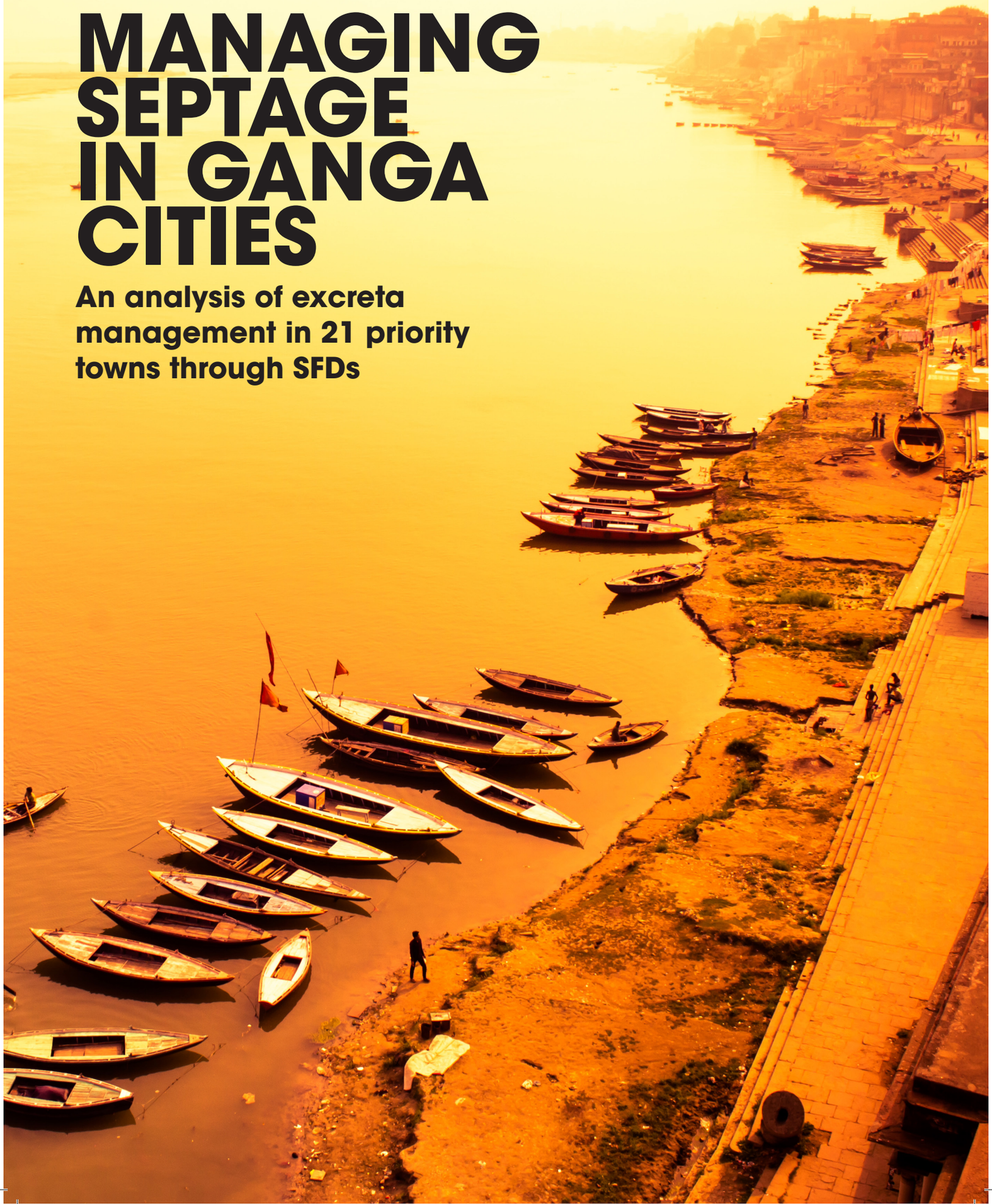
MANAGING SEPTAGE IN GANGA CITIES

An analysis of excreta management in 21 priority towns through SFDs



MANAGING SEPTAGE IN GANGA CITIES

An analysis of excreta management in 21 priority towns through SFDs

CENTRE FOR SCIENCE AND ENVIRONMENT

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This report would not have been possible without the constant support of National Mission for Clean Ganga and Urban Local Bodies of target cities.

We are grateful to Bill and Melinda Gates Foundation for their support to CSE – Programme Support Unit for mainstreaming Faecal Sludge and Septage Management in Ganga Basin

Suresh Rohilla, Bhitush Luthra et al 2020. *Managing Septage in Ganga Cities: An analysis of excreta management in 21 priority towns through SFDs*, Centre for Science and Environment, New Delhi

CONTENTS

List of Tables

List of Figures

List of Maps

EXECUTIVE SUMMARY

Namami Gange (a national mission for cleaning the Ganga River) is not just about physical cleaning of the river, it is about rejuvenating it and ensuring that it is ever flowing (Aviral) with clean (Nirmal) water. To achieve the same, a comprehensive approach is required which cuts across a lot of sectors. Human excreta (wastewater, faecal sludge, and supernatant) is one of the main causes for the deteriorating quality of water in the river. Managing these three streams of excreta is quintessential to achieve the dream of Nirmal and Aviral Ganga.

This report by CSE is based on the study of 21 priority towns, randomly selected, along the main stem of River Ganga. Shit Flow Diagrams (SFDs) are developed for each city to map the flow of excreta and understand the quality of service provision. The aim of the study is to find the gaps in excreta management and propose a way forward to fill the same to improve the health of the river and also the people residing in the basin cities.

In the initial part of the report, each stage of the service chain is looked at—containment, emptying, transport, and treatment—and an analysis of the same is presented based on the data collected for the 21 towns and cities. In the latter part of the report, the cities are clustered based on their population size and cluster SFDs are developed for three categories—Cluster 1 (cities with more than 5 lakh population), Cluster 2 (cities with population ranging from 1.2 to 5 lakh) and Cluster 3 (cities with population less than 1.2 lakh). Analysis of these clusters is shared in the report. Towards the end of the report an SFD for the basin has been attempted based on the data of 21 selected towns followed by the action plan and way forward.

Key highlights of the report—

- No city is 100 per cent sewered.
- Out of 21 cities surveyed for the study, 90 per cent of sewerage systems are found concentrated in three cities.
- Toilets of eight per cent of the population are directly connected to open drains, without any containment system.
- Roughly 60 per cent of the population is dependent on onsite sanitation systems but still very little attention is given to faecal sludge and septage management.
- Only 50 per cent of the faecal sludge generated in the basin is getting emptied and only 15 per cent of that gets treated.
- Containment systems of 40 per cent of the population are connected to open drains and around 50 per cent of the supernatant is getting intercepted and treated before reaching the river.
- At least one per cent of the population is still defecating in the open.
- Excreta of roughly 40 per cent of the population is managed, the rest is directly or indirectly polluting the river.

1. INTRODUCTION

THE SCENARIO IN GANGA BASIN

Ganga basin is the largest river basin in India in terms of catchment area, constituting 26 per cent of the country's land mass (861,404 sq. km) and supporting about 43 per cent of its population (126.7 million as per 2001 Census). According to the 2011 Census, Ganga basin has an urban population of 165.2 million—an increase of 30 per cent from 2001. About 79 per cent of the area of Ganga basin is in India. The basin covers 11 states—Uttarakhand, U.P., M.P., Rajasthan, Haryana, Himachal Pradesh, Chhattisgarh, Jharkhand, Bihar, West Bengal, and Delhi—including 2014 statutory towns. The current focus of Namami Gange is on five major states—Uttarakhand, Uttar Pradesh, Jharkhand, Bihar, and West Bengal—including 97 priority towns on the main stem of River Ganga.

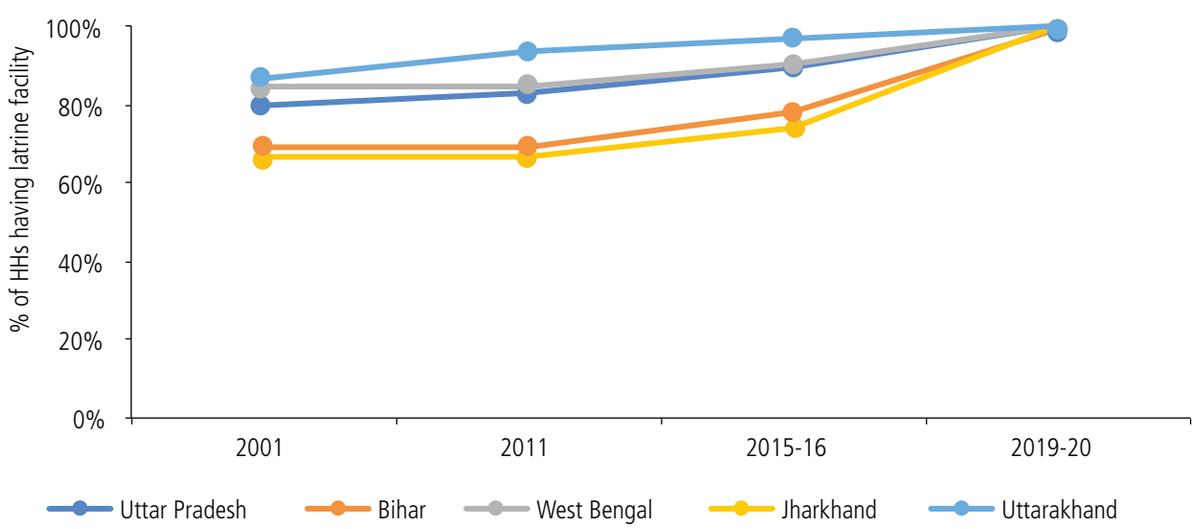
A sanitation snapshot of 21 Ganga cities clearly indicates that households with onsite sanitation systems (see *Box: The three pathways*) like septic tanks and pit latrines (nearly 60 per cent) far exceed those with sewer connections (34 per cent). According to Namami Gange, most cities in Ganga basin have reported more than 99 per cent coverage of latrines (see *Figure 1: Ganga Basin towards ODF++*), but excreta of only 40 per cent of the population is safely managed.

In the absence of even a single city that is completely sewered, most households, institutions, commercial areas, and public/community toilets in the basin depend on onsite sanitation systems. Moreover, as there is no designated site for disposal, the emptied faecal sludge from these systems ends up in open drains, nullahs, or open fields, which eventually leads to pollution of the Ganga River. According to the Central Pollution Control Board (CPCB), the main stem of the river receives 10,500 million litres per day (MLD) of polluted water with biochemical oxygen demand (BOD) load ranging from 350 to 430 tonnes per day (TPD). A considerable amount of faecal coliform has also been detected in the river (see *Box: Sewage vs faecal sludge*).

CSE-NMCG PARTNERSHIP

Centre for Science & Environment (CSE) entered into a long-term partnership with National Mission for Clean Ganga (NMCG) on 14 September 2018 for mainstreaming

Figure 1: Ganga basin towards ODF++



Source: MOHUA Handbook on Urban Statistics 2019

faecal sludge and septage management (FSSM) in Ganga basin. CSE's water programme has been active in the Ganga basin to capacitate states and cities in citywide sanitation with special focus on FSSM for river pollution abatement since 2016.

Under this partnership, deep dive support to state functionaries and urban local bodies (ULBs) is envisaged to plan and implement reforms for achieving effective septage management and citywide sanitation by facilitating the convergence of various national and state policies, plans, programmes, and project implementation showcasing improvements across the urban sanitation value chain—containment, emptying, disposal, treatment, and reuse/recycle, together with river pollution abatement.

In this initiative, the capacity of city officials, decision makers, and other stakeholders (engineers, planners, practitioners, desludgers, masons, etc.) involved in the implementation of the city sanitation programme is built through trainings, workshops, and exposure visits. Until now, 100+ officials have already been trained.

Under the first phase of this partnership (2018–21) technical support is being given to Chunar, a small town along the banks of River Ganga, for improving entire FSSM sanitation value chain, which also includes safe disposal and treatment of faecal sludge and septage.

CSE is currently engaged with NMCG in analyzing the existing sanitation situation of target cities and developing an action plan in target cities in the Ganga basin.

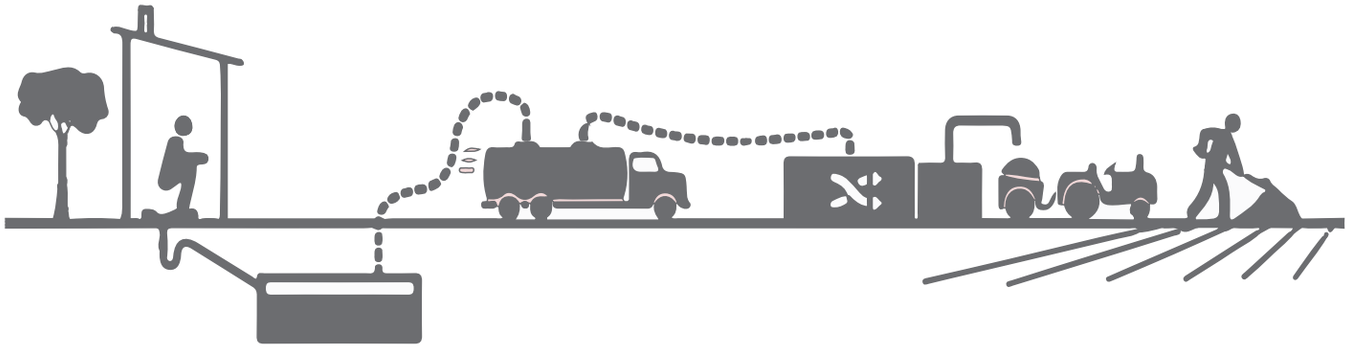
CSE'S FSSM STUDY OF GANGA BASIN

Safe containment, emptying, transport, treatment, and end use of faecal sludge and septage is known as FSSM. CSE has represented sanitation status of 9.6 million people residing in 21 Ganga priority towns through all the stages of their sanitation chain (see *Figure 2: Sanitation service chain*)—this briefing paper is an effort towards documenting the analysis.

One of the aims of the Union Ministry of Housing and Urban Affairs (MoHUA), under the Swachh Bharat Mission (SBM), is containment of human excreta. The ministry, recognizing that the end objectives and corresponding benefits of SBM cannot be achieved without proper management of faecal sludge and septage across the sanitation chain, notified a National Policy on FSSM in February 2017. According to this policy, each state in India, and eventually cities as well, is supposed to notify an FSSM action plan/strategy/operative guideline.

The CSE study links itself to this national objective by aiming to analyze the sanitation scenario of the Ganga basin so that the need for FSSM can be quantified and an action

Figure 2: Sanitation service chain



	Containment	Emptying and transport	Treatment	Disposal and end use
Definition	An onsite sanitation system into which a user interface discharges.	Manual or motorized removal and transportation of faecal waste from the containment system.	Process of converting faecal sludge into a product that is safe for end use.	Disposal or utilization of output products derived from sanitation systems.
Examples	Septic tanks, twin pits, and cesspools	Vacuum trucks, vacu-tugs, gulper, etc.	Co-treatment, faecal sludge treatment plant	Soil conditioner, briquettes, treated water for horticulture, etc.

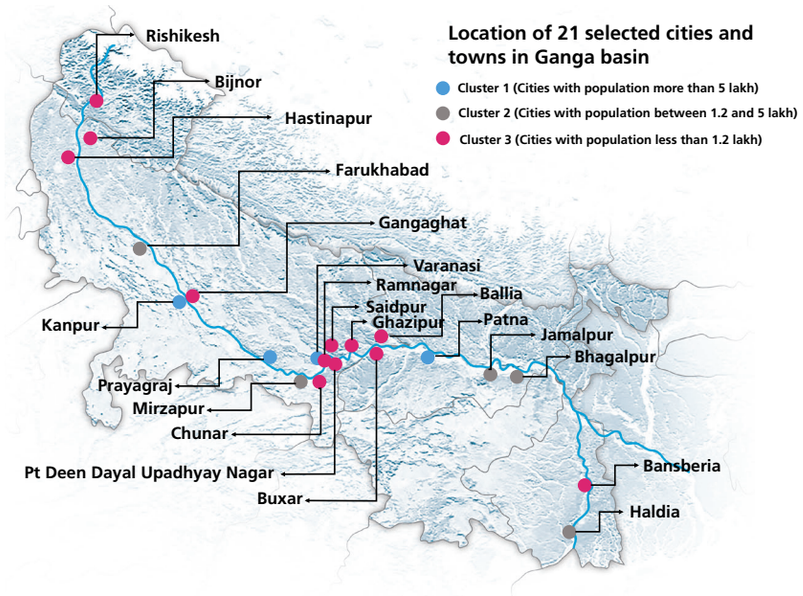
Source: Compiled by CSE

plan for implementing FSSM as priority intervention in the basin towns/cities can be developed with overall aim of improving river health.

To understand the excreta management in the basin, CSE has developed an SFD (see *Box: What is an SFD?*) for each of the 21 randomly selected towns from the 97 priority towns along the main stem of the River Ganga. Cities of different sizes were selected representing the four major states of the basin (see *Map 1: Twenty-one selected cities in Ganga basin*).

This work was divided into two phases—nine cities were visited in Phase 1 and ten cities were visited in Phase 2 in the last three years. The analysis of data collected in Phase 1 and Phase 2, along with two cities—Patna (February 2018) and Rishikesh (July 2018)—for which SFDs were developed by PSI and GIZ respectively, is presented in this report. A team of two researchers visited each city to develop SFDs for their respective cities. The team conducted secondary research before visiting each city; in the cities, it conducted key informant interviews and focus group discussions with relevant stakeholders apart from conducting random household surveys and recording field observations.

Map 1: Twenty-one selected cities in Ganga basin



THE THREE PATHWAYS Excreta generated in a city can follow three pathways:

- **Offsite sanitation:** Toilets connected to drainage networks like a sewerage system which conveys the excreta away from the site, preferably to a sewage treatment plant.
- **Onsite sanitation:** Toilets connected to a tank or a pit, which stores the excreta within the site. These systems generally produce partially treated effluent and faecal sludge/septage that needs periodic emptying.
- **Open defecation:** Users do not have access to a toilet and hence defecate in the open.

SEWAGE VS FAECAL SLUDGE

Sewage is untreated wastewater which contains faeces and urine—this wastewater gets conveyed through the sewerage system. Generally, grey water from the kitchen and bathroom also becomes part of sewage. The BOD of sewage ranges from 150–350 mg/l and all sewage treatment plants are designed for this load. Faecal sludge/septage is semisolid slurry, it is emptied out of septic tanks/pits and is much more concentrated than sewage. The BOD of faecal sludge ranges from 1,000–20,000 mg/l.

WHAT IS AN SFD? An excreta flow diagram (also often described as Shit Flow Diagram) is a tool to readily understand and communicate how excreta physically flows through a city or town. SFDs show how excreta is or is not managed as it moves from defecation to disposal or end-use. The SFD report presents the service delivery context of the city or town and the data sources used for the assessment.

2. FSSM IN GANGA BASIN

CONTAINMENT

Containment systems, which are connected to toilets, help in restricting human exposure to excreta either through offsite sanitation systems like underground drainage network or through onsite sanitation systems like septic tanks (see *Figure 3: Types of containment systems*). In the Ganga basin, the CSE team found various types of systems in place, which are modifications of septic tanks, as prescribed by Bureau of Indian Standards (BIS) (see *Figure 4: Standard septic tank design*). Due to unplanned growth in urban areas and minimal enforcement of building byelaws, the designs implemented on the ground are a prerogative of the households and masons. To reduce the frequency of emptying, households prefer to build tanks as big as possible and leave the bottom of the tank open.

Figure 3: Types of containment systems

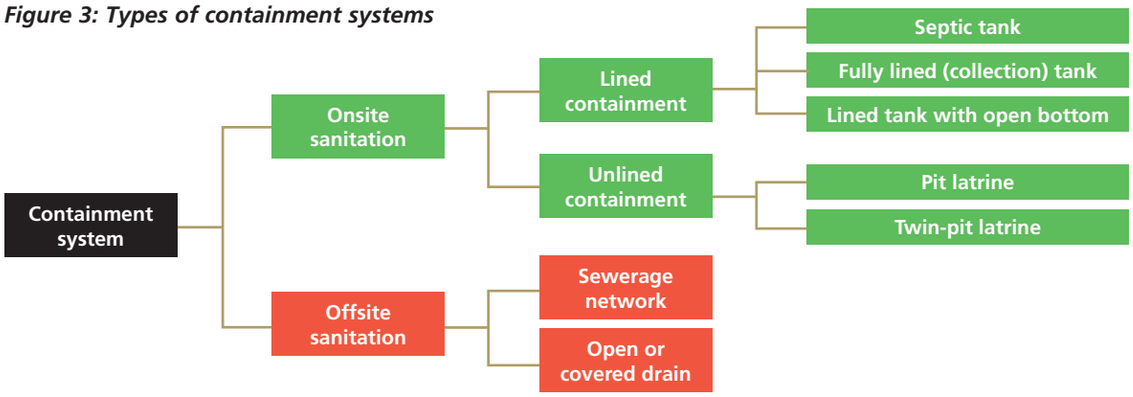
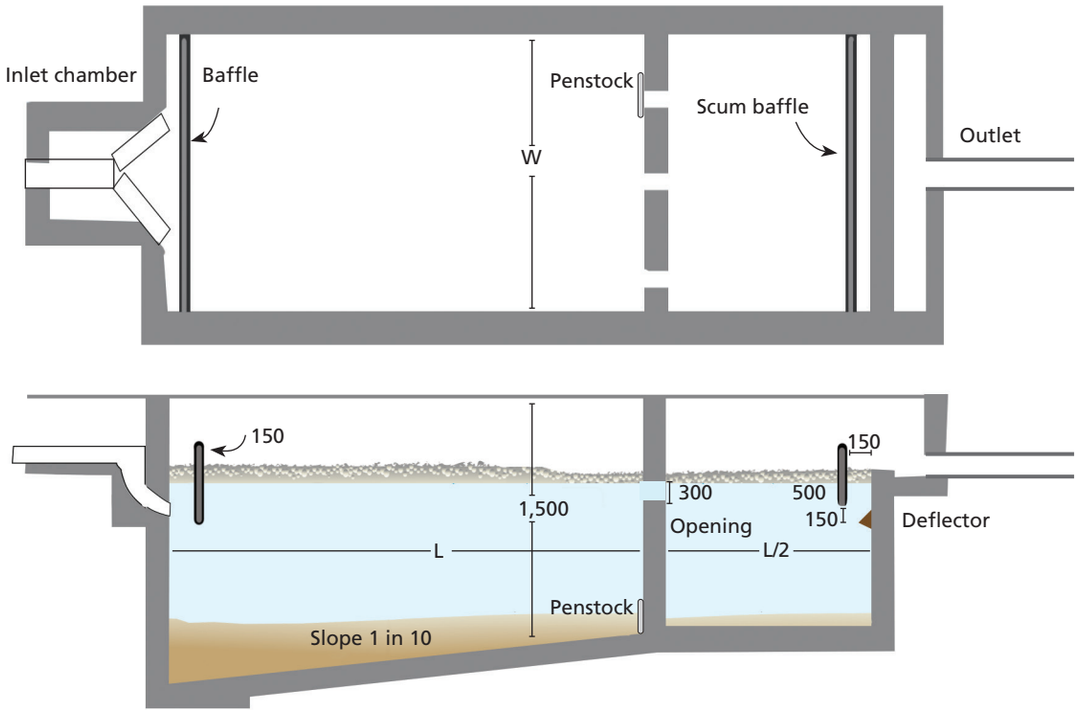


Figure 4: Standard septic tank design



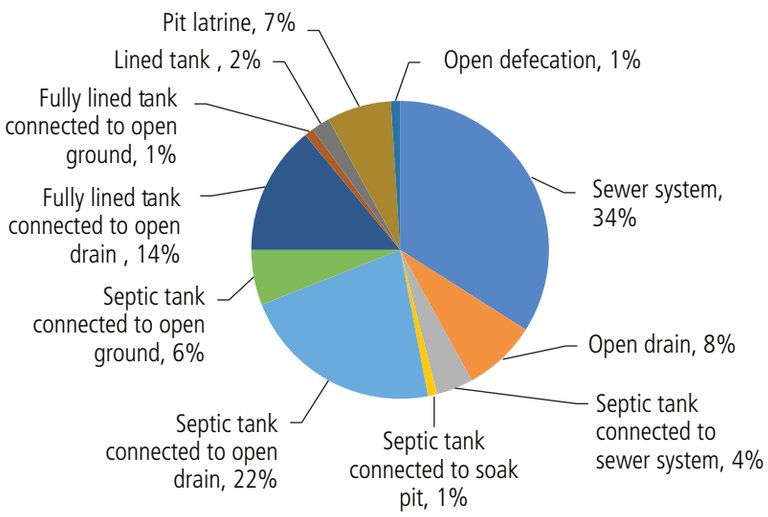
All measurements in millimetres (mm)
Source: Manual on Sewerage and Sewage Treatment—Part A: Engineering. CPHEEO, 2012

THESE CONTAINMENT SYSTEMS GENERATE TWO TYPES OF BY-PRODUCTS:

(i) Faecal sludge, that should be emptied periodically but is only emptied when the tank gets full and there is a backflow to the toilet. Faecal sludge from septic tanks is also known as septage.

(ii) Effluent (or supernatant), the semi-treated liquid component, which ideally should be infiltrated into the ground through a soak-pit (in case of low risk of ground water pollution) or undergo further treatment, but is discharged into open drains/open ground/water bodies.

Figure 5: Status of containment systems



Fully lined tank under construction, Bijnor

Septic tank under construction, Chunar

Outlet of containment system discharging into open drain, Bhagalpur

Containment system connected to sewerage network, Prayagraj

EMPTYING

The process of extracting faecal sludge/septage from onsite sanitation systems is known as emptying. It is done both mechanically and manually. The Prohibition of Employment of Manual Scavengers and their Rehabilitation Act, 2013 prohibits employment or engagement of manual scavengers. However, in many cities located in the Ganga basin, which are inaccessible to mechanical emptying, manual scavenging is still prevalent (see *Figure 6: Types of emptiers*).

Mechanized methods include use of vacuum trucks or tractor-mounted vacuum tankers. Mechanized systems are usually accompanied by a driver and a helper (sometimes two helpers). It has been observed in many cases that no personal protective equipment (PPE) was used by the operators while emptying the tanks or pits, posing a serious health risk.

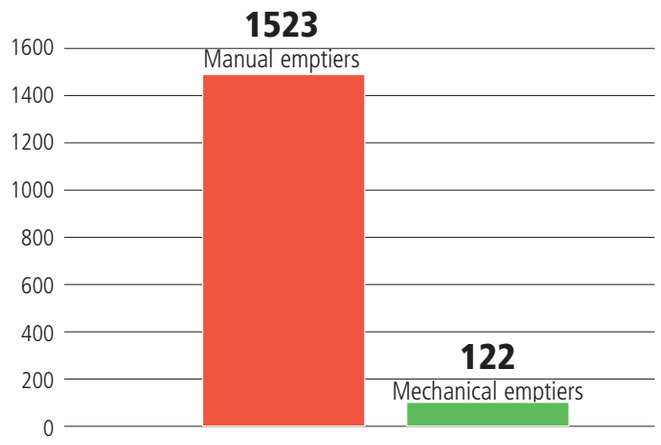
There is no schedule of emptying maintained in any of the cities, and a household calls for an emptying service only when the tanks get full with sludge. This service is majorly provided by private operators but in some cities government trucks also ply. The majority of the personnel involved in the emptying business belong to particular castes and there is a notion that only these people, who were initially involved in manual scavenging, would do this job. In many cities, safai karamcharis contracted with the government would also end up doing manual scavenging to earn quick money. Fees charged for emptying ranges from INR 500 to 3000 across the cities and, in general, a desludging tanker does 1–3 trips per day.

Mechanical emtying of containment system, Pilibhit

THE PROHIBITION OF EMPLOYMENT AS MANUAL SCAVENGERS AND THEIR REHABILITATION ACT, 2013

This act prohibits employment of manual scavengers and insanitary latrines—laying strong emphasis on rehabilitation of manual scavengers. The broad objectives of the act are to eliminate insanitary latrines, prohibit the employment of manual scavengers and the hazardous manual cleaning of sewer and septic tanks, and to maintain a survey of manual scavengers and their rehabilitation.

Figure 6: Types of emptiers



Mechanical emptying without using personal protective equipment, Prayagraj

Mechanical emptying of faecal sludge by government operated tractor mounted vacuum tanker, Chunar

TRANSPORT

Faecal sludge/septage and waste water/sewage both need to be transported/conveyed to the treatment/ disposal site. Sewage is conveyed using an underground drainage network, also called sewerage network. In absence of a sewerage network, the septic tank's effluent (supernatant) along with grey water finds its way into storm water drains/open drains/nullahs. On the other hand, the emptied faecal sludge is collected in a container installed on a vehicle to transport it to the designated site of disposal.

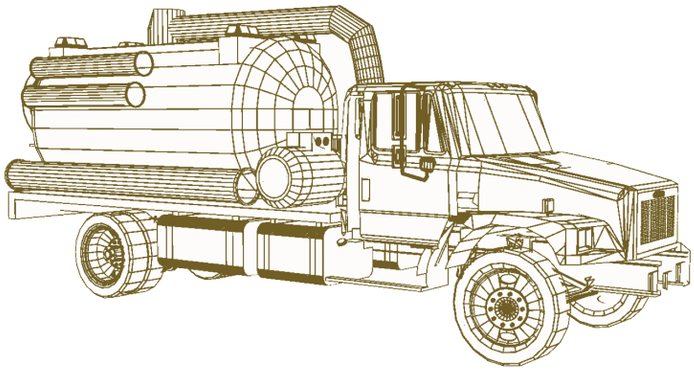
In case of manual emptying, a cycle cart is generally used to transport faecal sludge. Whereas for mechanized emptying, tractors, mini trucks, and indigenously developed vehicles mounted with suction pumps are predominantly used (see *Figure 7: Two types of vehicles prominent in Ganga cities* and *Figure 8: Types of desludging vehicles used*). The capacities of tanks attached to vehicles vary from 3,000 to 10,000 litres. The emptying vehicles can either be provided by the government or by private contractors (see *Figure 9: Types of service providers*).

Emptying of faecal sludge at trenching site by government operated vacuum tanker, Chunar

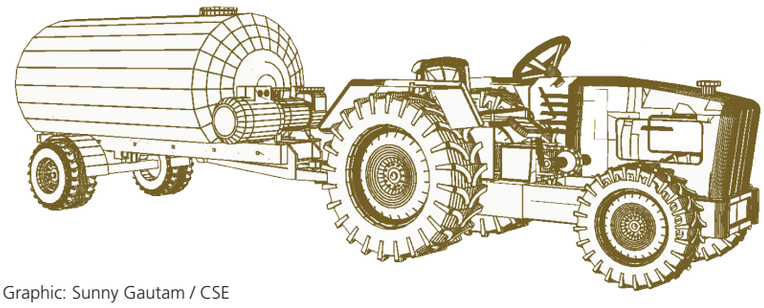
Tractor mounted vacuum tanker, Prayagraj

Figure 7: Two types of vehicles prominent in Ganga cities

A truck-mounted vacuum tanker



Tractor-mounted vacuum tanker



Graphic: Sunny Gautam / CSE

Figure 8: Types of desludging vehicles used

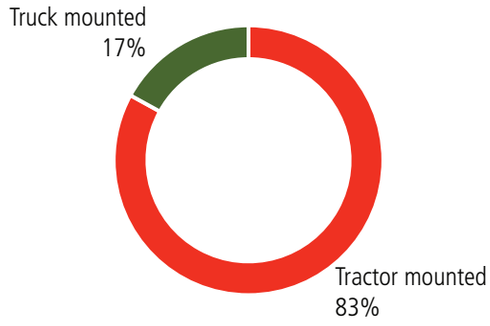
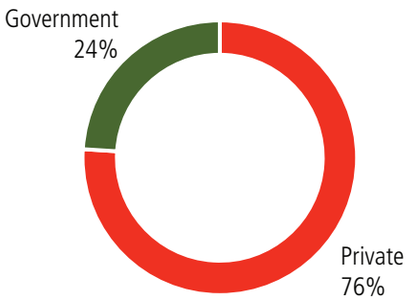


Figure 9: Types of service providers



Household discharging wastewater directly into nullah, Jamalpur

Truck mounted vacuum tanker, Jamalpur

TREATMENT AND DISPOSAL

Wastewater, faecal sludge, and supernatant should all be properly treated and/or safely disposed for improved sanitation. Though faecal sludge is most concentrated of all, its treatment is not given due attention in the cities across the Ganga basin. It's often disposed of untreated in storm-water drains, nullahs, canals, vacant plots, and agricultural fields. Extent of wastewater, faecal sludge, and supernatant treatment is much less than it should be (see *Figure 10: Wastewater, faecal sludge, and supernatant treatment*).

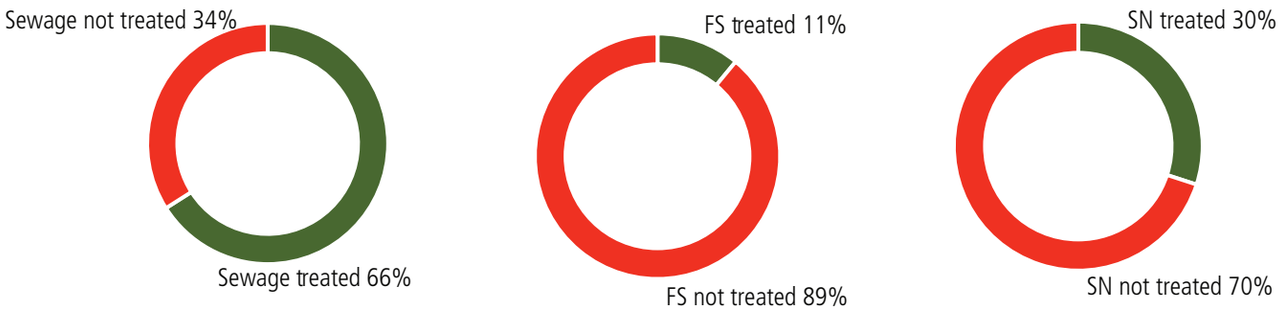
Wastewater and supernatant, with or without treatment, end up in lakes and rivers. Many times the untreated faecal sludge also finds its way into the water bodies, as the operator dumps the faecal sludge in the nearest drain/ nullah from the site of emptying. There is no regulation in place to restrict the uncontrolled dumping of faecal sludge in and around the cities.

Chunar is the first city under Namami Gange Programme to implement a faecal sludge treatment plant (under construction) and trenching site for safe disposal of faecal sludge till the time a scientifically designed treatment facility is in place. The authorities have taken these steps as they realized that laying down of sewerage network was not possible due to narrow or congested lanes. With the technical support of CSE, Nagar Palika Parishad Chunar has proposed FSSM byelaws and has a strategy cum operative guideline in place which includes steps like implementing scheduled desludging, GPS based monitoring of vehicles, as well as citywide information, education and communication (IEC) campaign for FSSM.

Discharge of faecal sludge into open ground, Haldia

Faecal sludge treatment plant under construction, Chunar

Figure 10: Wastewater, faecal sludge, and supernatant treatment



Note: Sewage is wastewater which is flowing into sewer network

Decanting of faecal sludge at inlet of STP, Kanpur

Faecal sludge discharged in low lying areas, Bijnor

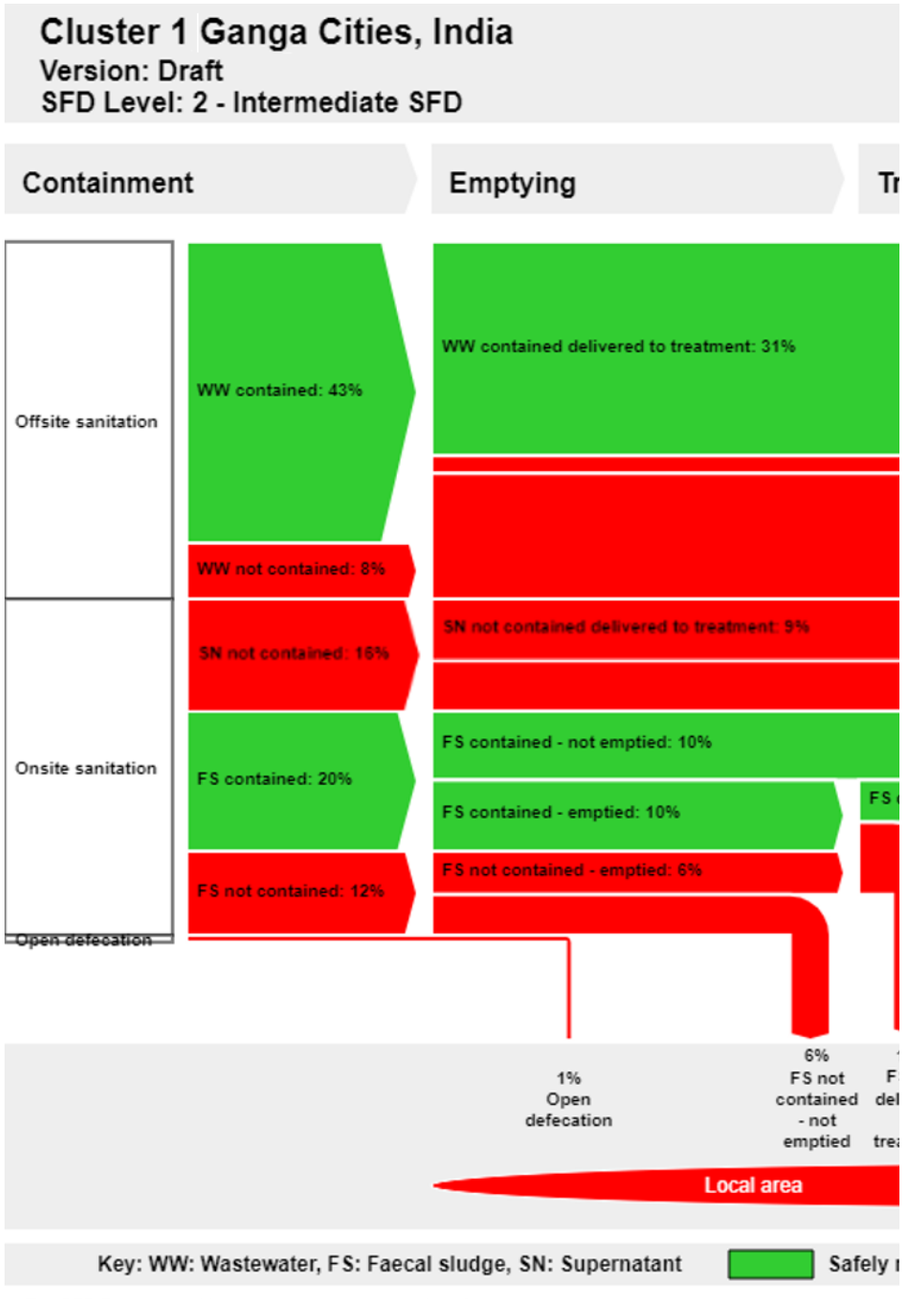
3. SFD ANALYSIS: CLUSTERIZATION OF CITIES

CLUSTER 1

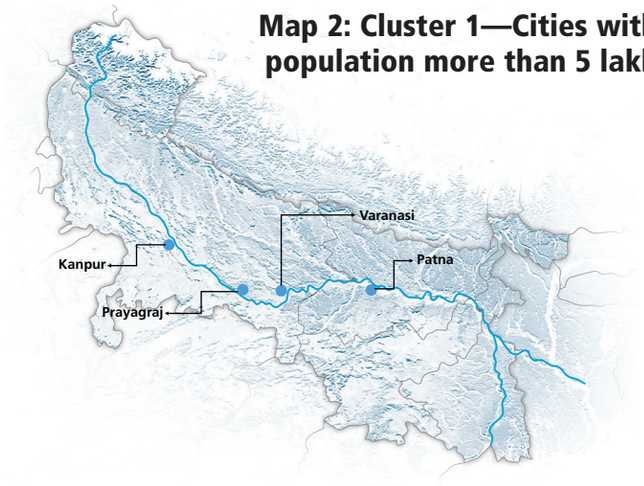
CITIES WITH POPULATION MORE THAN 5 LAKH

CHARACTERISTICS OF THE CLUSTER

- Roughly **32% of onsite sanitation systems** overflow in an open drain and 20% of them qualify to be called septic tanks.
- In absence of scheduled desludging, only **50% of faecal sludge generated gets emptied.** The rest remains in the tank and reduces the treatment efficiency of the onsite sanitation systems.
- Approximately **83% of the vacuum tankers are tractor mounted.** The rest are truck mounted.
- Due to inaccessible tanks, manual emptying is also observed.
- There are 19 STPs, spread across all the cities in the cluster, with cumulative capacity of 906 MLD, but they receive only 761 MLD of sewage.
- More than **60 private operators** are registered with local bodies.
- As a preliminary measure, Kanpur (1 STP) and Prayagraj (5 STPs) have allowed the discharge of collected faecal sludge into their sewage treatment plants (rudimentary co-treatment).
- The faecal sludge collected by unregistered operators is discharged in open drains/fields/ponds which ultimately adds to pollution in River Ganga.



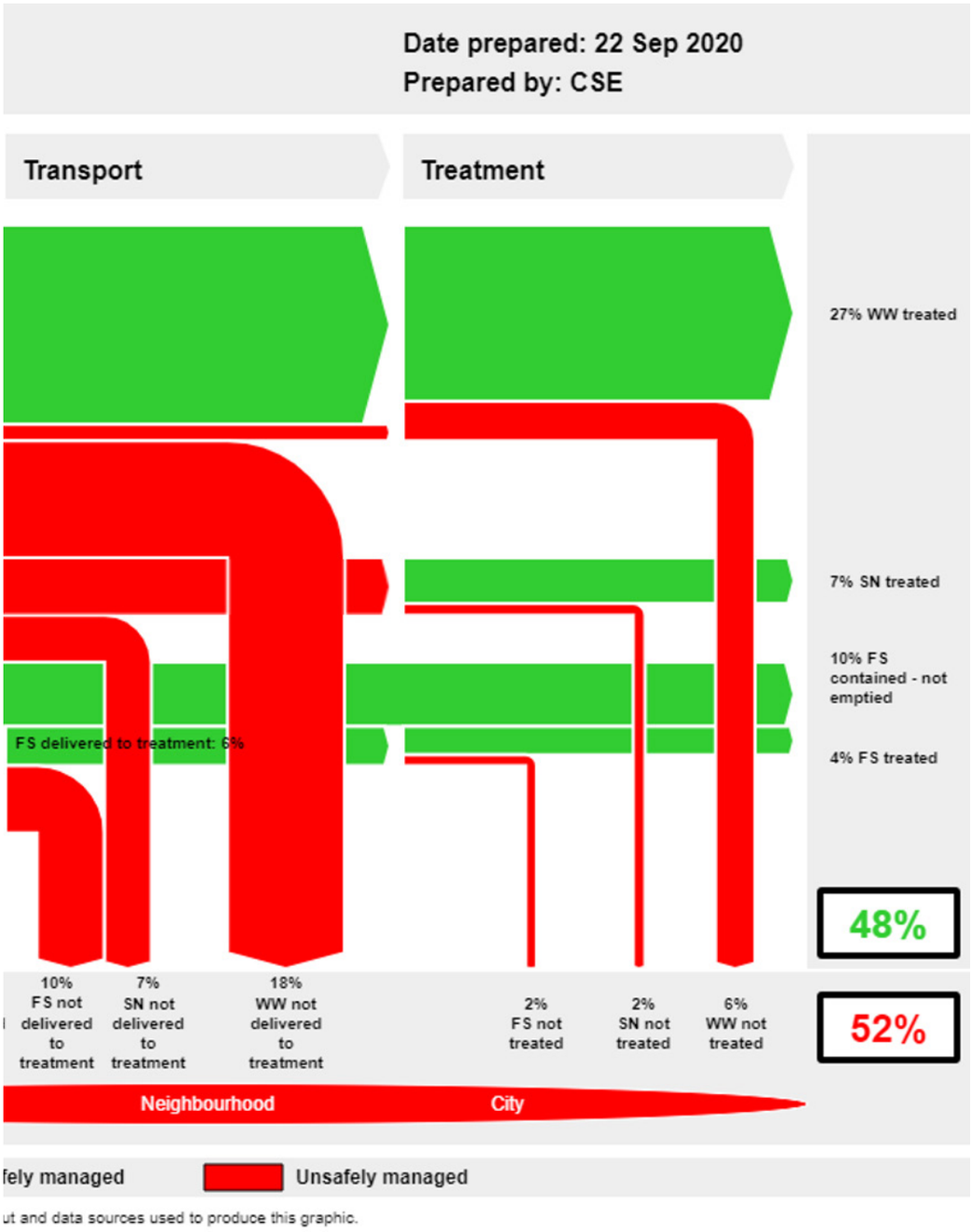
The SFD Promotion Initiative recommends preparation of a report on the city context, the analysis carried out and
Full details on how to create an SFD Report are available at: sfd.susana.org



Map 2: Cluster 1—Cities with population more than 5 lakh

Table 1: Faecal sludge generation and collection in Cluster 1 cities

City	Population	FS collected based on current demand (in KLD)	FS generated in KLD (emptied once in 3 years)	Gap (in %)
Prayagraj	1,378,295	88	344.6	74%
Kanpur	3,011,693	240	702	66%
Varanasi	1,198,491	30	246	88%
Patna	1,680,000	6	663	99%
Total	7,268,479	364	1,955.6	81%



ut and data sources used to produce this graphic.

EXPLANATION OF SFD

51% of the population is dependent on offsite sanitation systems, 43% of which is connected to sewerage networks but excreta of 27% is managed through STPs.

48% of the population is dependent on onsite sanitation systems like septic tanks, fully lined tanks, and pits, 40% of which have correctly designed systems, but excreta of only 21% is managed.

Around 32% population never gets their tanks emptied or gets them emptied only after 15–20 years.

1% of the population still defecates in the open.

10% 'FS contained-not emptied' only means that sludge is safely stored in containment systems that are not emptied for a long time.

7% supernatant treated denotes that either septic tanks are connected to centralized foul/separate sewer or some drains are being tapped to treat the liquid waste.

4% FS treated denotes that either faecal sludge is getting discharged into drains that get tapped or it is discharged into sewerage system and gets co-treated with sewage at STPs.

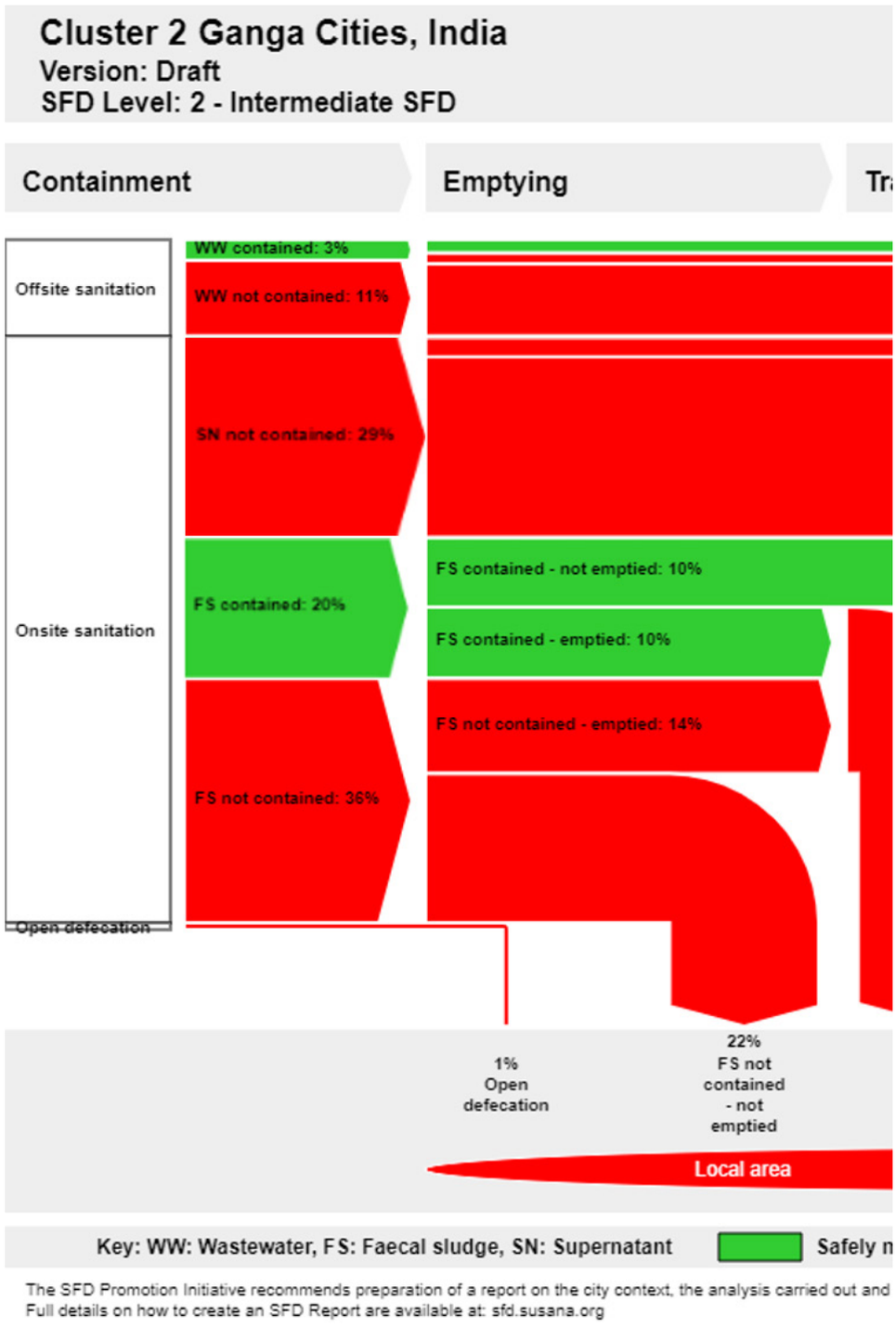
Overall excreta of 48% population is being managed despite inefficient emptying and transport.

CLUSTER 2

CITIES WITH POPULATION BETWEEN 1.2 AND 5 LAKHS

CHARACTERISTICS OF THE CLUSTER

- **Around 58% of the population** is dependent on tanks connected to open drains and 24% of them qualify to be called septic tanks.
- In absence of scheduled desludging, **less than 50% of faecal sludge generated gets emptied,** rest remains in the tank and reduces the treatment efficiency of the septic tank.
- **95% of the vacuum tankers** are tractor mounted. The rest are truck mounted.
- Due to inaccessible tanks, manual emptying is rampant.
- There are 3 STPs in **Mirzapur (18 MLD) and Farukhabad (0.5 MLD),** while no other city has any functional sewage treatment plant.
- There is no designated disposal site for the collected faecal sludge hence it is disposed in drains/fields/ponds.

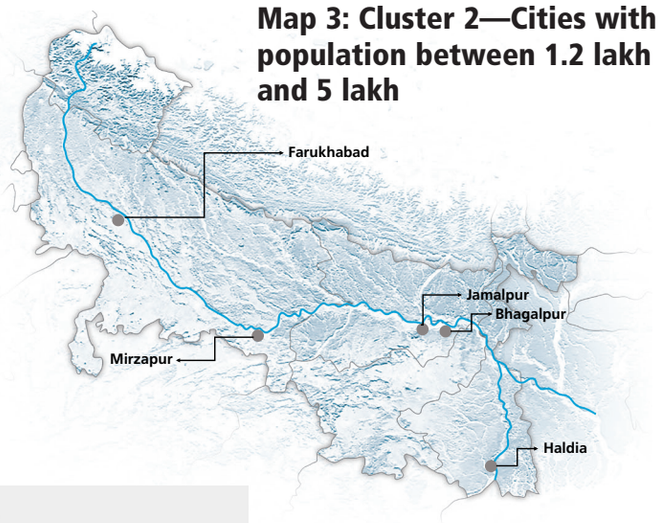


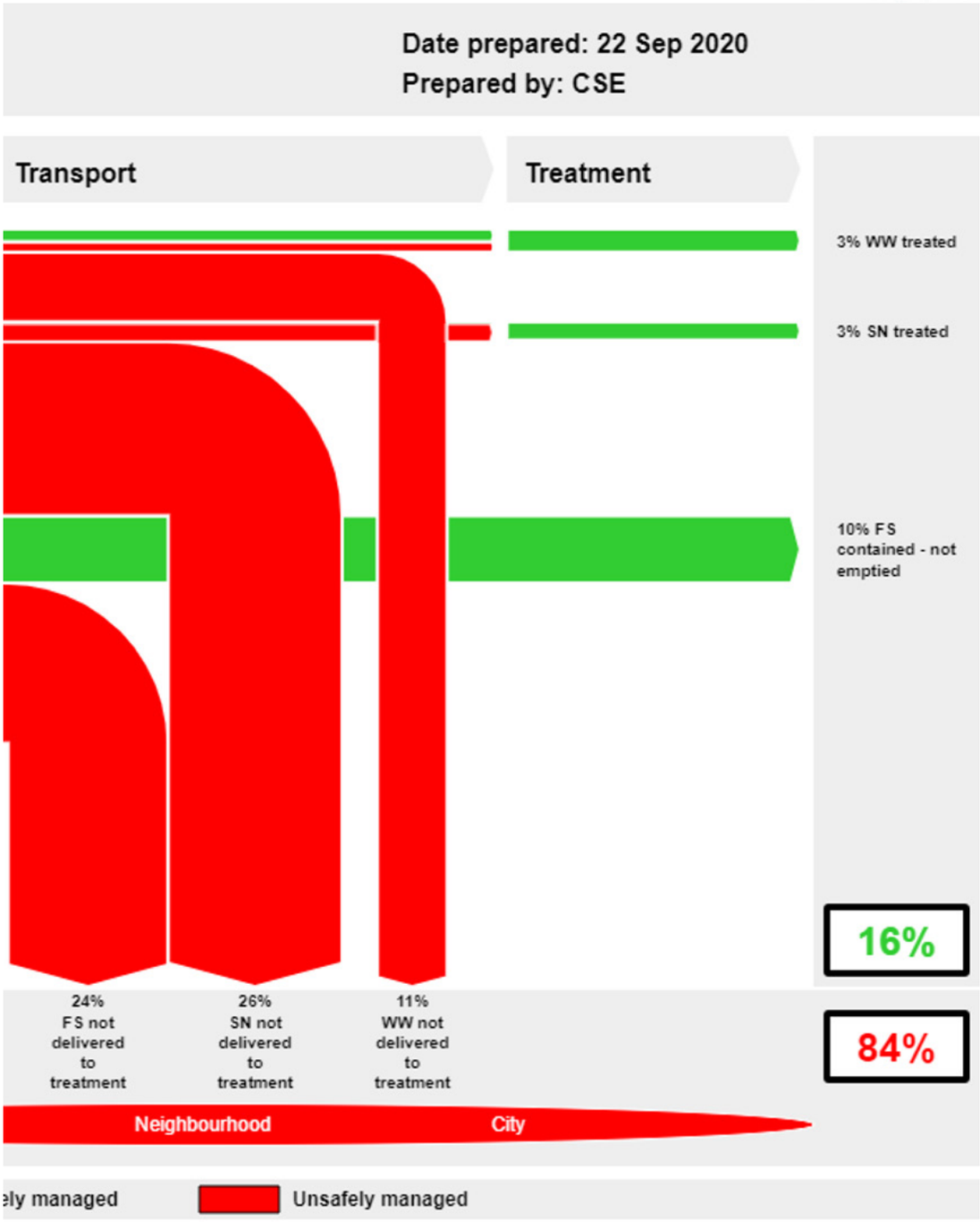
Note: SFD based on 5 selected priority town/cities

Table 2: Faecal sludge generation and collection in Cluster 2 cities

City	Population	FS collected based on current demand (in KLD)	FS generated in KLD (emptied once in 3 years)	Gap (in %)
Mirzapur	**233,691**	**12**	**79**	**85%**
Jamalpur	**130,530**	**3**	**67.4**	**96%**
Farukkhabad	**279,012**	**21**	**114**	**82%**
Bhagalpur	**470,335**	**8.6**	**261.2**	**97%**
Haldia	**248,578**	**7.7**	**135.4**	**94%**
Total	**1,362,146**	**52.3**	**657**	**92%**

Map 3: Cluster 2—Cities with population between 1.2 lakh and 5 lakh





EXPLANATION OF SFD

85% of the population is dependent on onsite sanitation systems like septic tanks, fully lined tanks, and pits, 40% of which have correctly designed systems, but excreta of only 13% is managed.

Around 64% of the population never gets their tanks emptied or gets them emptied only after 15–20 years.

1% of the population still defecates in the open.

10% 'FS contained-not emptied' only means that sludge is safely contained in systems which are either not emptied for a long time or safely infiltrate the effluent without polluting the ground water.

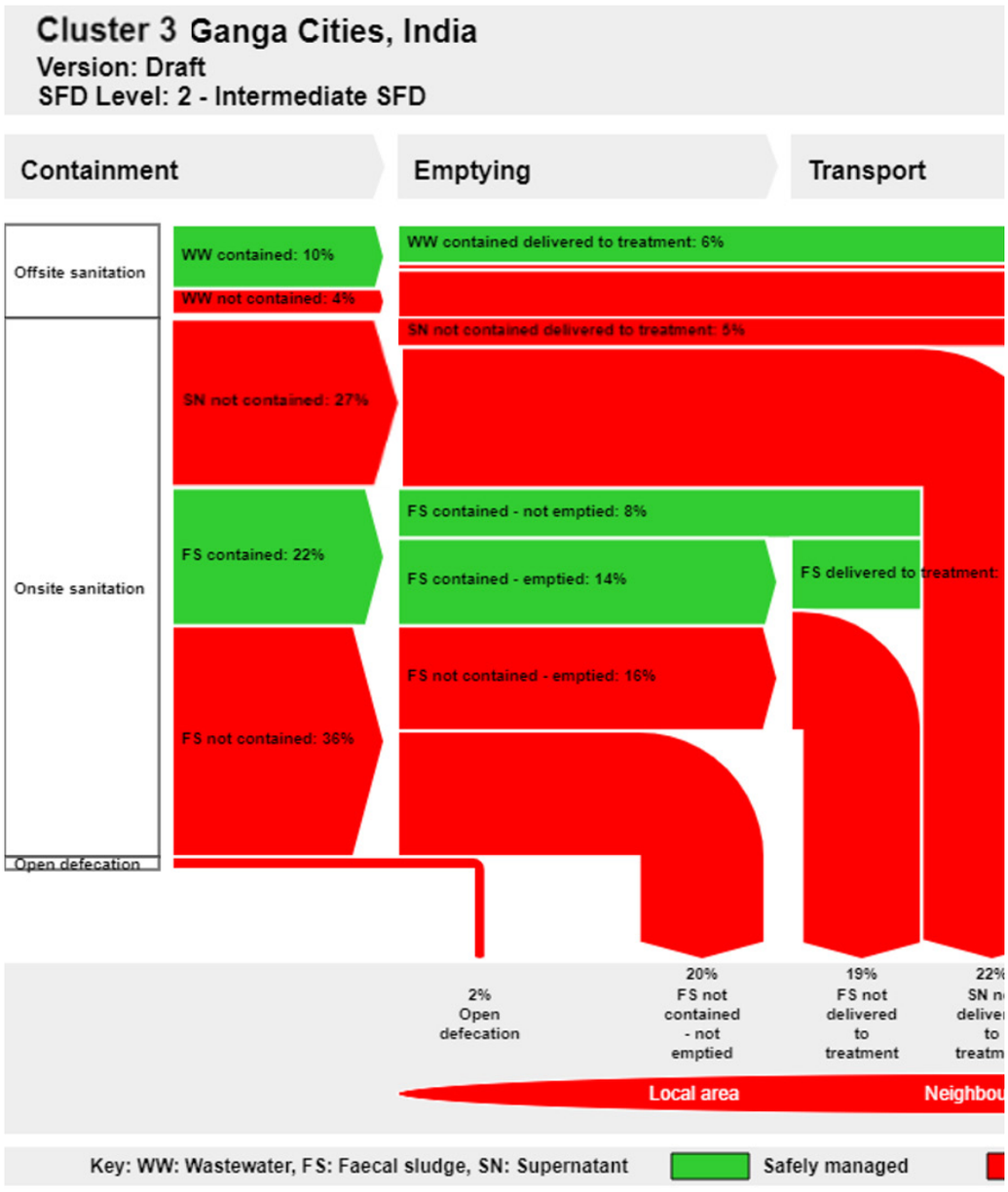
Overall excreta of 16% of the population is being managed despite inefficient emptying and transport.

CLUSTER 3

CITIES WITH POPULATION LESS THAN 1.2 LAKH

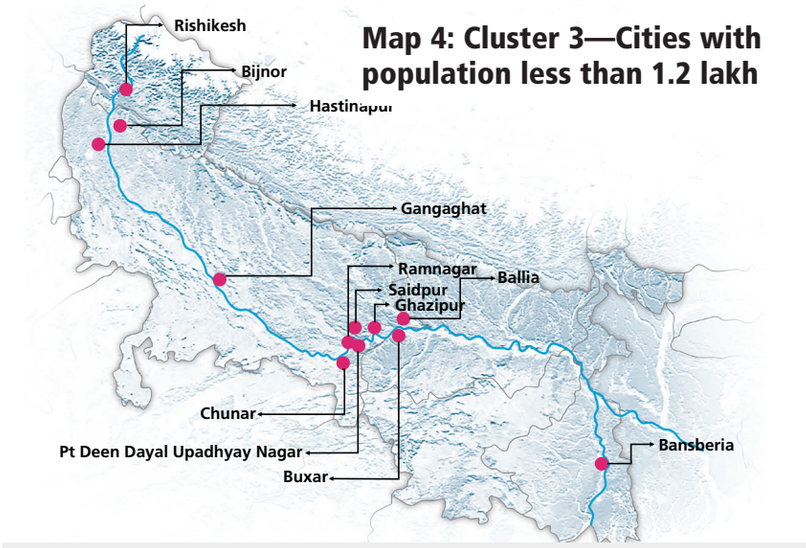
CHARACTERISTICS OF THE CLUSTER

- **Around 54% of the population is dependent** on tanks connected to open drains and 22% of them qualify to be called septic tanks.
- Prevalent containment systems are **fully lined tanks (around 39%)** which include oversized tanks and ill designed septic tanks.
- Around 20% of the systems are infiltrating into the ground with considerable number of systems installed in high ground water table areas.
- In absence of scheduled desludging, **roughly 50% of faecal sludge generated gets emptied,** the rest remains in the tank and reduces the treatment efficiency of the onsite sanitation systems.
- **77% of the vacuum tankers** are tractor mounted, manual emptying is also rampant.
- Except **Bijnor (24 MLD) and Rishikesh (6 MLD)** no other city has any functional sewage treatment plant.
- Except **Chunar (10 KLD),** there is no dedicated faecal sludge treatment plant in any of the cities in the cluster and the collected faecal sludge is disposed in drains/fields/ponds.



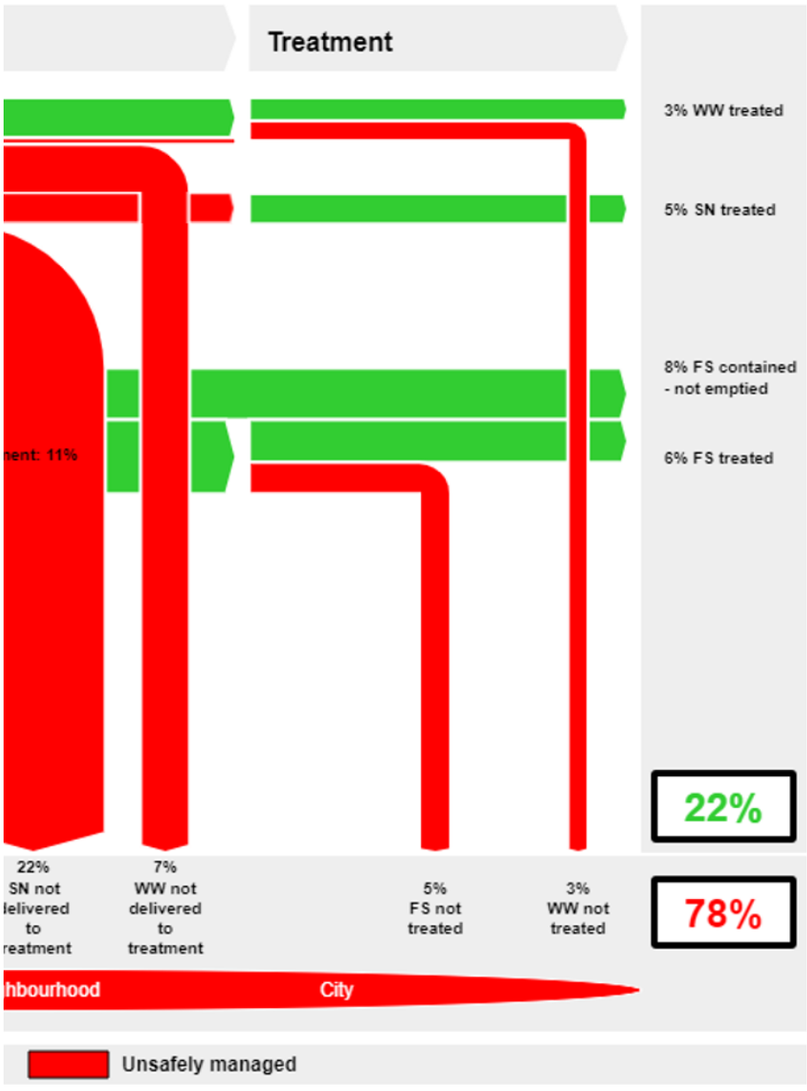
The SFD Promotion Initiative recommends preparation of a report on the city context, the analysis carried out and data sources used to pr
Full details on how to create an SFD Report are available at: sfd.susana.org

Note: SFD based on 12 selected priority town/cities



Map 4: Cluster 3—Cities with population less than 1.2 lakh

Date prepared: 22 Sep 2020
Prepared by: CSE



to produce this graphic.

Table 3: Faecal sludge generation and collection in Cluster 3 cities

City	Population	FS collected based on current demand (in KLD)	FS generated in KLD (emptied once in 3 years)	Gap (in %)
Ramnagar	**49,132**	**3**	**4**	**25%**
Gangaghat	**84,072**	**6**	**39**	**85%**
Hastinapur	**26,452**	**3**	**11**	**73%**
Chunar	**40,205**	**3.3**	**22.3**	**85%**
Saidpur	**24,438**	**3**	**11**	**73%**
Bijnor	**93,297**	**6**	**63.05**	**90%**
Rishikesh	**118,664**	**12**	**32**	**63%**
Mughalsarai	**109,650**	**10**	**48**	**79%**
Ballia	**104,424**	**34**	**35**	**3%**
Ghazipur	**110,587**	**12**	**56**	**79%**
Buxar	**102,861**	**0.23**	**38**	**99%**
Bansberia	**103,920**	**12**	**58**	**79%**
Total	**991,406**	**104.53**	**417.35**	**75%**

EXPLANATION OF SFD

14% of the population is dependent on offsite sanitation systems, 10% of which are connected to the sewerage network but only 3% of the collected wastewater gets treated.

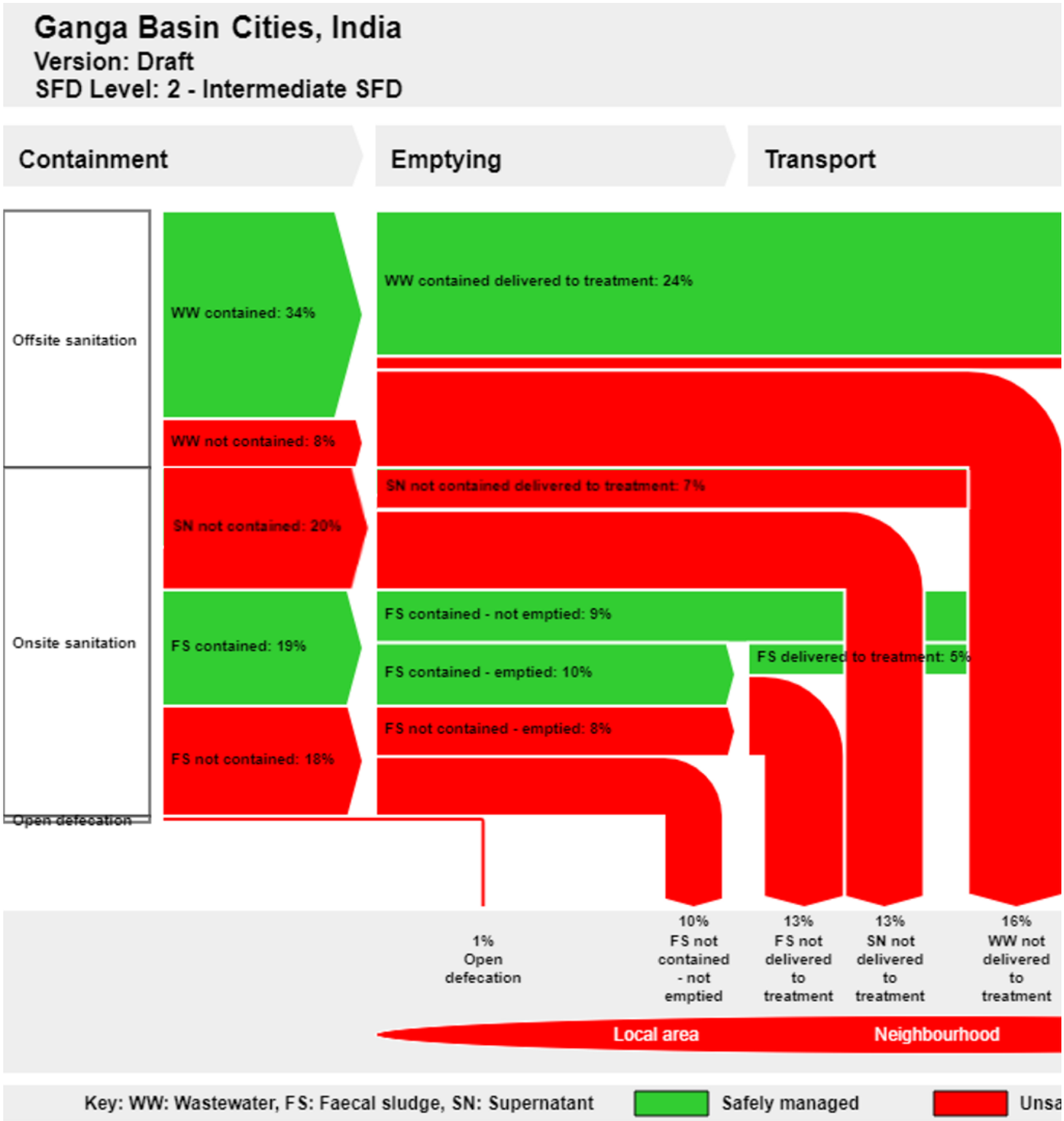
84% of the population is dependent on onsite sanitation systems like fully lined tanks, septic tanks, and pits, 44% of which have correctly designed systems that don't pollute the environment.

Around 56% of the population never gets their tanks emptied or gets them emptied only after 15–20 years.

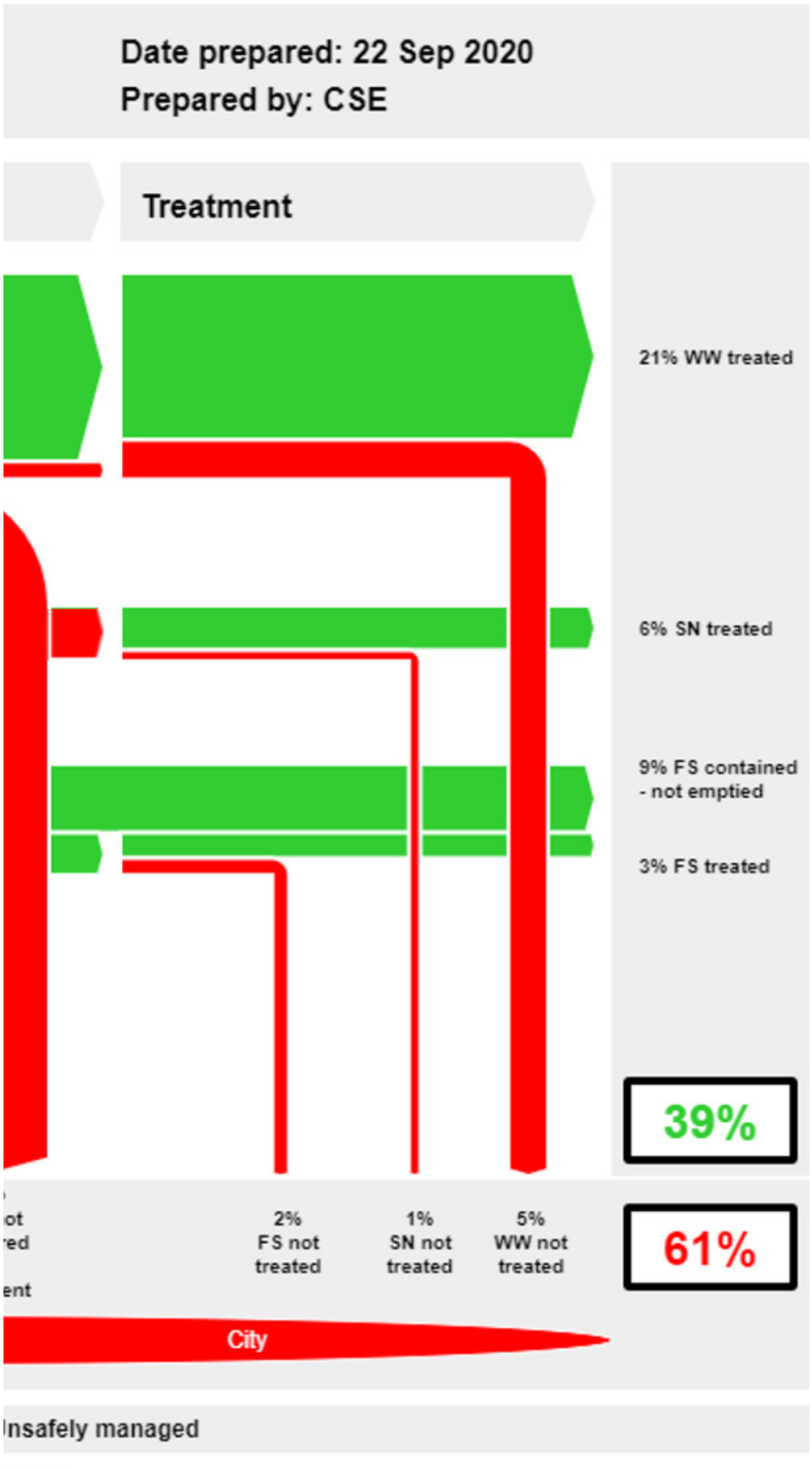
2% of the population still defecates in the open.

Overall excreta of 22% of the population is being managed, 8% of which is just simply stored in systems that limit the pathogen transmission to general public.

4. SFD FOR GANGA BASIN



The SFD Promotion Initiative recommends preparation of a report on the city context, the analysis carried out and data sources used to produce this graph
Full details on how to create an SFD Report are available at: sfd.susana.org



graphic.

KEY OBSERVATIONS

57%
of the total population is dependent on onsite sanitation systems like septic tank, fully lined tanks, and pit latrines. Out of which, the excreta of 18% of the population is treated.

Septic tank/fully lined tank effluent (overflow) of
40%
of the population is discharged in open drains, 50% of which is getting tapped and treated.

Out of 21 Ganga cities surveyed, around
90%
of the sewerage network is found in 3 cities.

Sanitation provision through sewer system increases with the increase in population of cities

Excreta of
8%
of the population is discharged directly in open drains.

34%
of the population is connected to sewerage network. But excreta of only 21% of the population is treated at STPs.

1%
of the population still defecates in the open.

No city is 100% sewered

Excreta of
39% **of the total population is safely managed, 6% of which is safely stored in containment systems.**

5. WAY FORWARD AND ACTION PLAN

PROPOSED ACTION PLAN FOR CITIES

Category	Actions	Year 1				Year 2				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
CLUSTER 1 > 10 Lakh population	A1									
	A2									
	A4									
	A3 + A6 + A13									
	A7 + A9									
	A8									
	A10 + A15									
	A11									
	A12 + A14									
CLUSTER 2 & 3 1.2 - 5 Lakh population and 5 - 10 Lakh population	A1									
	A2									
	A4									
	A3 + A5 + A6 + A13									
	A7 + A9									
	A8									
	A10 + A15 + A16									
	A11									
	A12 + A14									
CLUSTER 4 < 1.2 Lakh population	A1									
	A2									
	A4									
	A3 + A5 + A13									
	A7 + A9									
	A8									
	A10 + A15 + A16									
	A11									
	A12 + A14									

A1: Baseline data collection and formation of City Sanitation Task Force

A2: Preparation of city - level strategy on Faecal Sludge and Septage Management including decentralised liquid waste management

A3: Regulating & licensing of private desludgers and installation of GPS devices in each vacuum tanker (ULB-owned and private)

A4: Preparation of Citywide Sanitation Plan

A5: Identification, construction and designation of trenching sites for safe disposal of faecal sludge, till the time scientifically - designed treatment plant is in place

A6: Operationalising co-treatment at existing STP and/or co-composting with municipal solid waste wherever feasible for safe treatment of collected FSS

A7: Construction and commissioning of faecal sludge treatment plants with effective reuse of by-products (wherever feasible) for safe management of all the collected FSS

A8: Capacity building programme for ULB, service providers, masons, operators etc.

A9: Ensure adequate manpower and efficient equipment for collection and transport of FSS

A10: Implement scheduled desludging, initially on a pilot-scale and eventually extending across the city

A11: Operationalise decentralised wastewater treatment systems for the effluent generated from onsite sanitation systems and greywater

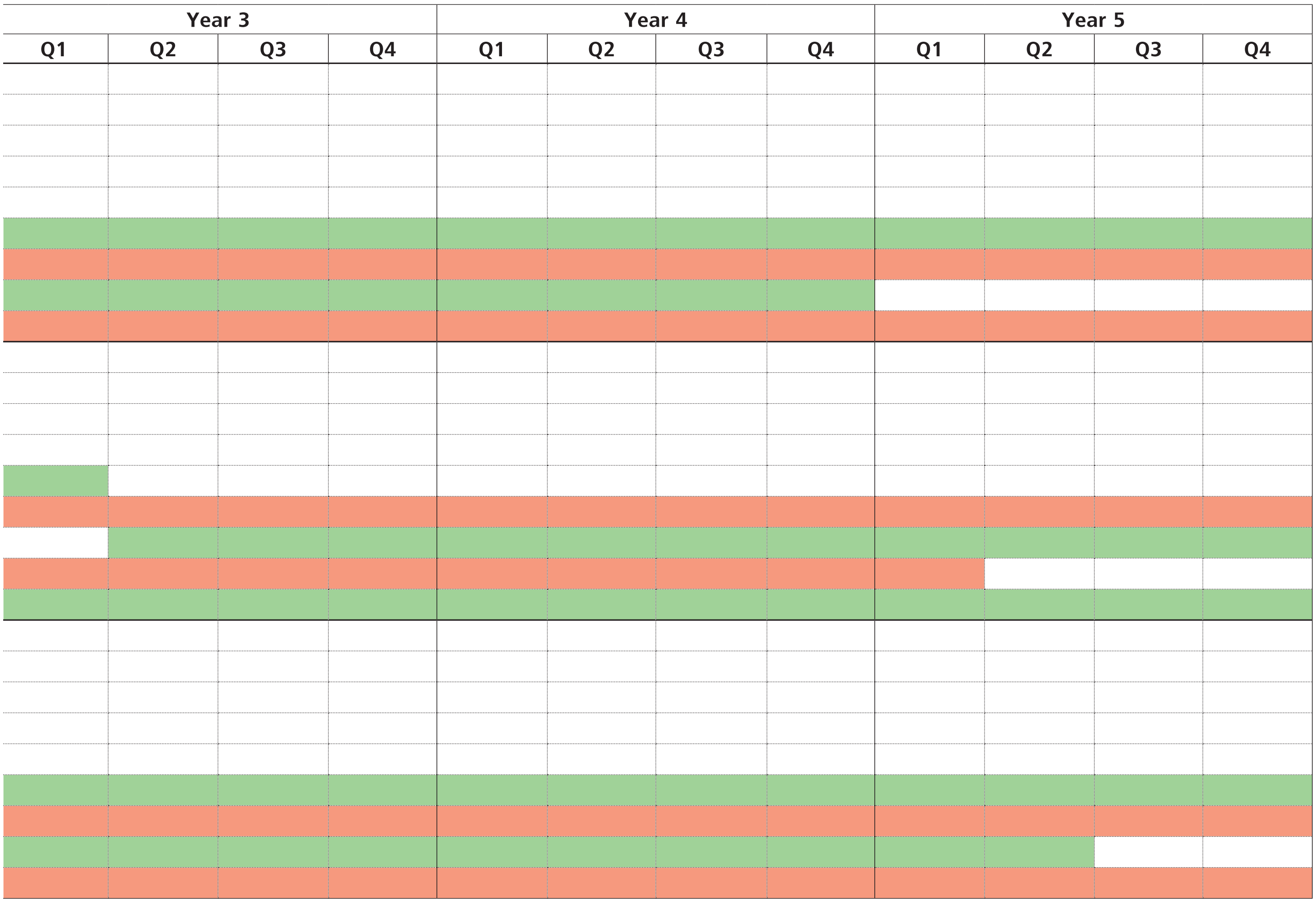
A12: All households with individual toilet in non - sewered areas to have safe onsite sanitation system

A13: Incorporate FSS co-treatment modules in the STPs which are in planning/designing/construction phase

A14: Conduct GIS survey for geo-tagging of all properties in the city

A15: Ensure enforcement of 'The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013' and provisions for penalising the defaulters

A16: Gap analysis and construction & commissioning of FSTP(s) for safe management of all the generated FSS , in conjunction with the implementation of scheduled desludging

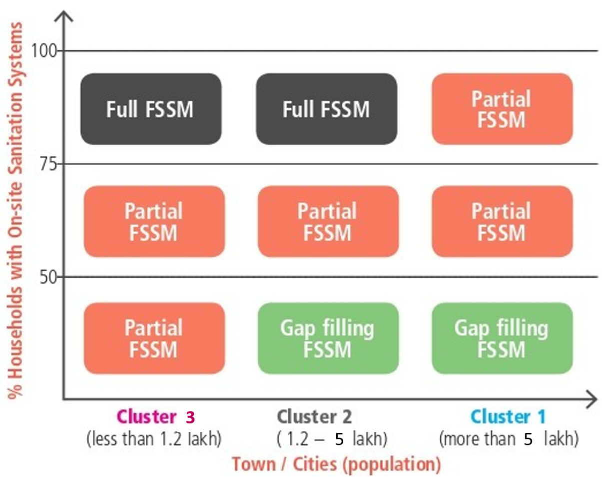


Town / Cities

Gangotri, Gopeshwar, Gangaghat, Garulia, Konnagar, Bijnor, Ghazipur, Gaucher, Hastinapur, Chunar, Saidpur, Mughalsarai,
Uttarapara Kotrung, Bally, Baranagar, Bhagalpur, Rishra

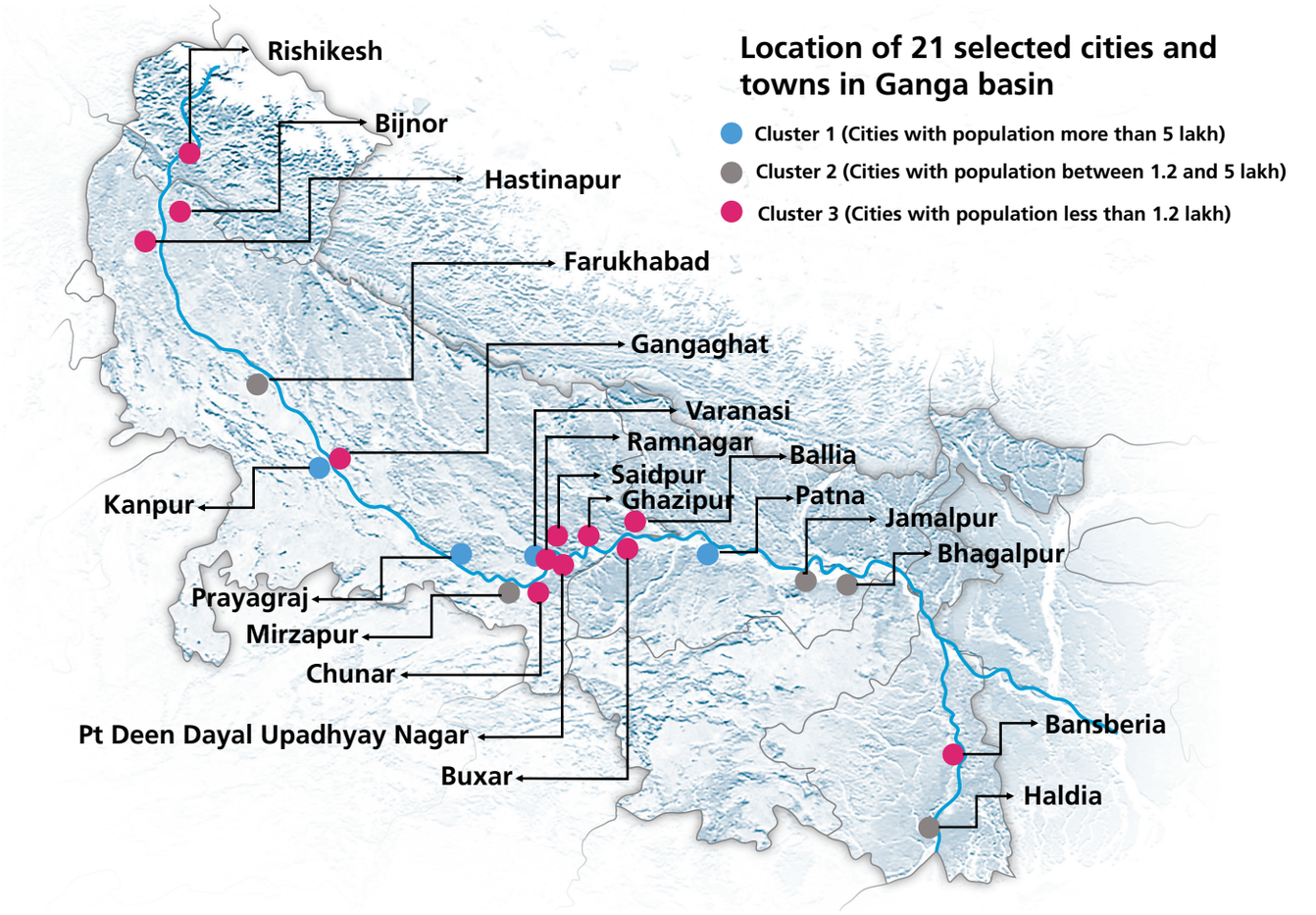
Rudraprayag, Srinagar, Kirtinagar, Tapovan, Devprayag, Garhmukteshwar, Anupshahar, Sonepur, Barh, Kahelgaon, Sahibganj, Jiaganj-Azimganj, Katwa, Bhadreshwar, Champdani, Khardah, Babrala
Chapra, Danapur, Hajipur, Munger, Bahrampur, Nabadwip, Halishahar, Kanchrapara, Naihati, Chandannagar, Baidyabati, Barrackpore, Serampore, Panihati, Kamarhati, Mirzapur, Farukkhabad, Hugli-Chinsurah, Haldia, Jamalpur
Patna

Badrinath, Muni Ki Reti, Kalyani, Titagarh, Ramnagar, Rishikesh, Joshimath, Nandprayag, Karnaprayag, Uttarkashi, Narora, Kannauj, Fatuah, Bakhtiyarpur, Barauni, Mokameh, Barahiya, Sultanganj, Rajmahal, Jangipur, Murshidabad, Gayespur, Budge Budge, Ballia, Buxar, Bansberia, Diamond Harbour, Dhulian, Chakdah, Bithoor
Haridwar, Begusarai, Bhatpara, Maheshtala, Santipur, Ulluberia
Howrah, Kolkata, Prayagraj, Kanpur, Varanasi



- Full FSM with dedicated treatment facility
- Partial FSSM – Combined FSSM & Sewerage system; co-treatment; DEWATs; On-site treatment system, FSSTP wherever necessary.
- Gap Filling – Complete Sewerage; FSSM only for non - sewered pockets with treatment at FSSTP or Co-treatment at STP

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



	CITY	POPULATION					
Cluster 1	Prayagraj	13,78,295	0%	37%	17%	26%	19%
	Kanpur	30,11,693	1%	36%	22%	19%	23%
	Varanasi	11,98,491	1%	21%	44%	28%	6%
	Patna	16,80,000	5%	6%	19%	8%	63%
Cluster 2	Mirzapur	2,33,691	9%	17%	13%	26%	35%
	Jamalpur	1,30,530	2%	0%	5%	7%	86%
	Farukkhabad	2,79,012	1%	1%	24%	7%	67%
	Bhagalpur	4,70,335	1%	0%	10%	6%	83%
	Haldia	2,48,578	7%	0%	0%	22%	71%
Cluster 3	Ramnagar	49,132	13%	0%	71%	1%	15%
	Gangaghat	84,072	14%	0%	2%	3%	81%
	Hastinapur	26,452	9%	0%	2%	2%	87%
	Chunar	40,205	0%	0%	0%	16%	84%
	Saidpur	24,438	14%	0%	0%	14%	72%
	Rishikesh	1,18,664	0%	24%	27%	25%	25%
	Bijnor	93,297	0%	2%	1%	45%	52%
	Mughalsarai	1,09,650	8%	0%	14%	10%	68%
	Ballia	1,04,424	30%	0%	10%	3%	57%
	Ghazipur	1,10,587	10%	0%	0%	8%	82%
	Buxar	1,02,861	30%	0%	4%	0%	66%
	Bansberia	1,03,920	0%	4%	2%	0%	94%

OPEN DEFECATION | OFFSITE: Safe, Unsafe | ONSITE: Safe, Unsafe

SFD PROMOTION INITIATIVE PHASE III

SFD Phase III initiative focuses on scaling up of Shit Flow Diagram approach to bridge the existing gap in availability of data for monitoring safely managed sanitation (SDG 6.2) and improve citywide sanitation planning and effective sanitation investments in urban areas. A demonstrated impact is the uptake of the approach by local, regional, and national organizations and governmental agencies—in particular in India, South Africa (WRC with CSE technical support launched a national campaign), and in states/cities in Africa and South Asia, where there is widespread use of SFDs for advocacy and as a tool to map progress across the sanitation value chain.

To promote the use of SFDs in South Asia and Africa, help desks are envisaged at three countries—India, Bangladesh, and South Africa. WaterAid Bangladesh and Water Research Commission, South Africa will act as core partners to upscale use of SFDs in South Asia and Africa respectively. In India, CSE will closely work with National Mission for Clean Ganga and Department of Urban Development, Uttar Pradesh as core partners.

In this third phase, CSE will support the rapid growth of the SFD database including capacity building engagements aimed to catalyze the long-term sustainability of the SFD initiative by establishing a Forum of Cities that manages faecal sludge and septage.

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