Draft SFD Lite Report

Haldia

India

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

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1 The SFD Graphic

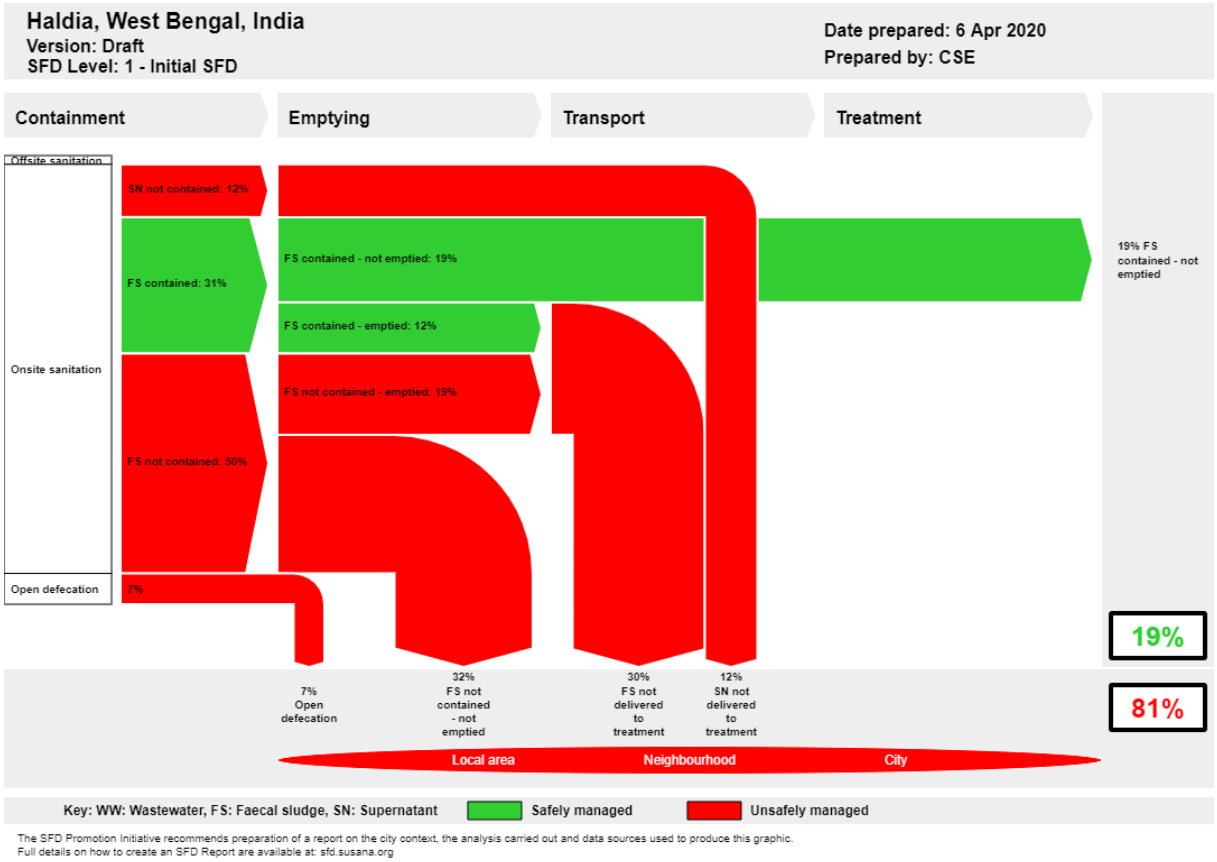

Figure 1: SFD Graphic for Haldia City

2 SFD Lite information

Produced by:

- Centre for Science and Environment, New Delhi
- This report was compiled as part of the SFD Promotion Initiative project funded by Deutsche Gesellschaftfür Internationale Zusammenarbeit (GIZ). We would like to thank Mr. Rabindra Nath, Executive Officer (EO); Tarun Adhikari, Head Clerk; Mr. Sandeep, Sanitation and Food inspector (SFI); Devjyoti Amiti, General Office Clerk; for providing all the required secondary data and cooperating for KII & FGDs.

Collaborating partners:

- Haldia Municipality, Purab Medinipur, West Bengal

Date of production: 10/04/2020

3 General city information

Haldia is a city and municipality in Purba Medinipur district in the Indian State of West Bengal. The Haldia Township is bordered by Haldi River an off shoot of the Ganges River. Haldia is located at 22.03˚N 88.06˚E. The temperature ranges between 24˚C to 39˚C, during summer and 7˚C to 22˚C in winter. The city gets an average rainfall of 1440mm annually and monsoon months are between May to September. Depth of ground water in pre and post monsoon ranges between 3.05 to 16.34 meters below ground level (mbgl) and 2.71 – 11.63mbgl respectively (CGWB)[1]. Haldia city's population for the year 2020 is estimated to be 262148 (Table No.1)[2] and total no. of households (HH) is 55776[3]. Administrative boundary of the city is spread across 109 sq.km, divided into 29 wards (KII-1, 2020).

Table 1: Population Growth Rate Haldia City

Census Year	Population	Growth Rate (%)	Source
2001	1,70,695	-	Census 2001
2011	2,00,827	18	Census 2011
2020	2,62,148	31	HM, 2020; CSE, 2020

4 Service outcomes

Table 2: SFD Matrix for Haldia

Haldia, West Bengal, India, 6 Apr 2020. SFD Level: 1 - Initial SFD
Population: 262679
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
T1A2C5 Septic tank connected to soak pit	22.0	75.0	0.0	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	24.0	75.0	0.0	0.0	0.0	0.0
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	9.0	75.0	0.0	0.0		
T1B11 C7 TO C9 Open defecation	7.0					
T2A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	34.0	50.0	0.0	0.0		
T2A6C10 Unlined pit, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	4.0	50.0	0.0	0.0		

[1] CGWB: http://cgwb.gov.in/District_Profile/WestBangal/Purba%20Medinipur.pdf

[2] Population Estimation and projection, Techniques of Demographic Analysis by K.B Pathak and F.Ram; https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/105105178/lec8.pdf , https://www.semanticscholar.org/paper/Analysis-of-changing-household-and-population-of-of-Mukhopadhyay/d98a17970dc4488a0536c654aa65a4b40dc637a6

[3] KII with Sanitary and Food Inspector (SFI), March, 2020.

Overview on technologies and methods used for different sanitation systems through the sanitation service chain is as follows:

4.1 Offsite Systems

According to the Census, 6% of the city is dependent on sewer system but as per KII, FGD and field survey the city's sewer lines were observed to be defunctional. Hence, offsite is considered to be zero.

Figure 2: Natural Pond in front of house, Source: Akansha/CSE, 2020

These disfunctional drainage systems are connected to the open drains, which finally converges into major natural drains (nullah). There are many Wards without drainage system, their WW collects in various natural ponds, across the city (figure-2) (FGD-4, 2020 & KII-2, 2020).

4.2 On-site Sanitation Systems

Containment: Based on sample household survey, KIIs and FGDs with relevant stakeholders it is estimated that 93% population is dependent on the On-site Sanitation Systems (OSS) (field observation, FGD-2, 2020). Out of this, 24% population is dependent on septic tanks connected to open drain (T1A2C6), 22% population is dependent on septic tank connected to soak pit (T1A2C5), 9% population is dependent on lined tank with impermeable wall and open bottom (T1A4C10), 34% population is dependent on lined pit with semi permeable wall and open bottom (T2A5C10) and 4% population is dependent on unlined pit with no outlet where there is significant risk of ground water (T2A6C10). (FGD-1, 2020)

Figure 3: Septic tank connected to open drain, Source: Manish/CSE, 2020

Figure 4: Twin - Pit system, Source: Manish/CSE, 2020

Due to insufficient data, it was difficult to assess the volume of effluent and solid FS generated by each of these containment systems, thus it is assumed 50% in SFD matrix to reduce maximum error. In this case, the 24% population dependent on systems T1A2C6 constitutes to 12% 'SN not contained 'and

12% population constitutes to 'FS not contained'. The system T2A5C10 and T2A6C10 shows that 38% FS Contained therefore total of 50% is 'FS Not Contained. The system T1A2C5 and T1A4C10 shows that 31% population constitutes to 'FS Contained'.

Community Toilets/Public Toilets: Haldia Municipality constructed 2813 IHHL, 3 Community toilets and 2 public toilets under Swachh Bharath Mission. HM is certified as ODF however it was noticed that in the year 2011 the percentage of open defecation was 13.56% which constitutes to 5766 HH, leaving 7% population (Table-2) without toilets and resorting to open defecating out of no choice. (KII-4, 2020, Field Observation).

Emptying: Haldia municipality owns two tractor mounted vacuum tankers, with 3000ltrs and 1700ltrs[4] capacity (KII-1, 2020). Their desludging charges ranges between INR 2000 (USD 26.34) and INR 3000 (USD 39.51) per trip and manual emptying charges ranges between INR 1000 and 1500. Mechanical emptying process is usually carried out by 2 people (1 driver + 1 helper). On an average, it takes about 1 – 1.5 hours for completing one trip of 10 – 15 km distance (figure-5)[5] (FGD-2, 2020).

Figure 5: Emptying Process through vacuum tanker, source: Manish/CSE, 2020

The field survey revealed that population dependent on T1A2C6, T1A2C5, T1A4C10, T2A5C10 and T2A6C10 systems, get their containments emptied. As shown in the SFD matrix, 50% 'FS not Contained', is further bifurcated into 9% from septic tank connected to open drains (T1A2C6), 17% from lined pit with semi permeable wall and open bottom no outlet or overflow where there is a significant risk of groundwater (T2A5C10), 2% from unlined pit no outlet or overflow where there is a significant risk of groundwater(T2A6C10), 16.5% from septic tank connected to soak pit (T1A2C5) and 6.75% from lined tank with impermeable wall and open bottom no outlet or overflow (T1A4C10) . Also, in case of 31% 'FS Contained', the percentage is bifurcated into 22% from septic tank connected to soak pit (T1A2C5) and 9% from lined tank with impermeable wall and open bottom no outlet or overflow (T1A4C10).

In general, frequency of emptying the containment system is 3 years. Average number of trips per day is 2[6]. Numbers of manual emptier' are around 40[7].The sanitary workers of the Municipality of Haldia do not use any personal protective equipment (PPE) like gloves, boots and mask during emptying of onsite sanitation system OSS and cleaning of drains.

[4] KII with HM official and field survey, March, 2020.
[5] FGD with Govt. Emptiers and Field Observation, March, 2020.
[6] KII with HM official and field survey, March, 2020.
[7] Field Observation, FGD with local people, March, 2020.

Transportation: Emptiers discharge FS in the open drains or in any nearest low-lying open grounds, in and around the city. Due to narrow, congested roads and high cost of mechanical desludging, manual emptying is also prevalent in low income groups. Based on Key Informant Interviews (KII) in generally LIG dwellers empty their containment system on their own manually. Spade and bucket are used by them for this process without using any safety gears. The manual emptying is usually carried out by 2 - 4 people, depending upon the size of the containment and the degree of density of FS in the containment. Since none of the FS getting emptied is delivered to the treatment facility F4 is considered to be zero.

Figure 6: Transportation of FS by Vacuum Tanker, source: Akansha/CSE, 2020

Treatment/Disposal: Haldia municipality owns two tractor mounted vacuum tankers and FS is disposed of at the designated site, Raira Chowk, Ward No. 18. Depending upon the irrigation requirement of the crops, farmers often use discharged FS. Since there is no proper treatment of emptied FS, F5 is also considered to be Zero. (KII-4, 2020)

Figure 7: Discharge of Faecal Sludge into open ground (Source: Manish/CSE, 2020)

5 Data and assumptions

Census 2011 was considered as the baseline and the data for all the stages of sanitation chain were updated based on the data collected from field through KII, FGDs, observations, secondary data collected from relevant stakeholders. Following assumptions were made for developing the SFD for Haldia.

- 80% of water supplied is wastewater generated
- 50% of the contents of septic tanks and fully lined tank is Faecal sludge
- Proportion of wastewater conveyed to treatment plant in open drain is estimated to be 80% considering leakage and diversions into account
- Proportion of OSS emptied is considered to be 75% for septic tanks and fully lined tanks as observed in survey.
- Proportion of OSS emptied is considered to be 50% for lined pits impermeable walls and open bottom and Lined pits semi permeable wall and open bottom as observed in survey.

6 Context adapted SFD Graphic

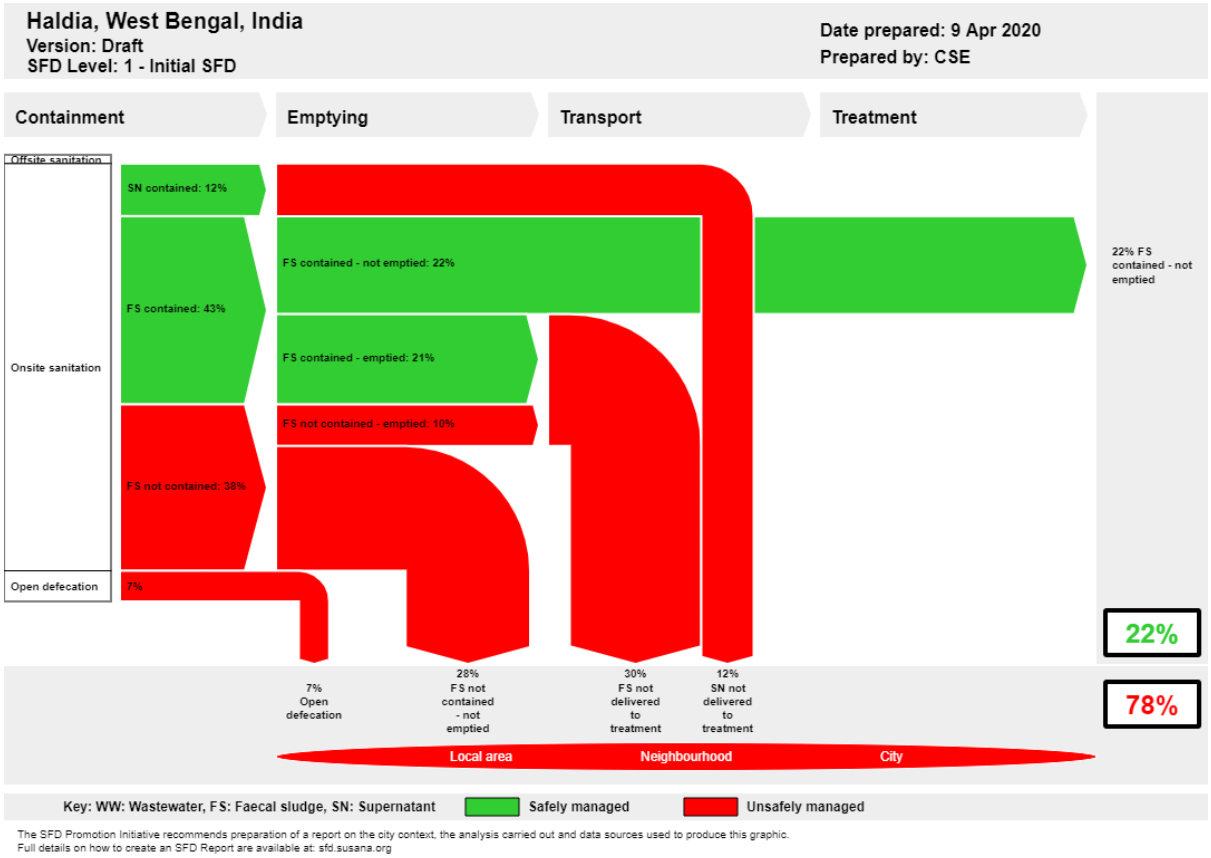

Figure 8: Context adapted SFD Graphic for Haldia City

The only difference suggested in the context adapted SFD is at 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 12% of the population flows through open drains. The solid FS collected in the septic tank are considered to be contained and hence 12% of FS is contained (represented green in colour at containment stage). Followed by this, 9% FS contained is emptied, remaining 3% is FS remains in the tank which is contained and never emptied. The supernatant generated from the septic tank connected to open drain are not contained and hence considered to be unsafely managed (representedred in colour). Overall, excreta of 78% population is not managed safely according to the context adapted SFD.

7 List of data sources

Reports and literature

- District Census Handbook for Haldia 2001tables on houses, household amenities and assets:http://censusindia.gov.in/DigitalLibrary/TablesSeries2001.aspx
- District Census Handbook for Haldia 2011 tables on houses, household amenities and assets [Online] Available at: http://censusindia.gov.in/DigitalLibrary/MFTableSeries.aspx
- Central Ground Water Board, CGWB,2006 [On line] Available at:http://cgwb.gov.in/District_Profile/WestBangal/Purba%20Medinipur.pdf

- Ward Wise Area wise concentration of *Safai Karamachari*/Conservancy Staff in ULB Documents, HM, 2020.
- MoSJE. 2014. The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 [18th September, 2013]. Ministry of Social Justice and Empowerment.
- MoUD. 2017. National Policy on Faecal Sludge and Septage Management. Ministry of Urban Development
- MoUD. 2014. Guidelines for Swachh Bharat Mission.: Ministry of Urban Development. Government of India.
- MoUD. 2013. Septage Management in Urban India. Ministry of Urban Development, Government of India.

Key Informant Interviews (KII)

- KII-1, 2020; Interview with Mr. Dev Jyoti Amiti, Head Clerk, HM
- KII-2, 2020: Interview with Government desludging operators
- KII-3, 2020: Interview with manual emptiers
- KII-4, 2020; Interview with Mr. Sandeep, Sanitation and Food inspector (SFI), HM
- KII-5, 2020; Interview with Mr. Rabindra Nath, Executive Officer (EO), Haldia Municipality (HM)
- KII-6, 2020; Interview with Mr. Tarun Adhikari, Head clerk, HM
- KII-7, 2020; Interview with Mr. Ravindra Nath Maiti, Water Incharge, HM

Focus Group Discussions (FGD)

- FGD-1, 2020; Focus Group Discussion with masons
- FGD-2, 2020; Focus Group Discussion with Government desludging operators
- FGD-3, 2020; Focus Group Discussion with manual emptiers
- FGD-4,2020, Focus Group Discussion with ward members
- FGD-5,2020, Focus Group Discussion with Residents

Field Observations

- Survey of Public toilet and community toilets
- Visit to Sewage Treatment Plant and its outlet/discharge point
- Visit to approximate 100 households covering Slums, Lower Income Groups (LIG), Middle Income Groups (MIG) and Higher Income Groups (HIG) spread throughout the city.
- Visit to current FS discharge locations.

Haldia, India, 2020

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