

Shit Flow Diagrams



Excreta Flow Diagrams: Orientation Workshop

21 July, 2021

Overview

- What are SFDs?
- How to read a SFD?
- Data requirements for SFDs
- SFD Promotion Initiative
 - Role of SFDs in water and sanitation management

What is an SFD?



- ◆ An SFD presents a clear picture of the outcome arising from wastewater and faecal sludge management practices and services in a city or town.
- ◆ It provides technical and non-technical stakeholders with an easy-understood advocacy tool that can be used to support decision-making on urban sanitation planning and programming.
- ◆ An SFD for any city or town has three parts:
 - A diagram which shows the pathways taken by all excreta from defecation to final fate - either unsafe discharge to the environment, or safe end-use/disposal - expressed in terms of percentage of the total population;
 - A concise narrative report describing the diagram and the service delivery context - including the enabling environment within which the services are being delivered; and
 - A complete record of all the data sources used in developing the diagram and report - the stakeholders consulted, documents reviewed and all validation and quality control exercises implemented.

What is an SFD?



It is

- A tool for engineers, planners and decision-makers
- Based on contributing populations and an indication of where their excreta goes
- A representation of public health hazard
- An effective communications and advocacy tool
- An overview from which to develop sanitation priorities

It is NOT

- Based on actual volumes/mass – these are determined by other related factors
- A representation of public health risk (risk = hazard x behavior)
- A precise scientific analytical tool

What is an SFD?

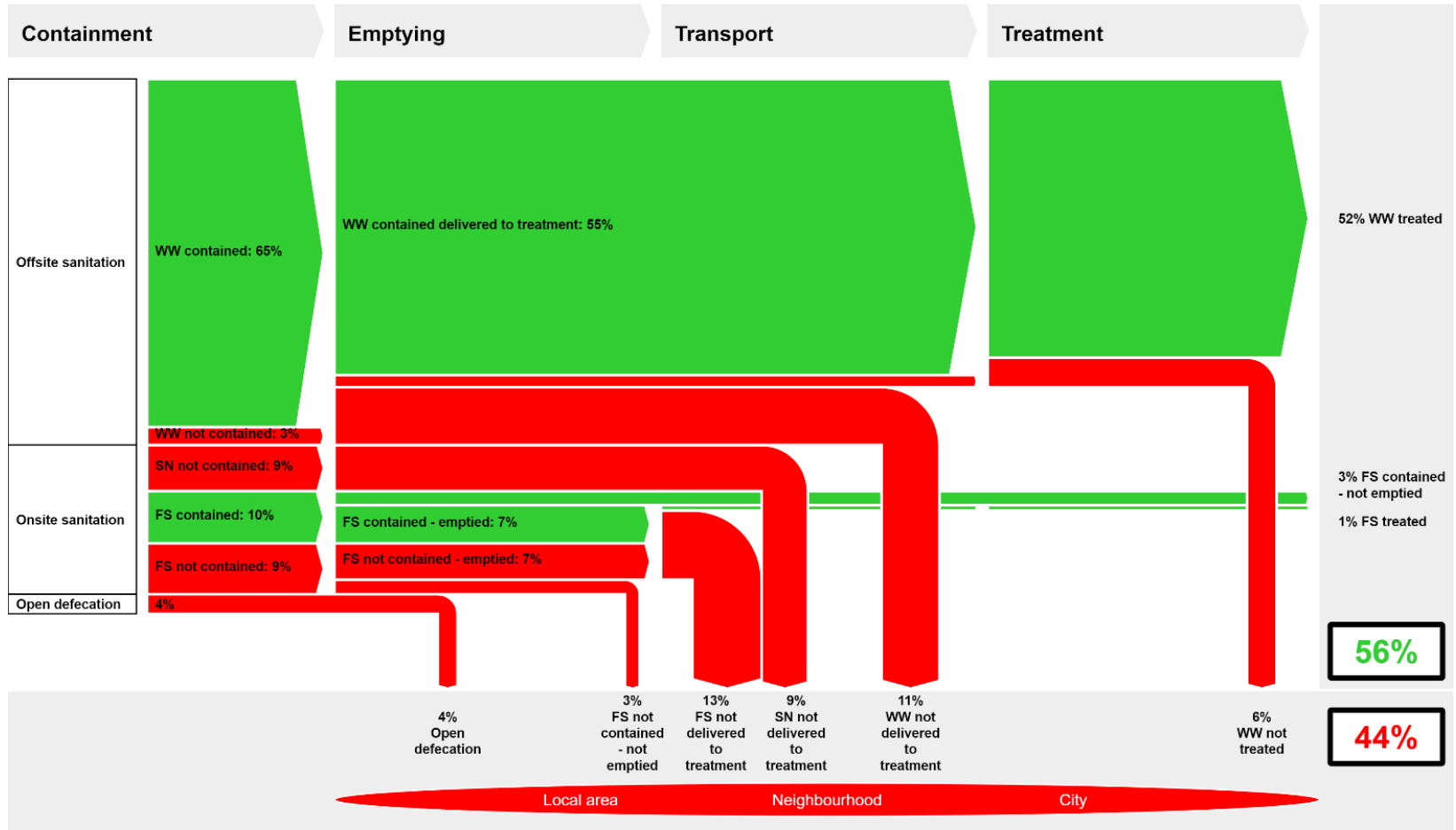


Delhi, National Capital Territory, India

Version: Reviewed
SFD Level: not set

Date prepared: 8 Feb 2016

Prepared by: CSE, India



Key: WW: Wastewater, FS: Faecal sludge, SN: Supernatant

■ Safely managed

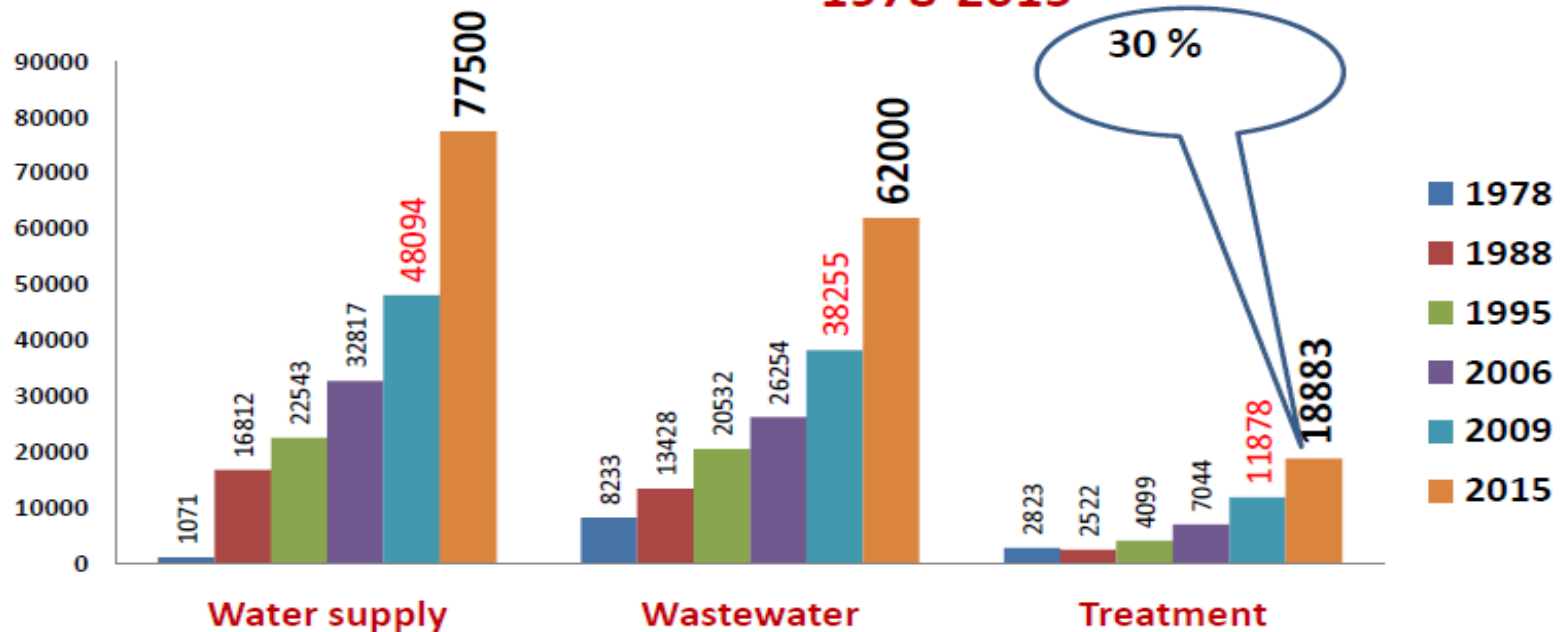
■ Unsafely managed

Produced with support from the SFD Promotion Initiative with funding from the Bill & Melinda Gates Foundation.

The SFD Promotion Initiative recommends that this graphic is read in conjunction with the city's SFD Report which is available at: sfd.susana.org

Mapping SFDs: India's journey...

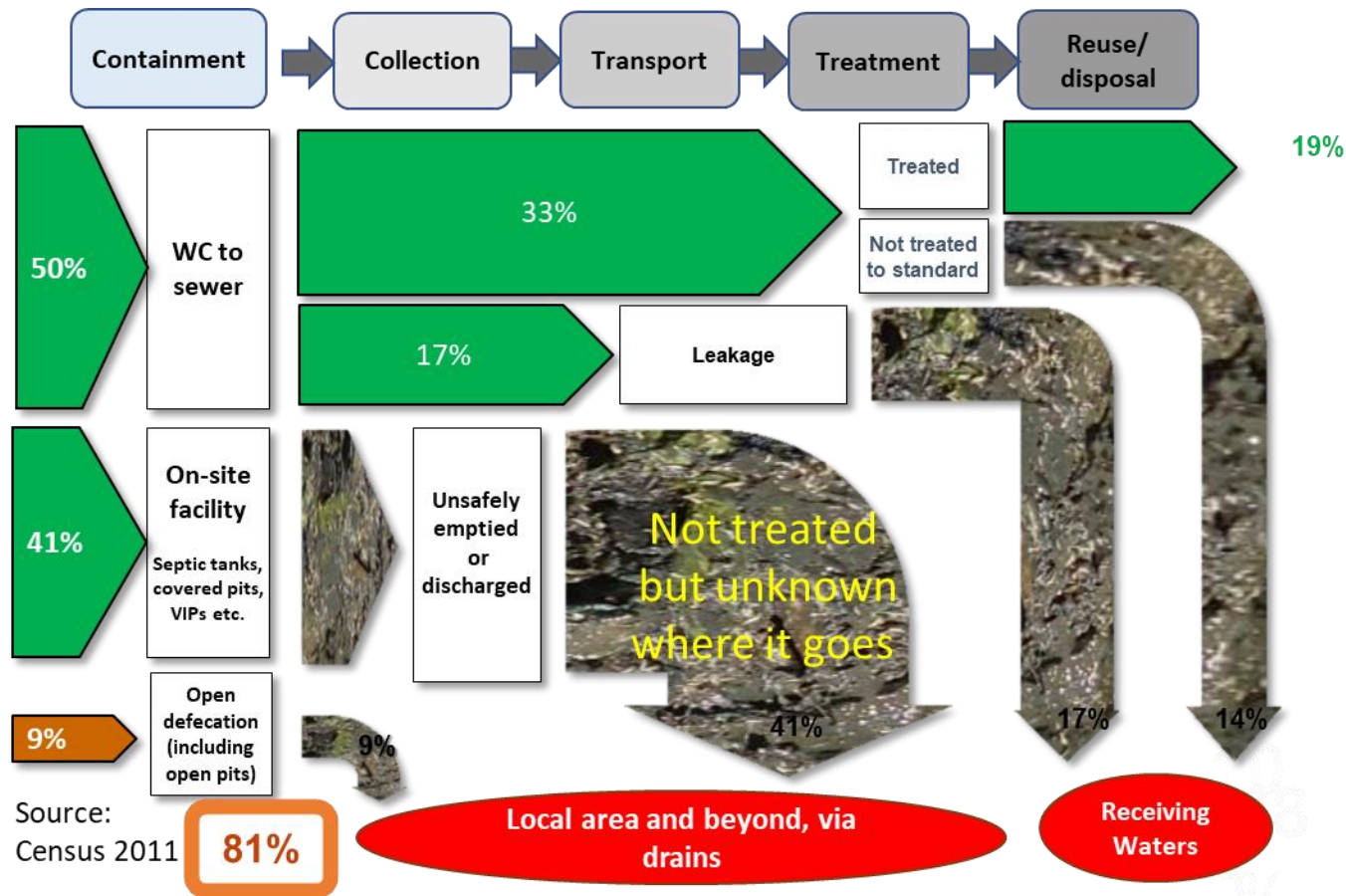
**Water supply, wastewater generation, treatment
in Class I & II cities (MLD)
1978-2015**



Mapping SFDs: India's journey...

- 30% of total sewage can be treated in 2015 and **31 % of treatment capacity in Delhi & Mumbai in 2015**
- Significant population still dependent on on-site sanitation - **Septic tanks** with inadequate mechanisms across sanitation chain.
- With increasing urbanization as on date situation has not changed much, increased sewage treatment capacity is falling behind - 65 % sewage in town/cities still disposed untreated.
- **We flush and forget**

Urban India – Excreta Management, 2011





Excreta Matters: 2011 - now

CSE prepared the India 1st Policy Paper on Septage Management in India as key reform agenda for improved urban sanitation for the Ministry of Urban Development (now called Housing & Urban Affairs), Government of India

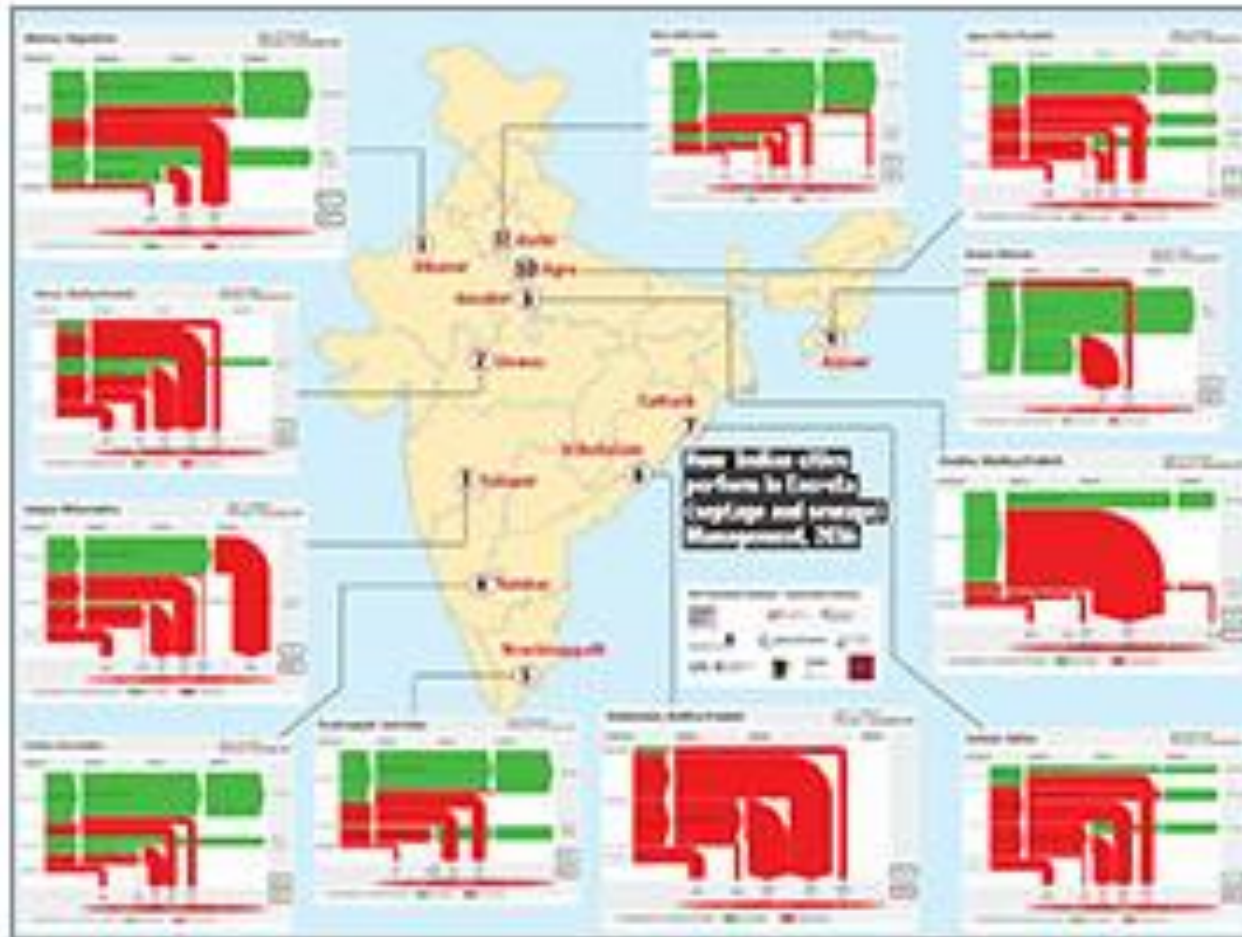
Gain support for more sustainable: Urban Sanitation solution...SFDs



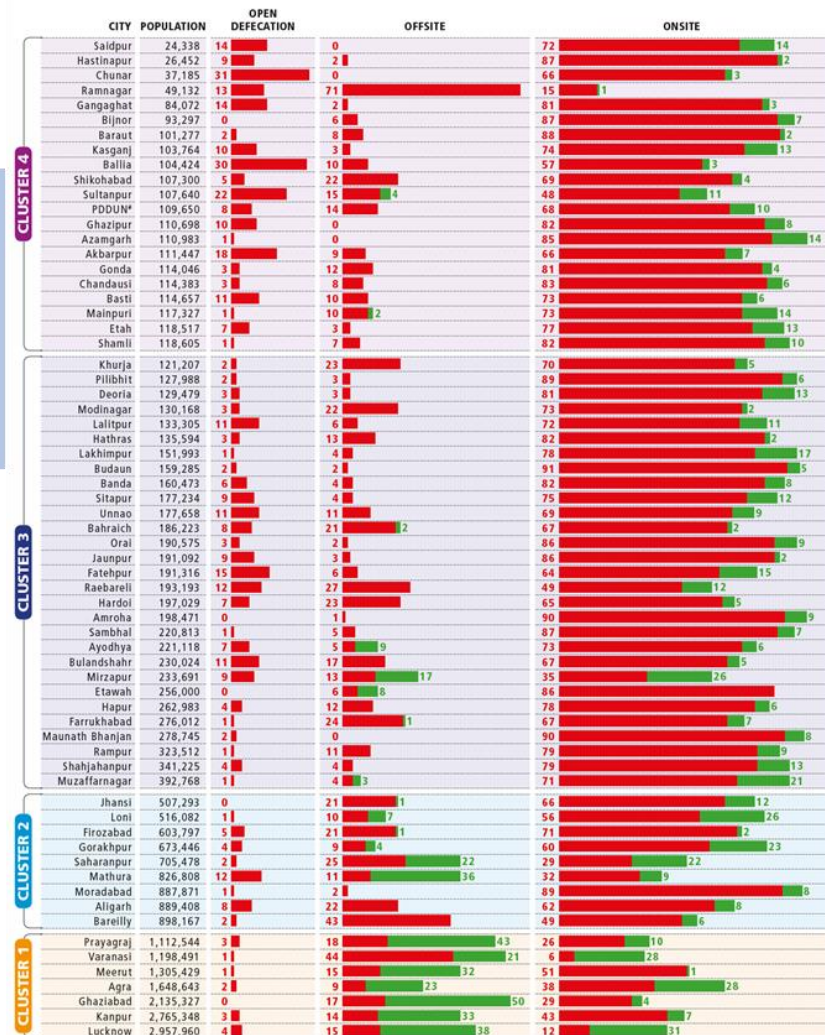
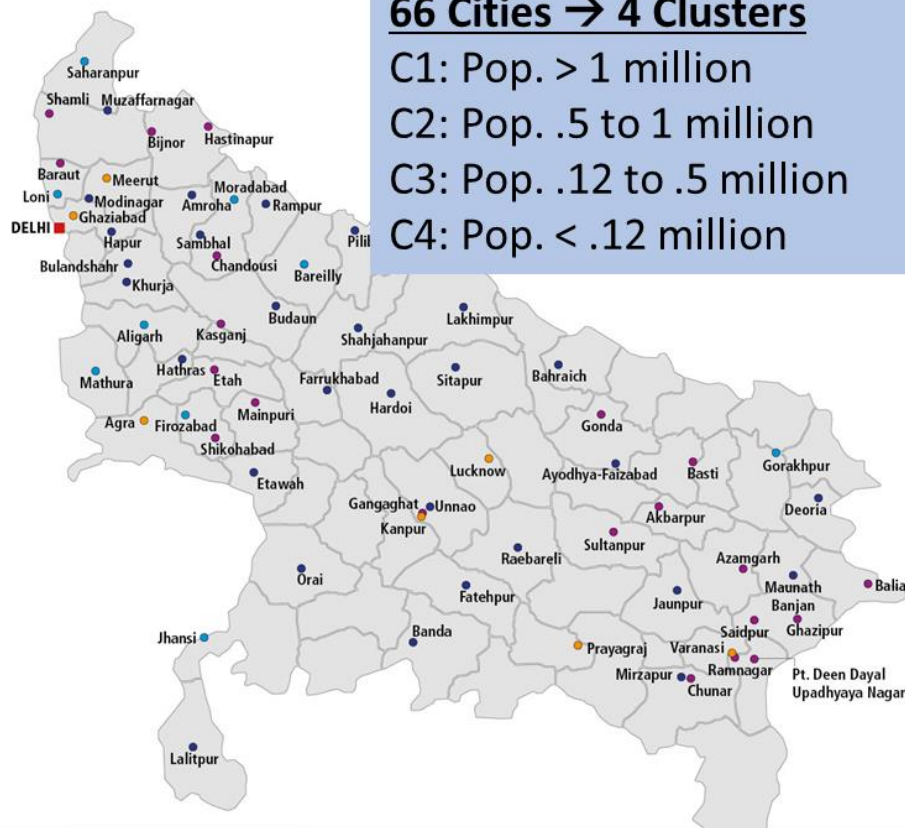
Image: Press Trust of India (PTI)

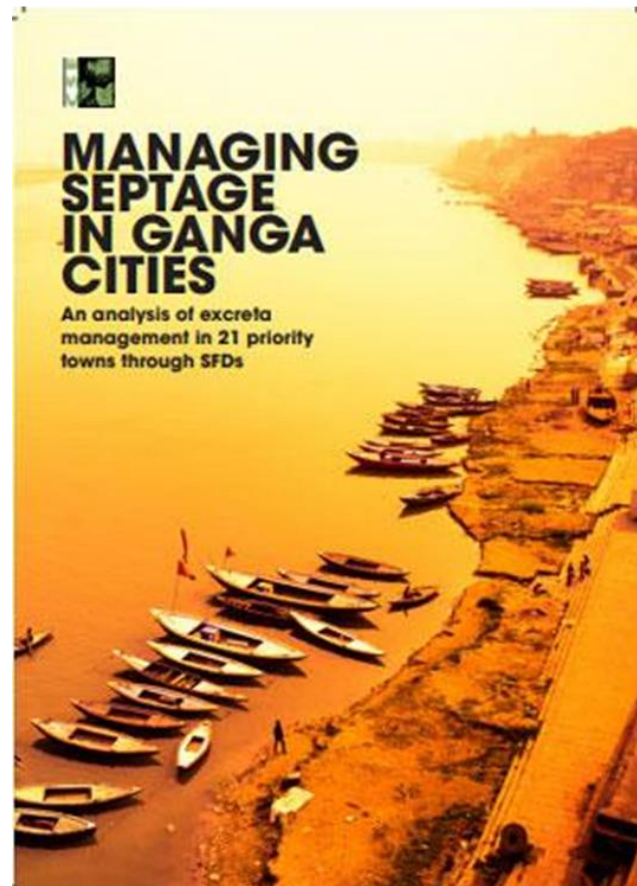
Image: Arne Panesar

SFD for Mapping Excreta Flows – Cities across India

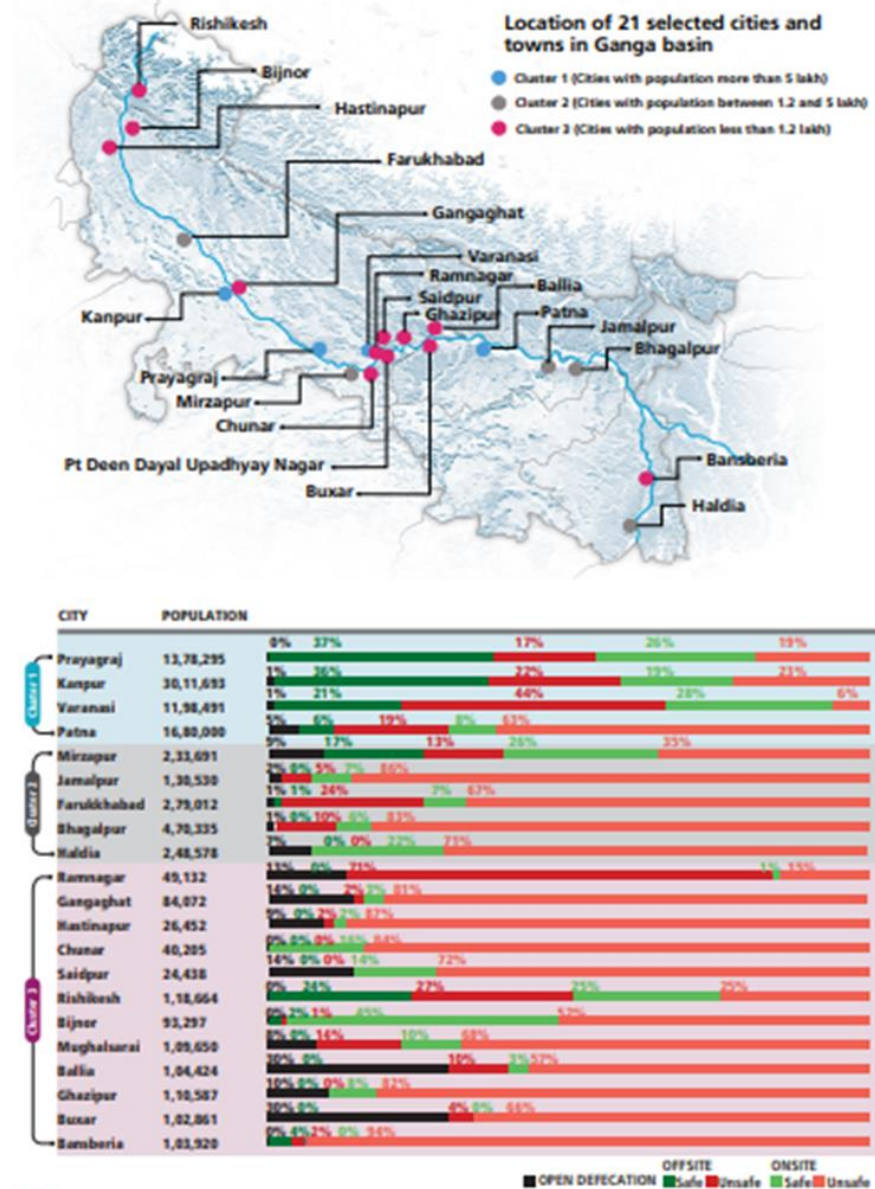


Assessment of FSSM in Uttar Pradesh





Poster 1: Analysis of excreta management of 21 selected priority towns of the Ganga Basin



Indian SFD story so far – Phase 1 & 2 :

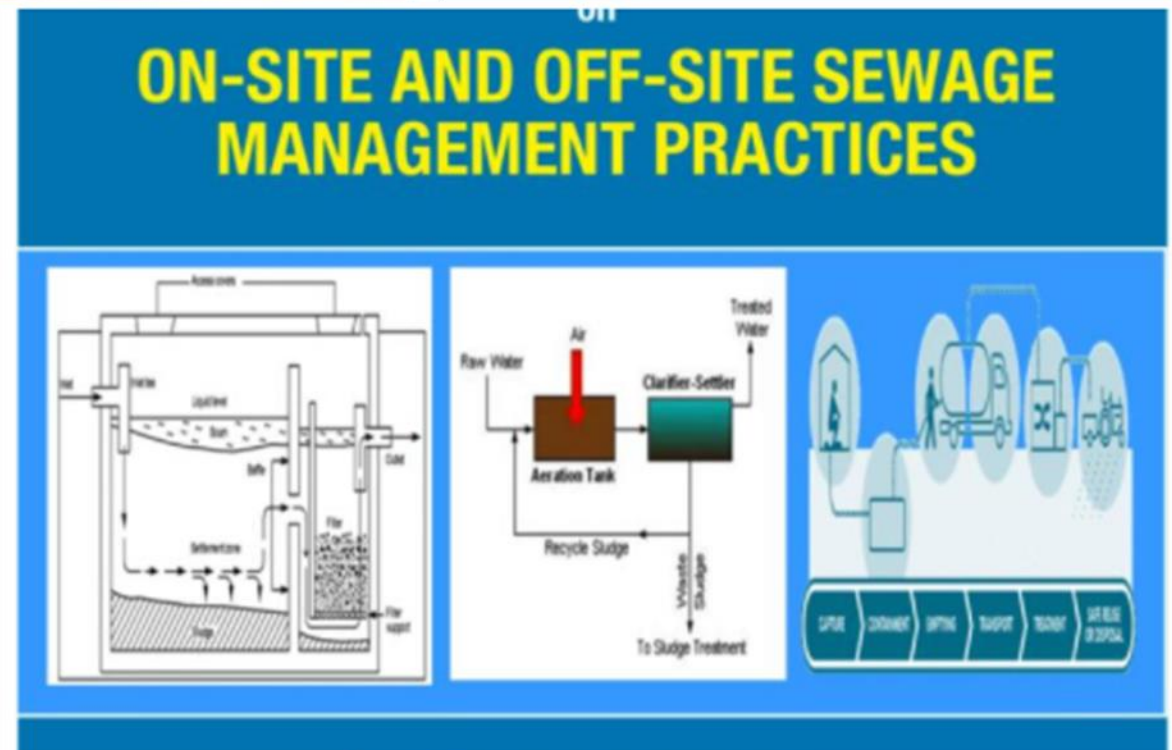
- CSE tested methodology of data collection to Indian context and trained various change agents to prepare and use SFD for advocacy and undertaken :
- Baseline study for developing City Sanitation Plans in select cities across India and in particular River Ganga basin (represents almost 40% Indian population)
- Analysis of sanitation in Urban Uttar Pradesh using SFDs of 66 major cities to produce State level SFD
- Baseline study of Hindon River basin through SFDs to decide relevant projects
- Baseline study of Ganga River Basin through SFDs of 21 cities along the main stem

Indian SFD story so far – Phase 1 & 2 :

- CSE has developed more than 100 SFDs and used as an advocacy tool to sensitize the decision makers at national , state and local level.
- More than 500 SFDs (different versions) developed in India, by various agents:
- National FSSM Policy notified,
- 19 State FSSM Policies notified and
- 450 + cities initiated effective FSM intervention

Indian SFD story so far – Phase 1 & 2 :

SFDs institutionalisation & Nationwide Rollout - Advisory issued by MoHUA (July 2020) on 'Onsite and Offsite Sewage Management Practices' recommends - *'SFDs to **monitor the progress of cities and City Sanitation Planning**'.*



Chapter-3 CITY SANITATION PLANNING

3.1 Introduction

Sanitation is a key component of urban infrastructure and is essential for the health and well-being of the population. It involves the collection, treatment, and disposal of human excreta and wastewater. The purpose of this chapter is to provide a comprehensive overview of the various aspects of city sanitation planning, from the collection and treatment of sewage to the disposal of sludge and effluent.

3.2 Collection and Treatment of Sewage

The collection and treatment of sewage is a critical part of city sanitation planning. It involves the design and construction of a sewerage system that can collect and transport sewage from the various parts of the city to a treatment plant. The treatment plant then treats the sewage to remove pollutants and pathogens, and the treated effluent is discharged into a water body or reused for irrigation.

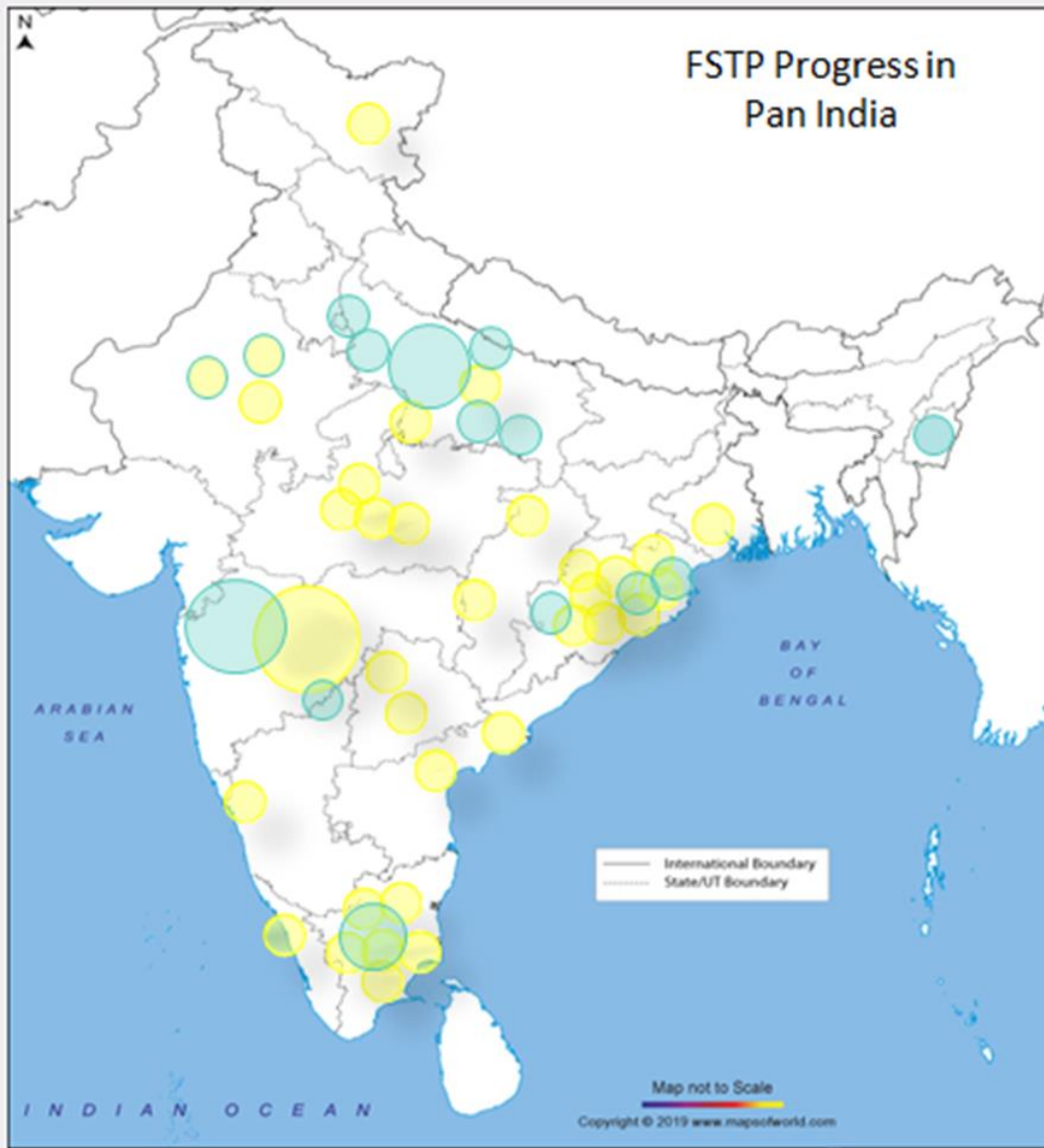
3.3 Disposal of Sludge and Effluent

The disposal of sludge and effluent is another important aspect of city sanitation planning. Sludge is the solid material that is removed from the sewage during the treatment process. It can be disposed of in a number of ways, including land application, incineration, or use as a fertilizer. Effluent is the liquid material that remains after the sludge has been removed. It can be discharged into a water body or reused for irrigation.

| Parameter | 2011 | 2016 | 2021 | 2026 | 2031 | 2036 | 2041 | 2046 | 2051 |
|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Population (Lakh) | 11.62 | 13.26 | 15.16 | 17.27 | 19.58 | 22.14 | 24.91 | 27.86 | 30.97 |
| Urban Population (Lakh) | 7.64 | 8.69 | 9.94 | 11.34 | 12.89 | 14.61 | 16.48 | 18.49 | 20.63 |
| Population Density (per sq. km) | 470 | 530 | 600 | 680 | 770 | 870 | 980 | 1100 | 1230 |
| Urban Population Density (per sq. km) | 300 | 340 | 390 | 450 | 510 | 580 | 660 | 750 | 840 |
| Population Growth Rate (%) | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 |
| Urban Population Growth Rate (%) | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 |
| Population Projection Error (%) | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 |
| Urban Population Projection Error (%) | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 |



MoHUA – CPHEEO, Swachh Bharat Mission – Urban Advisory released in July 2020 included : Preparation of SFDs, DWWT & CSPs integral to achieving improved urban sanitation

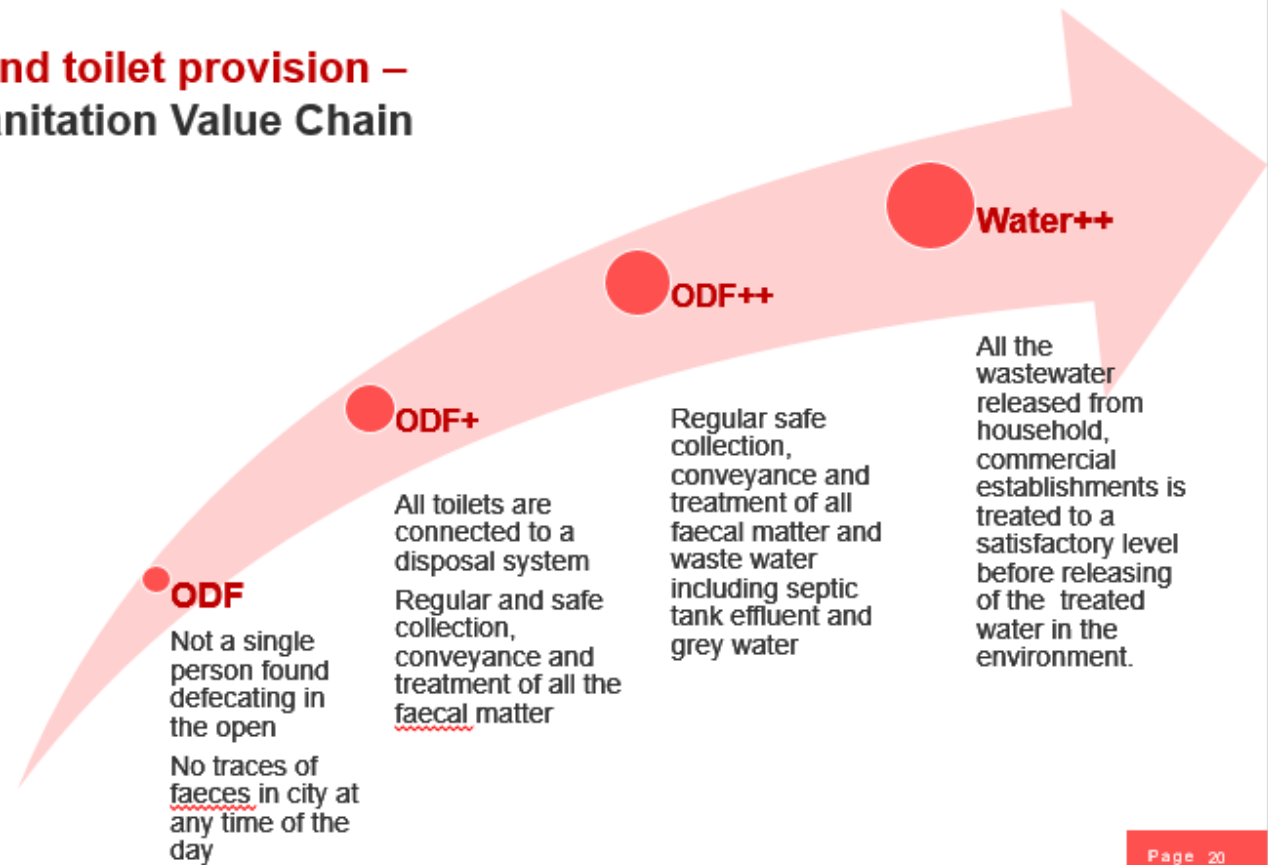


| State | Operational | Under Construction |
|----------------|-------------|--------------------|
| Odisha | 10 | 33 |
| Uttar Pradesh | 2 | 37 |
| Maharashtra | 74 | 94 |
| Tamil Nadu | 6 | 58 |
| Rajasthan | 3 | 2 |
| Madhya Pradesh | 4 | 0 |
| Chattisgarh | 2 | 0 |

450 + FSTP across India

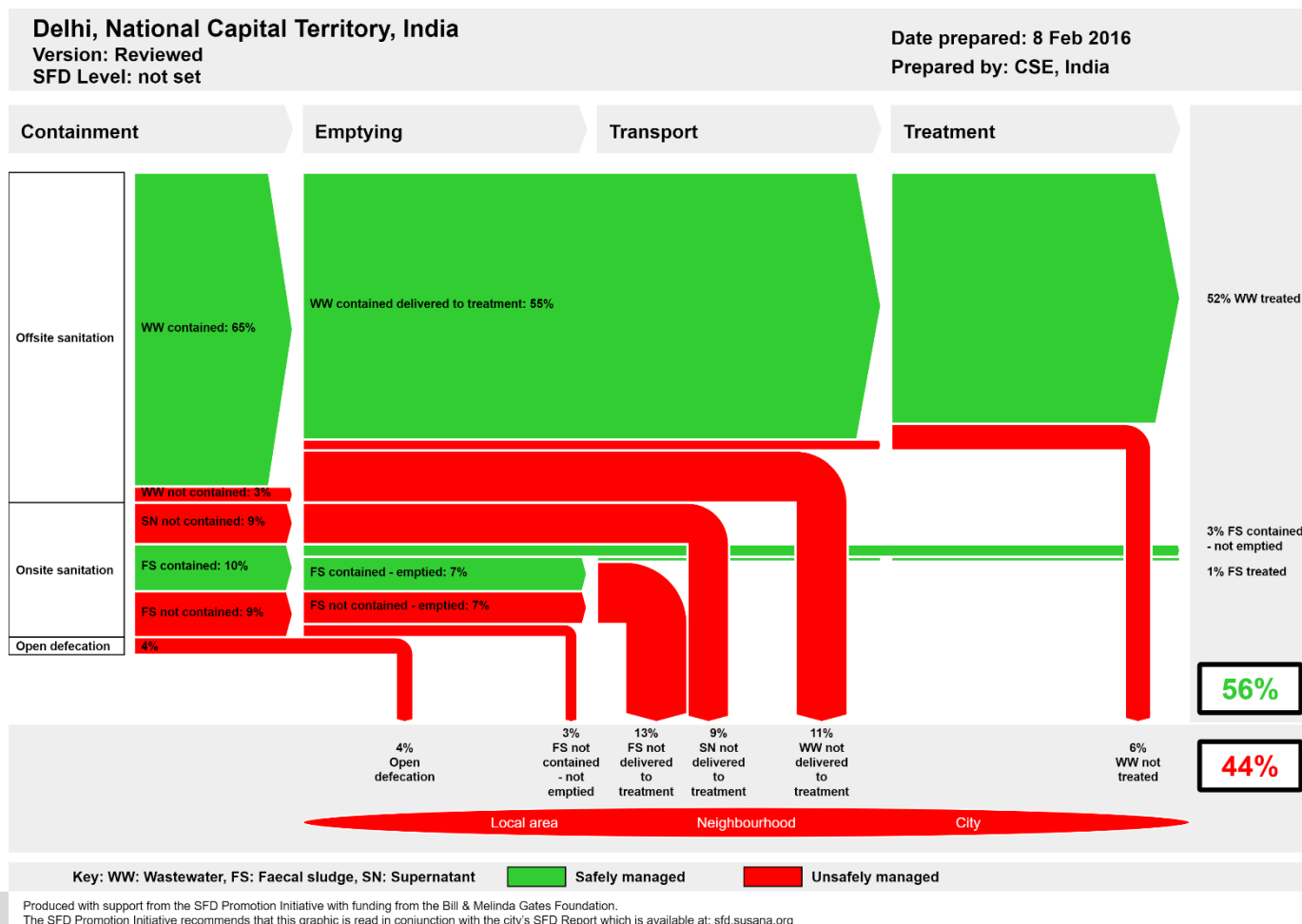
FSM progress in India

Cities journey beyond toilet provision – Progress across Sanitation Value Chain



Role of SFD in water and sanitation: Delhi

- Detailed SFD Report for Delhi prepared in 2016 by CSE



Role of SFD in water and sanitation: Delhi

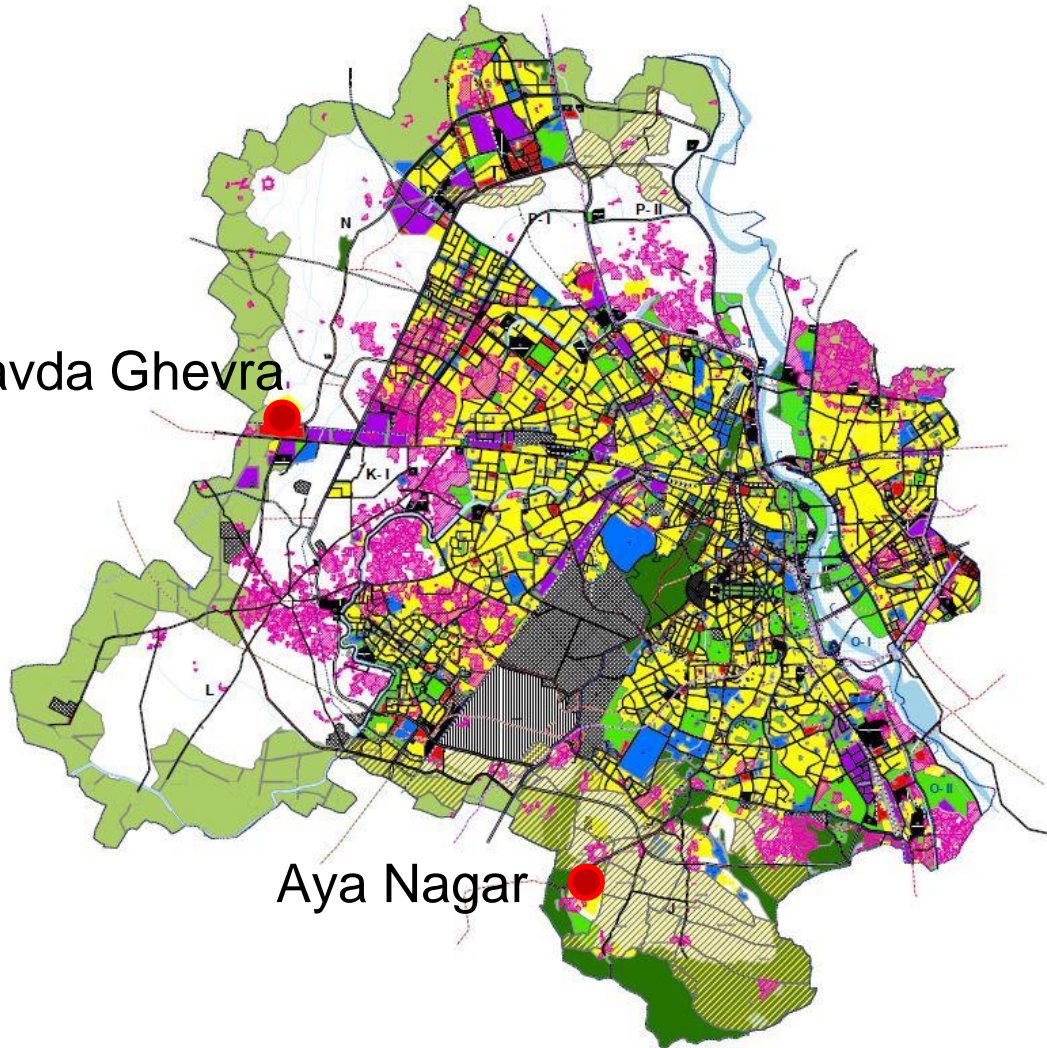
- Detailed SFD Report for Delhi prepared in 2016 by CSE
- 30% of city is dependent on OSS
- CSE report key in establishing NGT Committee on Pollution in River Yamuna
- The findings led to various initiatives like registering of private desludgers, co-treatment in STPs, free installation of septic tanks, etc.

SFDs for localised solutions.....



Savda Ghevra

Aya Nagar



LEGEND

| | |
|---|--|
| RESIDENTIAL | |
| R0 RESIDENTIAL AREA | |
| R1 POORER RESIDENCE | |
| COMMERCIAL | |
| C1 RETAIL, SHOPPING, GENERAL BUSINESS AND COMMERCIAL | |
| C2 DISTRICT CENTRE | |
| C3 COMMUNITY CENTRE | |
| C4 NON-HIERARCHICAL COMMERCIAL CENTRE | |
| C5 WHOLESALE & WAREHOUSING | |
| C6 COLD STORAGE AND OIL DEPOT | |
| C7 HOTEL | |
| INDUSTRIAL | |
| I1 MANUFACTURING, SERVICE INDUSTRY AND REPAIR INDUSTRY | |
| RECREATIONAL | |
| P1 REGIONAL PARK | |
| P2 CITY PARK, DISTRICT PARK, COMMUNITY PARK, MULTI-PURPOSE GROUND | |
| P3 HISTORICAL MONUMENT / ARCHAEOLOGICAL PARK | |
| P4 GREEN BELT | |
| P5 SPORTS FACILITIES / COMPLEX / STADIUM / SPORTS CENTRE | |
| TRANSPORTATION | |
| T1 AIRPORT | |
| T2 TERMINAL / DEPOT / WARD - RAIL / METRO / BUS / TRUCK | |
| T3 CIRCULATION - RAIL / METRO / ROAD / METRO / HIGH SPEED RAIL | |
| UTILITY | |
| U1 WATER (TREATMENT PLANT ETC.) | |
| U2 SEWERAGE (TREATMENT PLANT ETC.) | |
| U3 ELECTRICITY (POWER HOUSE, SUB-STATION ETC.) | |
| U4 SOLID WASTE (MATERIAL LANDFILL ETC.) | |
| U5 DRAIN | |
| U6 OTHER UTILITIES | |
| GOVERNMENT | |
| G1 PRESIDENT'S RESIDENCE AND PARLIAMENT HOUSE | |
| G2 GOVERNMENT OFFICE COMPLEX / COURTS / PSU | |
| G3 GOVERNMENT LAND (USE UNDETERMINED) | |
| PUBLIC & SEMI PUBLIC FACILITIES | |
| P01 HOSPITAL | |
| P02 EDUCATION AND RESEARCH / UNIVERSITY / COLLEGE | |
| P03 SOCIAL, CULTURAL, RECREATIONAL COMPLEX / CENTRE | |
| P04 POLICE / FIRE / DISASTER MANAGEMENT CENTRE | |
| P05 RELIGIOUS | |
| P06 BURIAL GROUND / CREMATION GROUND / CEMETERY | |
| P07 TRANSMISSION SITE CENTRE | |
| GREEN BELT AND WATER BODY | |
| A1 GREEN BELT | |
| A2 RIVER / FLOODPLAIN AND WATER BODY | |
| A3 L.R.A. VILLAGES | |
| LAND POOLING AREA | |
| OTHERS | |
| O1 FACILITY CORRIDOR | |
| O2 PLANNING ZONE BOUNDARY | |
| O3 UNAUTHORIZED COLONIES | |



DRAFT LAND USE PLAN FOR DELHI 2041

DELHI DEVELOPMENT AUTHORITY

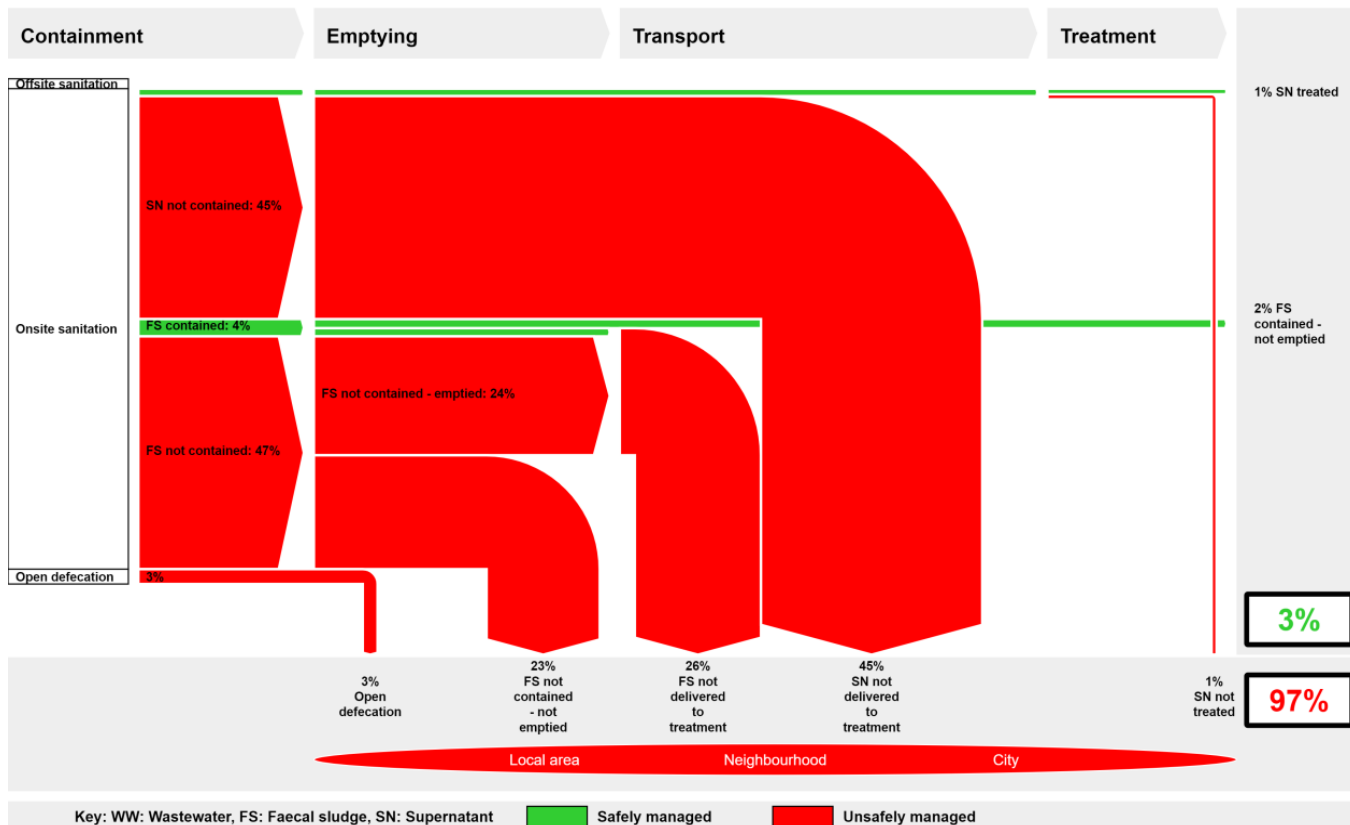
Km 0 2.5 5 10 15 Km



SFDs: Savda Ghevra

Savda Ghevra JJ Resettlement Colony, Delhi, India
Version: Reviewed
SFD Level: SFD Lite

Date prepared: 2 Dec 2020
Prepared by: CSE India

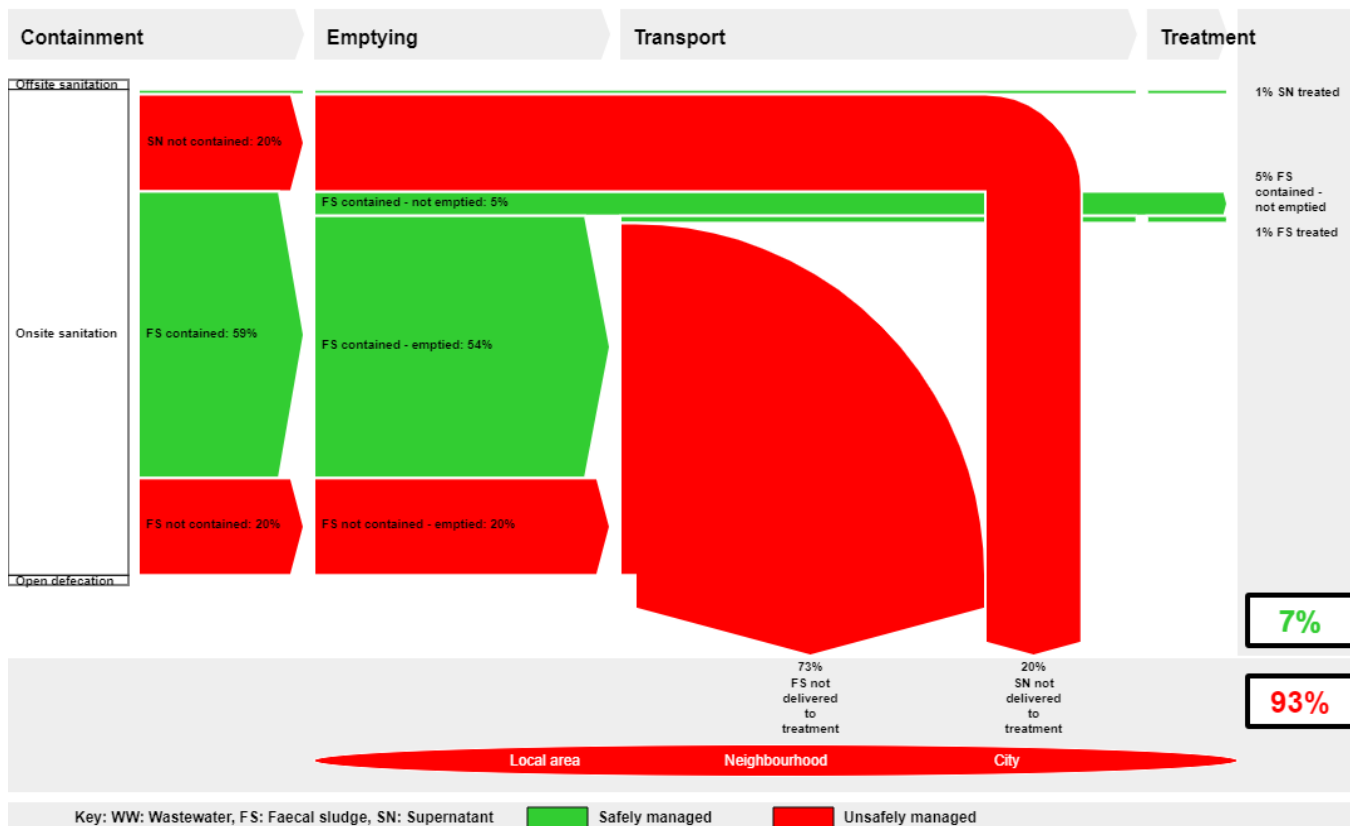


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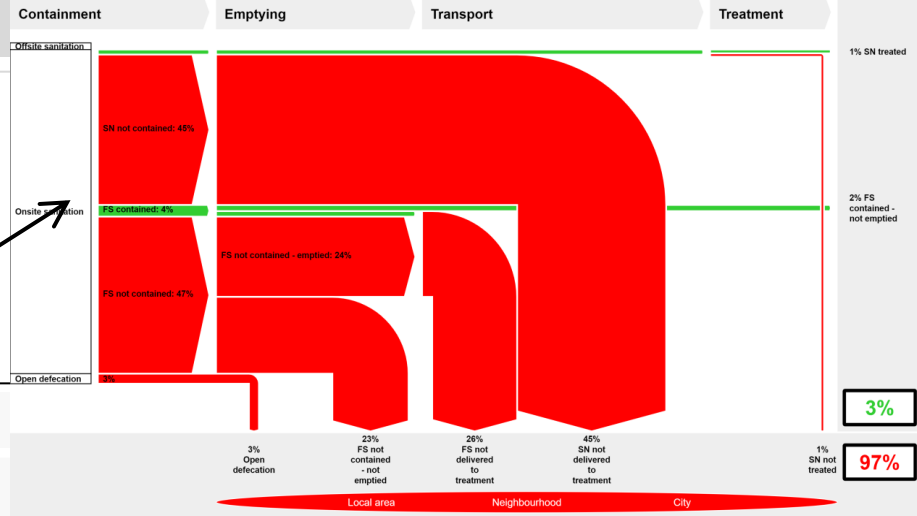
SFDs: Aya Nagar

Aya Nagar, New Delhi, India
Version: Reviewed
SFD Level: SFD Lite

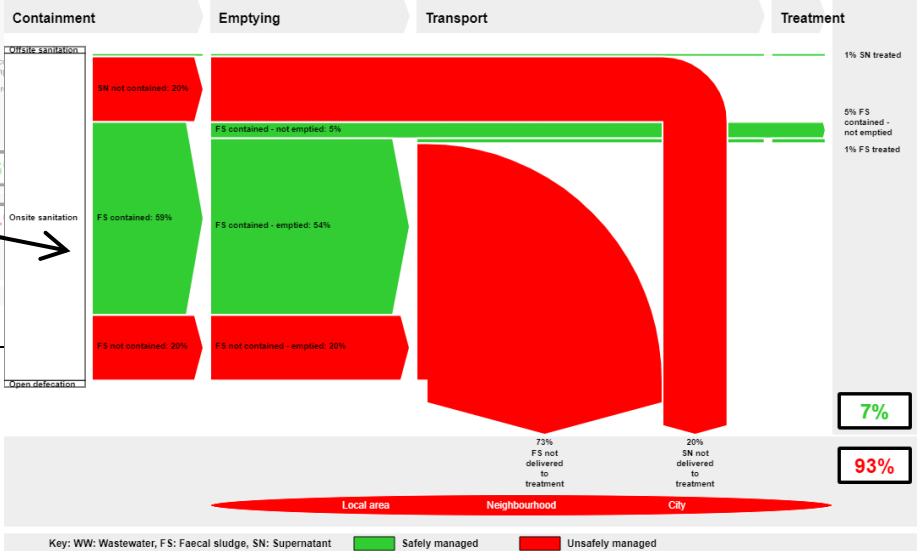
Date prepared: 28 Aug 2020
Prepared by: CSE



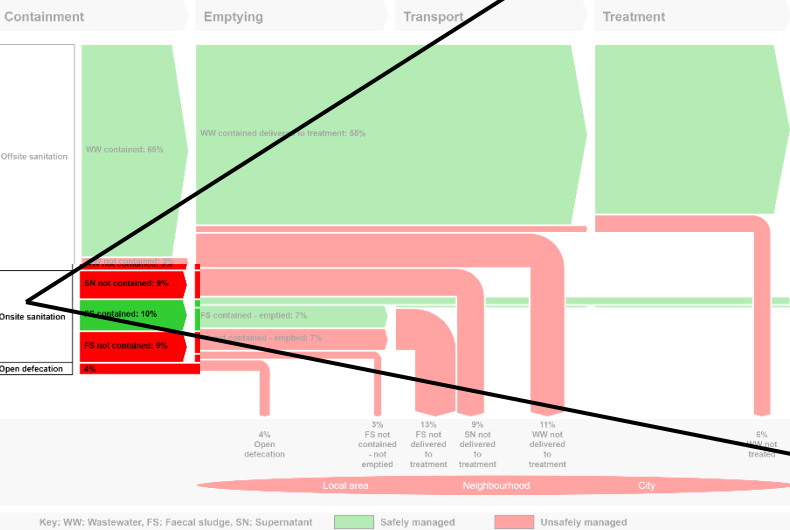
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Summarising

- SFDs help in providing localised sanitation solutions
- Decentralised water and wastewater management are required to address the water woes of Delhi
- SFD as a tool are important to analyse and improve the urban water cycle of Delhi

Thank you

Email us at: sfdhelpdesk@cseindia.org

SFD Promotion Initiative

sustainable
sanitation
alliance

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

On behalf of




Federal Ministry
for Economic Cooperation
and Development


UNIVERSITY OF LEEDS

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GLOBAL WATER
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