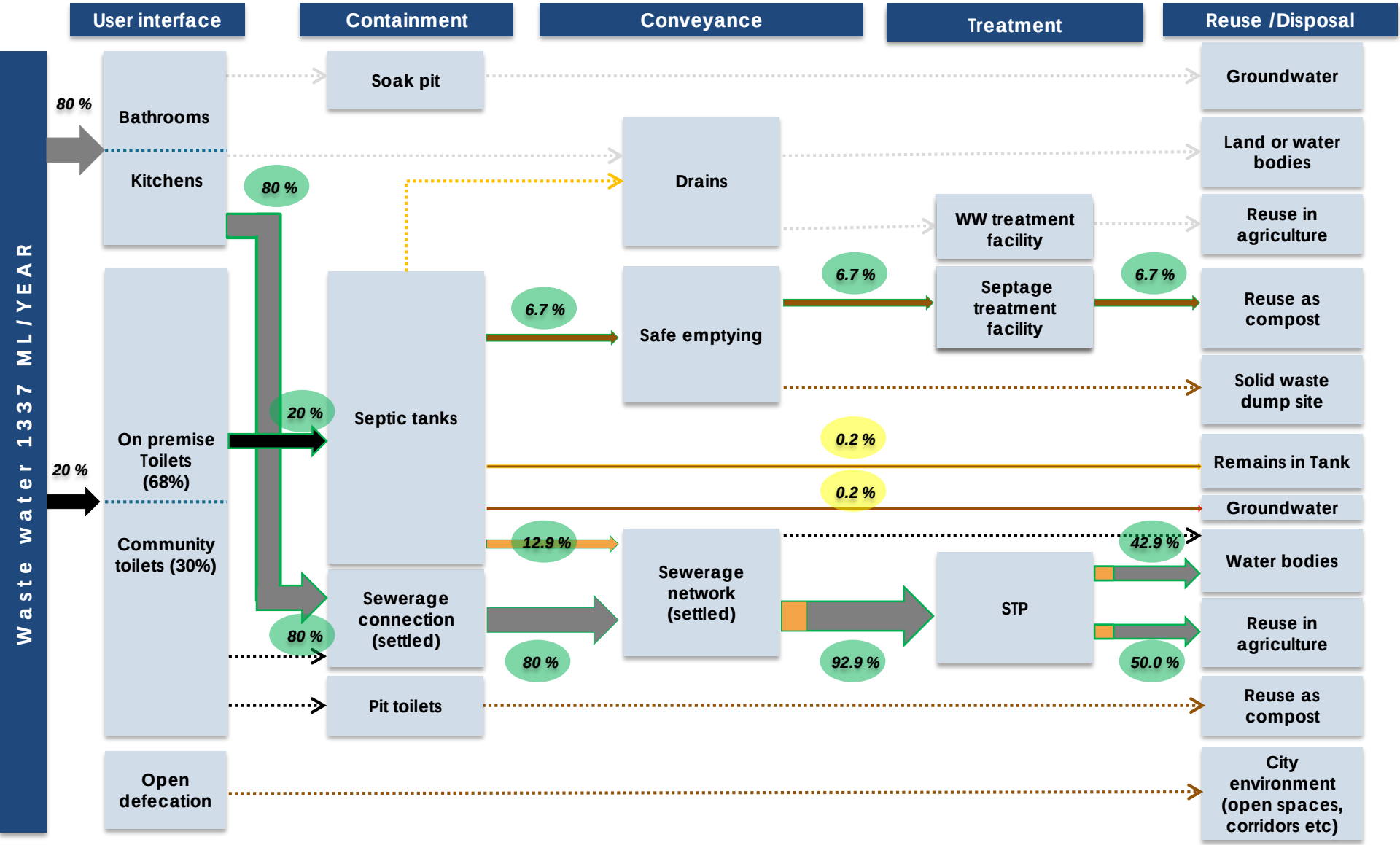
**Financial Assessment**

Assess municipal finances to develop a feasible financing plan. Explore creative financing through SIBs/DIBs, microcredit, debt and PPP options

# Existing Wastewater flows - Wai



# Wastewater flows after CSP - Wai



# Wai Areas of Implementation

1

## Own Toilets + Septic Tanks

Demand based incentive scheme

2

## Integrated fecal sludge management

Regular (in a 3-year cycle) collection of fecal waste + treatment of septage + reuse of treated septage


Awareness

SBM Monitoring

Training

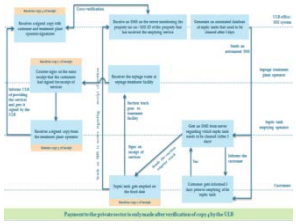

San. Financing


Created Database

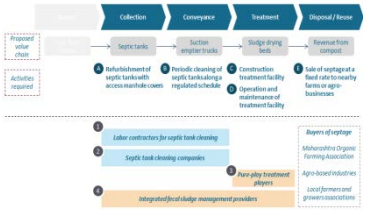

Citywide Plan

Treatment options


Awareness



Monitoring




Exploring PSP

# In conclusion

- SAN Benchmark, proposed by CEPT provide quantitative information that is easily converted to SFD
- SFD is seen as an advocacy tool, but to plan adequately for FSM, decision support tools are needed
- Preparing a SFD should not be a 'one-off' activity, but must lead to regular monitoring of the sanitation service chain

# Thank You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