

Draft SFD Lite Report

Chunar India

This SFD Lite Report was prepared by
Centre for Science and Environment.

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1 The SFD Graphic

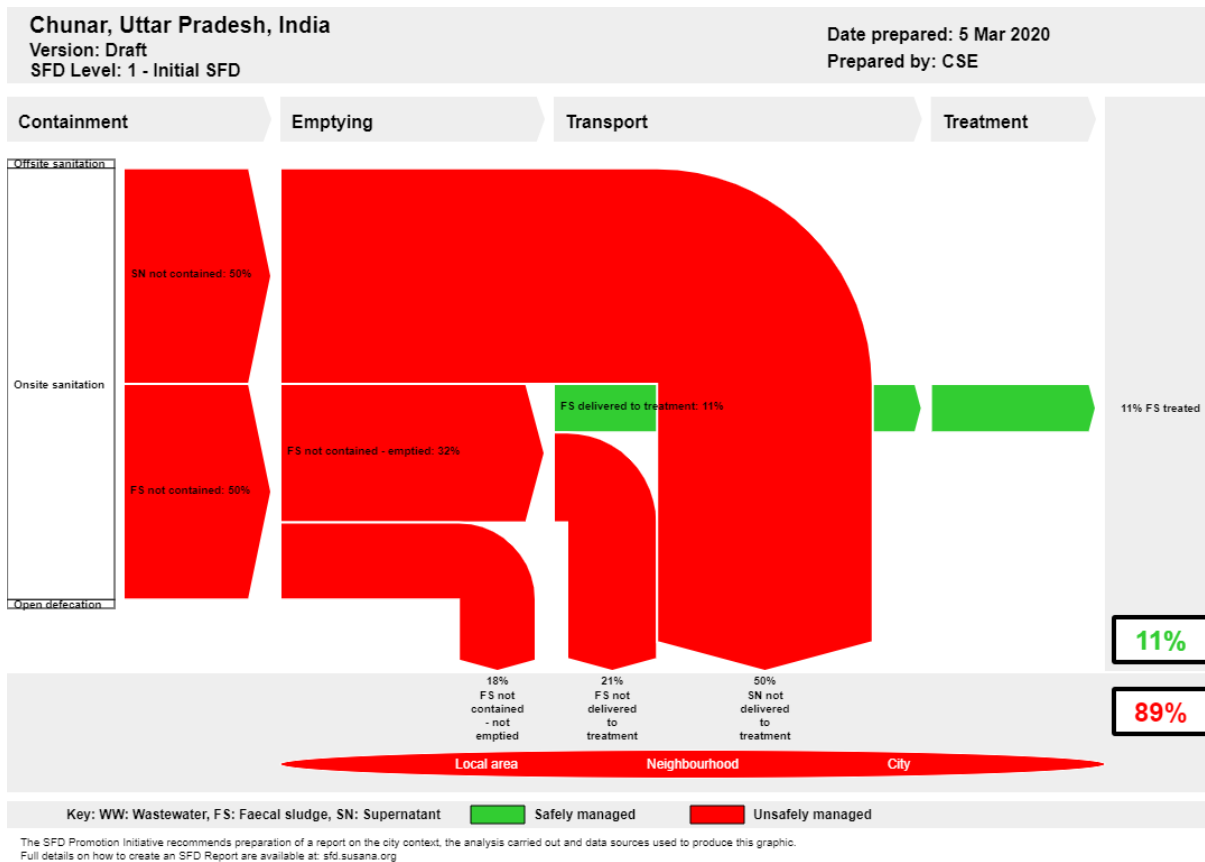


Figure 1: SFD graphic for Chunar

2 SFD Lite information

Produced by:

- Centre for Science and Environment
- This report was compiled as part of the SFD Promotion Initiative project funded by the Bill and Melinda Gates Foundation (BMGF). We would like to thank Mrs Pratibha Singh, Executive Officer (EO) ; Mr. Mithilesh Kumar, Sanitation and Food inspector (SFI); Mr. Lalmani Yadav (SFI); Mr. Saurabh Singh, Junior Engineer(JE), JalKal Vibhag; Mr. Ajit Singh Revenue Inspector (RI) and Mr. Sandeep Kumar, Clerk for providing all the required secondary data and cooperating in conducting KII & FGDs.

Collaborating partners:

- Chunar Nagar Palika Parishad.

Date of production: 09/03/2020

3 General city information

Chunar is situated on the banks of River Ganga and River Jargo, in the state of Uttar Pradesh, India. City lies in the Vidhyan Range, 42 km from the district headquarters, Mirzapur, and at a distance of 273 km from the state capital, Lucknow. The city gets its name from the Chunar Fort, which was constructed in 1029 by King Sahadeo, by Sher Khan in 1532, by Sher Shah Suri in 1538 and by Akbar in 1575 (NIC, 2016). The population of the city, as per the Census of India, 2011 is 37,185. Population density of the city is 2656 persons per sq.km, which is considerably high, when compared to that of Uttar Pradesh, i.e. 828 persons per sq.km. The current population according to Swachh Survekshan (SS) 2020 is 40205. The population growth rate of the city is given in Table 1.

Table 1: Population growth rate of Chunar city

Year	Population	Growth rate (%)
1991	27,778	-
2001	33,933	22
2011	37,185	10
2020 (SS 2020)	40,205	8

Source: CNPP 2020, Census 2011

The city is situated on the banks of Ganga, people of Hindu religion here consider Ganga Ghat as their place of worship. Kartik Purnima fair is held every year on this Ganga Ghat. Dargah Sharif fair is also held in Chunar. People from nearby towns and villages come to attend these fair. The administrative area under Nagar Palika Parishad (NPP) or municipal council of Chunar is 14 sq.km and the municipal boundary has been chosen for the current study. The city is divided into 25 municipal wards.¹ Primary mode of earning livelihood is agriculture and agro-based business. Chunar is well known for its small and micro scale pottery industries especially of clay toys.

The city is located at 25°7'48"N latitude and 82°54'E longitude with an average altitude of 84 m above Mean Sea Level (MSL). The climate is dry sub-humid to moist sub humid. The temperature rises maximum to 41.8°C during peak summer season and drops down to minimum of 9.6°C during the winter season.² Chunar city lies in a moderate to high rainfall region with minimum rainfall in April upto 3 mm and maximum in August up to 345 mm.

4 Service outcomes

Table 2: SFD Matrix for Chunar

Chunar, Uttar Pradesh, India, 5 Mar 2020. SFD Level: 3 - Comprehensive SFD						
Population: 40205						
Proportion of tanks: septic tanks: 50%, fully lined tanks: 50%, lined, open bottom tanks: 50%						
System label	Pop	F3	F4	F5	S4e	S5e
System description	Proportion of population using this type of system	Proportion of this type of system from which faecal sludge is emptied	Proportion of faecal sludge emptied, which is delivered to treatment plants	Proportion of faecal sludge delivered to treatment plants, which is treated	Proportion of supernatant in open drain or storm sewer system, which is delivered to treatment plants	Proportion of supernatant in open drain or storm sewer system that is delivered to treatment plants, which is treated
T1A2C6 Septic tank connected to open drain or storm sewer	30.0	65.0	35.0	100.0	0.0	0.0
T1A3C6 Fully lined tank (sealed) connected to an open drain or storm sewer	33.0	65.0	35.0	100.0	0.0	0.0
T1A4C6 Lined tank with impermeable walls and open bottom, connected to an open drain or storm sewer	37.0	65.0	35.0	100.0	0.0	0.0

¹ KII with Sanitary and Food Inspector

² District Census Handbook 2011 for Mirzapur (HH-8 Households by Availability of type of Latrine Facility Table For Uttar Pradesh) , https://censusindia.gov.in/2011census/dchb/DCHB_A/09/0968_PART_A_DCHB_MIRZAPUR.pdf

Offsite sanitation

According to Census 2011, there was a sewerage network in the city which covered about 9%³ of the population, but the field-based study revealed that neither there is any functional sewerage network in the city nor any kind of sewage treatment plant.

Onsite sanitation

In absence of any kind of sewerage system in the city, 100 % of the population is dependent on onsite sanitation systems in Chunar. There is no wastewater treatment plant in the city.⁴

Containment

Three types of containment systems are prevalent in Chunar city - septic tanks connected to open drains, fully lined tank connected to open drains and lined pits. 30% population is dependent on septic tanks connected to open drain (T1A2C6), 33% on fully lined tank connected to open drain (T1A3C6) and 37% on Lined tank with impermeable wall and open bottom connected to open drain (T1A4C6).^{5, 6, 7, 8} The size of containment system depends on space availability and affordability of households. Whether it's a fully lined tank or septic tank both are locally known as septic tank. Under the recent scheme of Swachh Bharat (Clean India) Mission, NPP Chunar constructed 1658 Individual Household Latrines (IHHL), 44 seats for community toilet and 5 seats for pink (only for women) toilet within the administrative boundary.⁹ It was observed in the field, that open defecation is still being practiced in the wards, where the community toilets are temporarily locked.



Figure 2: Septic Tank under construction and fully lined tank connected to open drain (Manish/CSE,2020)

Community Toilets/Public Toilets: There are 22 community toilets and 2 public toilets in Chunar which have STOD.¹⁰ The average size of septic tanks in community toilet is 5 x 2 x 4 m which are emptied every 1.5-2 years. The average size of septic tanks in public toilet is 4 x 3 x 4 m which are emptied in

³ District Census Handbook 2011 for Mirzapur (HH-8 Households by Availability of type of Latrine Facility Table For Uttar Pradesh) , https://censusindia.gov.in/2011census/dchb/DCHB_A/09/0968_PART_A_DCHB_MIRZAPUR.pdf

⁴ KII with sanitary inspector and field observation, February 2020

⁵ KII with executive officer Chunar

⁶ FGD with local masons

⁷ Field observation, February 2020

⁸ FGD with government emptiers

⁹ Swachh survekshan report 2020

¹⁰ Field observations from visits to different Community & Public Toilet, 2020

0.5-1 years' time. The CNPP owns two mobile Bio Toilets 4 seater each which are put up in the Exhibition ground during public gatherings in addition to the existing public toilets.

Even though Chunar has been declared as an Open Defecation Free city the instances of open defecation can still be observed.¹¹ According to CNPP, the rare case of open defecation can be attributed to behaviour issue but field observation suggests that the poor condition or lack of care taker of the public/community toilets also contribute to open defecation in the city.

Emptying

The local body has one vacuum tanker of 3,500 liters capacity but it hardly makes one or two trips in one week. The sanitary workers of the NPP uses all personal protective equipment (PPE) like gloves, boots and mask during emptying of OSS and cleaning of drains.¹² In general, frequency of emptying is less than 5 years. The fees for mechanical emptying is INR 3000 (40 USD). The field survey revealed that most of the settlements in the city are informal and unplanned and hence many containment systems are inaccessible to any emptying vehicle. The manual emptying is still prevalent in the city and is usually carried out by 2 - 4 people. The number of people deployed depends on the size of the containment and the degree of solidification of FS at the bottom of the containment. Spade and bucket are used by manual emptiers for emptying OSS without any safety gears. The emptying service fee ranges from INR 4,000 to INR 6,000 (52.93USD –79.40USD).¹³ Based on the sample household survey, FGD with emptiers it was concluded that 65 % of population is using their systems with emptying (F3).



Figure 3: Mechanical emptying in process (on left) and tractor mounted vacuum tanker (on right) (Manish/CSE, 2020)

Transportation

The faecal sludge emptied mechanically using a vacuum tanker gets transported to a temporary trenching site. The tanker has to cover a distance of 8 to 10 kms for a round trip.^{14, 15} There is no leakage or spillage during transportation of FSS. The faecal sludge emptied manually is transported using hand/cycle carts and is discharged into open drains or at any low-lying areas in and around the city. Supernatant (SN) is conveyed through open drains in the city, which finally converge into twenty-two

¹¹ Field observation, February 2020

¹² KII with government emptier, February 2020

¹³ KII with clerk at CNPP, February 2020

¹⁴ KII with sanitary inspector, February 2020

¹⁵ KII with trenching site incharge, February 2020

major nullahs out of which twelve nullahs terminate at Ganga River.¹⁶ Based on FGDs with emptiers and random household survey, it was estimated that only 35% of the faecal sludge emptied is getting delivered to the trenching facility, and rest of the 65% faecal sludge emptied is dumped in the neighbourhood, as it is emptied manually. Since no supernatant is delivered to any treatment facility S4e is considered zero.

Treatment

Chunar has a temporary trenching site which receives all the faecal sludge, emptied mechanically. This trenching site is a stop gap solution till the faecal sludge treatment plant (under construction) of 10 KLD capacity is up and running.¹⁷ There is no treatment of the supernatant and the grey water flowing in the open drains. Depending upon the irrigation requirement of the crops, farmers often draw this mixture of supernatant and grey water from the big and small nullahs passing through their agriculture fields. Out of the 22 major nullahs, 12 outflows into River Ganga, eight into River Jargo and the rest eventually outflow at agriculture fields.¹⁸ As much as 50% of this mixture of supernatant and grey water is discharged into River Jargo, 25% in River Ganga and 25% on agriculture fields, River Jargo runs almost dry when it meets the Ganga River after flowing for 16 kms.¹⁹ Since all the faecal sludge that is delivered to the trenching facility is getting treated naturally, F5 is considered as 100%. But as supernatant is being discharged untreated S5e is taken as zero.



Figure 4: Temporary trenching facility (on the left) and Faecal Sludge Treatment Plant (on the right) (Manish/CSE, 2020)

5 Data and assumptions

The availability and accessibility of data

- Two key sources of data are used; Census of India, 2011 and published documents of relevant departments. Ministry of Housing and Urban Affairs, Govt of India, Swachh Bharat Mission, Swachh Survekshan 2020. Most of the data is then updated by Key Informant Interviews (KIIs), Focused Group Discussions (FGDs) and Field observations.
- Data on containment is available in Census but has been updated based on FGDs and KIIs. Data on emptying and transport has been collected by KIIs. However most of the data is qualitative

Assumptions followed for preparing SFD

- 80% of water supplied is wastewater generated

¹⁶ Feasibility study report for STP in Chunar, JE Jalkal Vibhag

¹⁷ KII with Project manager, UP Jal Nigam Mirzapur, February 2020

¹⁸ Feasibility study report for STP in Chunar, JE Jalkal Vibhag

¹⁹ KII with Project manager, UP Jal Nigam Mirzapur, February 2020

- 50% of the contents of tanks and pits is Faecal sludge
- Proportion of OSS emptied is considered as 65% assuming 11 years as the threshold, based on the size of the tank and no. of people dependent on that system. So, households getting their systems emptied in less than 11 years are considered to be using their system with emptying and those who are taking more than 11 years are considered as good as not emptying their systems

6 Context adapted SFD Graphic

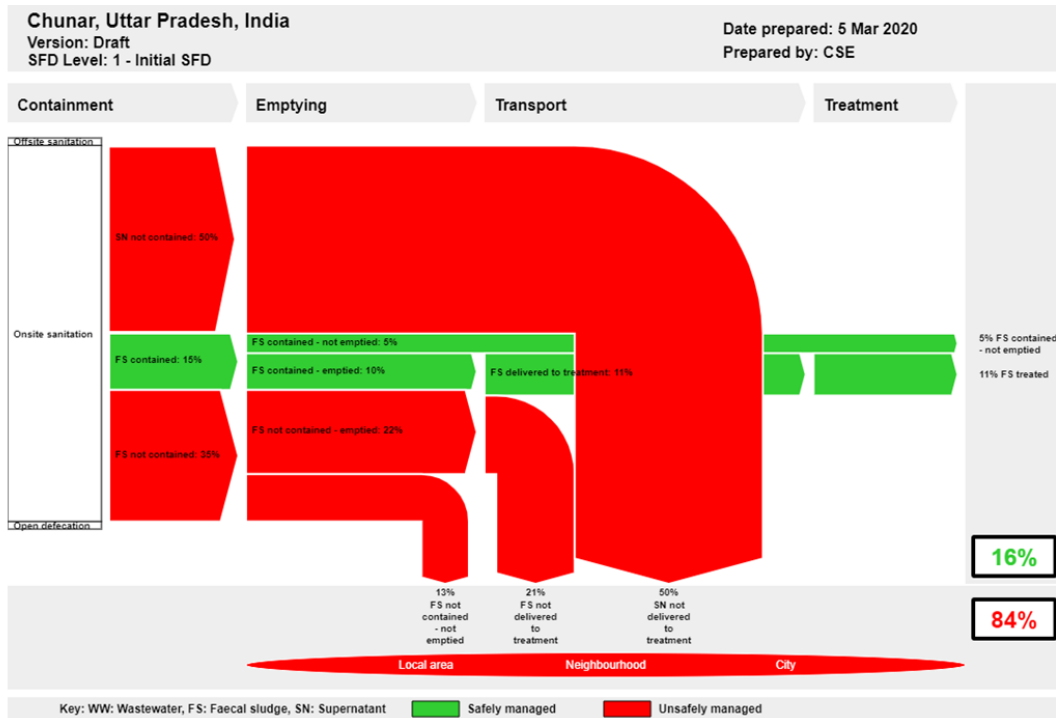


Figure 5: Context adapted SFD Graphic for Chunar

The only difference suggested in the context adapted SFD is at the containment stage for correctly designed septic tanks, though connected to open drains. With an earlier assumption of 50% of the proportion of the content of the septic tank which is solid FS, generated and collected inside the septic tanks. 50% of the content is supernatant which attributes to be 15% of the population, flows through open drains. The solid FS collected in the septic tank is considered to be contained and hence 15% of FS is contained (represented green in colour at containment stage). Followed by this, 10% FS contained is emptied, remaining 5% is FS that remains in the tank and is contained and never gets emptied. The supernatant generated from the septic tank connected to open drain is not contained and hence considered to be unsafely managed (represented red in colour). Overall, excreta of 84% population is not managed safely according to the context adapted SFD.

7 List of data sources

Reports and literature

- District Census Handbook 2011 for Chunar (Houses and household amenities and assets table HH-08: percentage of households by availability of the type of Latrine Facility <http://censusindia.gov.in/DigitalLibrary/MFTableSeries.aspx>)

- District Census Handbook 2011 (Population Census Abstract Data Table (India & State/UTs-Town/Village/WardLevel) http://censusindia.gov.in/2011census/population_enumeration.html
- CGWB. 2014. Groundwater Year Book. Uttar Pradesh: Central Ground Water Board. Ministry of Water Resources, River Development and Ganga Rejuvenation
- Swachhta Sarvekshan 2020, Ministry of Housing and Urban Development
- Detailed Project Report of Faecal Sludge Treatment Plant in Chunar, 2019
- Strategy cum operative guidelines on faecal sludge and septage management, 2020
- Shit Flow Diagram report of Chunar 2018, Centre for Science and Environment

Key informant interviews

- Executive Officer, *Nagar Palika Parishad Chunar (NPPC)*
- Junior Engineer, *JalKal Vibhag*
- Sanitation and Food Inspector 1, NPPC
- Sanitation and Food Inspector 2. NPPC
- Revenue Inspector ,NPPC
- Project Manager, UP Jal Nigam, Mirzapur
- Trenching site operator
- Government emptier

Focus group discussions

- Officials of the Health Department, PHC Chunar
- Masons
- Residents
- Mechanical and manual emptiers
- Sanitary workers, NPPC

Chunar, India, 2020

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